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Values, Opinions, and Behavior of Inland Trout Anglers in Michigan

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Abstract.—The Michigan Department of Natural Resources (DNR) conducted the Inland Trout Angler Survey to assess current opinions of Michigan’s inland trout anglers with respect to trout regulations and management priorities, and to characterize behavior, opinions, and practices of a large sample of these anglers. The survey was developed to provide information on these relatively unstudied aspects of Michigan trout anglers for incorporation into the DNR’s first statewide management plan for inland populations of Brook Trout *Salvelinus fontinalis*, Brown Trout *Salmo trutta*, Rainbow Trout *Oncorhynchus mykiss*, Lake Trout *Salvelinus namaycush*, and splake *Salvelinus fontinalis* x *S. namaycush*. The survey was designed to assess the values and opinions of anglers as a whole and to compare members of trout fishing organizations (i.e., Trout Unlimited, International Federation of Fly Fishers, and Anglers of the Au Sable) with non-members. Michigan trout anglers tend to have many years of trout fishing experience and use diverse resources to plan fishing trips. Most Michigan trout anglers fished for trout in streams. When deciding which stream to fish, aesthetic beauty was the most important selection factor, followed by the presence of quality-sized trout and trophy trout. More Michigan trout anglers used artificial flies and/or spinners/artificial lures than live bait when fishing for inland trout in streams. In contrast to streams, most Michigan trout anglers did not fish for trout in inland lakes. Those that fished inland lakes tended to target Rainbow Trout or Brown Trout. In contrast to stream anglers, lake anglers believed the chance to catch Rainbow Trout was more important than the chance to catch other species and equal in importance to aesthetic beauty. Results from harvest-related questions suggested lake anglers were more harvest-oriented than stream anglers. Overall, stream and lake anglers were generally satisfied with the DNR Fisheries Division’s management of trout streams and inland lakes.

Introduction

Fisheries management by state agencies is as much about understanding and meeting the needs of anglers as it is about managing fish populations and their habitats. To incorporate the human dimensions of fisheries into management programs, fisheries professionals must evaluate the attitudes, behaviors, and demographics of their stakeholders, particularly anglers. Various approaches have been developed to assess stakeholder attributes. Traditionally, studies investigating the human dimensions of fisheries have employed mail questionnaires, which allow the collection of detailed information on a large number of anglers (Brown 1977; Michaletz and Dillard 1999; Pope 2001; Fisher and Burroughs 2003). Telephone

surveys (Arlinghaus and Mehner 2005), personal interviews (Dickinson et al. 2015), combined mail-telephone surveys (Bray et al. 1996), and combined mail-interview surveys (Gigliotti and Peyton 1993) have also been used. Although agencies throughout the United States (e.g., Connecticut, Kentucky, Minnesota, New Jersey, Pennsylvania, Wisconsin) evaluate the attitudes, behaviors, and demographics of trout anglers using mail and telephone surveys (Responsive Management 2008; Schroeder 2013; NJDEP 2014; Petchenik 2014; Dreves 2015; Hagstrom and Machowski 2015), few surveys have been conducted using web-based approaches.

More recently, researchers have used web-based surveys to collect information on the human dimensions of fisheries. Schramm and Hunt (2007) used online surveys to assess the effects of tournament fishing on inland fisheries management. In addition, Eder and Neely (2013) administered online surveys via SurveyMonkey® to evaluate the use of geographic information systems by fisheries management agencies. Even though web-based surveys are being used more frequently in fisheries, published studies demonstrating their use in gauging angler populations are scarce (NMDGF 2015).

In Michigan, Knoche (2014) used a mixed-mode Internet and mail survey to investigate how the heterogeneous preferences of trout anglers for fishing regulations affect whether and to what extent they benefit from regulation-induced, catch-related improvements. Using a stated preference, discrete choice approach, Knoche (2014) discovered that trout anglers preferred to visit stream sites where trout harvest is allowed with minimal gear restrictions. Anglers preferred to visit sites that had high catch rates and required minimal travel distance (Knoche 2014). These results support Melstrom et al. (2015), wherein anglers were more likely to visit streams in watersheds with high Brook Trout *Salvelinus fontinalis* abundance, and Fenske (1983), who documented that a stream's nearness to public facilities and ease of access were the two most important stream selection criteria. Moreover, Michigan anglers who approve of harvest restrictions (i.e., mandatory catch and release, artificial-flies-only) tend to do so for the purpose of improving catch-related outcomes such as harvest rate (Knoche 2014). Gigliotti and Peyton (1993) found that such anglers were more likely to be members of trout fishing organizations (e.g., Trout Unlimited) than non-members. Their study highlighted important characteristics of angling group members, including more angling experience than non-members and greater interest in pursuing Brook Trout, Brown Trout *Salmo trutta*, and Rainbow Trout *Oncorhynchus mykiss*. Such differences between members and non-members establish a segmentation base for fisheries management issues involving harvest regulations (Gigliotti and Peyton 1993) and enhance managers' understanding of distinct fisheries stakeholders.

The Inland Trout Angler Survey (ITAS) was conducted by the Michigan Department of Natural Resources (DNR) to aid in characterizing the values, opinions, and behavior of inland trout anglers in Michigan. The ITAS was developed to provide information on these relatively unstudied aspects of Michigan trout anglers for incorporation into the DNR's first statewide management plan (hereafter referred to as Inland Trout Management Plan) for landlocked populations of several species of trout in inland lakes and streams. The objectives of the ITAS were to (1) characterize the values, opinions, and behavior of trout anglers in Michigan's inland streams and lakes; (2) provide a summary of responses from the email-based sample of inland trout anglers in Michigan; and (3) compare responses between individuals who did or did not identify themselves as members of trout angling or trout (coldwater) conservation organizations. Ultimately, these data will result in more socially-informed management of inland trout fisheries in Michigan.

Methods

The timeline and budget for the Inland Trout Management Plan necessitated the use of an efficient approach to conduct the ITAS. The survey was conducted via the web-based SurveyMonkey software, which was licensed to the DNR. This enabled us to conduct the survey quickly at no additional cost beyond staff time. Survey questions were developed in fall 2014 and winter 2015 in consultation with

DNR fishery managers and communications specialists, as well as survey specialists from Michigan State University.

The ITAS represented a combination of questions designed to assess current opinions of Michigan’s inland trout anglers with respect to trout regulations and management priorities, and to characterize behavior, opinions, and practices of a large sample of these anglers. The survey evaluated angler fishing methods, species and waterbody preferences, regulation preferences, and opinions regarding Michigan DNR Fisheries Division’s trout management. The ITAS also included commonly-used angler demographic questions. The Wisconsin Department of Natural Resources (WDNR) recently completed a similar survey of its trout anglers (Petchenik 2014). The WDNR survey followed standard mail survey techniques (e.g., hard-copy mailings, follow-up mailings), whereas the ITAS relied on voluntary responses from individuals electronically contacted via a Michigan DNR email list. We incorporated many WDNR questions in the ITAS to enable comparisons between Michigan and Wisconsin trout anglers, and between WDNR’s mail and Michigan DNR’s online survey approaches (Petchenik 2014).

Survey Questions

The ITAS included 57 questions to assess the values, attitudes, behaviors, and demographics of Michigan inland trout anglers (Table 1). A copy of the survey is included in the Appendix. Although these concepts are related, we considered values (i.e., what anglers deem important) as being distinct from attitudes (i.e., anglers’ perspectives and feelings) and preferences (i.e., what anglers willingly choose). Michigan trout anglers were only asked certain sets of questions based upon their experience. Michigan trout anglers who indicated they had less than one year of fishing experience were only asked demographic questions as they had little fishing history. Questions relating to stream fishing were only asked of those who indicated that they fished for inland trout in streams. The same was true for questions pertaining to trout fishing in inland lakes. All stream and lake anglers were asked the same demographic questions.

Table 1.–Types of questions and measures used for the 2015 Michigan Inland Trout Angler Survey.

Question type	Question #	Topics	Measures
Overall angling perspectives	1–6	Angling experience and trips per year	Effort, participation, time, fishing location, resources
Stream fishing	7–12	Planning fishing trips and species targeted	Effort, participation, time, fishing location, resources, species
	13–14	Stream fishing site selection	Important factors
	15–18	Harvest behavior, quality/trophy size definitions, tackle use	% catch-release, length, frequency of tackle use
	19–23	Perspectives on fishing regulations	Familiarity, favorite lake/stream, fishing frequency, resources
	24	Trout management satisfaction	Satisfaction with aspects of trout management
Inland lake fishing	25–41	Questions nearly identical to those used for streams	
Demographics	42–56	Age, domicile, employment, education, income, race, sex	Years, zip code, employment status, degrees obtained, annual household income, racial category, male/female

The same survey questions were posted at two web addresses for collecting responses from two sets of Michigan trout anglers. On March 9, 2015, a web link to the “email” version of the survey was sent to approximately 83,000 individuals, both residents and nonresidents, who bought a non-restricted fishing license in 2013 an annual fishing license in 2014, and had provided their email address through the DNR’s eLicense or retail sales system. Prior to 2014, trout and salmon anglers could be distinguished from non-salmonid anglers, because they were required to purchase an all-species license (as opposed to a restricted license). By only including anglers who bought an all species license in 2013 and a fishing license in 2014, the survey sample was restricted to active anglers who likely fished for trout and salmon at some time during the 2014 fishing season. This procedure for selecting Michigan trout anglers was analogous to those employed in trout angler surveys in Minnesota (Schroeder 2013), Pennsylvania (Responsive Management 2008), and Wisconsin (Petchenik 2014), wherein participants were subsampled from a pool of potential Michigan trout anglers. A link to the “email” version of the ITAS was sent to every email address that met criteria for survey participation.

On March 9, DNR Fisheries Division announced and provided a different web link for responding to a “public” version of the identical survey (hereafter “web survey”). The announcement was made via a press release that went out to anyone subscribed to DNR’s press releases via GovDelivery (i.e., email provider). Messages were also placed on DNR Fisheries Division’s Internet home page and Facebook page that included the survey’s web link. A reminder to take the email or web versions of the survey was sent through these distribution channels on March 18, and the survey closed on April 2, 2015. Different response links for the email and public versions of the survey resulted in two distinct sets of responses, one entirely or almost entirely from trout anglers (email survey), and another from a less-defined collection of participants (web survey).

Data Analysis

In this report, only data from the email survey were analyzed because the responses were known to reflect those of Michigan trout anglers, which are of particular interest to state fishery managers. This was not always the case for the web survey, which was not deemed fully representative of Michigan trout anglers. Responses to the email version of the survey were exported from SurveyMonkey as Excel spreadsheets and analyzed using program R version 3.1.3 (R Development Core Team 2015). For all survey questions assessed in this report, “plurality” is used to indicate a response category that received the most Michigan trout anglers in cases where that category did not receive a majority (i.e., >50% of Michigan trout anglers).

We were interested in providing an overall picture of values, attitudes, and behaviors of trout anglers in Michigan, as well as understanding differences between key segments of the state’s trout angling population. Therefore, survey response data were partitioned into “members” and “non-members” of trout angling groups (i.e., Michigan Trout Unlimited (TU), Anglers of the Au Sable, Federation of Fly Fishers) based upon responses to Question 55 (see Appendix) and used to assess differences between these segments of anglers. To characterize regional differences among respondents and compare ITAS responses to similar questions asked by Fenske (1983), we grouped some responses by region of the state (based on angler zip codes). For these questions, the statistical significance of differences in survey responses among anglers from the Upper Peninsula (UP), Northern Lower Peninsula (NLP), Southern Lower Peninsula (SLP), and out-of-state was evaluated using a chi-square test, because survey data were non-normal.

Because members were overrepresented among Michigan trout anglers, responses were weighted to produce estimates to represent all trout anglers more accurately. This required adjusting the proportional representation of members and non-members in the ITAS, so it aligned with the proportional representation of members and non-members in Michigan’s inland trout angler population. To estimate the number of inland trout anglers in Michigan in 2013, the total number of all species, 24-hour, and

72-hour licenses sold (556,492) was multiplied by 33%, the percentage of trout and salmon fishing trips that anglers took specifically to target inland trout in lakes and streams (Simoes 2009). This resulted in an estimate of 183,642 inland trout anglers in Michigan in 2013. Using a conservative assumption that the members of the three trout angling groups were not simultaneously members of more than one of these clubs and all fished for inland trout, there were approximately 9,200 members that were inland trout anglers (Anglers of the Au Sable 2016; Michigan TU 2016; J. Schramm, International Federation of Fly Fishers, unpublished data). These 9,200 members represented 5% of all inland trout anglers in Michigan (Table 2). Thus, our adjustment involved weighting member responses by a factor of 0.05 and non-member responses by a factor of 0.95. Overall angler response percentages reported in the Appendix tables of this report were weighted according to this procedure, and percentages specific to members and non-members were calculated.

Table 2.–Summary of responses of members and non-members to demographics questions.

Variable	Angler subpopulation	
	Members	Non-members
Number of respondents	1,026	3,135
% of total inland trout angling population	5	95
Median age of first fishing experience (years)	5	5
Median age category	56–60	56–60
% male	97	98
% employed	67	68
% retired	30	28
% with college education	75	59
Median income (economic category)	\$100,000–\$149,000	\$75,000–\$99,000
% with only fishing license in household	53	49
% who typically fish with family	29	43
% who typically fish with friends	51	39

Because members were disproportionately represented, presentation of results differed when there was a significant difference in responses between members and non-members. When a chi-square test indicated that a significant difference existed between member and non-member responses for a question, the difference was shown and results were computed using the weighting process described above. Weighting enabled characterization of typical “Michigan trout anglers” (i.e., Michigan residents or nonresidents who fish for trout in Michigan) independent of angling group membership status. Because Michigan fisheries managers were primarily interested in using ITAS results to understand typical, “overall” trout anglers, it was unnecessary to weight survey responses when there were no significant differences between members and non-members. In the absence of significant differences, response data were pooled and presented for respondents as a whole. Detailed comparison of members and non-members is provided in the Appendix. Findings from the web survey are also discussed in the Appendix.

Results and Discussion

The number of anglers who responded to the email survey was 4,161, for an overall response rate of 5.0% (i.e., 4,161/83,000). Although 5% was a low response rate compared to those from other trout angler surveys (e.g., Wisconsin: 56%, Petchenik 2014; Minnesota: 59%, Schroeder 2013), the number of responses to the email survey was more than seven times greater than the Wisconsin survey and nearly three times greater than the Minnesota survey. Nearly 2,000 respondents (n = 1,912) participated in the web survey, including 761 members and 1,151 non-members. Detailed discussion of findings for each survey question occurs in the Appendix.

Demographic Characteristics of Michigan Trout Anglers

Most email survey respondents (84%) were relatively young (i.e., less than 10 years old) when they went fishing for the first time (Table 2). They spanned a wide array of ages, with 76% of respondents between the ages of 46 and 70. Most respondents lived with their spouses/significant others (63%) and children older than five years old (18%). Similar to findings from trout angler surveys in Minnesota (Schroeder 2013) and New Jersey (NJDEP 2014), the vast majority of Michigan respondents (97%) were male (Table 2). Most respondents were employed full-time (64%) or retired (29%) and had at least some post-high school or college education (92%). More than one-third of respondents (37%) had a Bachelor's degree, and more than one-quarter of respondents (26%) had a graduate degree (Table 2; Appendix, Question 47).

Regional patterns in angler demographics, fishing experience, and preferences

Nearly two-thirds of email survey respondents (63%) lived in the SLP, whereas 18% lived in the NLP, seven percent lived in the UP, and 12% were nonresidents (Table 3). In contrast, higher percentages of respondents resided in the UP (15%) and NLP (25%) in 1981 (Fenske 1983).

Table 3.—Percentage (%) and number of email survey respondents who lived in different Michigan regions and out-of-state in 2015. The total number of respondents who answered this question was 3,462.

Region	Percentage	Number
Northern Lower Peninsula	18	609
Southern Lower Peninsula	63	2,181
Upper Peninsula	7	240
Out of state	12	432

Regional patterns in the income levels of email survey respondents were also similar for the 1981 and 2015 surveys. Although income results from the ITAS were not directly comparable to those from Fenske (1983) because the latter surveyed anglers about personal income, whereas anglers were asked about household income in the ITAS, respondents from both survey periods displayed the same general income trends. For instance, in both 1981 and 2015, respondents' income tended to increase progressively moving southward from the UP to the NLP and the SLP. The percentage of respondents in the two lowest income brackets of the 1981 survey (21.7%, n = 19) was highest for respondents who lived in the UP

(Fenske 1983). Similarly, the percentage of email survey respondents in the two lowest income brackets of the 2015 survey (21.6%, n = 49) was also highest for respondents who lived in the UP (Table 4). In contrast, respondents who lived in the SLP had the greatest representation in the two highest income brackets of the 1981 survey (20.6%, n = 66) and the 2015 survey (43.9%, n = 900; Table 4).

Table 4.—Percentage (%) of email survey respondents who had different levels of income in 2015 by Michigan region. Significant differences among regions within income categories are denoted by different superscripted letters. Regional total denotes the number of respondents from each region. The total number of respondents who answered this question was 3,262.

Income	Region			
	Upper Peninsula	Northern Lower Peninsula	Southern Lower Peninsula	Out of state
0–24,999	5 ^a	4 ^a	3 ^a	<1 ^b
25,000–49,999	17 ^{ab}	19 ^a	13 ^b	10 ^b
50,000–74,999	32 ^a	29 ^b	20 ^c	14 ^d
75,000–99,999	20	19	20	16
100,000–149,999	18 ^b	18 ^b	25 ^a	27 ^a
≥150,000	8 ^d	11 ^c	19 ^b	31 ^a
Regional total	227	577	2,051	407

Similar to angler income levels, regional patterns in the fishing experience (i.e., average number of years) of respondents were similar for the 1981 and 2015 surveys. In 2015, fishing experience was greatest for UP respondents (34.2 years) and NLP respondents (32.1 years). On average, respondents from the SLP (27.6 years) were more experienced than nonresident respondents (21.5 years); respondents from both of these regions were less experienced than those from the UP and NLP. Similar to 2015, respondents from the 1981 survey had the greatest fishing experience in the UP (25.3 years), followed by the NLP (20.3 years), SLP (16 years), and out-of-state (10.6 years; Fenske 1983). In 1981, respondents from all regions were significantly different from each other with respect to fishing experience.

Email survey respondents also exhibited regional differences in preferred trout species. Whereas a plurality of UP-resident respondents targeted Brook Trout, the majority of NLP, SLP, and nonresident respondents targeted multiple species: either Brown Trout, Brook Trout, and Rainbow Trout or Brown Trout and Brook Trout (Table 5). However, in 1981, Brown Trout were the most popular trout species among respondents in all regions of the state (Fenske 1983). In 2015, Brook Trout were most popular among UP-resident respondents and least popular among SLP-resident respondents. Nearly half of UP-resident respondents (50%, n = 109) targeted Brook Trout, whereas only eight percent (n = 152) of SLP-resident respondents targeted Brook Trout (Table 5). In contrast, Brook Trout were least popular among UP-resident respondents and most popular among SLP-resident respondents in 1981 (Fenske 1983). This trend suggests that proportionally more UP residents targeted Brook Trout in 2015 than 1981, when the proportion of SLP-resident respondents who traveled to the UP to pursue Brook Trout was greater than the proportion of UP-resident respondents who fished for this species. The popularity of Rainbow Trout among 2015 email survey respondents was not significantly different among Michigan regions (Table 5). Less than one percent (0.91%, n = 2) of UP-resident respondents targeted Rainbow Trout, and only 2.37% (n = 45) of SLP-resident respondents targeted Rainbow Trout. This is not surprising because our survey focused on stream resident populations of trout (excluding steelhead), and there are very few populations of stream-resident Rainbow Trout in Michigan. Fenske (1983) did not make this distinction.

Table 5.—Percentage (%) of email survey respondents who targeted different trout species in 2015 by Michigan region. Significant differences among regions within species groups are denoted by different superscripted letters. Regional total denotes the number of respondents from each region. The total number of respondents who answered this question was 3,041.

Species	Region			
	Upper Peninsula	Northern Lower Peninsula	Southern Lower Peninsula	Out of state
Brown Trout	<1 ^a	8 ^c	12 ^b	10 ^{bc}
Brook Trout	50 ^a	15 ^b	8 ^c	11 ^c
Rainbow Trout	<1	<1	2	2
Brown Trout, Brook Trout	16 ^b	32 ^a	19 ^a	26 ^a
Brown Trout, Rainbow Trout	<1 ^d	6 ^c	15 ^a	13 ^b
Brook Trout, Rainbow Trout	12 ^a	2 ^c	3 ^b	3 ^b
Brown Trout, Brook Trout, and Rainbow Trout	20 ^b	37 ^a	41 ^a	34 ^a
Regional total	220	547	1,902	372

In 2015, the proximity of streams to public lands was equally important to email survey respondents from all Michigan regions. However, in 1981, the proximity of streams to public lands was a more important factor for UP-resident respondents than SLP-resident and nonresident respondents (Fenske 1983). Ease of stream access was less important for UP-resident respondents than SLP-resident and nonresident respondents in 2015 (Table 6). In contrast, ease of access was more important for UP-resident respondents than SLP-resident and nonresident respondents in 1981 (Fenske 1983).

Table 6.—Importance of ease of stream access for email survey respondents in 2015. Numbers are percentages (%) of respondents. Significant differences among regions within importance categories are denoted by different superscripted letters. Regional total denotes the number of respondents from each region. The total number of respondents who answered this question was 3,024.

Importance	Region			
	Upper Peninsula	Northern Lower Peninsula	Southern Lower Peninsula	Out of state
Very unimportant	12 ^a	9 ^a	6 ^b	5 ^b
Unimportant	27 ^a	21 ^a	13 ^b	14 ^b
Neutral	29	23	25	25
Important	22 ^b	30 ^{ab}	35 ^a	32 ^{ab}
Very important	11 ^b	16 ^b	21 ^a	22 ^a
Don't know	0	<1	<1	<1
Regional total	213	542	1,900	369

Angling experience and trips per year

The majority of email survey respondents (92%, n = 3,815) had more than one year of fishing experience in pursuit of inland in the state. More than two-thirds of respondents (68%) had 20 or more years of trout fishing experience in Michigan. Some respondents stated they had fished for inland trout in Michigan for 60–69 years (4%) and 70–79 years (<1%; Figure 1).

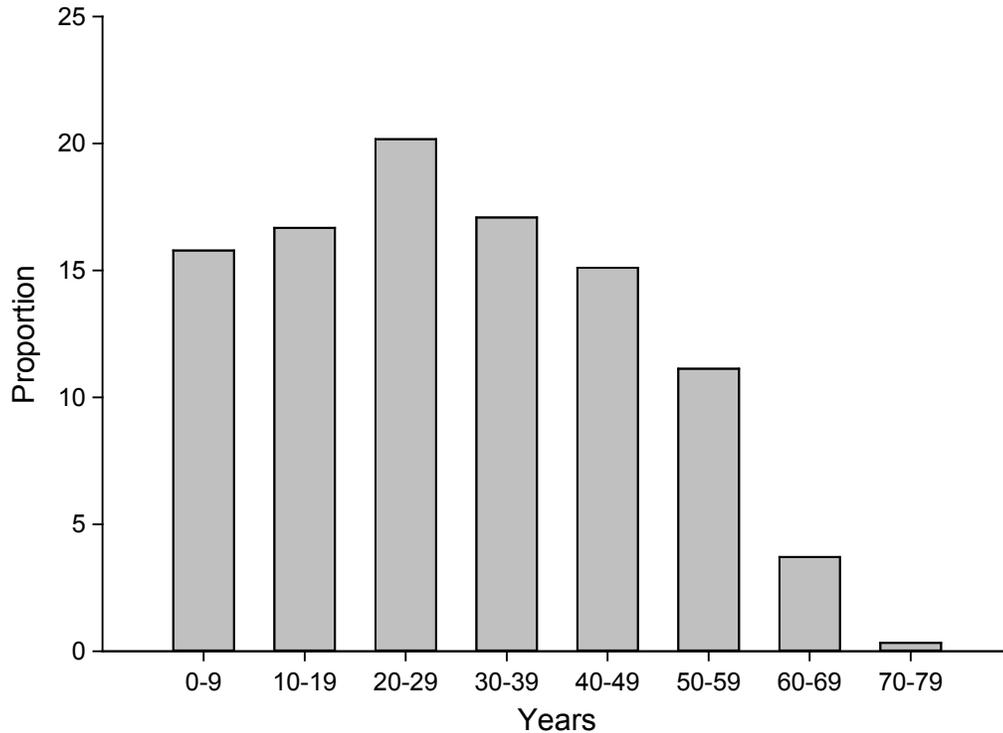


Figure 1.—Years of stream trout fishing experience among email survey respondents. The mean fishing experience was 27.6 ± 16.7 years (1 standard deviation). N = 3,693 respondents.

On average, most email survey respondents fished for inland trout in streams fewer than 20 times in 2014. In addition, 75% of respondents fished for trout in streams fewer than 20 times in 2014 (Figure 2).

More than half of email survey respondents (60%) did not fish for trout in inland lakes. Of the respondents who did fish for trout in inland lakes, most fished fewer than five times in 2014. Three-quarters of respondents (75%) fished lakes for inland trout fewer than 10 times in 2014, whereas four respondents (<1%) reported fishing inland lakes between 90 and 100 times.

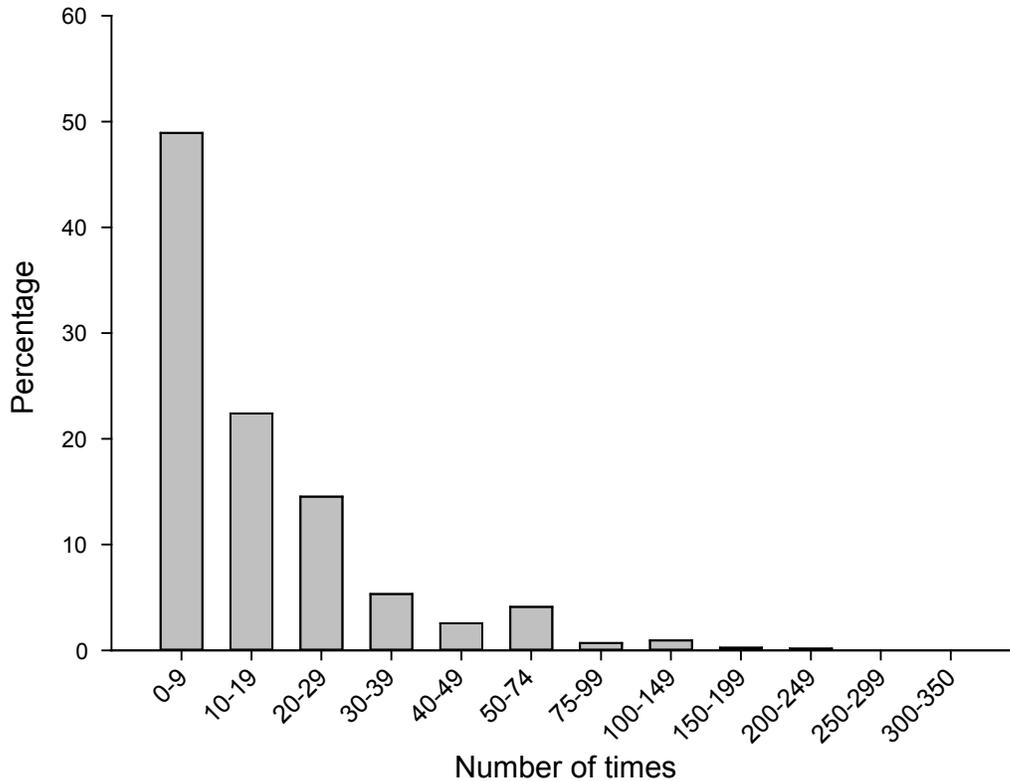


Figure 2.—Number of times email survey respondents fished for inland trout in Michigan streams in 2014. N = 3,621 respondents.

Planning fishing trips

The most popular resources that Michigan trout anglers used to plan fishing trips were the DNR Fishing Guide (59% of anglers), DNR online trout waters maps (42%), bait shop contacts (38%), and map books (34%). In contrast, only four percent of Michigan trout anglers contacted the DNR directly to plan fishing trips. Some Michigan trout anglers used plat maps (22%) and smart phones (12%) to plan trips, but more anglers used traditional paper resources such as books/guides (33%). These results suggest that fisheries managers should continue to produce paper-based angling resources, especially the DNR Fishing Guide, while maintaining high-quality online trout waters maps.

A lower percentage of Michigan trout anglers used the DNR guide compared to Wisconsin trout anglers, but a higher percentage of Michigan trout anglers used online map tools. Results from the Wisconsin trout angler survey indicate that 76% of anglers consulted a Wisconsin DNR trout fishing regulations guide when planning stream trout fishing trips (Petchenik 2014). In addition, nearly one-third (31%) of Wisconsin trout anglers used road atlases, and 20% of anglers used Wisconsin DNR online web maps.

Many Michigan trout anglers brought smart phones (63% of anglers) and the DNR Fishing Guide (47%) with them on trout fishing trips. Although comparatively few Michigan trout anglers used smart phones to plan fishing trips (12%), many anglers (63%) used smart phones during fishing outings. Items that Michigan trout anglers used less commonly during fishing trips included road atlases (37% of anglers), global positioning systems (36%), and cell phones (35%).

Michigan and Wisconsin trout anglers brought many of the same resources with them on trout fishing trips. In Wisconsin, 78% of anglers brought a Wisconsin DNR trout fishing regulations guide on fishing trips, 52% brought a mobile phone, 31% brought a road atlas, 19% brought a smart phone, 15% brought a county plat map, and 14% brought a global positioning system (GPS; Petchenik 2014). Thus, a higher percentage of Michigan trout anglers than Wisconsin trout anglers brought smart phones, road atlases, GPS units, and plat maps with them on fishing trips. However, a lower percentage of Michigan trout anglers brought a cell phone or their state agency's fishing guide with them.

More Michigan trout anglers fished for inland trout in streams in the NLP than in the SLP and UP combined. Sixty-seven percent Michigan trout anglers fished for inland trout in streams in the NLP. Relatively few Michigan trout anglers fished streams in the UP (19%) or the SLP (14%). Most Michigan trout anglers concentrated their fishing effort in relatively few streams in 2014. Michigan trout anglers fished for inland trout in an average of four different streams (range 1–100). A majority of Michigan trout anglers (84%) fished in five or fewer streams. Ten Michigan counties received most of the fishing effort from Michigan trout anglers. A plurality of Michigan trout anglers (13%) cited Crawford County, home of the renowned Au Sable and Manistee rivers, as the area where they did most of their stream fishing for inland trout. Many Michigan trout anglers did most of their stream trout fishing in Lake (13%) and Manistee (12%) counties.

More Michigan trout anglers (51%) fished for trout in inland lakes in the NLP than in the other two regions combined. Relatively few Michigan trout anglers fished inland lakes in the UP (29%) or the SLP (20%). Most Michigan trout anglers concentrated their fishing effort in relatively few inland lakes in 2014. Michigan trout anglers fished for inland trout in an average of two different inland lakes (range 1–20) in 2014, with 72% fishing in one or two lakes. Twelve Michigan counties received most of the trout fishing effort from Michigan trout anglers who fish lakes. A plurality of Michigan trout anglers (12%) cited Roscommon County (which encompasses Higgins Lake, a large, deep trout lake) as the area where they did most of their lake fishing for inland trout. Other Michigan trout anglers cited Grand Traverse (10%), Crawford (9%), and Iron (9%) counties as those where they did most of their trout fishing in inland lakes.

Species targeted

In streams, more Michigan trout anglers targeted Brook Trout (77% of Michigan trout anglers) and/or Brown Trout (75%) than Rainbow Trout (55%). This is not surprising given that Brook Trout and Brown Trout are widely distributed in Michigan, whereas there are few populations of stream-resident Rainbow Trout. Rainbow Trout were the most frequently targeted trout species in Michigan inland lakes. A plurality of Michigan trout anglers (35%) targeted Rainbow Trout in Michigan inland lakes, followed by Brown Trout (20%), Lake Trout (17%), Brook Trout (17%), and splake *Salvelinus fontinalis* x *S. namaycush* (12%).

Stream fishing site selection

Michigan trout anglers were asked how 16 stream attributes would affect their decision to fish a particular stream. We highlight six notable conclusions from this question. First, Michigan trout anglers believed that the aesthetic beauty of streams was more important than the chance to catch either Brook Trout or Brown Trout (Table 7). More than three-quarters of anglers (76%) believed aesthetic beauty was an important or very important stream selection factor. Slightly lower percentages of anglers believed the chance to catch Brook Trout (73%) or Brown Trout (72%) was important or very important.

Table 7.–Percentage (%) of email survey respondents who rated various stream attributes as very important (score = 1), important (score = 2), neutral (score = 3), unimportant (score = 4), or very unimportant (score = 5). The table also includes the weighted mean score (WMS; the overall score as weighted by the percentage in each category from 1 [most important] to 5 [least important]) and the number of email survey respondents for each attribute (N). The response option of “I don’t know” did not exceed 2% for any item and was omitted from the table.

Stream attribute	Very					WMS	N
	Important (1)	Important (2)	Neutral (3)	Unimportant (4)	Very unimportant (5)		
Aesthetic beauty	40	36	14	5	4	1.9	3,508
Chance to catch Brook Trout	44	29	18	4	5	2.0	3,509
Chance to catch Brown Trout	38	34	19	4	5	2.0	3,514
Presence of quality-sized trout	34	44	14	4	4	2.0	3,503
Public lands adjacent to stream	32	37	20	6	5	2.1	3,483
Chance to catch Rainbow Trout	29	32	27	6	5	2.2	3,474
Presence of wild trout	30	34	24	6	4	2.2	3,513
Regulations that allow use of preferred methods/gear	33	34	17	7	7	2.2	3,506
Chance to catch large numbers	17	38	30	11	3	2.4	3,486
Regulations that allow harvest	24	29	22	11	12	2.5	3,501
Ease of stream access	20	31	25	16	7	2.6	3,500
Stream 10–30’ wide	12	32	42	10	4	2.6	3,504
Presence of trophy trout	15	26	37	16	6	2.7	3,468
Stream < 10’ wide	10	21	48	15	5	2.8	3,465
Presence of stocked trout	7	20	48	17	7	3.0	3,479
Stream > 30’ wide	6	17	51	19	6	3.0	3,468

A second important finding was that Michigan trout anglers believed the chance to catch Rainbow Trout was less important than the chance to catch either Brook Trout or Brown Trout (Table 7). The fact that Brown Trout were an important or very important stream selection factor for many anglers (Figure 3) likely reflects their relatively high abundance compared to other trout species in Michigan streams. Differences in the relative importance of Brown Trout between members and non-members resulted from underlying differences in harvest practices between these segments of anglers (Appendix, Question 15). Michigan trout anglers were similar to Wisconsin anglers in considering the presence of Brown Trout an important stream selection factor. Results from the Wisconsin trout angler survey indicated that 61% of anglers preferred to fish in streams with Brown Trout, and 4% of anglers would only fish in such systems (Petchenik 2014). Although the ITAS did not assess Brown Trout presence using “prefer to fish” and “will only fish” as stream importance categories, results suggest that Michigan trout anglers, like Wisconsin anglers, considered the chance to catch Brown Trout an important stream selection factor. In addition, results from the Wisconsin trout angler survey indicated that the presence of Rainbow Trout was not as important to anglers as the presence of either Brook Trout or Brown Trout (Petchenik 2014). Less than one-half (46%) of Wisconsin anglers said they preferred to fish a stream if there was a chance to catch a Rainbow Trout, and an equal percentage (46%) said the presence of Rainbow Trout had no influence on their decision to fish a stream.

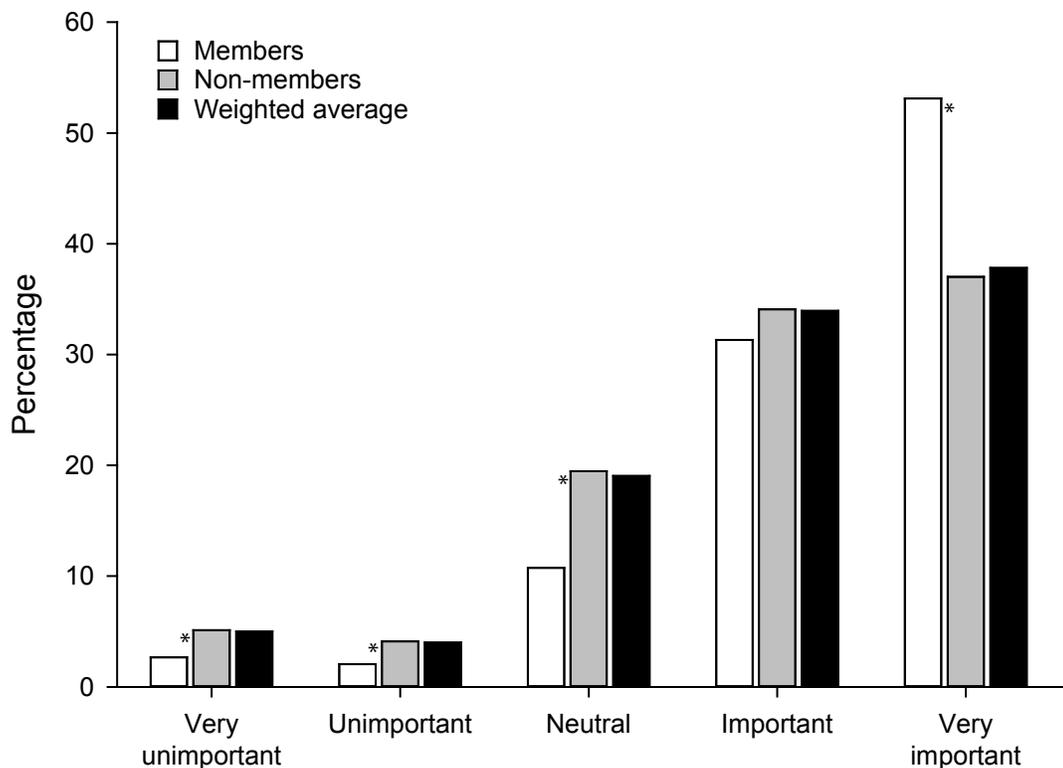


Figure 3.—Importance of Brown Trout presence as a stream fishing selection factor for Michigan trout anglers. Asterisks denote significantly different proportions between members and non-members within categories of importance ($P < 0.05$). $N = 3,514$ anglers (977 members, 2,537 non-members).

A third notable finding from the ITAS was that Michigan trout anglers believed the presence of trophy trout in streams and the chance to catch large numbers of trout in streams were less important than the presence of quality-sized trout in streams (Table 7), which was similar to Kentucky and Pennsylvania trout anglers, who believed trophy trout fishing opportunities were relatively unimportant (Responsive Management 2008, Dreves 2015). Overall, Michigan trout anglers placed less importance on the presence of trophy trout as a stream selection factor than Wisconsin trout anglers. Only 26% of Michigan trout anglers considered trophy trout important, whereas 55% of Wisconsin anglers preferred to fish streams with trophy trout, and 4% of Wisconsin anglers would only fish such systems (Petchenik 2014).

In addition, the presence of wild trout was more important to Michigan trout anglers than the presence of stocked trout (Table 7), with a higher proportion of angling group members than non-members believing that wild trout were important (Figure 4). Approximately two-thirds of Michigan trout anglers believed the presence of wild trout was very important (30%) or important (34%), compared to 7% of anglers who considered the presence of stocked trout very important and 20% who considered the presence of stocked trout important. Michigan trout anglers were similar to Wisconsin anglers in considering the presence of wild trout an important stream selection factor. Results from the Wisconsin trout angler survey indicated that 61% of anglers preferred to fish in streams with wild trout, 7% of anglers would only fish these systems, and 30% of anglers were indifferent about the presence of wild trout (Petchenik 2014). Moreover, 65% of Wisconsin anglers were indifferent about the presence of stocked trout (Petchenik 2014).

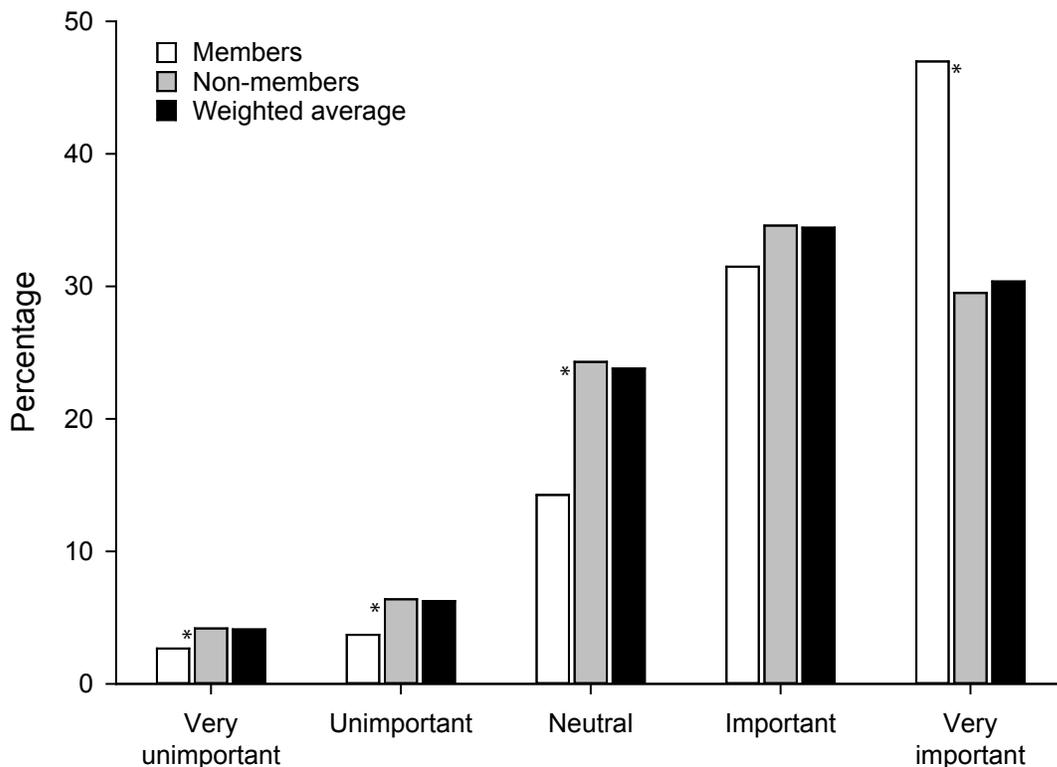


Figure 4.—Importance of wild trout presence as a stream fishing selection factor for Michigan trout anglers. Asterisks denote significantly different proportions between members and non-members within categories of importance ($P < 0.05$). $N = 3,513$ anglers (975 members, 2,538 non-members).

Slightly more than half (53%) of Michigan trout anglers rated regulations that allow harvest as an important or very important stream selection factor (Table 7). In addition, two-thirds (67%) of Michigan trout anglers considered regulations that allow use of preferred methods and gear as important or very important. One-third of Michigan trout anglers (34%) believed it was important that streams have regulations that allow use of preferred methods/gear (Table 7), a percentage that is comparable to the 38% of Wisconsin anglers who believed the opportunity to fish with preferred methods and gear was an important stream selection factor (Petchenik 2014).

Inland lake selection factors

Email survey respondents were also asked about the factors that influence their decision to fish inland lakes for trout. Overall, the presence of quality-sized trout, regulations that allow use of preferred methods/gear, and regulations that allow harvest were the most important inland lake selection factors (Table 8). In contrast to streams, respondents believed the chance to catch Rainbow Trout was more important than the chance to catch either Brook or Brown Trout. Given their greater interest in catching and harvesting trout, respondents who fished lakes showed no preference for wild trout over stocked trout, and they did not prefer a specific size category of lakes (Table 8).

A majority of email survey respondents believed the chance to catch large numbers of trout in lakes was very important (18%) or important (35%). Nearly two-thirds of respondents (65%) believed the presence of regulations that allowed harvest was an important inland lake selection factor (Table 8). Higher proportions of non-members than members believed these regulations were important or very important (Figure 5). Many respondents also believed that aesthetic beauty was a very important (28%) or important (38%) lake selection factor.

Harvest behavior

Michigan trout anglers did not have a strong preference to harvest or not to harvest legal-sized Brook Trout when they caught them in streams. A higher percentage of members (52%) than non-members (19%) never kept legal-sized Brook Trout, whereas a higher percentage of non-members (26%) often or always kept Brook Trout (Figure 6). Moreover, 46% of Michigan trout anglers rarely or never kept legal-sized Brook Trout compared to 30% of Wisconsin anglers (Petchenik 2014). Conversely, a lower percentage of Michigan trout anglers (26%) often or always kept Brook Trout compared to 42% of Wisconsin anglers (Petchenik 2014).

Similar to Brook Trout, Michigan trout anglers did not have a strong preference to harvest or not to harvest legal-sized Brown Trout when they caught them in streams. Forty-two percent of Michigan trout anglers never or rarely kept legal-sized Brown Trout, whereas 27% often or always kept them (Figure 6). Michigan trout anglers tended to be less harvest-oriented for Brown Trout compared to Wisconsin anglers, of whom 19% always and 20% often kept Brown Trout (Petchenik 2014). A higher proportion of angling group members never kept legal-sized Brown Trout (50% compared to 17% of non-members), whereas a higher proportion of non-members often kept them (21% compared to 9% of members).

Harvest frequencies for stream-dwelling Rainbow Trout generally followed the same pattern as Brook Trout and Brown Trout. Few Michigan trout anglers (22%) often always kept legal-sized Rainbow Trout when they caught them, whereas 43% Michigan trout anglers never or rarely kept them (Figure 6). Similarly, 26% of Wisconsin anglers always or often kept Rainbow Trout, whereas 37% rarely or never kept them (Petchenik 2014). A higher proportion of angling group members never kept legal-sized Rainbow Trout (48% compared to 17% of non-members), whereas a higher proportion of non-members often kept them (17% compared to 6% of members).

Table 8.—Percentage (%) of email survey respondents who attributed various levels of importance to different inland lake attributes when deciding whether to fish a lake for trout. The table also includes the weighted mean score (WMS); the overall score as weighted by the percentage in each category from 1 [most important] to 5 [least important]) and the number of email survey respondents for each attribute (N). The response option of “I don’t know” did not exceed 2% for any item and was omitted from the table.

Lake attribute	Very					WMS	N
	Important (1)	Important (2)	Neutral (3)	Unimportant (4)	Very unimportant (5)		
Presence of quality-sized trout	32	47	13	3	3	2.0	1,113
Regulations that allow preferred methods/gear	35	38	18	6	4	2.0	1,106
Regulations that allow harvest	29	36	22	7	5	2.1	1,108
Chance to catch Rainbow Trout	28	39	29	6	4	2.2	1,110
Vehicular access available	24	38	23	9	4	2.2	1,109
Aesthetic beauty	28	38	25	4	3	2.2	1,106
Chance to catch large numbers	18	35	33	9	4	2.4	1,112
Chance to catch Brown Trout	18	33	32	10	6	2.5	1,106
Presence of trophy trout	18	32	32	12	4	2.5	1,103
Walk-in access available	15	34	35	10	4	2.5	1,097
Chance to catch Brook Trout	22	24	31	15	7	2.6	1,109
Chance to catch Lake Trout	19	24	36	13	6	2.6	1,100
Presence of wild trout	15	25	42	13	4	2.6	1,107
Presence of stocked trout	15	27	43	10	5	2.6	1,108
Lake 10–50 acres	11	24	49	10	5	2.7	1,087
Lake < 50 acres	13	21	48	10	7	2.7	1,098
Chance to catch splake	13	22	41	15	7	2.8	1,097
Lake < 10 acres	8	20	52	12	6	2.9	1,073

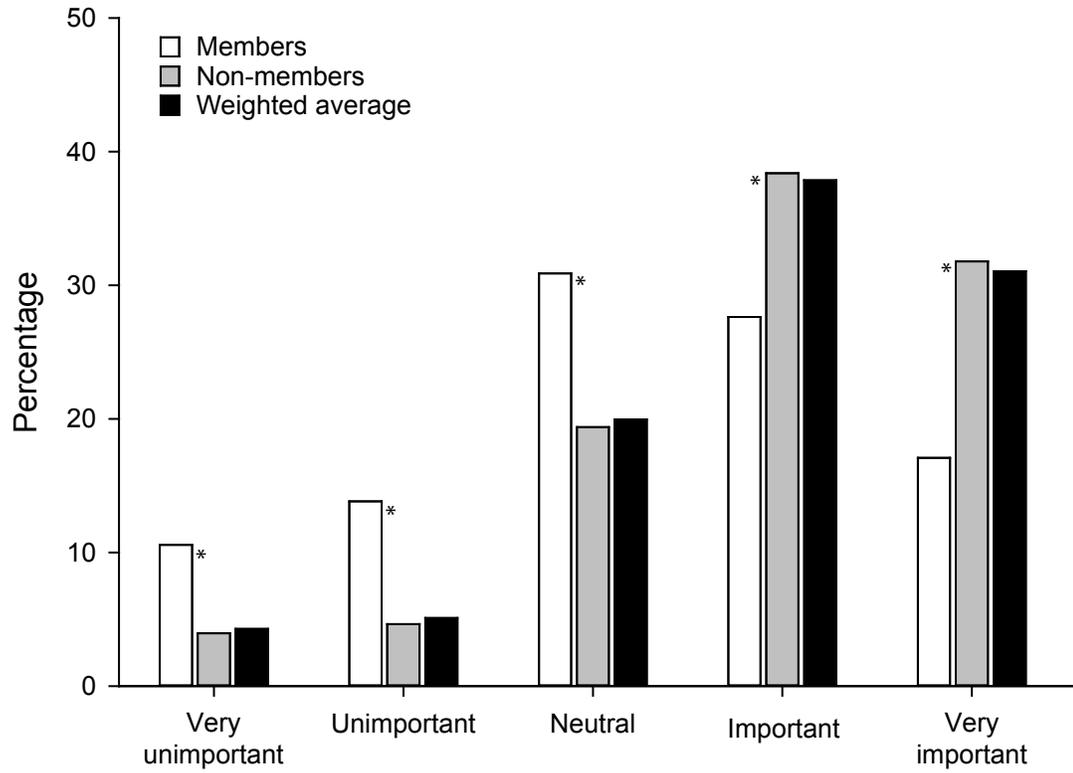


Figure 5.—Importance of regulations that allow harvest as an inland lake fishing selection factor for Michigan trout anglers. Asterisks denote significantly different proportions between members and non-members within categories of importance ($P < 0.05$). $N = 1,108$ anglers (246 members, 862 non-members).

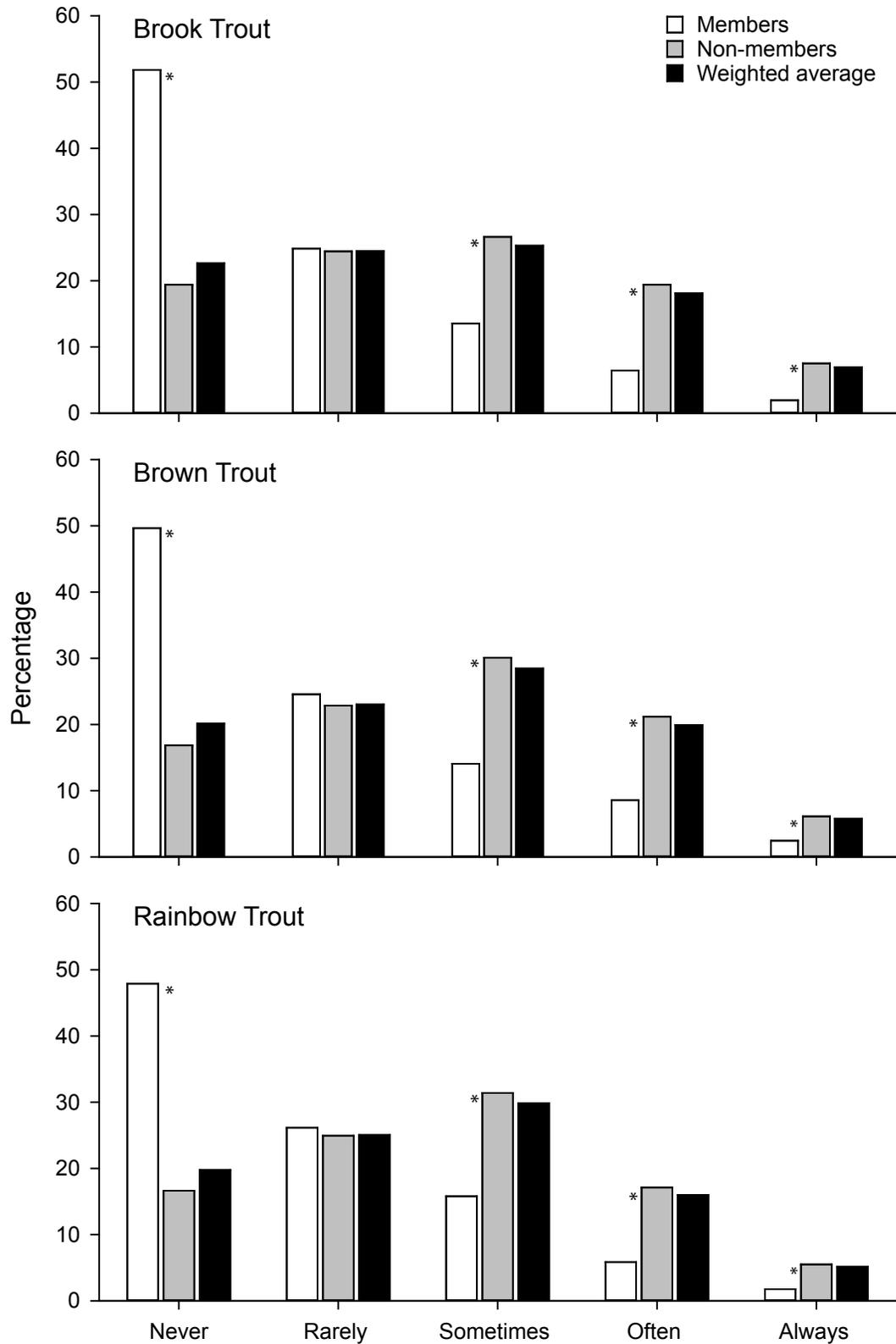


Figure 6.—Frequency with which Michigan trout anglers harvested legal-sized Brook Trout, Brown Trout, and Rainbow Trout when they caught them in streams. Asterisks denote significantly different proportions between members and non-members within frequency categories ($P < 0.05$). $N = 3,506$ anglers (982 members, 2,524 non-members).

Email survey respondents showed an interest in harvesting Brook Trout, Brown Trout, and Rainbow Trout at relatively small sizes. For example, more than 70% of respondents stated they would harvest the following species if they were the following lengths or greater: Brook Trout (7 inches), Brown Trout (10 inches), and Rainbow Trout (10 inches; Figure 7). These results were comparable to those for Wisconsin where 26% of trout anglers stated they would not harvest trout smaller than 8 inches (Petchenik 2014). The slight difference between email survey respondents and Wisconsin anglers may reflect differences in current stream trout fishing regulations (i.e., Michigan: 7-inch minimum size limit for Brook Trout on most streams; Wisconsin: 8-inch minimum size limit on most streams).

Email survey respondents showed a greater willingness to release Brook Trout at smaller sizes compared to Brown Trout or Rainbow Trout. For example, more than half of respondents stated they would release stream trout species if they were longer than the following sizes: Brook Trout (13 inches); Brown Trout (18 inches); Rainbow Trout (18 inches; Figure 7). Still, nearly half of email survey respondents stated they would keep trout, especially Brown Trout and Rainbow Trout, if over these lengths. These results are comparable to those of Wisconsin anglers, 40% or more of whom stated they would harvest Brown Trout and Rainbow Trout that were 20 inches or longer (Petchenik 2014).

Overall, email survey respondents who fish streams harvest Brook Trout and Brown Trout more frequently than respondents who fish inland lakes, whereas respondents who fish lakes harvest Rainbow Trout more frequently than those who fish streams. When fishing inland lakes, email survey respondents – particularly angling group members – tended not to harvest legal-sized Brook Trout or Brown Trout (Figure 8). A slight majority of Michigan trout anglers (51%) rarely or never kept legal-sized Brook Trout when they caught them in inland lakes. Email survey respondents were more likely to keep legal-sized Rainbow Trout than Brook Trout or Brown Trout when they caught them in inland lakes.

Email survey respondents who fish for inland trout in Michigan's inland lakes were less harvest-oriented than Wisconsin trout anglers fishing in inland lakes. Across all species, an average of 23% of email survey respondents never harvested trout caught in inland lakes, and 24% rarely harvested trout. These percentages were considerably higher than the 3% of Wisconsin anglers who never harvested trout in inland lakes and the 11% of anglers who rarely harvested trout (Petchenik 2014). Nearly three-quarters of Wisconsin anglers often (37%) or always (34%) harvested trout caught in inland lakes, whereas fewer than one-fifth of email survey respondents often (13%) or always (5%) harvested trout from inland lakes.

In lakes, email survey respondents showed an interest in harvesting trout at sizes fairly close to the minimum size limit for each species in most lakes. For example, more than 50% of respondents stated they would harvest the following fishes if they were the following lengths or greater: Brook Trout (8 inches), Brown Trout (10 inches), Rainbow Trout (10 inches), Lake Trout (14 inches), and splake (12 inches).

Email survey respondents' definition of a quality trout in inland lakes varied among species, with quality fish considered longer for more lake-oriented trout species. For example, more than two-thirds (66%) of respondents considered a lake-caught trout to have reached "quality" size at the following lengths: Brook Trout (10 inches); Brown Trout (13 inches); Rainbow Trout (12 inches); Lake Trout (20 inches); and splake (18 inches). Respondent-defined standards for "trophy"-sized trout for inland lakes raised the bar for Brown Trout and Rainbow Trout to a level comparable with that of Lake Trout and splake. More than 66% of respondents identified fish at the following sizes as trophies: Brook Trout (16 inches), Brown Trout (20 inches), Rainbow Trout (20 inches), Lake Trout (20 inches), and splake (18 inches).

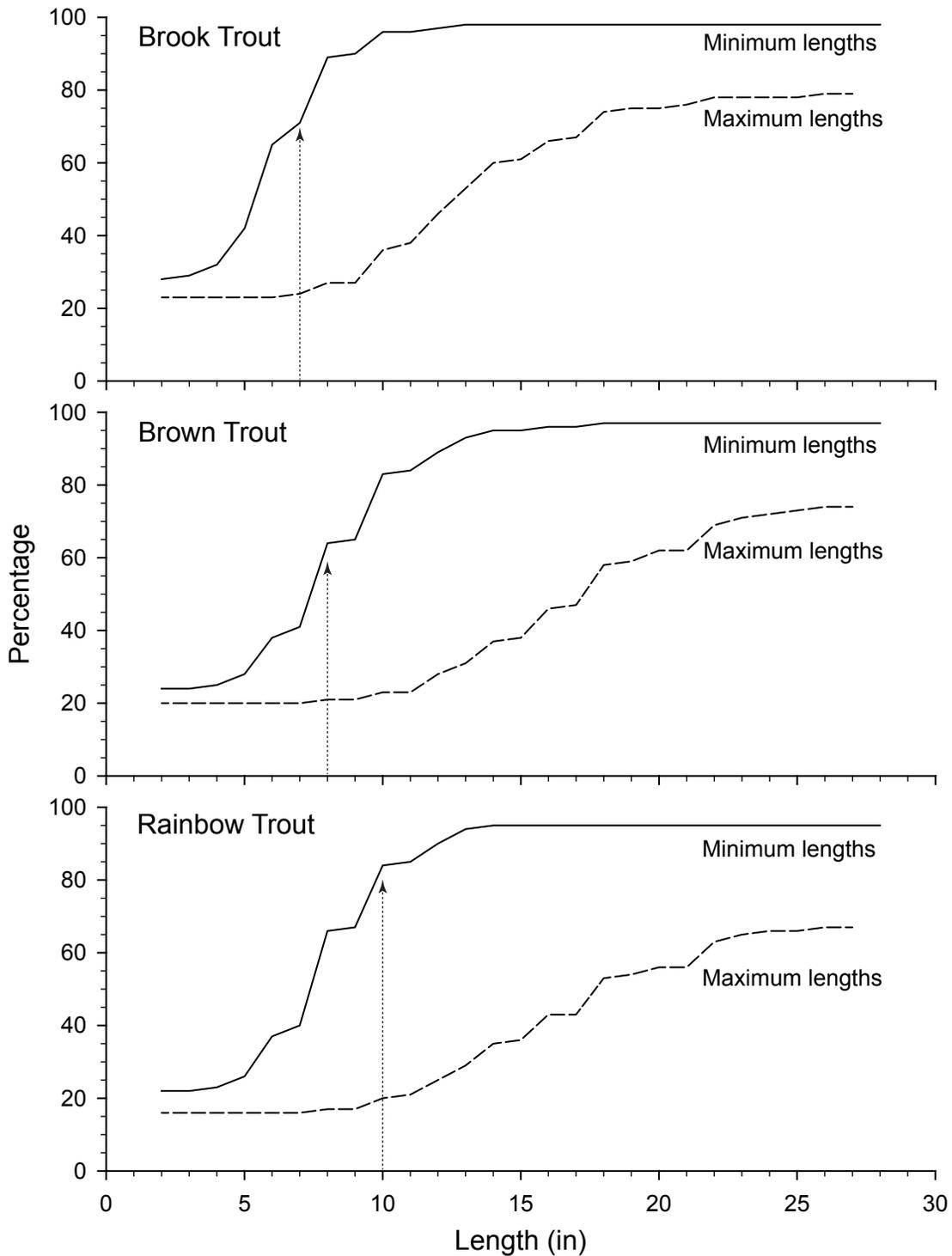


Figure 7.—Of email survey respondents who harvest trout, the percentage who stated they would keep a Brook Trout, Brown Trout, or Rainbow Trout if it was above a given minimum length. Also shown is the percentage of anglers who said they would not keep a trout longer than the specified maximum length. The number of respondents who responded to the minimum length question was 3,305 (Brook Trout), 3,280 (Brown Trout), and 3,256 (Rainbow Trout). The number of respondents who responded to the maximum length question was 2,775 (Brook Trout), 2,737 (Brown Trout), and 2,721 (Rainbow Trout). Arrows represent current species-specific minimum length limits in Type 1 streams in Michigan.

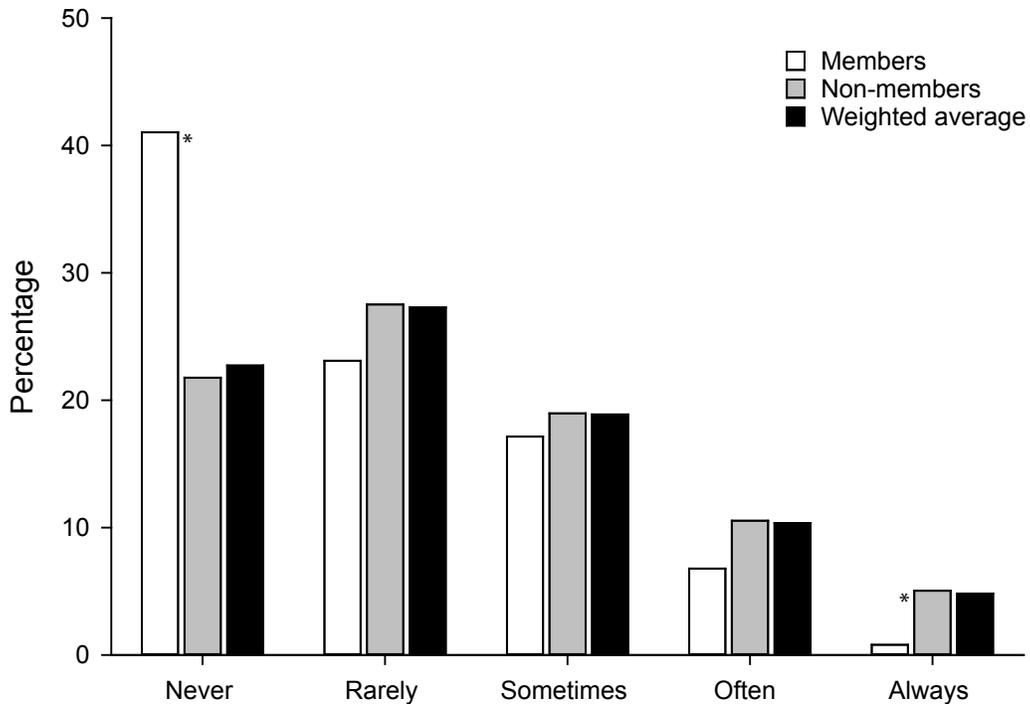


Figure 8.—Frequency with which Michigan trout anglers harvested legal-sized Brook Trout when they caught them in inland lakes. Asterisks denote significantly different proportions between members and non-members within frequency categories ($P < 0.05$). $n = 1,105$ anglers (251 members, 854 non-members).

Quality and trophy size definitions

Email survey respondents considered stream-dwelling Brook Trout to reach quality and trophy sizes at shorter lengths than Brown Trout or Rainbow Trout. For example, 80% or more of respondents considered quality size to be reached at the following lengths: Brook Trout (8 inches); Brown Trout (12 inches); and Rainbow Trout (13 inches; Figure 9). These lengths were somewhat lower than those listed by Wisconsin anglers, only 30% of whom thought Brook Trout less than 10 inches were “quality-sized” (Petchenik 2014). Fifty-four percent of Wisconsin anglers stated they would consider a 12-inch Brown Trout a quality fish, and 57% of them would consider a 12-inch Rainbow Trout a quality fish (Petchenik 2014). More than 80% of Michigan email survey respondents considered trophy size to be reached at the following lengths for stream-dwelling trout: Brook Trout (14 inches); Brown Trout (20 inches); and Rainbow Trout (20 inches; Figure 10). By comparison, the percentages of Wisconsin anglers who considered a 20-inch stream trout to be a trophy were 97% for Brook Trout, 67% for Brown Trout, and 66% for Rainbow Trout (Petchenik 2014). Dissimilarities between email survey respondents and Wisconsin anglers may reflect differences in stream productivity between Michigan and Wisconsin, or differences in fishing regulations between states (e.g., minimum size limits, length of “one-over” regulations) that shape anglers’ perceptions of “trophy” and “quality” size. For instance, a 19-inch Brown Trout caught in a stream with a one-over 18-inch regulation may be regarded as a higher quality fish than a 19-inch Brown Trout caught in a stream without such a regulation.

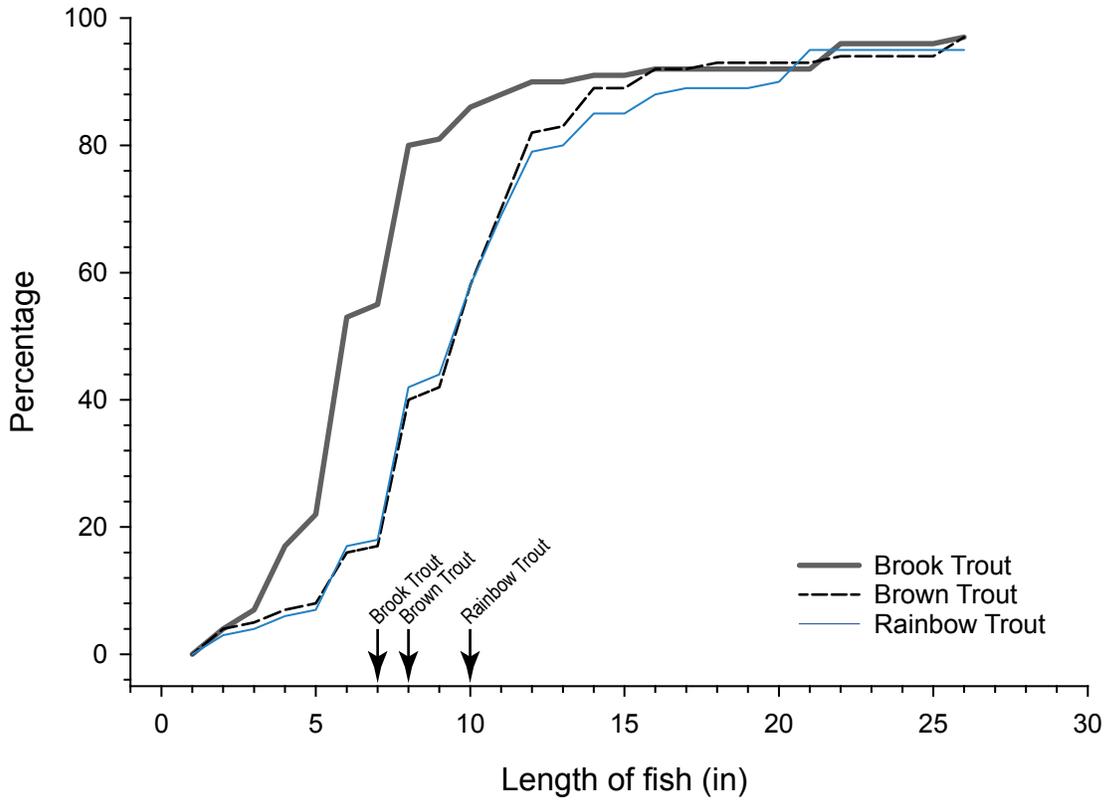


Figure 9.—Percentage of email survey respondents who consider stream-dwelling trout of given lengths to be “quality” fish. Arrows represent current species-specific minimum length limits in Type 1 streams in Michigan. Inflection points on each line reflect species-specific preferred size limits.

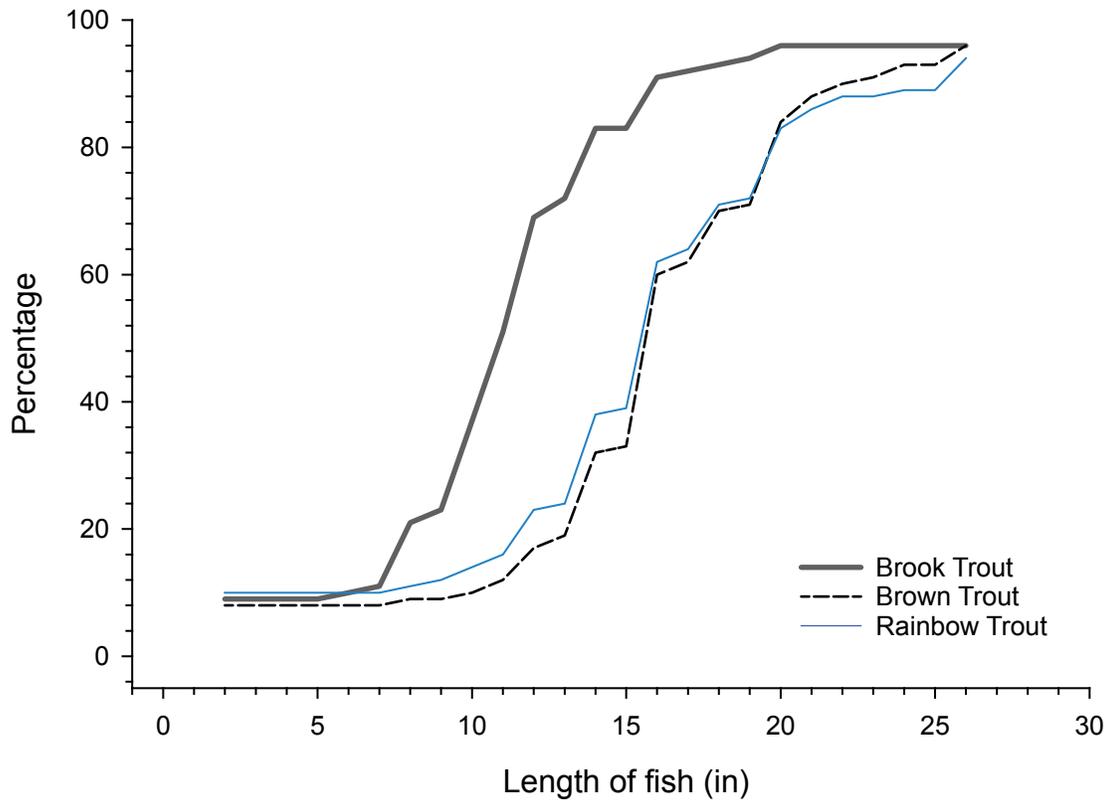


Figure 10.—Percentage of email survey respondents who consider stream-dwelling trout of given lengths to be “trophy” fish.

Tackle use

When stream fishing for inland trout, Michigan email survey respondents tended to use live bait less frequently and spinners/artificial lures and artificial flies more frequently than respondents did in other eastern states such as Connecticut (Hagstrom and Machowski 2015), Kentucky (Dreves 2015), New Jersey (NJDEP 2014), and Pennsylvania (Responsive Management 2008). Forty-two percent of email survey respondents always or often used live bait when fishing for inland trout in streams. The same percentage of email survey respondents and Wisconsin anglers (44%) often or always used artificial lures when fishing for inland trout in streams. Similarly, 44% of web survey respondents often or always fished with artificial lures. Half of email survey respondents (50%) often or always used artificial flies, compared to 27% of Wisconsin anglers (Petchenik 2014) and 40% of Pennsylvania anglers (Responsive Management 2008).

Given this, a significantly greater percentage of angling group non-members (44%) than members (8%) always or often used live bait when fishing for stream trout. Similarly, a significantly greater percentage of non-members (46%) than members (14%) often or always used artificial lures. However, significantly more members (92%) than non-members (48%) often or always used artificial flies when fishing for stream trout.

When fishing for trout in inland lakes, a majority of email survey respondents often (41%) or always (10%) used live bait. Moreover, a majority of respondents (64%) often or always used spinners or artificial lures when fishing for trout in inland lakes. Compared to email survey respondents who fished streams, those who fished lakes used live bait and spinners/artificial lures more frequently and artificial flies less often. Nearly half of email survey respondents rarely (23%) or never (25%) used artificial flies, percentages that were comparable to those of web survey respondents (rarely: 25%; never: 25%). However, email survey respondents were more likely to use flies for inland lake fishing than were Wisconsin anglers. About two-thirds of Wisconsin trout anglers never (43%) or rarely (22%) used artificial flies in inland lakes, and relatively few Wisconsin anglers often (8%) or always (8%) used artificial flies (Petchenik 2014).

Perspectives on fishing regulations

Email survey respondents generally fished streams with Type 1 regulations more often than they fished on other stream types, which is not surprising because Type 1 streams are comparatively abundant in Michigan. Over half of respondents often (39%) or always (14%) fished Type 1 stream reaches. Twenty-one percent of respondents always (5%) or often (16%) fished on flies-only stream reaches. Conversely, 34% of respondents never fished on these waters. One in ten respondents (10%) did not know the regulation type for their favorite stream reach.

Flies-only reaches make up less than 1% of the trout waters in Michigan but include productive reaches with aesthetic qualities that are important to some email survey respondents. A plurality of angling group members (41%) had a favorite stream reach with a flies-only regulation, whereas a plurality of non-members (45%) had a Type 1 favorite reach. Higher proportions of members than non-members often or always fished streams with artificial-flies-only regulations, whereas higher proportions of non-members rarely or never fished them (Figure 11). Infrequent angling in artificial-lures-only streams likely reflects the scarcity of stream reaches with these regulations, as they occur on fewer than 10 streams in Michigan.

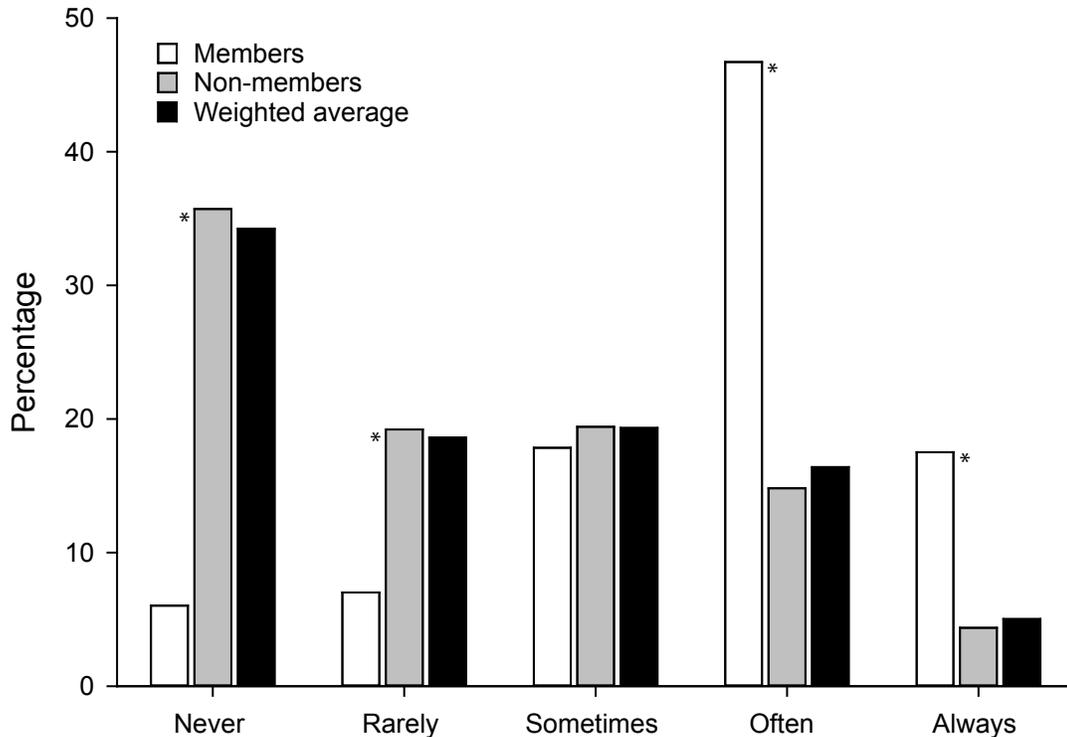


Figure 11.—Frequency with which Michigan trout anglers fished streams with an artificial-flies-only regulation. Asterisk denotes significantly different proportions between members and non-members within frequency categories ($P < 0.05$). $N = 3,022$ anglers (914 members, 2,108 non-members).

Although most inland trout fishing effort occurred during the standard harvest season, more than half of email survey respondents also fished for inland trout outside this season in Type 3, Type 4, and gear-restricted streams. Respondents fished for inland trout in Type 3 and Type 4 streams outside the standard harvest season an average of 4 times (range: 0–100 times) in a typical year. Email survey respondents generally believed the number of streams with Type 1–4, artificial-flies-only, and artificial-lures-only regulations should remain similar to current levels. A majority of respondents (55–72%) believed the number of streams with these regulation types should be about the same as at present.

A majority of email survey respondents had favorite inland lakes with Type A (28%) or Type B (25%) regulations. More than half of respondents never or rarely fished in lakes with Type D (60%), Type E (51%), or Type F (53%) regulations. A majority of respondents (70–81%) believed the number of lakes with Type A–F regulations should be about the same as at present.

Trout management satisfaction

Email survey respondents were generally satisfied with the DNR Fisheries Division’s stream trout management. A plurality of respondents (41–57%) was satisfied with all six aspects of stream trout management covered in the ITAS, including stream minimum size and bag limit categorization; stream trout fishing seasons; quality fishing opportunities; the DNR Fishing Guide and companion Inland Trout and Salmon Regulations and Maps online; Michigan’s inland stream trout fishing regulations in general; and their personal fishing experiences. The overall satisfaction with state agency trout

management in Michigan was similar to other states, including Connecticut (Hagstrom and Machowski 2015), Kentucky (Dreves 2015), and Pennsylvania.

In terms of their satisfaction with stream trout management in their respective states, Michigan email survey respondents and Wisconsin trout anglers were very similar for some aspects of trout management and different for others. Compared to the 49% of trout anglers who were satisfied or very satisfied with how streams are categorized for trout size and bag limits in Wisconsin (Petchenik 2014), a similar percentage of Michigan email survey respondents (48%) were satisfied or very satisfied with this aspect of stream trout management in Michigan. Only 16% of respondents were dissatisfied or very dissatisfied with minimum size and bag limit categorization (compared to 20% of Wisconsin trout anglers). Similar percentages of Michigan email survey respondents (64%) and Wisconsin trout anglers (62%; Petchenik 2014) were satisfied or very satisfied with stream trout fishing seasons. Only 9% of Michigan email survey respondents were dissatisfied or very dissatisfied with stream trout fishing seasons (compared to 17% of Wisconsin trout anglers).

The percentage of email survey respondents who were satisfied or very satisfied with quality stream trout fishing experiences in Michigan (46%) was identical to that of Wisconsin trout anglers (Petchenik 2014). One-quarter (24%) of email survey respondents were dissatisfied or very dissatisfied with quality stream trout fishing experiences in Michigan, compared to 24% of Wisconsin trout anglers. Sixty percent of anglers were satisfied or very satisfied with the trout fishing regulation booklet in Wisconsin (Petchenik 2014); a comparable percentage of Michigan email survey respondents (57%) were satisfied or very satisfied with the Michigan DNR Fishing Guide and companion Inland Trout and Salmon Regulations and Maps. In contrast, only 12% of respondents were dissatisfied or very dissatisfied with the Michigan guide, compared to the 19% of trout anglers who were dissatisfied or very dissatisfied with this aspect of stream trout management in Wisconsin. The percentage of Michigan email survey respondents who were satisfied with regulations in general (56%) was lower than the 82% of trout anglers in Pennsylvania who were satisfied with this aspect of trout management (Responsive Management 2008).

As in streams, Michigan email survey respondents were generally satisfied with the DNR Fisheries Division's management of inland trout lakes. Respondents were most satisfied with fishing seasons (53% satisfied or very satisfied), followed by the DNR Fishing Guide and companion Inland Trout and Salmon Regulations and Maps (52%), inland lake fishing regulations in general (49%), and their trout fishing experiences on inland lakes (49%). Respondents were least satisfied with quality fishing opportunities (38% satisfied or very satisfied).

Similar percentages of Michigan email survey respondents in Michigan (53%) and Wisconsin trout anglers (56%) were satisfied or very satisfied with trout fishing seasons on inland lakes (Petchenik 2014). However, email survey respondents were less satisfied than Wisconsin anglers were with how inland lakes and ponds are categorized for trout size and bag limits, and quality fishing experiences on inland lakes and ponds. Compared to the 59% of trout anglers who were satisfied or very satisfied with minimum size and bag limit categorization in Wisconsin (Petchenik 2014), only 43% of Michigan email survey respondents were satisfied or very satisfied with this aspect of trout management in Michigan inland lakes and ponds. Similarly, nearly half of Wisconsin anglers (45%) were satisfied with quality trout fishing experiences in Wisconsin (Petchenik 2014), whereas 38% of Michigan email survey respondents were satisfied or very satisfied with this aspect of trout management in Michigan.

The overall similarity in survey responses between the Michigan and Wisconsin surveys suggests that the ITAS gauged angler opinions as effectively as the traditional mail-based Wisconsin survey did. Similar preferences for Michigan email survey respondents and Wisconsin trout anglers may reflect similarities in how both states approach trout management.

Temporal patterns in angler values and preferences

Previous research on Michigan trout anglers (Fenske 1983) provides context for evaluating ITAS results. As in 1981, Michigan trout anglers were predominately male (97%) and active in angling and coldwater conservation organizations such as Trout Unlimited, Anglers of the Au Sable, and the International Federation of Fly Fishers in 2015. Anglers fished an average of four different streams in 1981 and 2015. In addition, Rainbow Trout were the most popular species of trout to catch in Michigan inland lakes in 2015, as they were in 1981.

Despite long-term similarities between historical and current Michigan trout anglers, temporal changes in attitudes and behaviors were prevalent between 1981 and 2015. Brown Trout were the trout species most commonly sought by anglers in 1981 (Fenske 1983), whereas Brook Trout were slightly more important than Brown Trout in 2015 (Appendix, Question 12). In 1981, trout anglers rated the relative importance of four stream selection factors as (in order of decreasing importance) ease of stream access, number of fish caught, size of fish caught, and aesthetic beauty (Fenske 1983). In contrast, the order of importance of these four factors was reversed in 2015, with aesthetic beauty most important and ease of stream access least important (Table 7). Moreover, 2015 email survey respondents were more satisfied with trout management than Michigan trout anglers were in 1981 (Fenske 1983).

These results suggest that Brook Trout fishing continues to be important for Michigan trout anglers and thus fisheries professionals should sustain healthy, fishable Brook Trout populations via harvest regulations, habitat protection and restoration, and other management strategies. Because Michigan trout anglers consider natural beauty and trout size more important than in 1981, management strategies that enhance the aesthetics of streams and their capacity to produce quality-sized trout are particularly important. Both the 1981 survey and the ITAS indicate that fisheries professionals should not concentrate their management efforts on just a few streams, but rather employ a regional approach that sustains the quality of trout fisheries in multiple systems. Fisheries managers should consider such findings as they develop management plans for inland trout waters.

Study Limitations

Certain issues associated with the ITAS potentially limit the applicability of our findings. Biases associated with email surveys include sample validity (i.e., not all members of the population under study have a known chance of participating) and non-response bias (i.e., responses of people who do not respond to requests to participate in a survey may be different from those who do respond). Stakeholder bias, where people with a vested interest in influencing survey results can encourage others to take the survey, may have been an issue in the ITAS. Members may have been overrepresented partly because Michigan Trout Unlimited contacted members via its email listserv, encouraging them to take the survey, but not mention their affiliation with the organization. In this situation, stakeholder bias may have been lessened because TU provided those on its listserv with a link to the web (public) survey rather than the email survey, which was the focus of our analysis. Even so, because members were overrepresented compared to non-members, we weighted survey responses to provide a less-biased picture of Michigan's trout angling population. We attempted to minimize bias associated with unverified Michigan trout anglers by focusing our analysis on the email survey, which was targeted specifically to trout anglers rather than the public at large. In addition, anglers were limited to only one response per IP address and the length of the survey (56 questions) likely deterred anglers from attempting to respond more than once. Fisheries stakeholders that did not use (or did not have access to) electronic communication were underrepresented in the ITAS respondent pool, which has been a long-standing issue for fisheries managers. Unfortunately, the ITAS did not contain a checkbox for respondents to indicate that they were not members of any club, so it was assumed that those who did not respond to this question were non-members.

Management Implications

Despite limitations of the ITAS, an email-based SurveyMonkey approach allowed the survey to be completed quickly and inexpensively. The ITAS produced the largest set of information of its kind (to date) from trout anglers in Michigan, and it provided valuable data for developing Michigan's first-ever statewide management plan for inland trout. The ITAS demonstrated that online surveys can be used to evaluate the opinions of large numbers of anglers and provide data in electronic formats for summarization at relatively little cost. When adjusted for bias, such large, online survey datasets may provide results comparable to those attained from more costly and time-consuming mail surveys. Moreover, the large number of Michigan trout anglers and consistency of results with traditional mail surveys conducted by the WDNR (Petchenik 2014) and Knoche (2014) suggest that the ITAS provided an accurate and relatively unbiased characterization of inland trout anglers in Michigan. In addition, the ITAS showed that weighted mean scores are a useful method for fisheries professionals to gauge the relative importance of various factors to anglers. For instance, Michigan trout anglers who fish for trout in streams believe aesthetic beauty is a more important selection attribute than the presence of any particular species of trout. Fisheries managers can use results from the ITAS to support management decisions, particularly with respect to fishing regulations, and they can use findings from the survey as a baseline for future human dimensions comparisons.

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Appendix.—Responses to individual questions and Inland Trout Angler Survey form

Overview of member and non-member comparison

Survey responses of members and non-members of trout angling groups were compared due to projected differences in trout angling values, attitudes, behaviors, and demographics between these groups. We hypothesized that differences would exist between members and non-members regarding certain aspects of stream trout fishing (e.g., regulations and harvest practices). Because survey data were non-normal, the statistical significance of differences between angling group members and non-members was determined from a chi-square test. Comparisons between members and non-members are described in the text when there was a significant difference in their responses; non-significant differences are not mentioned in the text. A chi-square test was also used to evaluate the statistical significance of differences among anglers from the UP, NLP, SLP, and out-of-state. Results from the email and web surveys are compared but not statistically analyzed.

Angling group members were overrepresented among survey respondents, so we weighted responses of members and non-members to produce a less biased estimate for all trout anglers. This required us to correct for the difference between the proportional representation of members vs. non-members in the survey, so it aligned with the proportional representation of members vs. non-members in Michigan's inland trout angler population. To estimate the number of inland trout anglers in Michigan in 2013, we multiplied the total number of all species, 24-hour, and 72-hour licenses sold (556,492) by 33%, the percentage of trout and salmon fishing trips that anglers took specifically to target inland trout in lakes and streams (Simoes 2009). Thus, we estimated that there were 183,642 inland trout anglers in Michigan in 2013. If we conservatively assume that none of the members of the three trout angling groups were simultaneously members of more than one of these clubs and all fished for inland trout, then there are about 9,200 members that are inland trout anglers (Anglers of the Au Sable 2016; Michigan TU 2016; J. Schramm, International Federation of Fly Fishers, unpublished data), collectively representing 5% of all inland trout anglers. Because members were overrepresented in the ITAS, we weighted member responses by a factor of 0.05 and non-member responses by a factor of 0.95. Overall angler response percentages reported in tables in this report were weighted according to this procedure, and percentages specific to members and non-members were calculated. For Likert-type questions (e.g., rankings of 1–5 from most to least important), weighted mean scores were calculated as the sum of the products of each ranking and its corresponding response percentage.

Question-specific information

Question 1: Check this box if you've fished less than one year for inland trout in Michigan.

The majority of email survey respondents stated that they have fished for inland trout in Michigan for more than one year. More than 3,800 email survey respondents ($n = 3,815$, 92%) fished for inland trout for more than one year in Michigan, whereas 346 respondents (8%) fished for less than one year. These 346 email survey respondents were directed to the Demographics questions and not queried further. Thus, non-Michigan trout anglers for subsequent questions were those individuals that answered Question 1 but not the subsequent question(s). Five percent of web survey respondents fished for inland trout in Michigan for less than one year.

Question 2: About how many years have you fished for inland trout in Michigan? (Enter a number)

Not surprisingly, email survey respondents tended to have many years of trout fishing experience. A plurality of respondents (20%) fished for inland trout in Michigan for 20–29 years. Some respondents stated they have fished for inland trout in Michigan for 60–69 years (4%) and 70–79 years (<1%; Table A.1, Figure 1). A plurality of web survey respondents (n = 334) stated they have fished for inland trout in Michigan for 10–19 years, followed by those that stated they have fished for trout for 20–29 years (n = 327). As for email survey respondents, few web survey respondents (>1%) stated they have fished for inland trout for 70 or more years.

Table A.1.–Number and percentage of email survey respondents who have fished for inland trout for different time periods. The total number of respondents to this question was 3,693.

Years	N	%
0–9	583	16
10–19	616	17
20–29	745	20
30–39	631	17
40–49	558	15
50–59	411	11
60–69	137	4
70–79	12	<1

Question 3: When planning a trout fishing trip to a stream or lake, which if any, of the following resources do you use? (check all that apply)

Michigan trout anglers used a diverse array of resources to plan trout fishing trips. The most popular resources that Michigan trout anglers used to plan fishing trips were the DNR Fishing guide, DNR online trout waters maps, bait shop contacts, and map books (Table A.2). In contrast, few Michigan trout anglers contacted the DNR directly to plan fishing trips. Some Michigan trout anglers used plat maps (22%) and smart phones (12%) to plan trips, but more Michigan trout anglers used traditional paper resources such as books/guides (33%). A higher percentage of angling group members than non-members used books/guides, fishing guides, other anglers, bait shop contacts, map books, online map tools, smartphones, and DNR contacts to plan fishing trips. In contrast, a higher percentage of non-members used the DNR Fishing Guide. Similar to email survey respondents, a plurality of web survey respondents planned fishing trips by communicating with other anglers (65%) or by using the DNR Fishing Guide (52%).

Trout anglers in Michigan and Wisconsin used similar resources to plan trout fishing trips. Results from a trout angler survey conducted in Wisconsin indicated that 76% of anglers consulted a Wisconsin DNR trout fishing regulations guide when planning stream trout fishing trips (Petchenik 2014). In addition, nearly one-third (31%) of Wisconsin trout anglers used road atlases, and 20% of anglers used Wisconsin DNR online web maps. Thus, a lower percentage of Michigan trout anglers used the DNR guide compared to Wisconsin anglers, but a higher percentage of Michigan trout anglers used online map tools.

Table A.2.—Percentage (%) of Michigan trout anglers who used particular resources to plan trout fishing trips to Michigan streams or lakes. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

Resource	Member	Non-member	Overall
DNR guide	52	59	59
DNR maps	45	41	42
Bait shop	43	38	38
Mapbook	49	34	34
Books/guides	63	32	33
Other anglers	75	27	30
Online map tools	36	26	27
Fishing forums	34	24	25
Plat maps	22	22	22
Fishing guides	63	32	20
Smart phone	31	11	12
Contact DNR	6	4	4
Number of respondents	981	2,719	3,700

Question 4: During a trout fishing trip to a stream or lake, which if any, of the following items do you bring with you? (check all that apply)

Many Michigan trout anglers brought smart phones and the DNR Fishing Guide with them on trout fishing trips. Although comparatively few Michigan trout anglers used smart phones to plan fishing trips (Table A.3), many Michigan trout anglers (63%) used smart phones during fishing outings (Table A.3). The DNR Fishing Guide and road atlases were other common fishing trip items. Few Michigan trout anglers (16%) brought plat maps with them on fishing trips. A higher percentage of angling group members than non-members brought smart phones, road atlases, and GPS units with them on fishing trips. In contrast, a higher percentage of non-members brought cell phones and the DNR Fishing Guide with them on fishing trips. As with email survey respondents, many web survey respondents brought smart phones (59%), road atlases (44%), or the DNR Fishing Guide (39%) with them on fishing trips.

Michigan and Wisconsin trout anglers brought many of the same resources with them on trout fishing trips. In Wisconsin, 78% of anglers brought a Wisconsin DNR trout fishing regulations guide on fishing trips, 52% brought a mobile phone, 31% brought a road atlas, 19% brought a smart phone, 15% brought a county plat map, and 14% brought a global positioning system (GPS) capability (Petchenik 2014). Thus, a higher percentage of Michigan trout anglers than Wisconsin anglers brought smart phones, road atlases, GPS units, and plat maps with them on fishing trips. However, a lower percentage of Michigan trout anglers brought a cell phone or their state agency’s fishing guide with them.

Table A.3.—Percentage (%) of Michigan trout anglers who brought particular items with them on trout fishing trips to Michigan streams or lakes. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

Item	Member	Non-member	Overall
Smart phone	73	63	63
DNR guide	39	47	47
Road atlas	56	36	37
GPS	41	36	36
Cell phone	27	35	35
Plat map	17	16	16
Number of respondents	964	2,666	3,630

Question 5: How do you usually determine what the trout fishing regulations are on a Michigan stream and lake? (check all that apply)

Michigan trout anglers determined fishing regulations in streams and planned fishing trips using similar resources, particularly the DNR Fishing Guide. Many Michigan trout anglers determined fishing regulations using the DNR Fishing Guide (68% of Michigan trout anglers) and online DNR maps (58%; Table A.4). Some Michigan trout anglers determined regulations using bait shop contacts and word of mouth from other anglers, whereas few Michigan trout anglers used online forums or contacted the DNR directly. Angling group members were more likely than non-members to use bait shop contacts and other anglers to determine trout fishing regulations. Conversely, non-members were more likely than members to use the DNR Fishing Guide for this purpose. Similar to email survey respondents, many web survey respondents determined trout fishing regulations using the DNR Fishing Guide (63%) and online DNR maps (54%).

Table A.4.—Percentage (%) of Michigan trout anglers who used particular resources to determine what the trout fishing regulations are on Michigan streams and lakes. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

Resource	Member	Non-member	Overall
DNR guide	64	68	68
Online maps	60	58	58
Bait shop contacts	26	13	14
Other anglers	19	16	16
Online forums	6	4	4
Contact DNR	4	4	4
Number of respondents	985	2,743	3,728

Question 6: Michigan DNR Fisheries Division often has to consider the tradeoffs of generating products for anglers against other priorities. For example, we have had requests to print a hardcopy version of the companion Inland Trout and Salmon Regulations and Maps (which are currently online) for the Michigan DNR Fishing Guide. However, printing the 500,000 copies needed for public distribution would cost about \$125,000, which would result in less “on the ground” work being accomplished. Do you think Fisheries Division should spend a portion of its budget to produce a hardcopy version of the companion Inland Trout and Salmon Regulations and Maps for the Michigan DNR Fishing Guide?

Overall, Michigan trout anglers did not support production of a hardcopy version of the companion Inland Trout and Salmon Regulations and Maps for the Michigan DNR Fishing Guide. The majority of Michigan trout anglers (59%) did *not* believe the Fisheries Division should spend a portion of its budget to produce a hardcopy version (Table A.5). A higher percentage of angling group members than non-members believed the DNR *should not* spend a portion of its budget to produce a hardcopy version. As with email survey respondents, many web survey respondents (70%) did *not* believe the Fisheries Division should spend a portion of its budget to produce a hardcopy version, whereas 30% believed a hardcopy version is needed.

Table A.5.—Percentage (%) of Michigan trout anglers who answered yes, no, and I don’t know to Question 6. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

Response	Member	Non-member	Overall
Yes	23	31	31
No	68	59	59
I don't know	9	9	9
Number of respondents	987	2,770	3,757

Inland trout in streams

Angling experience and trips per year

Question 7: Do you fish for inland trout in streams?

Ninety-six percent of Michigan trout anglers fished for inland trout in streams (Table A.6). This percentage was higher for angling club members than for non-members. Similar to the email survey, many web survey respondents (97%) fished for inland trout in streams.

Table A.6.—Percentage (%) of Michigan trout anglers who answered yes and no to Question 7. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

Response	Member	Non-member	Overall
Yes	99	96	96
No	1	4	4
Number of respondents	993	2,785	3,778

Question 8: About how many times did you fish for inland trout in Michigan streams in 2014? (Enter a number)

On average, most Michigan trout anglers fished for inland trout in streams fewer than twice per month in 2014. The majority of Michigan trout anglers (88%) fished for inland trout in Michigan streams fewer than 30 times in 2014 (Table A.7, Figure 2). In addition, 75% of Michigan trout anglers fished for trout in streams fewer than 20 times in 2014. Two Michigan trout anglers (<1%) reported fishing streams between 300 and 350 times in 2014. A lower percentage of angling group members than non-members fished for trout in streams 0–9 times in 2014 (Table A.7, Figure 2). Conversely, a higher percentage of members than non-members fished for trout in streams 20–29, 30–39, 40–49, 50–74, 75–99, and 100–149 times in 2014. Similar to email survey respondents, many web survey respondents fished for inland stream trout 0–9 times (34%) or 10–19 times (26%) in 2014. However, slightly higher percentages of web survey respondents fished for inland stream trout 30–39 times (8%), 40–49 times (3%), and 50–74 times (8%).

Table A.7.—Percentage (%) of Michigan trout anglers who fished for inland stream trout for different numbers of times in 2014. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

Number of times	Member	Non-member	Overall
0–9	36	54	53
10–19	23	22	22
20–29	19	13	13
30–39	8	4	5
40–49	5	2	2
50–74	7	3	3
75–99	1	<1	1
>99	<1	<1	<1
Number of respondents	985	2,636	3,621

Planning fishing trips

Question 9: Where do you do most of your fishing for inland trout in Michigan streams? (choose one)

More Michigan trout anglers fished for inland trout in NLP streams than in the other regions combined. Sixty-seven percent of Michigan trout anglers fished for inland trout in streams in the NLP (Table A.8, Figure A.1). Relatively few Michigan trout anglers fished streams in the UP (19%) or the SLP (14%). A higher percentage of angling group members fished in NLP streams, whereas a higher percentage of non-members fished in UP streams (Table A.8). Compared to email survey respondents, similar percentages of web survey respondents did most of their inland stream trout fishing in the UP (22%), NLP (67%), and SLP (11%). Stream selection is likely influenced by multiple factors, including population density and available trout streams in each region. With abundant trout streams in the NLP in reasonable proximity to relatively large population centers, it is not surprising that this region receives disproportionate trout angling effort.

Table A.8.—Percentage (%) of Michigan trout anglers who did most of their inland stream trout fishing in the Upper Peninsula, Northern Lower Peninsula, and the Southern Lower Peninsula. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all (Overall, weighted percentage).

Region	Member	Non-member	Overall
Upper Peninsula	10	19	19
Northern Lower Peninsula	79	67	67
Southern Lower Peninsula	11	14	14
Number of respondents	985	2,655	3,640

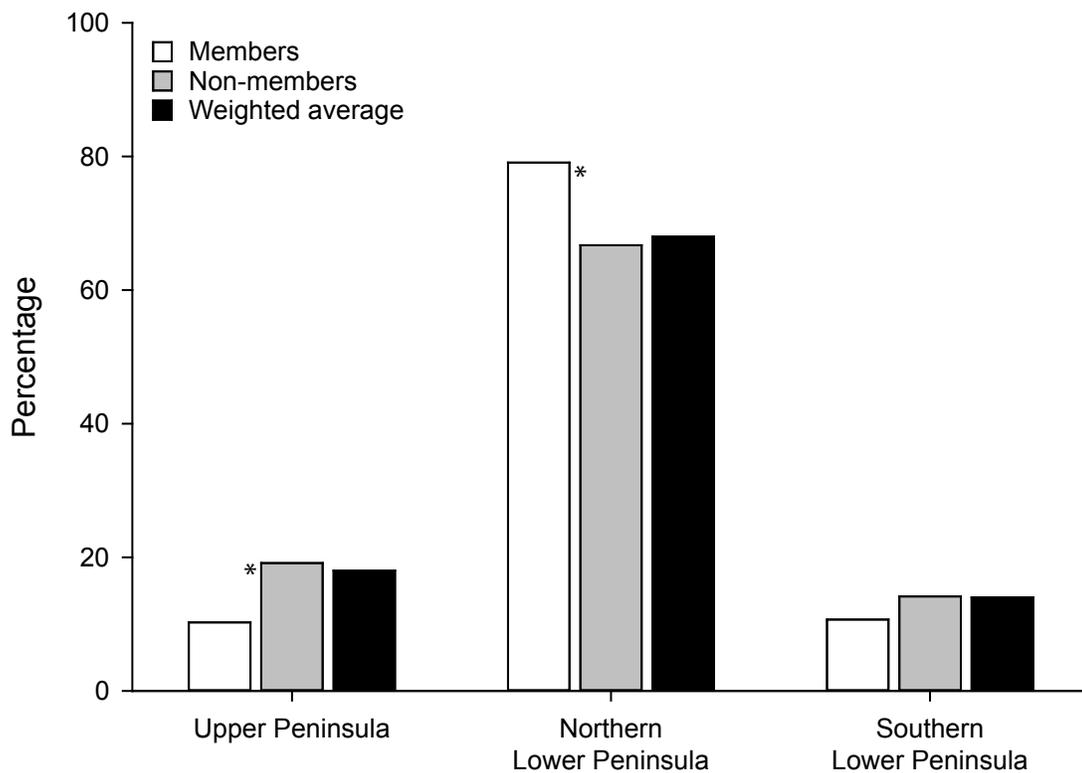


Figure A.1.—Michigan region (i.e., Upper Peninsula [UP], Northern Lower Peninsula [NLP], Southern Lower Peninsula [SLP]) where Michigan trout anglers did most of their fishing for inland stream trout. “Members” were members of trout fishing organizations (i.e., Trout Unlimited, Anglers of the Au Sable, Federation of Fly Fishers), whereas “Non-members” were not members of these organizations. Weighted averages (0.05*members, 0.95*non-members) represent Michigan trout anglers as a whole irrespective of membership status (see Methods for further details). Asterisks denote significantly different intra-region proportions between Members and Non-members ($P < 0.05$). $N = 3,640$ anglers (985 Members, 2,655 Non-members).

Question 10: In about how many different streams did you fish for inland trout in 2014? (Enter a number)

Most Michigan trout anglers concentrated their fishing effort in relatively few streams in 2014. Michigan trout anglers fished for inland trout in an average of four different streams (range 1–100). A majority of Michigan trout anglers (84%) fished in five or fewer streams (Table A.9). A plurality of Michigan trout anglers fished in two streams (23%), followed by three streams (22%), and one stream (15%). A lower percentage of angling group members than non-members fished one or two different streams for trout in 2014, whereas a higher percentage of members fished four, five, or six to ten streams (Table A.9). The percentages of web survey respondents who fished for inland trout in different numbers of streams in 2014 were similar to those of email survey respondents. Slightly lower percentages of web survey respondents fished in one (11%), two (17%), or three (20%) streams, whereas slightly higher percentages of web survey respondents fished in 4 (15%), 5 (13%), and 6–10 (18%) streams.

Table A.9.—Percentage (%) of Michigan trout anglers who fished for inland trout in different numbers of streams in 2014. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all (Overall, weighted percentage).

Number of streams	Member	Non-member	Overall
1	8	15	15
2	15	23	23
3	22	22	22
4	18	14	14
5	15	10	10
6–10	19	14	14
11–15	2	2	2
16–20	<1	1	1
21–25	<1	<1	<1
26–30	<1	<1	<1
>30	<1	<1	<1
Number of respondents	979	2,586	3,565

Question 11: In which two counties do you do most of your stream fishing for inland trout?

Ten counties received most of the fishing effort from Michigan trout anglers. A plurality of Michigan trout anglers (13%) cited Crawford County, home of the renowned Au Sable and Manistee rivers, as the area where they do most of their stream fishing for inland trout (Table A.10). Many Michigan trout anglers also cited Lake (13%) and Manistee (12%) counties as those where they do most of their stream trout fishing. These counties include portions of two other famous rivers: the Pere Marquette and Manistee. A higher percentage of angling group members than non-members did most of their trout fishing in Crawford, Lake, Kalkaska, Oscoda, and Roscommon counties (Table A.10). As with email survey respondents, most web survey respondents fished for inland stream trout in Crawford (18%), Lake (12%), Kalkaska (10%), or Manistee (10%) counties.

Table A.10.—Percentage (%) of Michigan trout anglers who did most of their stream fishing for inland trout in Michigan counties. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

County	Member	Non-member	Overall
Crawford	36	11	13
Lake	18	13	13
Manistee	12	12	12
Kalkaska	13	8	8
Newaygo	8	8	8
Oscoda	8	5	6
Benzie	5	6	6
Grand Traverse	6	6	6
Kent	5	6	6
Roscommon	8	3	3
Number of respondents	943	2,535	3,478

Species targeted

Question 12: Which species of inland trout do you typically target in streams? (check all that apply)

More Michigan trout anglers targeted Brook Trout and/or Brown Trout than Rainbow Trout (Table A.11). This is not surprising given that Brook Trout and Brown Trout are widely distributed, whereas there are few populations of stream-resident Rainbow Trout in Michigan. It is important to note here, and in other questions, that most “Rainbow Trout” were likely steelhead, rather than inland (i.e., stream-resident or nonmigratory) Rainbow Trout. A greater percentage of angling group members than non-members typically targeted Brook Trout in streams. Similar to email survey respondents, most web survey respondents targeted Brook Trout (75%) or Brown Trout (71%), as opposed to Rainbow Trout (49%).

Table A.11.—Percentage (%) of Michigan trout anglers who typically targeted Brook Trout, Brown Trout, and Rainbow Trout in streams. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

Species	Member	Non-member	Overall
Brook Trout	94	76	77
Brown Trout	75	75	75
Rainbow Trout	58	55	55
Number of respondents	980	2,594	3,574

Michigan stream trout anglers also exhibited regional differences in preferred trout species. Whereas a plurality of UP anglers targeted Brook Trout, the majority of NLP, SLP, and nonresident anglers targeted multiple species: either Brown Trout, Brook Trout, and Rainbow Trout or Brown Trout and Brook Trout (Table 7). However, in 1981, Brown Trout were the most popular trout species among Michigan stream trout anglers in all regions of the state (Fenske 1983). In 2015, Brook Trout were most popular among UP anglers and least popular among SLP anglers. Nearly half of UP stream trout anglers (50%, n = 109) targeted Brook Trout, whereas only eight percent (n = 152) of SLP stream trout anglers targeted Brook Trout (Table 7). In contrast, Brook Trout were least popular among UP anglers and most popular among SLP anglers in 1981 (Fenske 1983). This trend suggests that proportionally more UP residents targeted Brook Trout in 2015 than 1981, when the proportion of SLP-resident anglers who traveled to the UP to pursue Brook Trout was greater than the proportion of UP-resident anglers who fished for this species. The popularity of Rainbow Trout among 2015 stream trout anglers was not significantly different among Michigan regions (Table 7). Less than one percent (0.91%, n = 2) of UP stream trout anglers targeted Rainbow Trout, and only 2.37% (n = 45) of SLP stream trout anglers targeted Rainbow Trout. In contrast, Rainbow Trout were most popular among Michigan stream trout anglers in the SLP and least popular in the UP in 1981 (Fenske 1983).

Stream fishing site selection

Question 13: To you, how important are the following reasons in deciding whether or not to fish a trout stream?

Survey participants were asked how 16 stream attributes would affect their decision to fish a particular stream. To help interpret these findings, we describe six notable conclusions. First, Michigan trout anglers believed that the aesthetic beauty of streams was as important as the chance to catch either Brook Trout or Brown Trout (Table A.12, Table 3). Second, Michigan trout anglers believed the chance to catch Rainbow Trout was less important than the chance to catch either Brook Trout or Brown Trout. Third, Michigan trout anglers believed the presence of trophy trout and the chance to catch large numbers of trout were less important than the presence of quality-sized trout. Fourth, the presence of wild trout was more important to Michigan trout anglers than the presence of stocked trout. Approximately two thirds of Michigan trout anglers believed the presence of wild trout was very important (30%) or important (34%), compared to 7% of Michigan trout anglers who considered the presence of stocked trout very important and 20% who considered the presence of stocked trout important. Fifth, slightly more than half (53%) of Michigan trout anglers rated regulations that allow harvest as important or very important. Finally, two-thirds (67%) of Michigan trout anglers considered regulations that allow use of preferred methods/gear as important or very important.

The aesthetic beauty of streams was the most important selection factor for Michigan trout anglers. Aesthetic beauty had a weighted mean score of 1.9, and a plurality of email survey respondents believed aesthetic beauty was very important (40%; Table A.12, Table 3). Similarly, a plurality of web survey respondents (44%) believed aesthetic beauty was important. This is noteworthy because the aesthetic beauty of streams is related to habitat protection efforts, municipal and agricultural development, and riparian management.

Not surprisingly, the presence of Brook Trout and Brown Trout were also important stream selection factors for Michigan trout anglers. For example, in deciding whether or not to fish trout streams, a plurality of Michigan trout anglers believed it was very important that streams have Brook Trout (44%) and Brown Trout (38%; Table A.12, Table 3, Figure 3). Both selection factors had weighted mean scores of 2.0. Similar to email survey respondents, a plurality of web survey respondents believed it was very important that streams had Brook Trout (47%) and Brown Trout (42%). A higher proportion of angling group members believed it was very important that streams have Brown Trout, whereas a higher proportion of non-members was indifferent about the presence of Brown Trout in the streams they fish (Figure 3).

Table A.12.—Percentage (%) of Michigan trout anglers who rated various stream attributes as very important (score = 1), important (score = 2), Neutral (score = 3), unimportant (score = 4), or very unimportant (score = 5). The table also includes the weighted mean score (WMS; the overall score as weighted by the percentage in each category from 1 [most important] to 5 [least important]) and the number of Michigan trout anglers for each attribute (N). The response option of “I don’t know” did not exceed 2% for any item and was omitted from the table.

Stream attribute	Very important					WMS	N
	(1)	(2)	(3)	(4)	(5)		
Aesthetic beauty	40	36	14	5	4	1.9	3,508
Chance to catch Brook Trout	44	29	18	4	5	2.0	3,509
Chance to catch Brown Trout	38	34	19	4	5	2.0	3,514
Presence of quality-sized trout	34	44	14	4	4	2.0	3,503
Public lands adjacent to stream	32	37	20	6	5	2.1	3,483
Chance to catch Rainbow Trout	29	32	27	6	5	2.2	3,474
Presence of wild trout	30	34	24	6	4	2.2	3,513
Regulations that allow use of preferred methods/gear	33	34	17	7	7	2.2	3,506
Chance to catch large numbers	17	38	30	11	3	2.4	3,486
Regulations that allow harvest	24	29	22	11	12	2.5	3,501
Ease of stream access	20	31	25	16	7	2.6	3,500
Stream 10–30’ wide	12	32	42	10	4	2.6	3,504
Presence of trophy trout	15	26	37	16	6	2.7	3,468
Stream <10’ wide	10	21	48	15	5	2.8	3,465
Presence of stocked trout	7	20	48	17	7	3.0	3,479
Stream >30’ wide	6	17	51	19	6	3.0	3,468

Michigan trout anglers were similar to Wisconsin anglers in considering the presence of Brown Trout an important stream selection factor. Results from the Wisconsin trout angler survey indicated that 61% of anglers preferred to fish in streams with Brown Trout, and 4% of anglers would only fish in such systems (Petchenik 2014). Although the ITAS did not assess Brown Trout presence using “prefer to fish” and “will only fish” as stream importance categories, results suggested that Michigan trout anglers, like Wisconsin anglers, considered the chance to catch Brown Trout an important stream selection factor.

Many Michigan trout anglers believed the presence of Rainbow Trout was an important stream selection factor, but less important than the presence of Brook Trout and Brown Trout (Table A.12, Table 3). The presence of Rainbow Trout had a weighted mean score of 2.2, and most Michigan trout anglers considered Rainbow Trout important (32%) or very important (29%; Table A.12, Table 3). As with email survey respondents, many web survey respondents believed Rainbow Trout were important (31%) or very important (28%). Interpreting these results is difficult because many streams contain juvenile offspring of steelhead (migratory Rainbow Trout), but few hold populations of stream-resident Rainbow Trout. Results from the Wisconsin trout angler survey indicated that the presence of Rainbow Trout was not as important to anglers as the presence of either Brook Trout or Brown Trout (Petchenik 2014). Less than one-half (46%) of Wisconsin anglers said they preferred to fish a stream if there was a chance to catch a Rainbow Trout, and an equal percentage (46%) said the presence of Rainbow Trout had no influence on their decision to fish a stream.

The presence of trophy trout (weighted mean score = 2.7) was less important to Michigan trout anglers than the presence of Brook Trout, Brown Trout, or Rainbow Trout. A plurality of email survey respondents (37%) was indifferent about the presence of trophy trout as a stream selection factor (Table A.12, Table 3), as were 34% of web survey respondents. More than one quarter of email survey respondents (26%) believed trophy trout were important, and 15% believed they were very important. For both the email and web surveys, a higher proportion of angling group members than non-members believed trophy trout were very important, whereas a higher proportion of non-members than members were indifferent about trophy trout (Figure A.2).

Overall, Michigan trout anglers placed less importance on the presence of trophy trout as a stream selection factor than Wisconsin trout anglers. Only 26% of Michigan trout anglers considered trophy trout important, whereas 55% of Wisconsin anglers preferred to fish streams with trophy trout, and 4% of Wisconsin anglers would only fish such systems (Petchenik 2014).

Many Michigan trout anglers believed the presence of quality-sized trout (weighted mean score = 2.0) and the opportunity to catch large numbers of trout (weighted mean score = 2.4) were important stream selection factors. A majority of Michigan trout anglers (78%) believed quality-sized trout were important or very important (Table A.12, Table 3). In addition, many Michigan trout anglers (55%) believed the chance to catch large numbers of trout was important or very important, a finding consistent with the Michigan study by Melstrom et al. (2015). Similar to email survey respondents, a plurality of web survey respondents believed the presence of quality-sized trout (41%) and the opportunity to catch large numbers of trout (39%) were important stream selection factors. The ITAS results were comparable to those from the Wisconsin trout angler survey, in which 77% of anglers preferred to fish in streams with quality-sized trout, and 62% of anglers preferred to fish in streams with large numbers of trout (Petchenik 2014).

In deciding whether or not to fish trout streams, nearly two-thirds (64%) of Michigan trout anglers rated the presence of wild trout as an important or very important consideration (Table A.12, Table 3, Figure 4). Similarly, many web survey respondents believed wild trout were very important (38%) or important (33%). In both the email and web surveys, the percentage of Michigan trout anglers who considered the presence of wild trout to be very important was higher for members than for non-members. This finding suggests that angling group members place an especially high value on natural stream systems with self-sustaining trout populations and is consistent with the mission statements of Trout Unlimited and other coldwater conservation organizations.

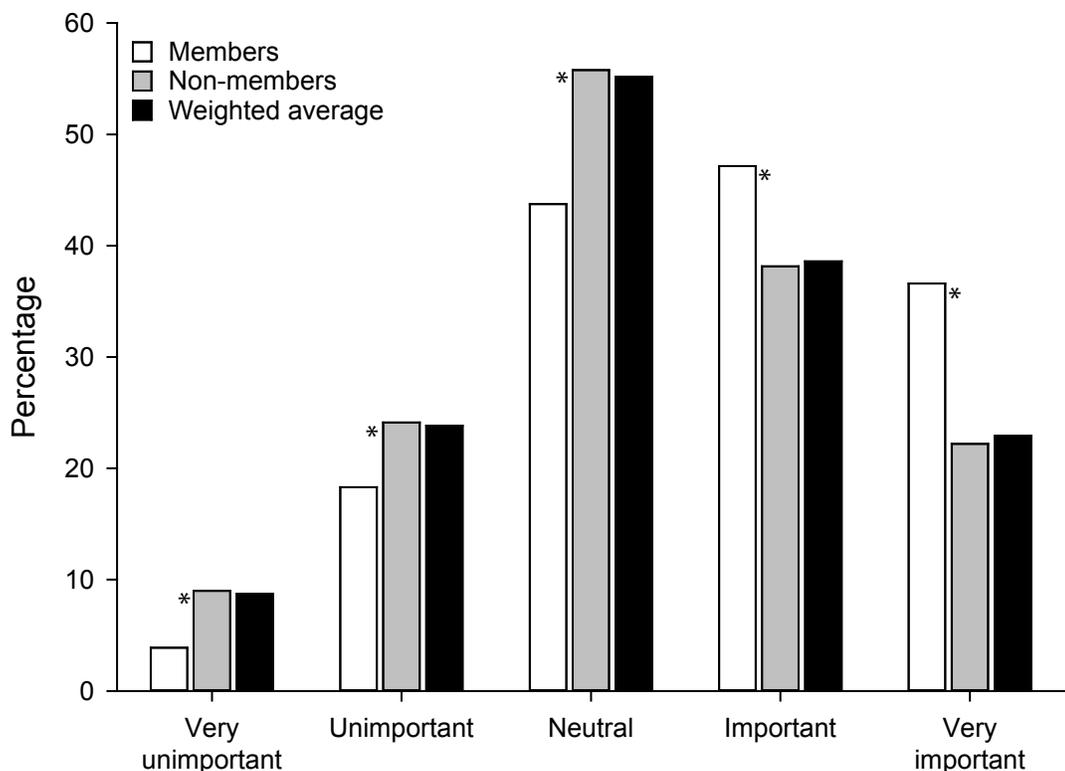


Figure A.2.—Importance of trophy trout presence as a stream fishing selection factor for Michigan trout anglers. Asterisks denote significantly different proportions between Members and Non-members within categories of importance ($P < 0.05$). $N = 3,468$ anglers (967 Members, 2,501 Non-members).

Michigan trout anglers were similar to Wisconsin anglers in considering the presence of wild trout an important stream selection factor. Results from the Wisconsin trout angler survey indicated that 61% of anglers preferred to fish in streams with wild trout, 7% of anglers would only fish these systems, and 30% of anglers were indifferent about the presence of wild trout (Petchenik 2014). Thus, both Michigan and Wisconsin trout anglers believed the presence of wild trout was an important stream selection factor (Table A.12, Table 3).

Overall, Michigan trout anglers believed the presence of stocked trout (weighted mean score = 3.0) was a less important stream selection factor than the presence of wild trout. A plurality of email survey respondents (48%) was indifferent about the presence of stocked trout (Table A.12, Table 3), which was similar to the percentage of web survey respondents who felt the same way (43%). Only 20% of Michigan trout anglers believed stocked trout were important, and 17% believed they were unimportant. These results were comparable to those from the Wisconsin trout angler survey, wherein 65% of anglers were indifferent about the presence of stocked trout, 18% preferred to fish in streams with stocked trout, and 14% preferred not to fish in streams with stocked trout (Petchenik 2014). Thus, both Michigan and Wisconsin trout anglers tended to be indifferent about the importance of stocked trout presence as a stream selection factor. In addition, anglers from both states considered stocked trout less important than wild trout (Table A.12, Table 3; Petchenik 2014). In Michigan, a higher proportion of angling group members believed stocked trout were unimportant and very unimportant, whereas a higher proportion of non-members were indifferent about stocked trout (Figure A.3).

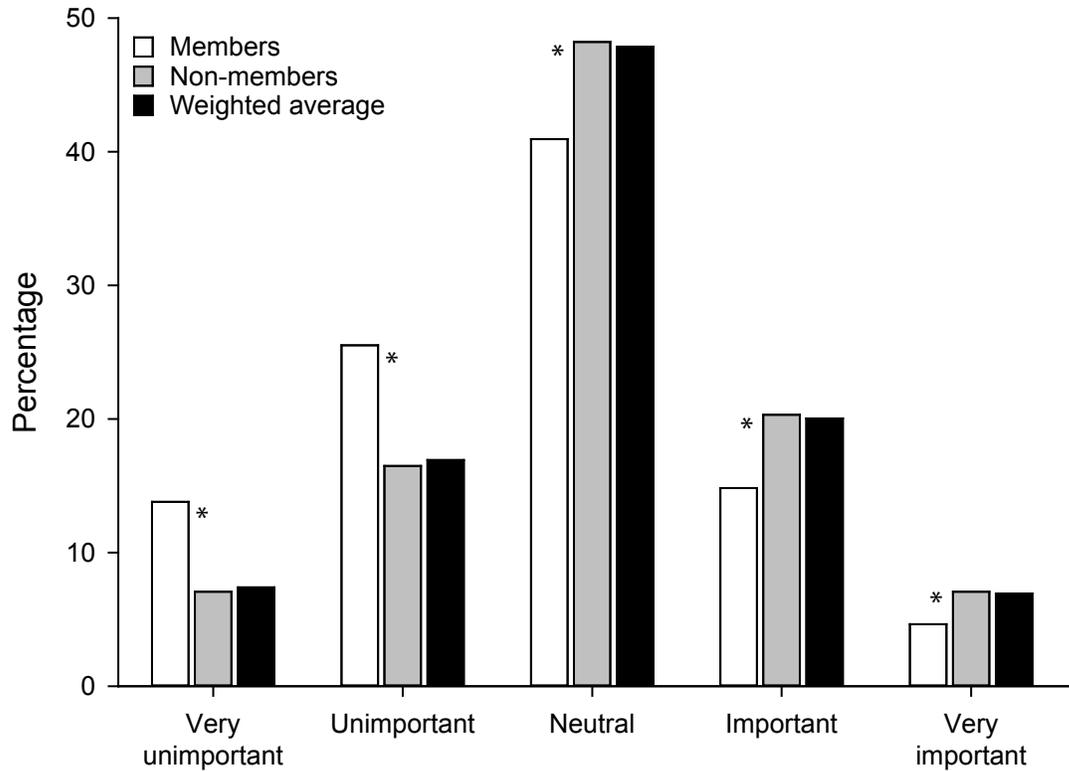


Figure A.3.—Importance of stocked trout presence as a stream fishing selection factor for Michigan trout anglers. Asterisks denote significantly different proportions between Members and Non-members within categories of importance ($P < 0.05$). $N = 3,479$ anglers (972 Members, 2,507 Non-members).

Many Michigan trout anglers also believed the existence of regulations that allow harvest was an important stream selection factor (weighted mean score = 2.5). In deciding whether or not to fish trout streams, a plurality of Michigan trout anglers (29%) believed such regulations were important, and 24% felt they are very important (Table A.12, Table 3). These percentages were similar to those of web survey respondents, 27% of whom believed regulations that allow harvest were important and 24% of whom believe they were very important. This may be an important selection criterion that acts in two opposing ways: as a desirable trait for harvest-oriented anglers or an undesirable trait for anglers who are not harvest-oriented (e.g., prefer catch-and-release). Approximately 22% of Michigan trout anglers were indifferent about regulations that allow harvest. These results mirrored those from the Wisconsin angler survey, in which the chance to harvest trout was the only stream attribute that was considered a necessity by more than 10% of anglers (Petchenik 2014). Additionally, one-half (50%) of Wisconsin anglers preferred to fish a stream that offered the chance to harvest trout.

In Michigan, a higher proportion of angling group members believed regulations that allow harvest were unimportant or very unimportant, whereas a higher proportion of non-members believed such regulations were important or very important (Figure A.4). This divergence in the importance of harvest was the most notable value difference observed between members and non-members. It also highlights the DNR’s challenge to provide diverse fishing opportunities to accommodate anglers who value distinct aspects of stream trout fishing (e.g., catch and release vs. harvest of trout).

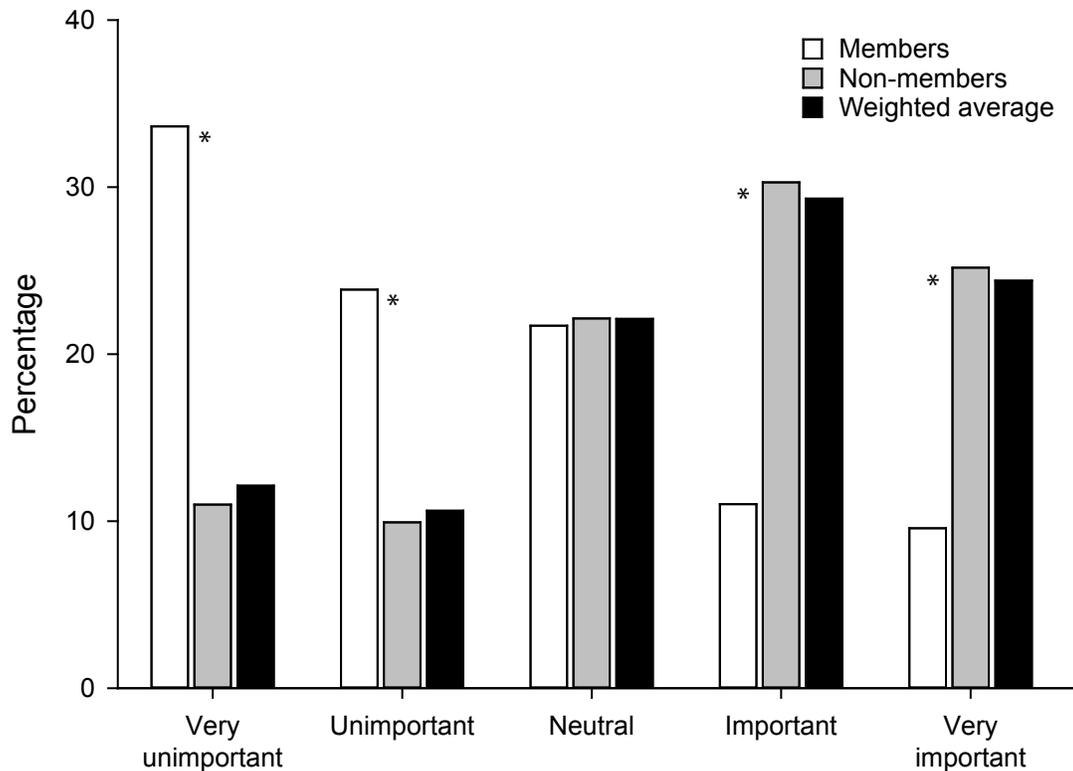


Figure A.4.—Importance of regulations that allow harvest as a stream fishing selection factor for Michigan trout anglers. Asterisks denote significantly different proportions between Members and Non-members within categories of importance ($P < 0.05$). $N = 3,501$ anglers (972 Members, 2,529 Non-members).

Similar to regulations that allow harvest, regulations that permit fishing with preferred methods and gear were also important for Michigan trout anglers (weighted mean score = 2.2). A plurality of Michigan trout anglers (34%) believed it was important that streams have these regulations (Table A.12, Table 3), a percentage that was comparable to the 31% of web survey respondents and 38% of Wisconsin anglers who believed the opportunity to fish with preferred methods and gear was an important stream selection factor (Petchenik 2014). In addition, many Michigan trout anglers believed such regulations were very important (33%). A higher proportion of angling group members believed regulations that allow angling with preferred methods and gear were unimportant or very unimportant, whereas a higher proportion of non-members believed such regulations were important or very important (Figure A.5).

Michigan trout anglers valued stream trout fishing opportunities on public lands. In deciding whether or not to fish trout streams, a plurality of Michigan trout anglers (37%) believed it was important that streams have public land adjacent to them (Table A.12, Table 3), which was similar to the 39% of web survey respondents who felt the same way. Many Michigan trout anglers believed adjacent public lands were very important (32%), and few believed public lands were unimportant (6%) or very unimportant (5%). In 2015, the nearness of streams to public lands was not significantly more or less important for trout anglers in any Michigan region. However, in 1981, the nearness of streams to public lands was a more important factor for UP trout anglers than SLP anglers and nonresident anglers (Fenske 1983).

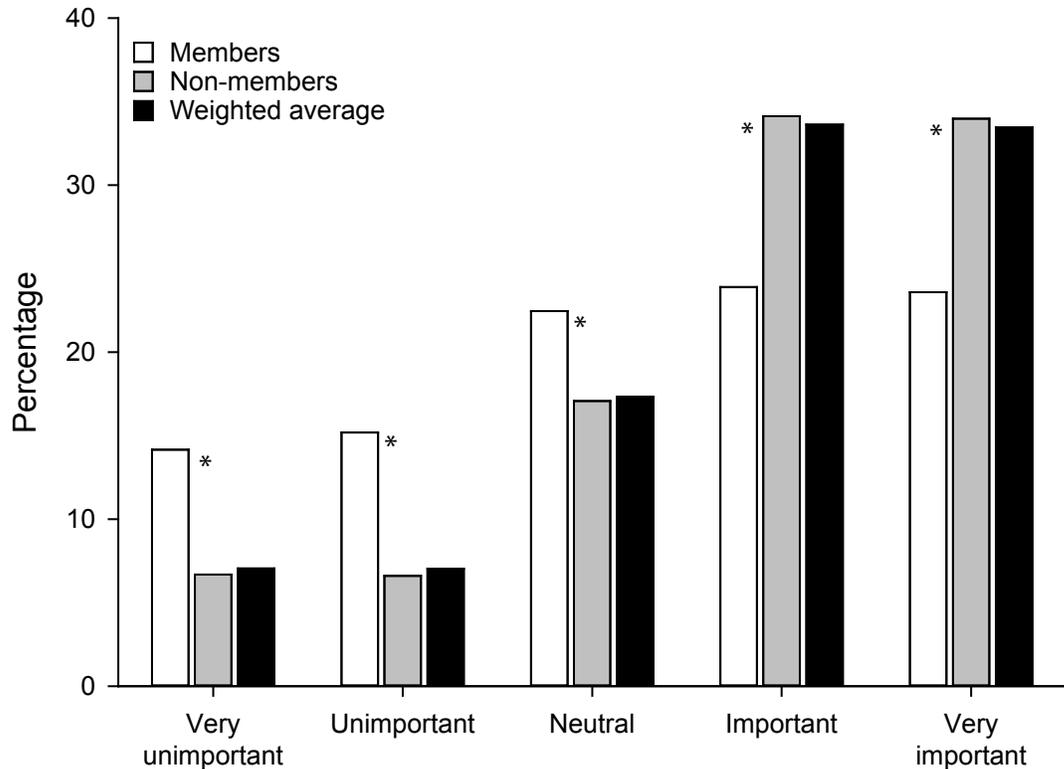


Figure A.5.—Importance of regulations that allow angling with preferred methods and gear as a stream fishing selection factor for Michigan trout anglers. Asterisks denote significantly different proportions between Members and Non-members within categories of importance ($P < 0.05$). $N = 3,508$ anglers (975 Members, 2,531 Non-members).

Many Michigan trout anglers did not consider stream size an important selection factor when deciding whether or not to fish a stream. Weighted mean scores were relatively high for all size categories (i.e., small = 2.8; medium = 2.6; large = 3.0; Table A.12, Table 3), indicating Michigan trout anglers believed stream size was less important than other selection factors. These results were comparable to those from the Wisconsin angler survey, wherein anglers tended to be indifferent about stream size (Petchenik 2014).

Ease of stream access had a weighted mean score of 2.6 (Table A.12, Table 3) and was only a moderately important consideration for Michigan trout anglers. Only 31% of Michigan trout anglers believed ease of access was important, compared to 53% of Wisconsin anglers (Petchenik 2014). This may reflect a difference between states in the availability of accessible trout waters. However, the use of relatively ambiguous terminology (i.e., “ease of stream access”) in the ITAS may have allowed Michigan trout anglers to interpret this question in different ways. Ease of stream access was less important for UP anglers than SLP anglers and nonresident anglers in 2015 (Table 6). In contrast, ease of access was more important for UP anglers than SLP anglers and nonresident anglers in 1981 (Fenske 1983).

Question 14: Which number best represents the effect each item would have on whether or not you would fish a trout stream?

Public access was one of the more important stream selection factors for email survey respondents (weighted mean score = 2.1). A large majority of respondents preferred to fish (59%) or would only fish (15%) streams with public access (Table A.13). These results were comparable to those for web

survey respondents, 60% (n = 1,024) of whom preferred to fish and 12% (n = 203) of whom would only fish streams with public access. In addition, these results were comparable to the Wisconsin trout angler survey, wherein 57% of anglers preferred to fish streams with public access and 14% of anglers would only fish streams with public access (Petchenik 2014). More than half of Michigan email survey respondents preferred not to fish (37%) or would never fish (14%) streams that can only be accessed with landowner permission (Table A.13). Again, these percentages mirrored those for web survey respondents, 36% (n = 595) of whom preferred not to fish and 13% (n = 212) of whom would never fish streams that can only be accessed with landowner permission. Moreover, results from the Michigan ITAS were similar to those from the Wisconsin survey, wherein 52% of anglers preferred not to fish (42%) or would never fish (10%) streams that required landowner permission. Nearly one third of Michigan email survey respondents (28%) were indifferent about fishing in streams that can only be accessed with landowner permission (Table A.13).

Table A.13.—Percentage (%) of email survey respondents who showed different preferences to fish streams with access available and landowner permission required. The table also includes scores for each category (in parentheses), weighted mean scores (WMS; the overall score as weighted by the percentage in each category from 1 [only fish streams with access available or permission required] to 5 [never fish these streams]), and the number of respondents for each access condition (N).

Item	Only (1)	Prefer (2)	Neutral (3)	Prefer not (4)	Never (5)	WMS	N
Access available	15	59	23	2	<1	2.1	3,519
Permission required	2	13	28	37	14	3.3	3,475

Harvest behavior

Question 15: For each species below, how often do you harvest legal-sized trout when you catch them in streams?

Michigan trout anglers did not have a strong preference to harvest or not to harvest legal-sized Brook Trout when they caught them in streams (Figure 6). A higher percentage of Michigan trout anglers rarely (25%) or never (21%) kept legal-sized Brook Trout compared to Wisconsin anglers (rarely: 14%; never: 16%; Petchenik 2014). Conversely, a lower percentage of Michigan trout anglers often (19%) or always (7%) kept Brook Trout compared to Wisconsin anglers (often: 20%; always: 22%; Petchenik 2014). For both the email and web surveys, a higher proportion of angling group members never kept legal-sized Brook Trout, whereas a higher proportion of non-members often or always kept them. The relatively high percentages in the “never” and “rarely” categories (i.e., catch-and-release angling and limited harvest fishing) among Michigan trout anglers supported results from other trout angler surveys. In Pennsylvania, a majority of trout anglers (61%) released most of the trout they catch, a percentage that was five times greater than the 12% of anglers who kept most of the trout they catch (Responsive Management 2008). Similarly, catch-and-release angling was a popular practice among trout anglers in Connecticut (Hagstrom and Machowski 2015).

Similar to Brook Trout, Michigan trout anglers did not have a strong preference to harvest or not to harvest legal-sized Brown Trout when they caught them in streams (Figure 6). Forty-two percent of Michigan trout anglers never or rarely kept legal-sized Brown Trout, whereas 27% often or always kept them. Michigan trout anglers tended to be less harvest-oriented for Brown Trout compared to Wisconsin anglers, of whom 19% always and 20% often kept Brown Trout (Petchenik 2014). For both the email and web surveys, a higher proportion of angling group members never kept legal-sized Brown Trout (50% compared to 17% of non-members), whereas a higher proportion of non-members often kept them (21% compared to 9% of members).

Harvest frequencies for Rainbow Trout generally followed the same pattern as Brook Trout and Brown Trout (Figure 6). Few Michigan trout anglers often (17%) or always (5%) kept legal-sized Rainbow Trout when they caught them in streams (Figure 6). Some Michigan trout anglers never (18%) or rarely (25%) kept them. More than one quarter (26%) of Wisconsin anglers always or often kept Rainbow Trout, whereas 37% rarely or never kept them (Petchenik 2014). For both the email and web surveys, a higher proportion of angling group members never kept legal-sized Rainbow Trout (48% compared to 17% of non-members), whereas a higher proportion of non-members often kept them (17% compared to 6% of members).

For Brook Trout, Brown Trout, and Rainbow Trout, the plurality of anglers sometimes harvested these fish when they caught them in streams. Anglers who rarely harvested fish were the second most abundant group for all three trout species. Roughly equal numbers of anglers never or often kept trout, whereas relatively few always kept trout when they caught them in streams.

Question 16: For this question, assume there are no minimum size limits for trout in Michigan streams. When fishing for inland trout in a stream, please tell us the size range (in inches) that a fish of each species must be for you to keep it. Minimum size means that you would not keep a trout smaller than your answer; maximum size means you would not keep a trout larger than your answer. If you do not fish for a type of trout or would never keep it, select one of those options.

Email survey respondents showed an interest in harvesting Brook Trout, Brown Trout, and Rainbow Trout at relatively small sizes. For example, more than 70% of respondents stated they would harvest the following species if they were the following lengths or greater: Brook Trout (7 inches), Brown Trout (10 inches), and Rainbow Trout (10 inches) (Figure 7). These results are comparable to those for Wisconsin, where 26% of trout anglers stated they would not harvest trout smaller than 8 inches (Petchenik 2014). The slight difference between Michigan email survey respondents and Wisconsin anglers may reflect differences between surveys in how questions were phrased. Also, stream trout regulations, which differ between states (i.e., Michigan: 7 inch minimum size limit for Brook Trout on most streams; Wisconsin: 8 inch minimum size limit on most streams), may influence how anglers perceive the association between fish size and quality.

Email survey respondents showed a greater willingness to release Brook Trout at smaller sizes compared to Brown Trout or Rainbow Trout. For example, more than half of respondents stated they would release stream trout species if longer than the following sizes: Brook Trout (13 inches), Brown Trout (18 inches), and Rainbow Trout (18 inches) (Figure 7). On the other hand, sizeable percentages of respondents stated they would keep trout, especially Brown Trout and Rainbow Trout, if over these lengths. These results are comparable to those of Wisconsin anglers, 40% or more of whom stated they would harvest Brown Trout and Rainbow Trout that were 20 inches or longer (Petchenik 2014).

Quality and trophy size definitions

Question 17: How long (in inches) must a trout from a Michigan stream be for you to consider it a “Quality”-sized trout versus a “Trophy”-sized trout? If you are uncertain or do not fish for one of the species listed, indicate that in the dropdown.

Email survey respondents considered Brook Trout to reach quality and trophy sizes at shorter lengths than Brown Trout or Rainbow Trout. For example, 80% or more of respondents considered quality size to be reached at the following lengths for these species in streams: Brook Trout (8 inches); Brown Trout (12 inches); and Rainbow Trout (13 inches) (Table A.14, Figure 9). These lengths were somewhat lower than those listed by Wisconsin anglers, only 30% of whom thought Brook Trout less than 10 inches should be considered “quality-sized” (Petchenik 2014). Fifty-four percent of Wisconsin anglers stated they would consider a 12-inch Brown Trout a quality fish, and 57% of them would consider a 12-inch Rainbow Trout a quality fish (Petchenik 2014). More than 80% of email survey respondents

considered trophy size to be reached at the following lengths for these species in streams: Brook Trout (14 inches); Brown Trout (20 inches); and Rainbow Trout (20 inches) (Table A.15, Figure 10). In comparison, the percentages of Wisconsin anglers who considered a 20-inch stream trout to be a trophy were 97% for Brook Trout, 67% for Brown Trout, and 66% for Rainbow Trout (Petchenik 2014). Although these dissimilarities between Michigan email survey respondents and Wisconsin anglers may reflect differences between surveys in how questions were phrased or differences in stream productivity between Michigan and Wisconsin, differences in regulations between states (e.g., minimum size limits, length of “one-over” regulations) also may shape anglers’ associations between fish size and perceived quality (e.g., quality-sized, trophy-sized). For instance, a 19-inch Brown Trout caught in a stream with a one-over 18-inch regulation may be regarded as a higher quality fish than a 19-inch Brown Trout caught in a stream without such a regulation.

Table A.14.—Percentage (%) of email survey respondents who considered trout of given lengths to be “quality” fish. The table also includes the percentage of respondents who were uncertain or did not fish for a particular trout species (U/DF) and the total number of respondents (N).

Length (in)	Brook Trout	Brown Trout	Rainbow Trout
1	0	0	0
2	4	4	3
3	7	5	4
4	17	7	6
5	22	8	7
6	53	16	17
7	55	17	18
8	80	40	42
9	81	42	44
10	86	58	58
11	88	70	69
12	90	82	79
13	90	83	80
14	91	89	85
15	91	89	85
16	92	92	88
17	92	92	89
18	92	93	89
19	92	93	89
20	92	93	90
21	92	93	95
22	96	94	95
23	96	94	95
24	96	94	95
25	96	94	95
26	97	97	95
U/DF	3	3	5
N	3,271	3,243	3,204

Table A.15.–Percentage (%) of email survey respondents who considered trout of given lengths to be “trophy” fish. The table also includes the percentage of respondents who were uncertain or did not fish for a particular trout species (U/DF), weighted mean lengths (W. mean), and the total number of respondents (N).

Length (in)	Brook Trout	Brown Trout	Rainbow Trout
2	9	8	10
3	9	8	10
4	9	8	10
5	9	8	10
6	10	8	10
7	11	8	10
8	21	9	11
9	23	9	12
10	37	10	14
11	51	12	16
12	69	17	23
13	72	19	24
14	83	32	38
15	83	33	39
16	91	60	62
17	92	62	64
18	93	70	71
19	94	71	72
20	96	84	83
21	96	88	86
22	96	90	88
23	96	91	88
24	96	93	89
25	96	93	89
26	96	96	94
U/DF	4	4	6
W. mean	10.9	15	14.2
N	3,075	3,059	3,011

Tackle use

Question 18: How often do you use the following types of tackle when fishing for inland trout in streams?

Email survey respondents tended to use live bait less frequently and spinners/artificial lures and artificial flies more frequently than trout anglers in other states. Forty two percent of email survey respondents always or often used live bait when fishing for inland trout in streams (Table A.16). Similarly, 56% of web survey respondents used live bait at least some of the time when fishing for inland stream trout. However, trout anglers in Pennsylvania used live bait 82% of the time (Responsive Management 2008) and those in Connecticut used live bait 61% of the time (Hagstrom and Machowski 2015). The same percentage of Michigan email survey respondents and Wisconsin anglers (44%) often or always used artificial lures when fishing for inland trout in streams. Similarly, 44% of web survey

respondents often or always fished with artificial lures. Half of Michigan email survey respondents (50%) often or always used artificial flies, compared to 27% of Wisconsin anglers (Petchenik 2014), 40% of Pennsylvania anglers (Responsive Management 2008), and 56% of Michigan web survey respondents.

A significantly greater percentage of angling group non-members (44%) than members (8%) always or often use live bait when fishing for stream trout. Similarly, a greater percentage of non-members (46%) than members (14%) often or always use artificial lures. However, proportionally more members (92%) than non-members (48%) often or always use artificial flies when fishing for stream trout.

Table A.16.—Percentage (%) of email survey respondents who fished for trout in streams with live bait, spinners/artificial lures (Spin/lures), and artificial flies (Flies) with different levels of frequency. The table also includes scores for each category (in parentheses), weighted mean scores (WMS; the overall score as weighted by the percentage in each category from 1 [never fish streams with given tackle types] to 5 [always fish streams with given tackle types]), and the number of respondents for each tackle type (N).

Tackle	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Always (5)	WMS	N
Live bait	25	15	18	32	10	2.6	3,410
Spin/lures	13	14	29	36	8	2.9	3,405
Flies	12	16	22	29	21	3.6	3,434

Perspectives on fishing regulations

Question 19: Considering where you have fished this past year, do you know the regulation types for the streams you most often fish?

Michigan trout anglers were generally aware of the specific regulations in place on the streams they most often fish. A majority of Michigan trout anglers (91%) knew the regulation types for the streams they most often fished, whereas few (9%) were unaware of extant regulations (Table A.17). Some who were unaware of the regulations may be fly anglers who do not keep trout, and were generally not affected by regulations pertaining to size and harvest limits. Similarly, 95% of web survey respondents knew the regulation types for the streams they most often fished.

Table A.17.—Percentage (%) of Michigan trout anglers who knew (yes) and did not know (no) the regulation types for the streams they most often fished. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

Response	Member	Non-member	Overall
Yes	93	91	91
No	7	9	9
Number of respondents	983	2,437	3,420

Question 20: Which regulation type does your favorite reach of stream have?

Non-members' favorite stream reaches most often had Type 1 regulations, whereas members' favorite reaches most frequently had flies-only regulations (Table A.18). One in ten Michigan trout anglers (10%) did not know the regulation type for their favorite stream reach. A lower percentage of angling group members than non-members had favorite stream reaches with Type 1 regulations or did not know the regulations on that particular reach (Table A.18). In contrast, a higher percentage of members had favorite stream reaches with artificial-flies-only regulations (Figure 11). Similar to the email survey, 45% and 19% of web survey respondents had favorite stream reaches with Type 1 and artificial-flies-only regulations, respectively. Moreover, fewer web survey respondents had favorite stream reaches with Type 2 (8%), Type 3 (5%), or artificial-lures-only (5%) regulations (i.e., those that allow fishing only with flies or other types of lures).

Table A.18.—Percentage (%) of Michigan trout anglers who had favorite stream reaches with particular regulation types, including Type 1–4 (T1–4), artificial-flies-only (Flies only), and artificial-lures-only (Lures only). Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

Regulation	Member	Non-member	Overall
I don't know	6	10	10
T1	21	45	44
T2	6	8	8
T3	7	6	6
T4	15	17	17
Flies only	41	11	13
Lures only	5	3	3
Number of respondents	979	2,418	3,397

Question 21: About how often do you fish Michigan streams having the following regulation types?

Email survey respondents generally fished on streams with Type 1 regulations more often than they fished on other stream types, which is not surprising because there are so many Type 1 stream reaches in Michigan. Over half of email survey respondents often (39%) or always (14%) fished Type 1 stream reaches (Table A.19). Similarly, 43% of web survey respondents often fished on Type 1 streams. For Types 2–4, the percentage of email survey respondents who often or always fished on these waters ranged from 16% for Type 2 to 32% for Type 4 reaches. This pattern coincided with the relative abundance of these stream types in Michigan, as Type 4 reaches are common and Type 2 are rare. Some fishing on Type 3 and Type 4 streams may have been directed toward steelhead as opposed to resident trout.

Twenty-one percent of email survey respondents always (5%) or often (16%) fished on flies-only stream reaches. Conversely, 34% of respondents never fished on these waters. Flies-only waters make up less than 1% of the trout waters in Michigan. However, these reaches have environmental characteristics that make them some of the most productive trout waters in the state. They also have forested watersheds that have the aesthetics found to be important to many ITAS anglers. For both the email and web surveys, higher proportions of angling group members often or always fished streams with artificial-flies-only regulations, whereas higher proportions of non-members rarely or never fished them.

Table A.19.—Percentage (%) of email survey respondents who fished streams with various regulation types with different levels of frequency. The table also includes scores for each category (in parentheses), weighted mean scores (WMS), and the number of respondents for each regulation (N). WMS is an index for how often streams are fished (i.e., higher WMS indicates more frequent fishing) but does not account for the number of stream miles within each regulation type or stream proximity to population centers.

Regulation	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Always (5)	WMS	N
Type 1	6	9	23	39	14	3.2	3,142
Type 2	17	24	32	14	2	2.3	2,998
Type 3	19	25	28	15	2	2.2	2,981
Type 4	12	17	27	27	5	2.6	3,007
Flies only	34	19	19	16	5	2.2	3,022
Lures only	35	24	22	9	1	1.9	2,804

Most email survey respondents never or rarely fished streams with artificial-lures-only regulations. A plurality of Michigan trout anglers (35%) never fished streams with these regulations (Table A.19, Figure A.6). Similarly, many web survey respondents (31%, n = 364) never fished artificial-lures-only streams. These low percent-use values likely reflected the scarcity of stream reaches with these regulations, as they occurred on fewer than 10 streams in Michigan. For both the email and web surveys, a higher proportion of angling group members often fished these streams, whereas a higher proportion of non-members never fished them.

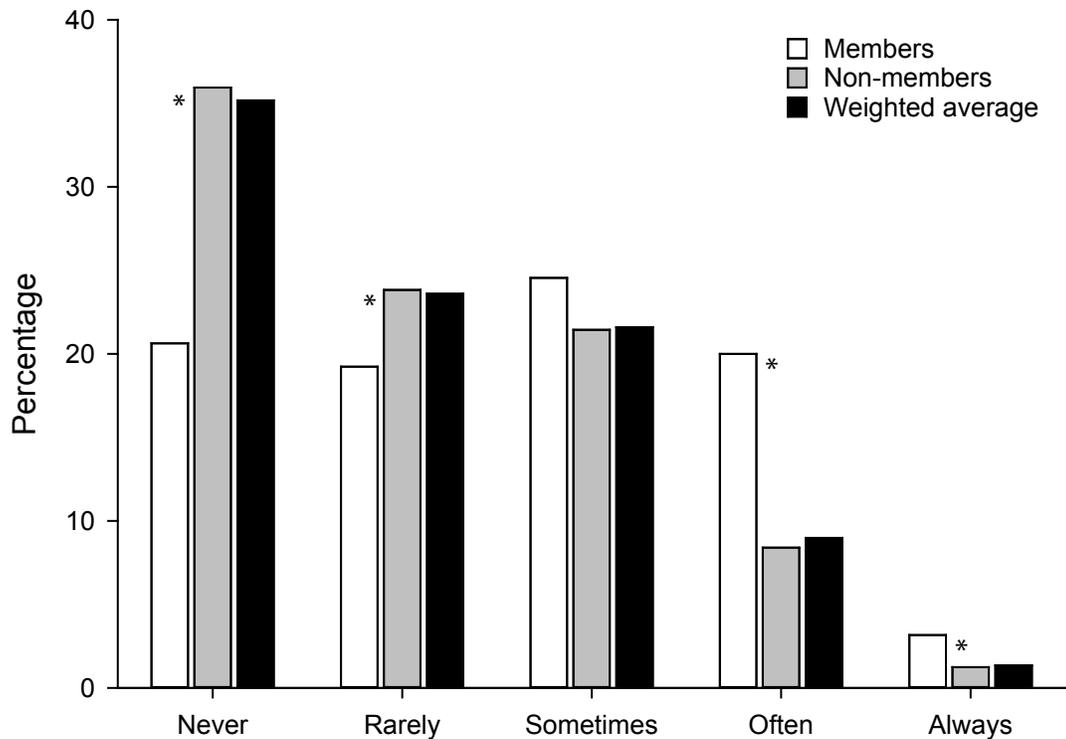


Figure A.6.—Frequency with which Michigan trout anglers fished streams with an artificial-lures-only regulation. Asterisks denote significantly different proportions between Members and Non-members within frequency categories ($P < 0.05$). N = 2,804 anglers (790 Members, 2,014 Non-members).

Question 22: Currently, all Type 3 and 4 streams and most Gear Restricted streams are open to fishing for inland trout outside of the standard trout season (last Saturday in April to September 30). In a typical year, about how many times do you fish for inland trout in these streams outside the standard harvest season? (enter a number)

Although most inland trout fishing effort occurred during the standard harvest season, more than half of email survey respondents also fished for inland trout outside this season in Type 3, Type 4, and gear-restricted streams. Respondents fished for inland trout in Type 3 and Type 4 streams outside the standard harvest season an average of 4 times (range: 0–100 times) in a typical year. A plurality of respondents (47%) fished these streams zero times per year outside the standard harvest season, but 38% of respondents fished these streams 1–5 times per year. Fewer respondents fished these streams 6–10 (9%) or more than 10 (5%) times per year outside the standard harvest season. Similarly, a plurality of web survey respondents fished Type 3, Type 4, and gear-restricted streams zero times per year outside the standard harvest season (39%), whereas considerably fewer respondents fished them 6–10 (14%) or more than 10 (13%) times per year.

Question 23: Please complete the following statement which pertains to the Michigan DNR's balance of regulation types for inland trout in streams. The number of streams having this regulation type should be:

Email survey respondents generally believed the number of streams with Type 1–4, artificial-flies-only, and artificial-lures-only regulations should remain similar to current levels. A majority of respondents (55–72%) believed the number of streams with these regulation types should be about the same as at present (Table A.20). Similarly, a majority of web survey respondents (52–69%) believed the number of streams with Type 1–4 and artificial-lures-only regulations should remain consistent. A plurality of web survey respondents (46%) believed the number of streams with artificial-flies-only regulations should remain consistent. Weighted mean scores for the regulation types suggested email survey respondents may have preferred somewhat fewer flies-and-lures-only waters (Table A.20).

Table A.20.—Percentage (%) of email survey respondents who believed the number of streams with various regulation types should be higher, lower, or remain the same. The table also includes scores for each category (in parentheses), weighted mean scores (WMS; the overall score as weighted by the percentage in each category from 1 [number of streams with given regulations should be much lower] to 5 [number of streams with given regulations should be much higher]), and the number of respondents for each regulation (N).

Regulation	Much lower (1)	Lower (2)	About same (3)	Higher (4)	Much higher (5)	WMS	N
Type 1	5	12	70	10	3	2.9	2,963
Type 2	4	11	69	13	2	3.0	2,922
Type 3	4	11	71	12	4	3.1	2,905
Type 4	3	9	72	12	4	3.1	2,889
Flies only	14	13	55	13	5	2.8	2,957
Lures only	13	13	60	10	3	2.7	2,858

Trout management satisfaction

Question 24: How satisfied are you with each of the following aspects of trout management on Michigan streams?

Email survey respondents were generally satisfied with the DNR Fisheries Division’s stream trout management. A plurality of respondents (41–57%) was satisfied with all six aspects of stream trout management included in the ITAS (Table A.21). Similarly, many web survey respondents (39–55%) were satisfied with all six aspects of stream trout management. Some email survey respondents were indifferent about the aspects of stream trout management, whereas relatively few were dissatisfied, very dissatisfied, or very satisfied. Based on weighted mean scores, email survey respondents were most satisfied with their personal fishing experiences and trout fishing seasons, and least satisfied with quality fishing opportunities (Table A.21).

Table A.21.—Percentage (%) of email survey respondents who had different levels of satisfaction regarding various aspects of stream trout management. Abbreviations are as follows: stream minimum size and bag limit categorization (Stream cat); stream trout fishing seasons (Seasons); quality fishing opportunities (Quality opps); the DNR Fishing Guide and companion Inland Trout and Salmon Regulations and Maps online (DNR Guide); Michigan’s inland stream trout fishing regulations in general (Regs. general); and their personal fishing experiences (Personal exps). The table also includes scores for each category (in parentheses), weighted mean scores (WMS; the overall score as weighted by the percentage in each category from 1 [very dissatisfied with given aspect of trout management] to 5 [very satisfied with given aspect of trout management]), and the number of email survey respondents for each aspect of stream trout management (N).

Aspect	Very dissatisfied (1)	Dissatisfied (2)	Neutral (3)	Satisfied (4)	Very satisfied (5)	WMS	N
Stream cat	4	12	37	43	5	3.4	3,218
Seasons	2	7	27	57	7	3.6	3,211
Quality opps	4	20	30	41	5	3.2	3,198
DNR Guide	4	8	32	49	8	3.5	3,210
Regs. general	4	11	29	51	5	3.4	3,213
Personal exps	2	9	20	54	15	3.7	3,225

In terms of their satisfaction with stream trout management in their respective states, Michigan email survey respondents and Wisconsin trout anglers were very similar for some aspects of trout management and different for others. Compared to the 49% of trout anglers who were satisfied or very satisfied with how streams were categorized for trout size and bag limits in Wisconsin (Petchenik 2014), a similar percentage of email survey respondents (48%) were satisfied or very satisfied with this aspect of stream trout management in Michigan. More than one third of email survey respondents (37%) were indifferent about minimum size and bag limit categorization (compared to 31% of Wisconsin anglers), whereas only 16% of email survey respondents were dissatisfied or very dissatisfied with this aspect of stream trout management (compared to 20% of Wisconsin anglers). Similar percentages of email survey respondents (64%) and Wisconsin trout anglers (62%; Petchenik 2014) were satisfied or very satisfied with stream trout fishing seasons. More than one fourth of email survey respondents (27%) were indifferent about stream trout fishing seasons (compared to 21% of Wisconsin anglers), whereas only 9% of email survey respondents were dissatisfied or very dissatisfied with this aspect of stream trout management (compared to 17% of Wisconsin anglers).

The percentage of email survey respondents who were satisfied or very satisfied with quality stream trout fishing experiences (46%) was identical to that of Wisconsin trout anglers (Petchenik 2014). Nearly one third of email survey respondents (30%) were indifferent about quality stream trout fishing experiences (compared to 29% of Wisconsin anglers), and 24% of email survey respondents were dissatisfied or very dissatisfied with this aspect of stream trout management (compared to 24% of Wisconsin anglers). Sixty percent of anglers were satisfied or very satisfied with the trout fishing regulation booklet in Wisconsin (Petchenik 2014); a comparable percentage of email survey respondents (57%) were satisfied or very satisfied with the Michigan DNR Fishing Guide and companion Inland Trout and Salmon Regulations and Maps. Approximately one third of email survey respondents (32%) were indifferent about the Michigan guide, whereas only 21% of Wisconsin anglers were indifferent about the Wisconsin trout fishing regulation booklet (Petchenik 2014). In contrast, only 12% of email survey respondents were dissatisfied or very dissatisfied with the Michigan guide, compared to the 19% of trout anglers who were dissatisfied or very dissatisfied with this aspect of stream trout management in Wisconsin. The percentage of email survey respondents who were satisfied with regulations in general (56%) was lower than the 82% of trout anglers in Pennsylvania who were satisfied with this aspect of trout management (Responsive Management 2008).

Inland trout in lakes

Angling experience and trips per year

Question 25: Do you fish for trout in Michigan inland lakes?

Most Michigan trout anglers (60%) did not fish for trout in inland lakes. Of 3,433 Michigan trout anglers to Question 25, 40% fished for trout in inland lakes (Table A.22). A higher percentage of angling group members than non-members did *not* fish for trout in inland lakes, whereas a higher percentage of non-members fished for trout in inland lakes (Table A.22). For the web survey, 46% of respondents indicated that they fished for trout in inland lakes.

Table A.22.–Percentage (%) of Michigan trout anglers who did (yes) and did not (no) fish for trout in Michigan inland lakes. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

Response	Member	Non-member	Overall
Yes	27	41	40
No	74	59	60
Number of respondents	993	2,440	3,433

Question 26: About how many times did you fish for trout in Michigan inland lakes in 2014? (enter a number)

On average, most Michigan trout anglers fished for trout in inland lakes fewer than five times in 2014. Three-quarters of Michigan trout anglers (75%) fished lakes for inland trout fewer than 10 times in 2014, while four Michigan trout anglers (<1%) reported fishing inland lakes between 90 and 100 times (Table A.23, Figure A.7). Similarly, many web survey respondents (67%) fished for inland trout in Michigan for 0–9 times in 2014, followed by 10–19 times (20%), 20–29 times (7%), and 30–39 times (2%).

Table A.23.—Percentage (%) of Michigan trout anglers who fished for trout in inland lakes for different numbers of times in 2014. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

Number of times	Member	Non-member	Overall
0	0	0	0
1–4	59	54	54
5–9	16	21	21
10–19	16	16	16
20–29	5	6	6
30–39	2	2	2
40–49	<1	<1	<1
50–59	0	1	1
60–69	0	<1	<1
70–79	0	0	0
80–89	0	0	0
90–100	0	<1	<1
Number of respondents	265	962	1,227

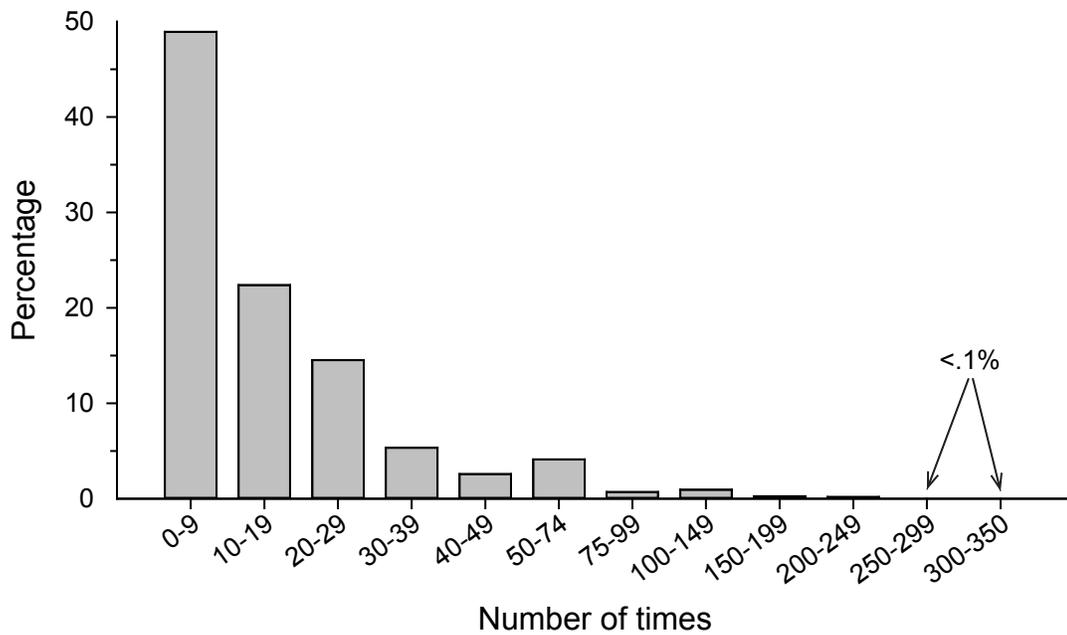


Figure A.7.—Number of times Michigan trout anglers fished for trout in Michigan inland lakes in 2014. N = 1,226 anglers.

Fishing trips

Question 27: Where do you do most of your fishing for trout in Michigan inland lakes? (choose one)

More Michigan trout anglers (51%) fished for trout in inland lakes in the NLP than in the other two regions combined (Table A.24, Figure A.8). Relatively few Michigan trout anglers fished inland lakes in the UP (29%) or the SLP (20%). A higher percentage of angling group members than non-members fished lakes in the NLP, whereas a higher percentage of non-members fished lakes in the UP and SLP (Table A.24, Figure A.8). Compared to email survey respondents, a similar percentage of web survey respondents did most of their inland lake trout fishing in the NLP (50%), whereas a higher percentage web survey respondents fished in the UP (36%) and a lower percentage fished in the SLP (14%).

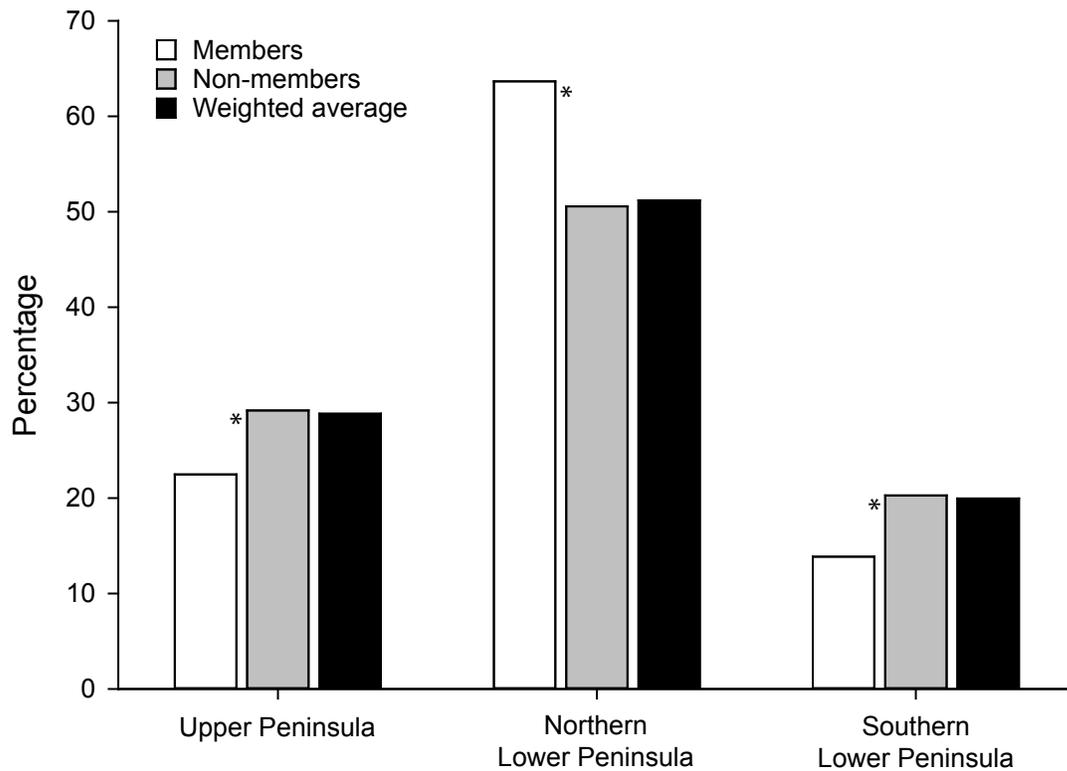


Figure A.8.—Michigan region (i.e., Upper Peninsula [UP], Northern Lower Peninsula [NLP], Southern Lower Peninsula [SLP]) where Michigan trout anglers did most of their fishing for trout in inland lakes. Asterisks denote significantly different proportions between Members and Non-members within regional categories ($P < 0.05$). $N = 1,244$ anglers (267 Members, 977 Non-members).

Table A.24.–Percentage (%) of Michigan trout anglers who did most of their trout fishing in inland lakes. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

Region	Member	Non-member	Overall
Upper Peninsula	23	29	29
Northern Lower Peninsula	64	51	51
Southern Lower Peninsula	14	20	20
Number of respondents	267	977	1,244

Question 28: In about how many different lakes did you fish for inland trout in 2014? (enter a number)

Most Michigan trout anglers concentrated their fishing effort in relatively few inland lakes in 2014. Michigan trout anglers fished for inland trout in an average of two different inland lakes (range 1–20) in 2014. A majority of Michigan trout anglers (72%) fished in one or two lakes (Table A.25). Compared to email survey respondents, the percentages of web survey respondents who fished for trout in inland lakes were lower for one lake (32%) and two lakes (28%) but higher for three lakes (20%) and four lakes (8%).

Table A.25.–Percentage (%) of Michigan trout anglers who fished for trout in different numbers of inland lakes in 2014. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

Number of lakes	Member	Non-member	Overall
1	35	40	40
2	32	32	32
3	18	14	14
4	6	7	7
5	4	4	4
6–10	5	3	3
11–15	0	<1	<1
16–20	0	<1	<1
Number of respondents	253	904	1,157

Question 29: In which two counties do you do most of your fishing for trout in inland lakes?

Twelve counties received most of the trout fishing effort from Michigan trout anglers who fish lakes. A plurality of Michigan trout anglers (12%) cited Roscommon County (which encompasses Higgins Lake, a large, deep trout lake) as the area where they did most of their lake fishing for inland trout (Table A.26). Other Michigan trout anglers cited Grand Traverse (10%), Crawford (9%), and Iron counties as those where they did most of their trout fishing in inland lakes. As with email survey respondents, many web survey respondents fished for trout in inland lakes in Crawford County (10%). A higher percentage of web survey respondents fished for trout in Marquette County (17%), whereas a lower percentage fished in Roscommon County (6%). The same percentage of email and web survey respondents fished for trout in Iron County (7%).

Table A.26.–Percentage (%) of Michigan trout anglers who did most of their fishing for trout in inland lakes in Michigan counties. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

County	Member	Non-member	Overall
Roscommon	8	12	12
Grand Traverse	11	10	10
Crawford	17	9	9
Iron	7	9	9
Oakland	3	7	7
Marquette	12	7	7
Alger	0	7	7
Antrim	6	6	6
Kalkaska	6	5	5
Benzie	13	4	4
Number of respondents	252	670	922

Species targeted

Question 30: Which species of inland trout do you typically target in inland lakes? (check all that apply)

Rainbow Trout were the most frequently targeted trout species in Michigan inland lakes. A plurality of Michigan trout anglers (35%) targeted Rainbow Trout in Michigan inland lakes, followed by Brown Trout (20%), Lake Trout (17%), Brook Trout (17%), and splake (12%, Table A.27). A lower percentage of angling group members than non-members targeted Lake Trout. Similarly, many web survey respondents (23%) targeted Rainbow Trout, followed by Brown Trout (13%), Brook Trout (13%), Lake Trout (10%), and splake (9%).

Table A.27.—Percentage (%) of Michigan trout anglers who typically targeted Brook Trout, Brown Trout, Rainbow Trout, splake, and Lake Trout in inland lakes. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

Species	Member	Non-member	Overall
Brook Trout	18	16	17
Brown Trout	22	19	20
Rainbow Trout	36	34	35
Splake	10	12	12
Lake Trout	14	18	17
Number of respondents	517	1,856	2,373

Inland lake fishing site selection

Question 31: To you, how important are the following reasons in deciding whether or not to fish an inland lake for trout?

Survey participants were asked how 18 attributes would affect their decision to fish inland lakes for trout (Table A.28). To help interpret these findings, we describe four notable conclusions. First, the presence of quality-sized trout, regulations that allow use of preferred methods/gear, and regulations that allow harvest were the most important inland lake selection factors (Table A.28, Table 4, Figure 5). Second, in contrast to streams, email survey respondents believed the chance to catch Rainbow Trout was more important than the chance to catch either Brook or Brown Trout. Third, respondents showed no preference for wild trout over stocked trout. Finally, respondents who fished for inland trout in lakes did not show a strong preference for a specific size category of lakes.

A majority of respondents believed the chance to catch large numbers of trout was very important (18%) or important (35%; WMS = 2.4). Similar to email survey respondents, many web survey respondents believed the chance to catch large numbers of trout was important (37%). For both the email and web surveys, a higher percentage of angling group members believed the opportunity to catch large numbers of trout was unimportant, whereas a higher percentage of non-members believed it was very important (Figure A.9). Half of email survey respondents believed trophy trout were important (32%) or very important (18%; WMS = 2.5), similar to the 54% of web survey respondents who believed trophy trout were important or very important. For both the email and web surveys, a higher percentage of angling group members believed trophy trout were very important, whereas a higher percentage of non-members believed they were important (Figure A.10).

Email survey respondents generally believed vehicular access (weighted mean score = 2.2) and walk-in access (weighted mean score = 2.5) were reasonably important inland lake selection factors. For both the email and web surveys, a higher percentage of angling group members believed walk-in access was important or very important (Figure A.11). Overall, more respondents wanted to drive to a lake rather than walk to it, and members placed a higher value on walk-in lakes than non-members.

As with streams, most email survey respondents considered aesthetic beauty to be a very important (28%) or important (38%) lake selection factor (WMS = 2.2). Similarly, many web survey respondents (35%) believed aesthetic beauty was important, and 25% of respondents believed it was very important. For both the email and web surveys, more angling group members than non-members believed aesthetic beauty was very important (Figure A.12).

Table A.28.—Percentage (%) of email survey respondents who attributed various levels of importance to different inland lake attributes when deciding whether to fish a lake for trout. The table also includes the weighted mean score (WMS); the overall score as weighted by the percentage in each category from 1 [most important] to 5 [least important] and the number of email survey respondents for each attribute (N). The response option of “I don’t know” did not exceed 2% for any item and was omitted from the table.

Lake attribute	Very important					WMS	N
	(1)	(2)	(3)	(4)	(5)		
Presence of quality-sized trout	32	47	13	3	3	2.0	1,113
Regulations that allow preferred methods/gear	35	38	18	6	4	2.0	1,106
Regulations that allow harvest	29	36	22	7	5	2.1	1,108
Chance to catch Rainbow Trout	28	39	29	6	4	2.2	1,110
Vehicular access available	24	38	23	9	4	2.2	1,109
Aesthetic beauty	28	38	25	4	3	2.2	1,106
Chance to catch large numbers	18	35	33	9	4	2.4	1,112
Chance to catch Brown Trout	18	33	32	10	6	2.5	1,106
Presence of trophy trout	18	32	32	12	4	2.5	1,103
Walk-in access available	15	34	35	10	4	2.5	1,097
Chance to catch Brook Trout	22	24	31	15	7	2.6	1,109
Chance to catch Lake Trout	19	24	36	13	6	2.6	1,100
Presence of wild trout	15	25	42	13	4	2.6	1,107
Presence of stocked trout	15	27	43	10	5	2.6	1,108
Lake 10–50 acres	11	24	49	10	5	2.7	1,087
Lake <50 acres	13	21	48	10	7	2.7	1,098
Chance to catch splake	13	22	41	15	7	2.8	1,097
Lake <10 acres	8	20	52	12	6	2.9	1,073

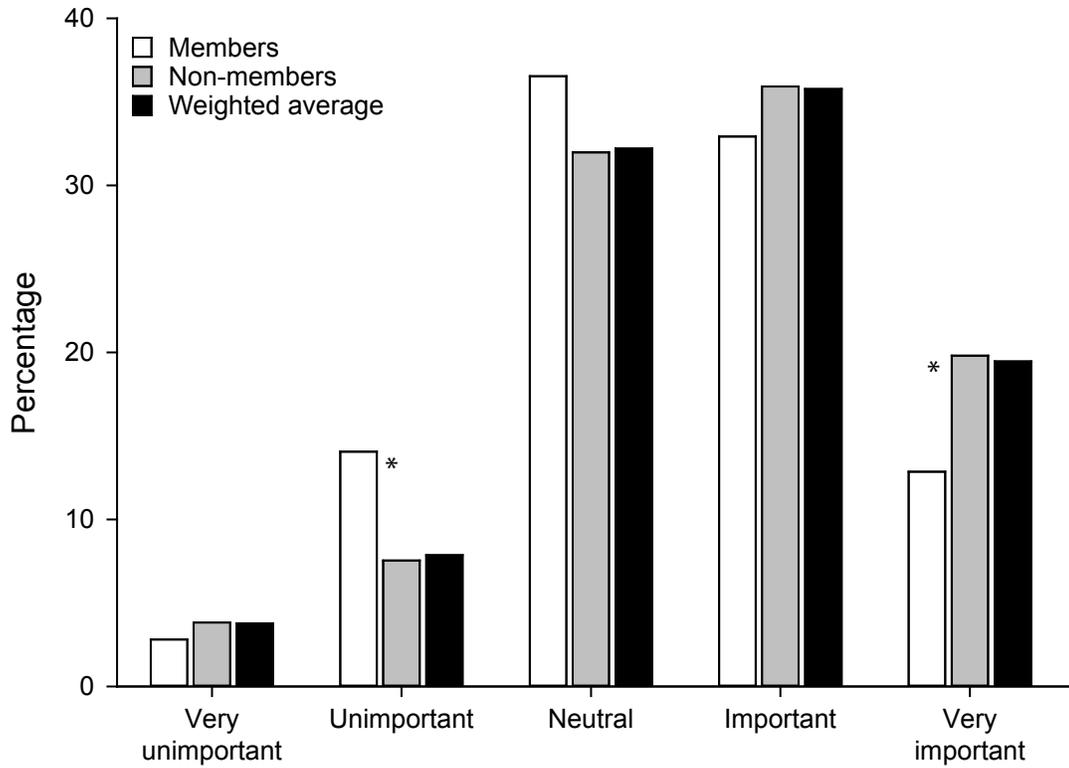


Figure A.9.—Importance of large numbers of trout as an inland lake fishing selection factor for Michigan trout anglers. Asterisks denote significantly different proportions between Members and Non-members within categories of importance ($P < 0.05$). $N = 1,112$ anglers (249 Members, 863 Non-members).

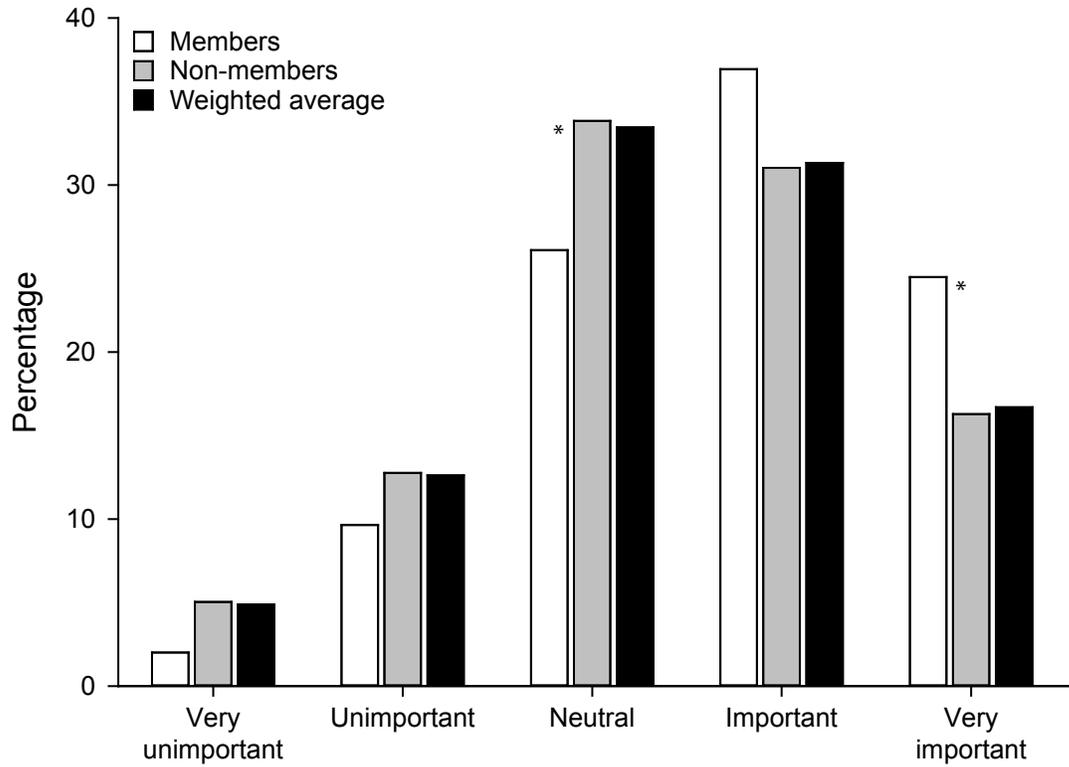


Figure A.10.—Importance of trophy trout presence as an inland lake fishing selection factor for Michigan trout anglers. Asterisks denote significantly different proportions between Members and Non-members within categories of importance ($P < 0.05$). $N = 1,103$ anglers (249 Members, 854 Non-members).

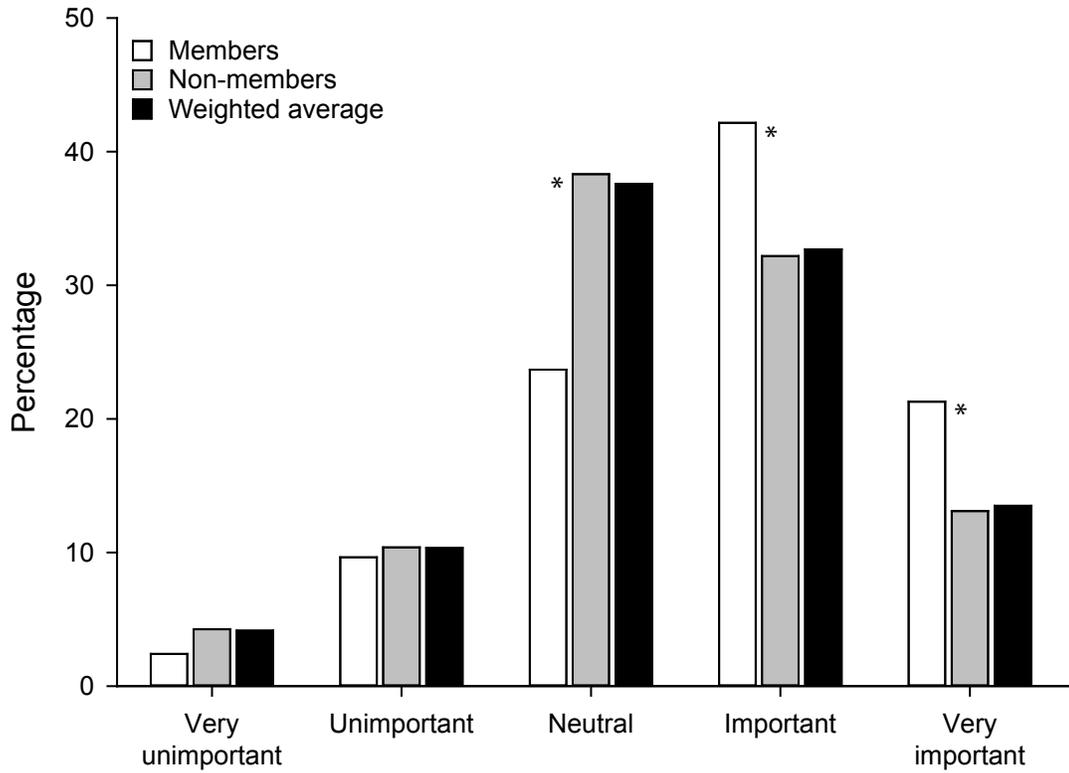


Figure A.11.—Importance of walk-in access as an inland lake fishing selection factor for Michigan trout anglers. Asterisks denote significantly different proportions between Members and Non-members within categories of importance ($P < 0.05$). $N = 1,097$ anglers (249 Members, 848 Non-members).

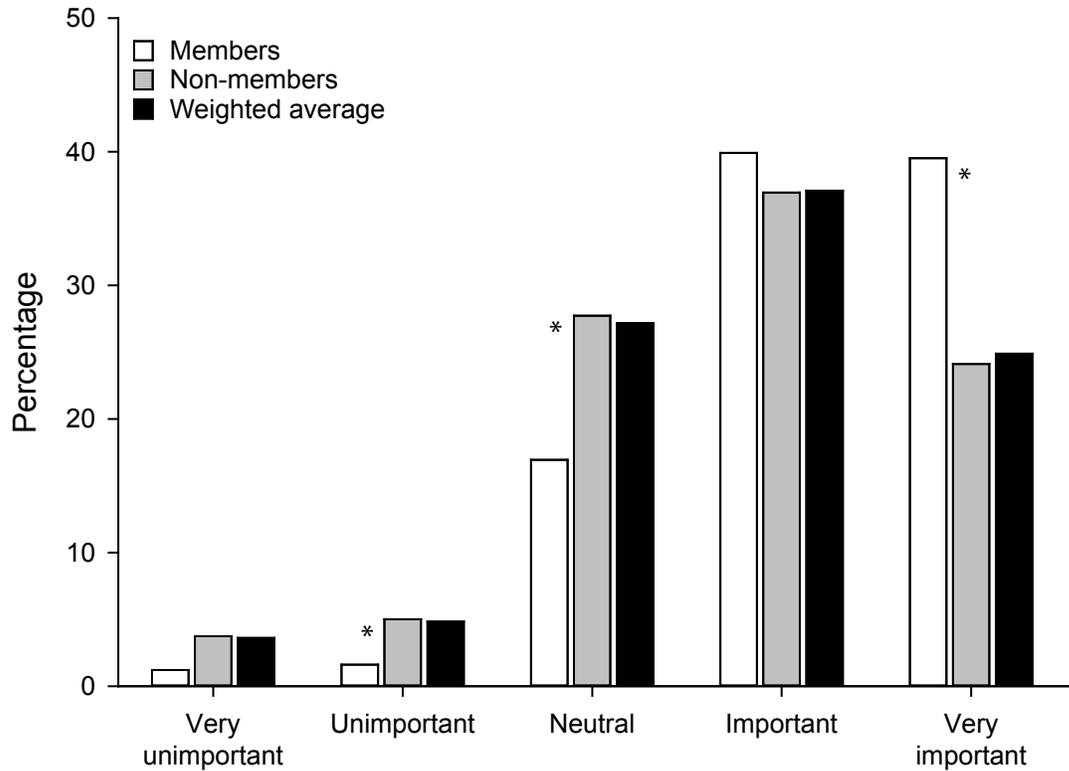


Figure A.12.—Importance of aesthetic beauty as an inland lake fishing selection factor for Michigan trout anglers. Asterisks denote significantly different proportions between Members and Non-members within categories of importance ($P < 0.05$). $N = 1,106$ anglers (248 Members, 858 Non-members).

Nearly two thirds of email survey respondents (65%) believed the presence of regulations that allow harvest was an important inland lake selection factor. For both the email and web surveys, a lower percentage of angling group members believed regulations that allow harvest were important or very important. Similarly, for both surveys, a lower percentage of members believed regulations that allow fishing with preferred methods and gear were very important (Figure A.13).

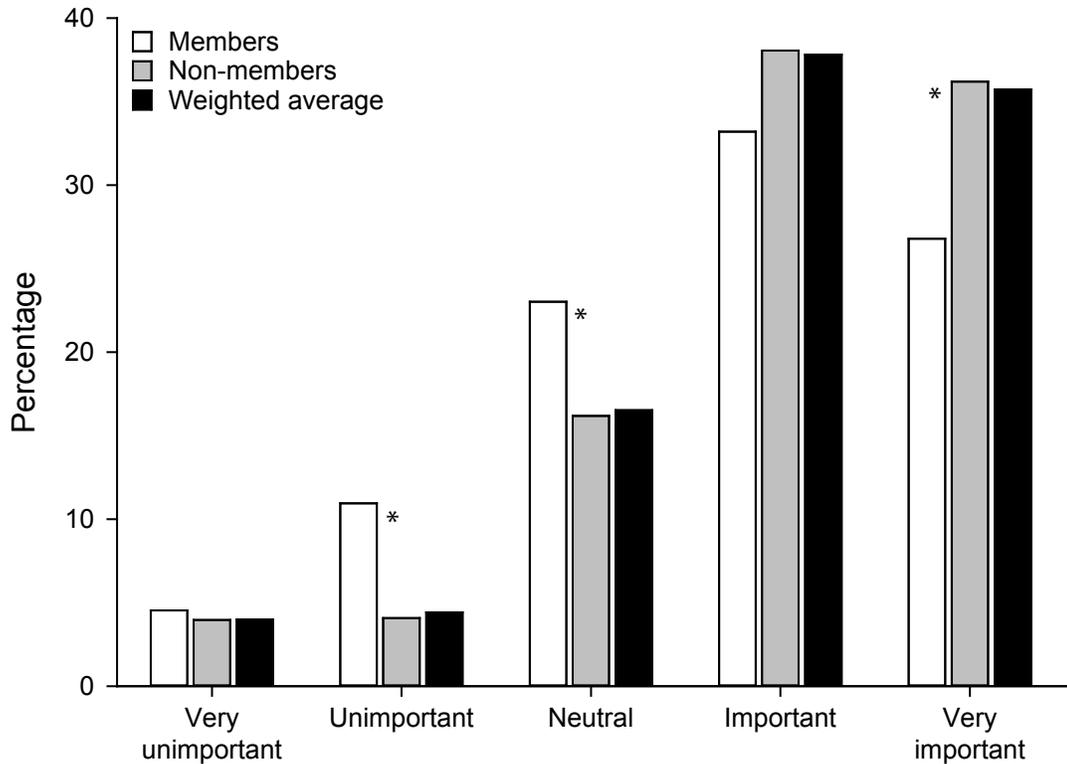


Figure A.13.—Importance of regulations that allow fishing with preferred methods and gear as an inland lake fishing selection factor for Michigan trout anglers. Asterisks denote significantly different proportions between Members and Non-members within categories of importance ($P < 0.05$). $N = 1,124$ anglers (265 Members, 859 Non-members).

Finally, as with streams, email survey respondents did not consider lake size an important selection factor when deciding whether or not to fish an inland lake. A plurality of respondents was indifferent about the significance of lake size (<10 acres 52%, 10–50 acres 49%, and >50 acres 48%) as selection factors (Table A.28, Table 4). Similarly, many web survey respondents were indifferent about the significance of lake size (<10 acres 52%, 10–50 acres 49%, and >50 acres 50%).

Email survey respondents who fished lakes were distinct from those who fished streams in some of the factors they considered important when deciding where to fish for trout. Compared to respondents who fished streams, those who fished lakes believed aesthetic beauty and the presence of Brook Trout (weighted mean score = 2.6), Brown Trout (weighted mean score = 2.5), and wild trout (weighted mean score = 2.6) were less important selection factors when deciding which water body to fish. Respondents who fished lakes believed the presence of Rainbow Trout, quality-sized trout (weighted mean score = 2.0), and large numbers of trout were equally important selection factors compared to respondents who fished streams. Moreover, respondents who fished lakes believed the presence of trophy trout and stocked trout (weighted mean score = 2.6) and regulations that allow harvest and angling with preferred methods and gear were more important selection factors than respondents who fished streams. Respondents who fished lakes and were members of angling groups were more likely to seek lakes that provide solitude (walk-in access), trophy trout, and aesthetic beauty, whereas non-members were more likely to seek large numbers of trout and harvest opportunities. In addition, catching trout and harvesting fish were evidently more important to respondents who fished lakes compared to those who fished streams.

Harvest patterns

Question 32: For each species below, how often do you harvest legal-sized trout when you catch them in inland lakes?

Email survey respondents tended not to harvest legal-sized Brook Trout or Brown Trout when they fished inland lakes. A majority of respondents rarely (27%) or never (26%) kept legal-sized Brook Trout when they caught them in inland lakes (Table A.29, Figure 7). Similarly, 50% of web survey respondents rarely or never kept legal-sized Brook Trout. Half of email survey respondents rarely (29%) or never (21%) kept legal-sized Brown Trout when they caught them in inland lakes (Table A.29), percentages that were higher than those of web survey respondents who rarely (28%) or never (18%) kept legal-sized Brown Trout. Michigan trout anglers were more likely to keep legal-sized Rainbow Trout than other trout species. Twenty-seven percent of Michigan trout anglers often or always kept legal-sized Rainbow Trout when they caught them in inland lakes (Table A.29, Figure A.14). For both the email and web surveys, a higher percentage of angling group members than non-members never harvested legal-sized trout (all five species) when they caught them in inland lakes.

Email survey respondents were less harvest-oriented than Wisconsin trout anglers in inland lakes. Across all species, an average of 23% of email survey respondents never harvested trout caught in inland lakes, and 24% rarely harvested trout. These percentages were considerably higher than the 3% of Wisconsin anglers who never harvested trout in inland lakes and the 11% of anglers who rarely harvested trout (Petchenik 2014). Nearly three quarters of Wisconsin anglers often (37%) or always (34%) harvested trout caught in inland lakes, whereas fewer than one fifth of email survey respondents often (13%) or always (5%) harvested trout from inland lakes.

Table A.29.—Percentage (%) of email survey respondents who showed different patterns of harvest for legal-sized Brook Trout, Brown Trout, Rainbow Trout, splake, and Lake Trout caught in inland lakes. The table also includes scores for each category (in parentheses), weighted mean scores (WMS; the overall score as weighted by the percentage in each category from 1 [never keep legal-sized trout] to 5 [always keep legal-sized trout]), and the number of respondents for each species (N).

Species	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Always (5)	WMS	N
Brook Trout	26	27	19	10	4	2.0	1,105
Brown Trout	21	29	25	11	4	2.2	1,113
Rainbow Trout	14	24	30	21	6	2.8	1,117
Splake	28	20	15	11	4	1.8	1,085
Lake Trout	24	20	19	13	5	2.0	1,104

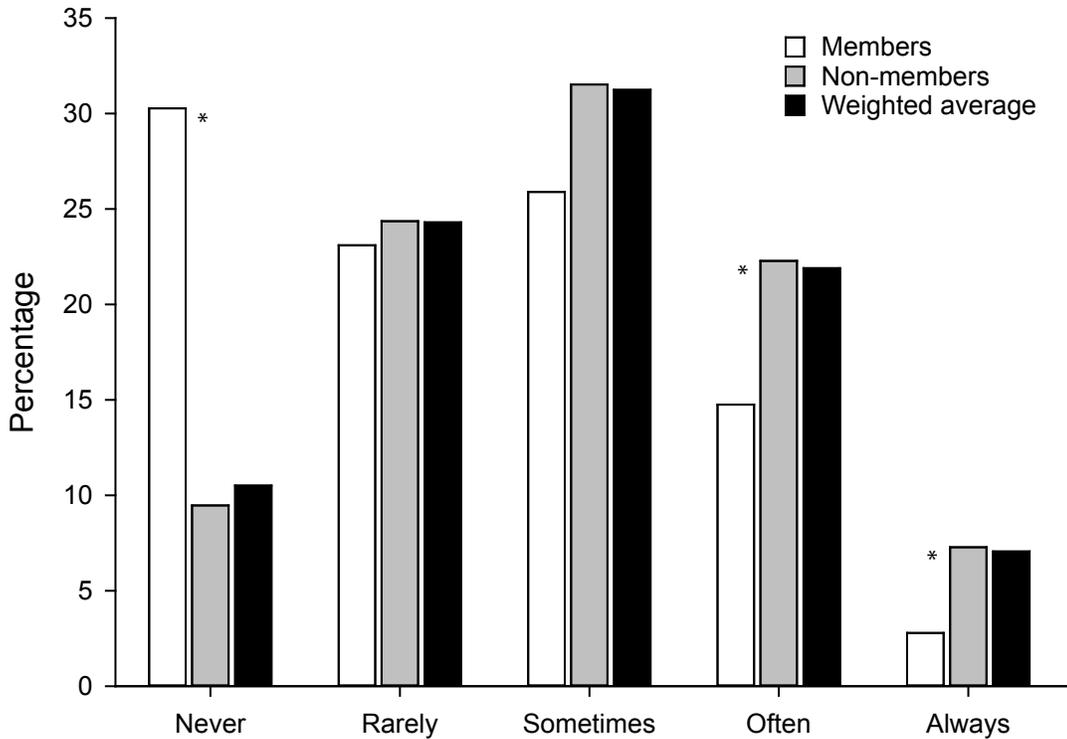


Figure A.14.—Frequency with which Michigan trout anglers harvested legal-sized Rainbow Trout when they caught them in inland lakes. Asterisks denote significantly different proportions between Members and Non-members within frequency categories ($P < 0.05$). There is a significant difference for the “Always” category because 0% of Members always harvest legal-sized Rainbow Trout. $N = 1,117$ anglers (251 Members, 866 Non-members).

Question 33: When fishing for inland trout in an inland lake, please tell us the size range (in inches) that a fish of each species must be for you to keep it. Minimum size means that you would not keep a trout smaller than your answer; maximum size means you would not keep a trout larger than your answer. If you do not fish for a type of trout or would never keep it, select one of those options.

In lakes, email survey respondents showed an interest in harvesting Brook Trout, Brown Trout, and Rainbow Trout at relatively small sizes, but they tended to harvest Lake Trout and splake that were relatively large (Table A.30). For example, more than 50% of respondents stated they would harvest each species if they were the following lengths or greater: Brook Trout (8 inches), Brown Trout (10 inches), Rainbow Trout (10 inches), Lake Trout (14 inches), and splake (12 inches).

Email survey respondents showed more willingness to release large fish of typical stream trout species in inland lakes than they would trout species more closely associated with lakes (Table A.31). For example, the percentages of respondents who stated they would release a 20-inch fish were as follows: Brook Trout (54%), Brown Trout (41%), Rainbow Trout (45%), Lake Trout (22%), and splake (33%). Therefore, respondents showed considerable interest in harvesting trout from inland lakes, especially Lake Trout and splake, once they reach a desirable size.

Table A.30.—For email survey respondents who harvested trout in Michigan inland lakes, the percentage (%) of respondents who stated they would keep trout if they were above given minimum lengths. The table also includes the percentage of respondents who do not fish for or would never keep a particular trout species (DF/NK) and the number of survey respondents (N).

Length (in)	Brook Trout	Brown Trout	Rainbow Trout	Lake Trout	Splake
2	12	9	7	7	9
3	13	9	7	8	9
4	13	10	8	8	10
5	19	12	9	9	11
6	32	17	16	9	12
7	34	17	17	10	13
8	63	39	43	17	26
9	64	40	44	18	26
10	75	61	70	26	43
11	75	62	71	27	44
12	77	67	75	31	50
13	81	76	85	49	59
14	82	81	90	58	63
15	82	81	90	58	64
16	82	83	92	65	66
17	82	83	92	65	66
18	82	85	93	72	68
19	82	85	93	72	68
20	82	85	93	72	68
21	82	85	93	72	68
22	82	85	94	74	69
23	82	85	94	74	69
24	82	85	94	74	69
25	82	85	94	74	69
26	82	85	94	74	69
27	82	85	94	74	69
28	82	85	94	75	69
DF/NK	18	15	6	26	31
N	930	925	940	896	886

Table A.31.—For email survey respondents who harvested trout from Michigan inland lakes, the percentage (%) of respondents who stated they would release trout if they were above given maximum lengths. The table also includes the percentage of respondents who do not fish for or would never keep a particular trout species (DF/NK) and the number of survey respondents (N).

Length (in)	Brook Trout	Brown Trout	Rainbow Trout	Lake Trout	Splake
2	11	8	6	7	7
3	11	8	6	7	7
4	11	8	6	7	7
5	11	8	6	7	8
6	11	8	6	7	8
7	11	8	6	7	8
8	12	8	6	7	8
9	12	8	6	7	9
10	17	10	9	7	9
11	17	10	9	7	9
12	22	11	11	8	10
13	29	14	14	8	11
14	34	17	18	9	14
15	35	17	19	9	16
16	42	22	24	12	19
17	43	22	25	12	20
18	53	37	40	19	29
19	53	38	41	19	29
20	54	41	45	22	33
21	55	41	45	23	33
22	59	51	54	31	39
23	60	54	56	35	41
24	60	55	58	37	42
25	60	55	58	38	43
26	61	57	61	39	44
27	61	57	61	40	44
28 ^a					
DF/NK	16	13	5	23	29
N	765	751	768	733	702

^a no max

Quality and trophy size definitions

Question 34: How long (in inches) must a trout from a Michigan inland lake be for you to consider it a “Quality”-sized trout versus a “Trophy”-sized trout? If you are uncertain or do not fish for one of the species listed, indicate that in the dropdown.

Email survey respondents’ definition of “quality” trout in inland lakes varied among species and was higher for more lake-oriented trout species. For example, more than two-thirds (66%) of respondents considered a lake-caught trout species to have reached “quality” size at the following lengths: Brook Trout (10 inches); Brown Trout (13 inches); Rainbow Trout (12 inches); Lake Trout (20 inches); and splake (18 inches) (Table A.32). Email survey respondents’ standards for “trophy”-sized trout for inland

lakes raised the bar for Brown Trout and Rainbow Trout to a level comparable with that of Lake Trout and splake. More than 66% of respondents identified fish at the following sizes as trophies: Brook Trout (16 inches), Brown Trout (20 inches), Rainbow Trout (20 inches), Lake Trout (20 inches), and splake (18 inches) (Table A.33).

Table A.32.—Percentage (%) of email survey respondents who considered trout of given lengths to be “quality” fish. The table also includes the percentage of email survey respondents who were uncertain or did not fish for a particular trout species (U/DF) and the total number of email survey respondents (N).

Length	Brook Trout	Brown Trout	Rainbow Trout	Lake Trout	Splake
2	6	6	6	6	10
3	8	7	7	7	10
4	13	8	9	7	11
5	14	8	9	7	11
6	32	16	17	10	15
7	33	17	18	10	15
8	59	32	37	14	24
9	61	32	39	14	25
10	68	41	47	16	30
11	75	55	63	25	41
12	80	66	73	31	49
13	81	68	74	32	50
14	83	76	82	42	58
15	83	76	82	43	58
16	84	84	91	60	65
17	84	84	91	61	66
18	84	86	93	64	67
19	84	86	93	65	67
20	84	87	94	70	68
21	84	87	95	72	68
22	84	87	95	73	68
23	84	87	95	73	68
24	84	87	95	74	68
25	84	87	95	74	68
26	84	88	95	75	68
U/DF	16	13	5	25	32
N	913	907	919	876	863

Table A.33.—Percentage (%) of email survey respondents who considered trout of given lengths to be “trophy” fish. The table also includes the percentage of respondents who were uncertain or did not fish for a particular trout species (U/DF) and the total number of survey respondents (N).

Length	Brook Trout	Brown Trout	Rainbow Trout	Lake Trout	Splake
2	7	7	8	8	11
3	8	8	8	8	11
4	8	8	8	8	11
5	8	8	8	8	11
6	8	8	8	8	11
7	8	8	8	8	11
8	13	8	8	9	11
9	14	8	9	9	11
10	19	10	10	9	13
11	31	12	12	9	15
12	43	15	17	11	17
13	46	16	17	11	18
14	63	24	26	13	23
15	63	25	27	13	24
16	77	46	49	19	38
17	78	47	50	20	39
18	79	54	57	23	42
19	80	55	59	24	43
20	82	69	73	32	53
21	83	74	78	36	59
22	84	78	81	40	61
23	84	78	81	40	62
24	84	82	85	48	64
25	84	82	86	48	65
26	87	89	95	78	72
U/DF	14	11	5	22	28
N	816	816	836	780	748

Tackle use

Question 35: How often do you use the following types of tackle when fishing for trout in inland lakes?

A majority of email survey respondents often (41%) or always (10%) used live bait when fishing for trout in inland lakes (Table A.34). Similarly, many web survey respondents often (36%) used live bait. Live bait use was more common in Wisconsin, where 65% of anglers always (27%) or often (38%) used live bait when fishing for trout in inland lakes (Petchenik 2014).

A majority of email survey respondents (64%) often or always used spinners or artificial lures when fishing for trout in inland lakes (Table A.34). Similarly, many web survey respondents often (50%) used spinners or artificial lures. These results were comparable to those from the Wisconsin trout angler survey, wherein 45% of Wisconsin trout anglers stated they often use spinners or artificial lures when fishing in inland lakes (Petchenik 2014).

Compared to email survey respondents who fish streams, lake anglers fished with live bait and spinners/artificial lures more frequently and artificial flies less frequently. Nearly half of email survey respondents rarely (23%) or never (25%) used artificial flies (Table A.34), percentages that were comparable to those of web survey respondents (rarely: 25%; never: 25%). However, email survey respondents were more likely to use flies for inland lake fishing than were Wisconsin anglers. About two-thirds of Wisconsin trout anglers never (43%) or rarely (22%) used artificial flies in inland lakes, and relatively few Wisconsin anglers often (8%) or always (8%) used artificial flies (Petchenik 2014).

Table A.34.—Percentage (%) of email survey respondents who fished for trout in inland lakes with live bait, spinners/artificial lures (Spin/lures), and artificial flies (Flies) with different levels of frequency. The table also includes the scores for each category (in parentheses), weighted mean scores (WMS; the overall score as weighted by the percentage in each category from 1 [never fish in inland lakes with given tackle types] to 5 [always fish in inland lakes with given tackle types]), and the number of respondents for each tackle type (N).

Tackle	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Always (5)	WMS	N
Live bait	11	12	26	41	10	3.3	1,072
Spin/lures	4	6	26	54	10	3.6	1,079
Flies	25	23	26	21	5	2.6	1,064

Perspectives on fishing regulations

Question 36: Considering where you have fished this past year, do you know the regulation types for the inland trout lakes you most often fish?

Michigan trout anglers were generally aware of the specific regulations in place on the inland lakes they most often fished. A majority of Michigan trout anglers (84%) knew the regulation types for the inland lakes they most often fished, whereas few Michigan trout anglers (16%) were unaware of current regulations (Table A.35). Similarly, 89% of web survey respondents knew the regulation types for the lakes they most often fished.

Table A.35.—Percentage (%) of Michigan trout anglers who knew (yes) and did not know (no) the regulation types for the lakes they most often fished. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage).

Response	Member	Non-member	Overall
Yes	88	84	84
No	12	16	16
Number of respondents	244	811	1,055

Question 37: Which regulation type does your favorite inland trout lake have? (check one)

More Michigan trout anglers had favorite inland lakes with Type A (28%) and Type B (25%) regulations than those that favored lakes with other regulations (Table A.36). Similarly, most web survey respondents had favorite inland lakes with Type A (24%) or Type B (29%) regulations. In general, the percentages of favorite lakes corresponded to the relative abundance of the each Type in the state. The percentages of favorite lakes with E and F regulations were higher than would be expected based on the number of these lakes. However, Type E and F lakes also generally are much larger than the lakes in the other categories.

Table A.36.—Percentage (%) of Michigan trout anglers who had favorite inland trout lakes with Type A–F regulations. Michigan trout anglers include angling group members (Member), non-members (Non-member), and all Michigan trout anglers (Overall, weighted percentage). The percentage of lakes with each regulation type (Lakes) is also included.

Regulation type	Member	Non-member	Overall	Lakes
A	25	28	28	33
B	21	25	25	31
C	8	14	14	13
D	22	10	10	12
E	15	11	12	6
F	9	11	11	6
Number of respondents	222	743	969	

Question 38: How often do you fish for trout in Michigan inland lakes that have the following regulation types?

Email survey respondents email survey respondents most often fished inland lakes with Type A or Type B regulations (Table A.37). More than half of respondents never or rarely fished on Type D (60%), Type E (51%), and Type F (53%) lakes. In general, the web survey results closely corresponded with the email survey responses for this question. For both the email and web surveys, higher proportions of angling group members always or sometimes fished Type D lakes, whereas a higher proportion of non-members never fished Type D lakes (Figure A.15).

Table A.37.—Percentage (%) of email survey respondents who fished inland lakes with Type A–F regulations with different levels of frequency. The table also includes the scores for each category (in parentheses), weighted mean scores (WMS; the overall score as weighted by the percentage in each category from 1 [never fish inland lakes with given regulations] to 5 [always fish inland lakes with given regulations]), and the number of respondents for each regulation type (N).

Regulation type	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Always (5)	WMS	N
A	22	21	27	15	5	2.3	962
B	18	19	30	15	5	2.3	947
C	22	24	27	11	4	2.1	949
D	33	27	20	7	2	1.8	955
E	26	25	24	8	4	2.0	954
F	29	24	24	8	2	1.9	943

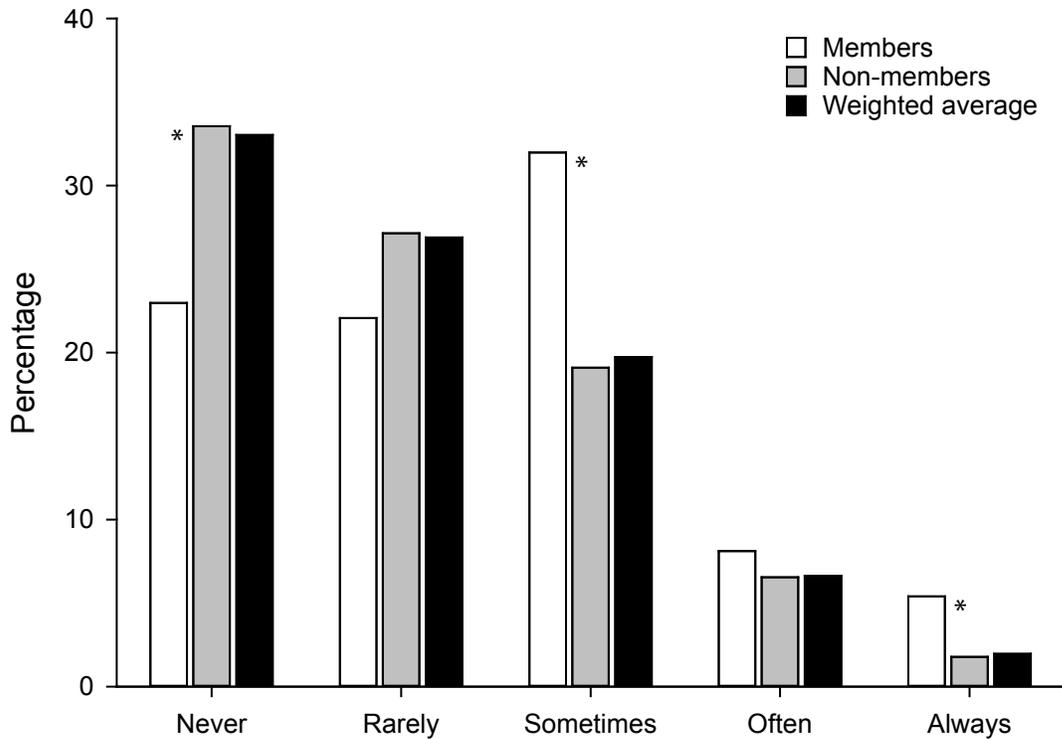


Figure A.15.—Frequency with which Michigan trout anglers fished lakes with Type D regulations. Asterisks denote significantly different proportions between Members and Non-members within frequency categories ($P < 0.05$). $N = 955$ anglers (222 Members, 733 Non-members).

Question 39: Please complete the following statement which pertains to the Michigan DNR’s balance of regulation types for inland trout in inland lakes and ponds. The number of lakes having this regulation type should be:

Email survey respondents generally believed the numbers of inland lakes with Type A–F regulations should remain at current levels. A majority of respondents (70–81%) believed the number of lakes with each of these regulations should be about the same as at present (Table A.38). Similarly, 65–81% of web survey respondents believed the number of lakes with Type A–F regulations should be about the same as at present.

Table A.38.—Percentage (%) of email survey respondents who believed the number of inland lakes with various regulation types should be higher, lower, or remain the same. The table also includes the scores for each category (in parentheses), weighted mean scores (WMS; the overall score as weighted by the percentage in each category from 1 [number of inland lakes with given regulations should be much lower] to 5 [number of lakes with given regulations should be much higher]), and the number of respondents for each regulation type (N).

Regulation type	Much lower (1)	Lower (2)	About same (3)	Higher (4)	Much higher (5)	WMS	N
A	4	10	76	8	2	2.9	904
B	2	7	76	12	3	3.1	900
C	2	7	76	10	5	3.1	895
D	10	11	70	8	2	2.8	904
E	3	8	78	8	3	3.0	901
F	3	7	81	6	3	3.0	896

Trout management satisfaction

Question 40: How satisfied are you with each of the following aspects of trout management on Michigan inland lakes?

Email survey respondents were generally satisfied with the DNR Fisheries Division’s management of inland trout lakes. A plurality of respondents was satisfied with various aspects of trout management in inland lakes. Email survey respondents were most satisfied with fishing seasons (weighted mean score = 3.5), followed by the DNR Fishing Guide and companion Inland Trout and Salmon Regulations and Maps, inland lake fishing regulations in general, and their trout fishing experiences on inland lakes (Table A.39). Email survey respondents were least satisfied with quality fishing opportunities (weighted mean score = 3.1; Table A.39). Similarly, many web survey respondents were satisfied with fishing seasons (45%), the DNR Fishing Guide and companion Inland Trout and Salmon Regulations and Maps (44%), inland lake fishing regulations in general (42%), and their trout fishing experiences on inland lakes (40%).

Overall, similar percentages of email survey respondents (53%) and Wisconsin trout anglers (56%) were satisfied or very satisfied with trout fishing seasons on inland lakes (Petchenik 2014). However, email survey respondents were less satisfied than Wisconsin anglers with (1) how inland lakes and ponds are categorized for trout size and bag limits, and (2) quality fishing experiences on inland lakes and ponds. Compared to the 59% of trout anglers who were satisfied or very satisfied with minimum size and bag limit categorization in Wisconsin (Petchenik 2014), only 43% of email survey respondents were satisfied or very satisfied with this aspect of trout management in Michigan inland lakes and ponds (Table A.39). Similarly, nearly half of Wisconsin anglers (45%) were satisfied with quality trout fishing experiences in Wisconsin (Petchenik 2014), whereas 38% of email survey respondents were satisfied or very satisfied with this aspect of trout management in Michigan (Table A.39).

Table A.39.—Percentage (%) of email survey respondents who had different levels of satisfaction regarding various aspects of trout management in inland lakes. Abbreviations are as follows: trout fishing seasons in lakes (Seasons); the DNR Fishing Guide and companion Inland Trout and Salmon Regulations and Maps online (DNR Guide); respondents’ personal fishing experiences (Personal exps); lake size and bag limit categorization (Lake cat); Michigan’s trout fishing regulations in inland lakes in general (Regs. general); and quality fishing opportunities (Quality opps). The table also includes the scores for each category (in parentheses), weighted mean scores (WMS; the overall score as weighted by the percentage in each category from 1 [very dissatisfied with given aspect of trout management] to 5 [very satisfied with given aspect of trout management]), and the number of respondents for each aspect of trout management (N).

Aspect	Very dissatisfied (1)	Dissatisfied (2)	Neutral (3)	Satisfied (4)	Very satisfied (5)	WMS	N
Seasons	2	8	38	49	4	3.5	996
DNR Guide	4	8	37	46	6	3.4	994
Personal exps	4	14	33	41	8	3.4	998
Lake cat	4	8	45	40	3	3.3	996
Regs. general	5	9	37	45	4	3.3	994
Quality opps	4	21	37	34	4	3.1	994

Question 41: For you personally, how easy or difficult would you say the inland Lake Trout fishing regulations are to understand?

Of the 1,037 email survey respondents who answered this question, more than one-third believed inland lake fishing regulations were easy (31%) or very easy (5%) to understand. Similarly, 35% of

web survey respondents believed inland Lake Trout fishing regulations were easy to understand. At the opposite end of the spectrum, nearly one-third of email survey respondents considered lake regulations to be difficult (23%) or very difficult (7%) to understand.

Demographic questions

Question 42: About how old were you the first time you went fishing? (even if you did not catch a fish)

Most Michigan trout anglers were relatively young (i.e., less than 10 years old) when they went fishing for the first time. Many Michigan trout anglers (26%) were five years old when they first went fishing (range = 1–83 years old; Table A.40, Table 2). The majority of Michigan trout anglers were older than age two (95%) and younger than age 11 (92%) when they first went fishing. Angling group members, non-members, and new anglers (i.e., those that have fished for less than one year in Michigan, Question 1) had similar distributions of the ages when they first went fishing (Table A.40).

Table A.40.—Percentage (%) of Michigan trout anglers who went fishing for the first time at various ages. “New” anglers are those who have fished for less than one year in Michigan (Question 1). “Member” and “Non-member” refer to members and non-members of trout fishing organizations who have fished for more than one year. “Overall” represents all Michigan trout anglers (weighted percentage).

Age	New	Member	Non-member	Overall
0	0	<1	<1	<1
1	<1	<1	1	1
2	2	4	4	4
3	8	10	12	11
4	13	13	15	14
5	27	25	26	26
6	9	11	11	11
7	7	7	6	6
8	13	11	9	10
9	<1	1	1	1
10	10	10	8	9
11–15	5	4	5	6
16–20	0	1	1	1
21–25	0	1	1	0
26–30	2	0	0	0
31–35	3	0	0	0
36–40	0	2	0	0
41–45	0	0	0	0
46–50	0	0	0	0
51–55	1	0	0	0
56–60	0	0	0	0
61–65	0	0	0	0
66–70	0	0	0	0
71–75	0	0	0	0
76–80	0	0	0	0
81–85	0	0	0	0
Number of respondents	313	988	2,247	3,548

Question 43: How many people in your household have a current fishing license, including yourself? (enter a number)

The majority of Michigan trout anglers (51%) were the only license holders in their household (Table A.41). Compared to angling group members and non-members, a higher percentage of new anglers (58%) were the only license holders in their households (Table A.41). Less than 15% of Michigan trout anglers had more than two anglers in their household.

Table A.41.—Percentage (%) of Michigan trout anglers who had different numbers of people (N) with current fishing licenses living in their household. “New” anglers are those who fished for less than one year in Michigan (Question 1). “Member” and “Non-member” refer to members and non-members of trout fishing organizations who fished for more than one year. “Overall” represents all Michigan trout anglers (weighted percentage).

N	New	Member	Non-member	Overall
1	58	53	49	51
2	31	34	36	35
3	8	8	10	9
4	1	3	3	3
5	<1	<1	1	1
6	<1	<1	<1	<1
9	0	0	<1	<1
10	0	<1	<1	<1
12	0	<1	0	<1
Number of respondents	315	988	2,250	3,553

Question 44: Which of the following best describes who you usually fish with?

A majority of Michigan trout anglers usually fished with friends (42%) or family/relatives (39%), whereas others fished alone (15%) or with other groups of people (Table A.42, Table 2). A higher percentage of angling group members fished with friends than non-members and new anglers, whereas a lower percentage of members fished with family and/or relatives compared to non-members and new anglers (Table A.42, Table 2). Michigan trout anglers fished with family/relatives less frequently than Pennsylvania trout anglers, 54% of whom fished with spouses or children and 15% of whom fished with extended family members (Responsive Management 2008).

Table A.42.—Percentage (%) of Michigan trout anglers who usually fished with different categories of people. “All” denotes all categories of people. “New” anglers are those who have fished for less than one year in Michigan (Question 1). “Member” and “Non-member” refer to members and non-members of trout fishing organizations who have fished for more than one year. “Overall” represents all Michigan trout anglers (weighted percentage).

Description	New	Member	Non-member	Overall
No one	17	16	15	15
Family and/or relatives	44	29	43	39
Friends	36	51	39	42
Guide	1	1	<1	<1
Clients	<1	1	<1	<1
All	<1	1	1	1
Family and friends	2	1	2	2
Number of respondents	312	989	2,252	3,553

Question 45: Do any of the following live in your household? (check all that apply)

Many email survey respondents lived with their spouses/significant others (Table A.43). Substantial numbers of respondents lived with children age 6–17 or “other family” (presumably children older than 17). Relatively few respondents lived alone or lived with extended family.

Table A.43.–Number of email survey respondents who lived with different categories of people. “New” respondents are those who fished for less than one year in Michigan (Question 1). “Member” and “Non-member” refer to members and non-members of trout fishing organizations who fished for more than one year.

People	New	Member	Non-member
Spouse/significant other	233	821	1,803
Children <5	39	74	208
Children 6–17	72	203	527
Other family	48	126	353
Extended family	24	40	96
None	44	108	244
Number of respondents	460	1,372	3,231

Question 46: Which of the following best describes your employment status?

A majority of Michigan trout anglers were employed full-time (64%) or retired (29%; Table A.44). Compared to angling group members and non-members, a slightly lower percentage of new anglers were employed full-time and a slightly higher percentage were retired. Only 4% of Michigan trout anglers were unemployed or had part-time employment.

Table A.44.–Percentage (%) of Michigan trout anglers with various employment statuses. “New” anglers are those who fished for less than one year in Michigan (Question 1). “Member” and “Non-member” refer to members and non-members of trout fishing organizations who fished for more than one year. “Overall” represents all Michigan trout anglers (weighted percentage).

Status	New	Member	Non-member	Overall
Full-time	60	63	65	64
Unemployed	2	1	1	1
Part-time	5	4	3	3
Retired	31	30	28	29
Other	3	2	3	3
Number of respondents	307	983	2,237	3,527

Question 47: What is your highest level of education? (check one)

Most Michigan trout anglers had at least some post high school or college education. A majority of Michigan trout anglers had some post high school/college education (29%) or a Bachelor’s degree (37%; Table A.45, Table 2), similar to trout anglers in other states (e.g., Kentucky; Dreves 2015). Approximately one quarter of Michigan trout anglers (26%) had a graduate degree. A higher percentage of angling group members (38%) than non-members (22%) had graduate degrees. In terms of their education, new anglers were similar to non-members (Table A.45).

Table A.45.—Percentage (%) of Michigan trout anglers with various levels of education. Abbreviations are as follows: high school (HS), general educational development (GED), Bachelor of Science degree (BS), graduate degree (Grad). “New” anglers are those who have fished for less than one year in Michigan (Question 1). “Member” and “Non-member” refer to members and non-members of trout fishing organizations who have fished for more than one year. “Overall” represents all Michigan trout anglers (weighted percentage).

Education	New	Member	Non-member	Overall
<HS	1	0	0	0
HS/GED	12	3	8	7
Some post-HS, college	33	22	32	29
BS	34	37	37	37
Grad	21	38	22	26
Number of respondents	310	983	2,243	3,536

Question 48: What is your race or ethnic background? (check all that apply)

At least seven racial or ethnic groups were represented among the Michigan trout anglers (Table A.46). Most Michigan trout anglers defined their race/ethnic background as White and non-Hispanic, as did trout anglers in other states (e.g., New Jersey; NJDEP 2014). The racial and ethnic diversity among Michigan trout anglers was lower than in the general population of Michigan.

Table A.46.–Percentage (%) of Michigan trout anglers by selected racial or ethnic background. “New” anglers are those who have fished for less than one year in Michigan (Question 1). “Member” and “Non-member” refer to members and non-members of trout fishing organizations who have fished for more than one year. “Overall” represents all Michigan trout anglers (weighted percentage).

Background	New	Member	Non-member	Overall
Asian	1	1	<1	<1
American Indian/Alaska native	1	1	1	1
Black	1	<1	<1	<1
Hawaii/Pacific Islander	0	<1	<1	<1
Hispanic	1	1	1	1
White	96	97	95	95
Other	2	1	2	2
Number of respondents	309	976	2,257	3,542

Question 49: Which of the following best describes your annual household income? (check one)

Michigan trout anglers most commonly defined their annual household income as \$100,000–149,000 (24%), followed by \$50,000–74,000 (22%), \$75,000–99,000 (20%), and other income categories (Table A.47, Table 2). Angling group members tended to have higher incomes than non-members, new anglers, and Michigan trout anglers as a whole.

Table A.47.–Percentage (%) of Michigan trout anglers by household income level. “New” anglers are those who fished for less than one year in Michigan (Question 1). “Member” and “Non-member” refer to members and non-members of trout fishing organizations who fished for more than one year. “Overall” represents all Michigan trout anglers (weighted percentage).

Income	New	Member	Non-member	Overall
\$0–\$24,000	8	2	3	3
\$25,000–\$49,000	16	7	16	14
\$50,000–\$74,000	24	15	24	22
\$75,000–\$99,000	18	20	20	20
\$100,000–\$149,000	20	28	22	24
\$150,000+	14	29	14	18
Number of respondents	291	920	2,102	3,313

Regional patterns in the income levels of Michigan trout anglers were also similar for the 1981 and 2015 surveys. Although income results from the ITAS were not directly comparable to those from Fenske (1983) because the latter surveyed anglers about personal income, whereas anglers were asked about household income in the ITAS, anglers from both survey periods displayed the same general income trends. For instance, in both 1981 and 2015, the income of Michigan trout anglers tended to increase progressively moving southward from the UP to the NLP and the SLP. The percentage of anglers in the two lowest income brackets of the 1981 survey (21.7%, n = 19) was highest for anglers who lived in the UP (Fenske 1983). Similarly, the percentage of anglers in the two lowest income brackets of the 2015 survey (21.6%, n = 49) was also highest for anglers who lived in the UP (Table A.48). In contrast, anglers who lived in the SLP had the greatest representation in the two highest income brackets of the 1981 survey (20.6%, n = 66) and the 2015 survey (43.9%, n = 900; Table A.48).

Table A.48.—Percentage (%) of email survey respondents by income in 2015 grouped by Michigan region. Significant differences among regions within income categories are denoted by different superscripted letters. Regional total denotes the number of respondents from each region. The total number of respondents who answered this question was 3,262.

Income	Region			
	Upper Peninsula	Northern Lower Peninsula	Southern Lower Peninsula	Out of state
\$0–\$24,999	5 ^a	4 ^a	3 ^a	<1 ^b
\$25,000–\$49,999	17 ^{ab}	19 ^a	13 ^b	10 ^b
\$50,000–\$74,999	32 ^a	29 ^b	20 ^c	14 ^d
\$75,000–\$99,999	20	19	20	16
\$100,000–\$149,999	18 ^b	18 ^b	25 ^a	27 ^a
≥\$150,000	8 ^d	11 ^c	19 ^b	31 ^a
Regional total	227	577	2,051	407

Question 50: What is the 5-digit zip code of your primary residence?

Most email survey respondents identified their primary residence as being located in a zip code in the northwestern NLP or the western, northeastern, or southeastern SLP (Table A.49, Figure A.16). The majority of respondents lived near urban population centers such as Detroit, Grand Rapids, Saginaw, Traverse City, and Marquette. Nearly two thirds of respondents (63%) lived in the SLP, whereas 18% lived in the NLP, seven percent lived in the UP, and 12% were nonresidents (Table A.50). In contrast, higher percentages of stream trout anglers resided in the UP (15%) and NLP (25%) in 1981 (Fenske 1983).

Table A.49.—Percentage (%) of email survey respondents by primary residence 5-digit zip code. Only zip codes with five or more respondents are included. “New” respondents are those who fished for less than one year in Michigan (Question 1). “Member” and “Non-member” refer to members and non-members of trout fishing organizations who have fished for more than one year. “Overall” represents the weighted percentage of all members and non-members for each zip code. The total number of respondents who answered this question was 3,462.

Zip code	New	Member	Non-member	Overall
48103	11	9	0	5
49684	0	7	8	7
48642	0	6	8	6
49686	0	5	8	6
48105	0	5	0	3
49341	0	5	12	8
49506	0	5	0	3
48009	0	4	0	2
48823	0	4	0	2
48640	22	4	8	6
49738	0	4	0	2
48306	0	3	6	4
49301	0	3	0	2
48067	0	3	0	2
48170	0	3	0	2
48430	0	3	0	2
48197	0	3	0	1
49546	0	3	0	1
49685	0	3	0	1
48073	0	2	6	4
48176	0	2	0	1
48230	22	2	0	1
48304	0	2	0	1
48843	0	2	6	4
48864	0	2	8	4
49441	0	2	0	1
49456	0	2	7	4
49601	44	2	8	5
49855	0	2	15	7
Total	9	235	171	415

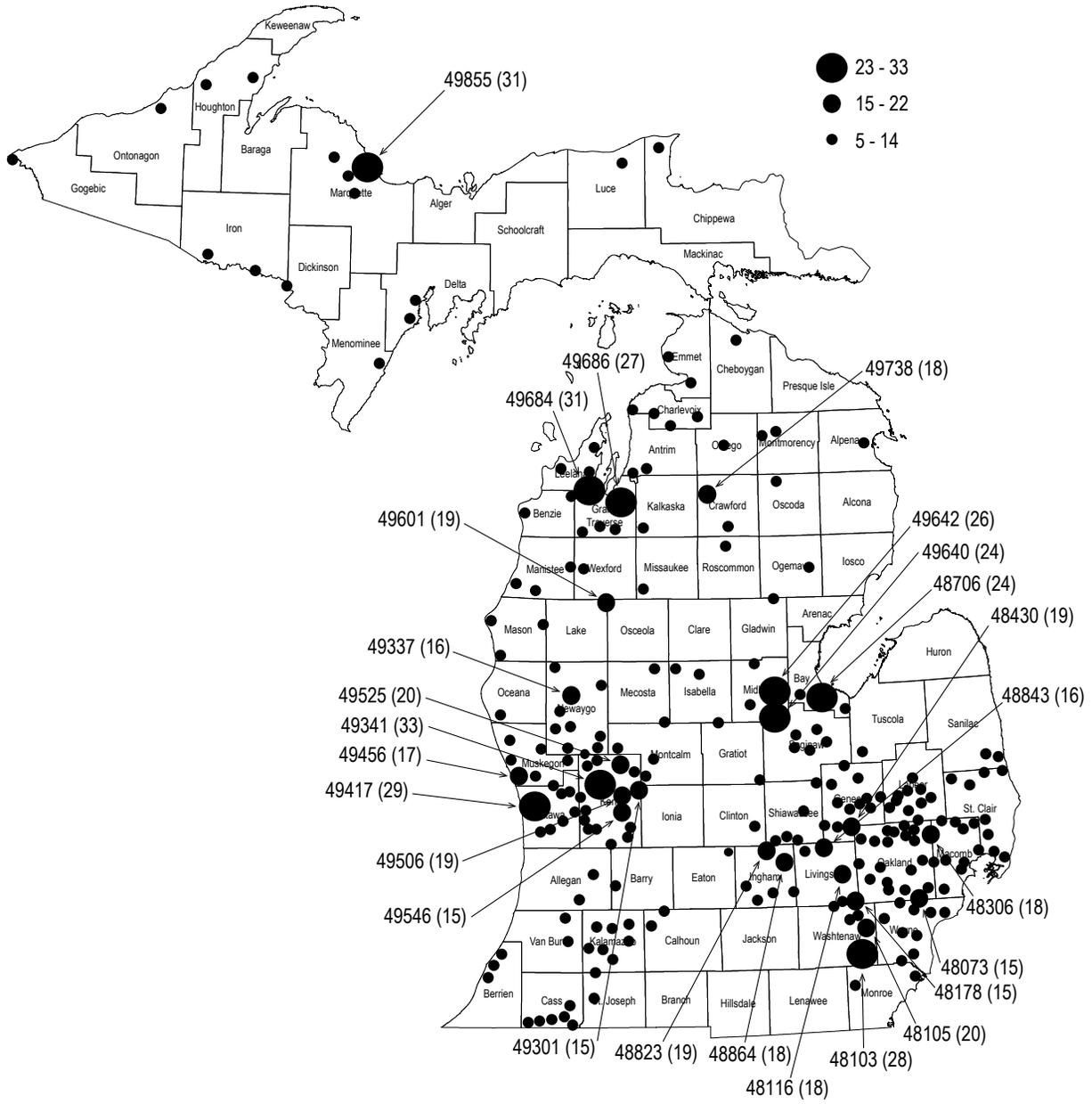


Figure A.16.—Map of Michigan zip codes where email survey respondents had their primary residence. Zip codes with at least 15 respondents are labeled (number of respondents in parentheses).

Table A.50.—Percentage (%) and number of Michigan trout anglers who lived in different Michigan regions and out-of-state in 2015. The total number of anglers who responded to this question was 3,462.

Region	Percentage	Number
Northern Lower Peninsula	18	609
Southern Lower Peninsula	63	2,181
Upper Peninsula	7	240
Out of state	12	432

Question 51: In what year were you born?

The largest group of Michigan trout anglers (36%) in this survey were 56–65 years old (Table A.51). Twenty-eight percent of Michigan trout anglers were either 51–55 or 66–70 years old. Anglers less than 30 years old made up less than one percent of all Michigan trout anglers in this survey.

Table A.51.—Percentage (%) of Michigan trout anglers by age. Only years with at least 17 Michigan trout anglers are included. “New” anglers are those who fished for less than one year in Michigan (Question 1). “Member” and “Non-member” refer to members and non-members of trout fishing organizations who fished for more than one year. “Overall” represents all Michigan trout anglers (weighted percentage).

Age	New	Member	Non-member	Overall
30–35	6	3	3	3
36–40	9	5	6	6
41–45	7	7	8	8
46–50	11	12	13	12
51–55	14	11	15	14
56–60	15	17	19	18
61–65	17	19	18	18
66–70	13	16	13	14
71–75	8	8	5	6
76–80	2	1	0	1
Number of respondents	239	870	1,872	2,981

Question 52: What is your sex?

Most Michigan trout anglers in this survey were male, regardless of their status as angling group members, non-members, or new anglers. The majority of Michigan trout anglers (97%) were male, whereas 3% of Michigan trout anglers were female (Table A.52, Table 2).

Table A.52.—Percentage (%) of Michigan trout anglers in this survey by sex. “New” anglers are those who fished for less than one year in Michigan (Question 1). “Member” and “Non-member” refer to members and non-members of trout fishing organizations who fished for more than one year. “Overall” represents all Michigan trout anglers (weighted percentage).

Sex	New	Member	Non-member	Overall
Female	2	3	2	3
Male	98	97	98	97
Number of respondents	301	982	2,221	3,504

Question 53: In the past 12 months, have you attended any fisheries-related public meetings, citizen advisory committee meetings, or other fisheries meetings?

Michigan trout anglers generally did not attend fisheries-related public meetings in 2014. The majority of Michigan trout anglers (84%) did not attend a fisheries-related public meeting, citizen advisory committee meeting, or other fisheries meeting in the past 12 months (Table A.53). A higher percentage of angling group members than non-members and new anglers attended a fisheries-related meeting in the past 12 months (Table A.53).

Table A.53.—Percentage (%) of Michigan trout anglers who attended and did not attend fisheries-related public meetings, citizen advisory committee meetings, or other fisheries meetings in the past 12 months. “New” anglers are those who fished for less than one year in Michigan (Question 1). “Member” and “Non-member” refer to members and non-members of trout fishing organizations who fished for more than one year. “Overall” represents all Michigan trout anglers (weighted percentage).

Attendance	New	Member	Non-member	Overall
Yes	12	31	10	16
No	88	69	90	84
Number of respondents	303	988	2,226	3,517

Question 54: In the past 12 months, have you fished in other countries or in other states, besides Michigan?

Many Michigan trout anglers fished outside of Michigan in 2014. Nearly half of Michigan trout anglers (47%) fished in other countries or states in the past 12 months (Table A.54). A higher percentage of angling group members than non-members and new anglers fished in other countries or states in the past 12 months (Table A.54).

Table A.54.–Percentage (%) of Michigan trout anglers who fished and did not fish in other countries or states in the past 12 months. “New” anglers are those that fished for less than one year in Michigan (Question 1). “Member” and “Non-member” refer to members and non-members of trout fishing organizations that fished for more than one year. “Overall” represents all Michigan trout anglers (weighted percentage).

Attendance	New	Member	Non-member	Overall
Yes	41	65	41	47
No	59	35	59	53
Number of respondents	303	990	2,232	3,525

Question 55: Do you belong to any of the following clubs or organizations? (check all that apply)

More Michigan email survey respondents than Wisconsin anglers were members of environmental/conservation clubs or organizations. Many email survey respondents were members of Trout Unlimited, fishing/hunting clubs, Michigan United Conservation Clubs, Anglers of the Au Sable, and/or the Federation of Fly Fishers (Table A.55).

Table A.55.–Number of email survey respondents who identified themselves as members of clubs and organizations. “New” respondents are those who fished for less than one year in Michigan (Question 1). “Member” and “Non-member” refer to members and non-members of Anglers of the Au Sable, Federation of Fly Fishers, and Trout Unlimited who fished for more than one year.

Organization	New	Member	Non-member
Anglers of the Au Sable	1	214	0
Federation of Fly Fishers	5	202	0
Lake associations or watershed groups	3	91	84
Fishing or hunting clubs	31	158	200
Michigan United Conservation Clubs	16	125	220
Michigan River Guide’s Association	0	14	2
Michigan Steelhead and Salmon Fishermen’s Association	9	23	50
Trout Unlimited	28	929	0
Other	32	0	30
Total	125	1,756	586

Question 56: How did you hear about this inland trout angler survey? (select one)

Many email survey respondents heard about the survey via electronic media. All respondents heard about the survey via email, although some respondents used the DNR website and other electronic and nonelectronic sources (Table A.56). The percentage of respondents who heard about the ITAS from various sources was similar for angling group members, non-members, and new anglers. A slightly lower percentage of members than non-members and new anglers heard about the survey from the DNR website (Table A.56).

Table A.56.—Percentage (%) of email survey respondents who heard about the inland trout angler survey from sources other than email by source. “New” respondents are those who fished for less than one year in Michigan (Question 1). “Member” and “Non-member” refer to members and non-members of trout fishing organizations who fished for more than one year. All respondents received an email directing them to take the ITAS.

Source	New	Member	Non-member
DNR website	8	4	5
Friend/relative	3	5	4
DNR press release	6	4	3
Other internet source	2	2	3
Other source	1	3	1
Fishing organization	1	2	1
Newspaper/magazine	1	0	<1
Number of respondents	300	989	2,216

Question 57: Please record any additional comments you may have below.

Many email survey respondents (n = 186) offered comments of appreciation in Question 57 (Table A.57a). In addition, respondents stated that new regulations for bag limits/catch and release are needed, trout fishing regulations are too complex, and/or more trout need to be stocked. Comments about local issues and personal fishing experiences (Table A.57b) were sent to the appropriate fishery management biologists.

Table A.57a.—Number of email survey respondents (N) who offered additional comments in Question 57 organized by category. If a comment encompassed more than one category, the respondent offering it is included in both categories. If a comment could not be classified into one of these categories, it is included in Table A.57b. The total number of respondents who answered this question was 1,061.

Type of comment	N
Appreciation for DNR management	186
New regulations (general comments)	149
Rule complexity	116
Increase stocking	100
New regulations (bag limit/catch & release)	79
Habitat improvement	39
DNR Fishing Guide (general comments)	38
Increase public access	37
Enforcement	33
Survey too long	25
Lengthen fishing season	15
Decrease stocking	15
DNR Fishing Guide (fishing app)	14
Change number of fish species managed for	9
Increase public access (limited mobility)	5
Chumming	4
Increase recreational opportunities	1
Total	865

Table A.57b.—Number of email survey respondents who offered additional comments in Question 57 that could not be classified into one of the categories in Table A.57a. The total number of respondents who answered this question was 1,061.

Type of comment	N
General comments	90
Fishing quality has decreased	82
Personal fishing experiences	72
License fee too high	18
Survey design needs improvement	13
Increase youth fishing opportunities	13
Improve license structure for out-of-state anglers	12
Au Sable River fishing quality has decreased	11
Too many paddlers on rivers	9
Invasive species spread	9
DNR effectiveness (needs improvement)	8
Brook Trout fishing opportunities too limited	6
Shorten season	6
Snagging (general comments)	5
Anticipating the fishing season	4
Beaver and beaver dam management needs improvement	4
Oil and gas (general comments)	4
Professional fishing guides (general comments)	4
Residential development too extensive	3
Importance of science-based management	3
Stocking practices need refinement	3
Atlantic salmon (general comments)	2
Control beavers	2
Increase conservation funding	2
Current regulations effective	2
Remove dams	2
Increase DNR funding	3
Fracking (general comments)	2
Hodenpyl dam (general comments)	2
Maintain current stocking levels	2
Increase signage along streams	2
Change timing of stocking	2
Increase trout fishing opportunities in lakes	2
Add Canada postal codes	1
Add college and high school student as survey option	1
Add free fishing and hunting for elderly	1
Add free fishing days	1
Add no-kill fly zone	1
Add trout stamp	1
All species license (general comment)	1
Angler density too high	1
Angler wading rights need clarification	1
Assist anglers with trout identification	1
Catch and release not mentioned in survey	1
Change master angler classification	1

Table A.57b.—Continued.

Type of comment	N
Change race question in survey	1
Chestnut lamprey problem	1
Combine fishing and hunting licenses	1
Concern about avian predation on fish	1
Concern about Bessemer treatment plant	1
Concern about gill netting	1
Concern about hooking mortality	1
Concern about public support of DNR	1
Concern about reliability of survey results	1
Concern about trout mortality	1
Concern about yellow perch	1
Counties question too vague	1
Create a lifelong achievement award	1
DNR needs to embrace technology more	1
Email address bias for ITAS	1
Favorite fishing destination (general comment)	1
Forest diversity (general comment)	1
Ice fishing (general comment)	1
Improve hatcheries	1
Improve lamprey control/lampricide	1
Improve landing net handle regulation	1
Improve management of small streams	1
Improve the ITAS news release	1
Increase coaster Brook Trout fishing opportunities	1
Increase fishing opportunities	1
Increase fishing opportunities for women	1
Increase Lake Trout fishing opportunities	1
Increase number of streams open to fishing in eastern MI	1
Increase public outreach on proper trout handling	1
Increase Salmon in the Classroom opportunities	1
Increase trout fishing opportunities in SE MI	1
Manage for trophy Brown Trout	1
More survey questions about catch and release	1
More surveys	1
More workshops	1
Need fewer "sociologically based regulations"	1
Need fish ladders	1
Otter abundance too high	1
Pacific salmon (general comment)	1
Pucker Street dam (general comment)	1
Refine definition of "trophy" Lake Trout	1
Smallmouth bass too abundant	1
Some trout fishing regulations obsolete	1
Spearfishing (general comment)	1
Special interest groups (general comment)	1
Stream closures (general comment)	1
Too many boats	1
Torpedoes (general comment)	1
Total	464

Copy of the Inland Trout Angler Survey

(reduced to fit this page)

Inland trout angler survey

Inland trout angler survey background & instructions

Background: The Michigan Department of Natural Resources (DNR) Fisheries Division is developing a statewide management plan for inland trout fisheries. Inland trout populations are defined as those which spend their entire lives in inland lakes and streams, and generally do not migrate into the Great Lakes. Optimal management of fish populations to benefit Michigan anglers involves an understanding of biological and social factors. This survey seeks to gather information on social factors important for management planning, including information on inland trout anglers, their use of Michigan's trout resources, and their thoughts and opinions on inland trout management. The survey includes sets of questions pertaining to trout fishing and management in streams and inland lakes, with each set of questions (stream and lake) taking 10-20 minutes to complete. Your participation is voluntary and you may choose not to participate at all, refuse to answer certain questions, or stop the survey at any time without repercussions.

Instructions: Please answer these questions only with respect to fishing for inland trout in Michigan streams and inland lakes and ponds. Inland trout populations spend their entire lives in inland lakes and streams, and generally do not migrate into the Great Lakes. Brook trout and brown trout are the primary species of inland trout in Michigan streams, while inland lakes and ponds may have stocked or naturally-reproducing populations of brook trout, brown trout, rainbow trout, lake trout, or splake (a hybrid of brook trout and lake trout). This survey does not pertain to populations of salmon and trout (including steelhead) that live in the Great Lakes or move inland from the Great Lakes. Thank you for taking the time to complete this survey, and contributing to management of Michigan's inland trout resources.

1. Check this box if you've fished less than one year for inland trout in Michigan.

2. About how many years have you fished for inland trout in Michigan? (Enter a number)

3. When planning a trout fishing trip to a stream or lake, which if any, of the following resources do you use? (check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Michigan DNR Fishing Guide | <input type="checkbox"/> contact DNR |
| <input type="checkbox"/> Michigan DNR online trout waters maps | <input type="checkbox"/> bait shop contacts |
| <input type="checkbox"/> smart phone | <input type="checkbox"/> plat maps |
| <input type="checkbox"/> online map tools | <input type="checkbox"/> fishing guides |
| <input type="checkbox"/> mapbook or gazatteer | <input type="checkbox"/> online fishing forums |
| <input type="checkbox"/> word of mouth (other anglers) | <input type="checkbox"/> trout fishing books and guides |

Inland trout angler survey

4. During a trout fishing trip to a stream or lake, which if any, of the following items do you bring with you? (check all that apply)

- | | |
|---|-------------------------------------|
| <input type="checkbox"/> cell phone | <input type="checkbox"/> road atlas |
| <input type="checkbox"/> smart phone | <input type="checkbox"/> plat map |
| <input type="checkbox"/> Michigan DNR Fishing Guide | <input type="checkbox"/> GPS |

5. How do you usually determine what the trout fishing regulations are on a Michigan stream and lake? (check all that apply)

- | | |
|---|---|
| <input type="checkbox"/> Text description in the Michigan DNR Fishing Guide | <input type="checkbox"/> Word of mouth- other anglers |
| <input type="checkbox"/> Michigan DNR's online Inland Trout and Salmon Regulations and Maps | <input type="checkbox"/> Tackle shops |
| <input type="checkbox"/> Directly contact Michigan DNR | <input type="checkbox"/> Online fishing forums |

6. Michigan DNR Fisheries Division often has to consider the trade-offs of generating products for anglers against other priorities. For example, we have had requests to print a hardcopy version of the companion Inland Trout and Salmon Regulations and Maps (which are currently online) for the Michigan DNR Fishing Guide. However, printing the 500,000 copies needed for public distribution would cost about \$125,000; meaning less “on the ground” work is accomplished. Do you think Fisheries Division should spend a portion of its budget to produce a hardcopy version of the companion Inland Trout and Salmon Regulations and Maps for the Michigan DNR Fishing Guide?

- Yes
- No
- I don't know

***7. Do you fish for inland trout in streams?**

- Yes
- No

Inland trout fishing in streams

These questions pertain to fishing for inland trout (typically brown trout and brook trout) in Michigan streams.

Inland trout angler survey

8. About how many times did you fish for inland trout in Michigan streams in 2014? (Enter a number)

9. Where do you do most of your fishing for inland trout in Michigan streams? (choose one)

- Upper Peninsula
 Northern half of Lower Peninsula
 Southern half of Lower Peninsula

10. In about how many different streams did you fish for inland trout in 2014? (Enter a number)

11. In which two counties do you do most of your stream fishing for inland trout?

County

County

12. Which species of inland trout do you typically target in streams? (check all that apply)

- Brown trout
 Brook trout
 Rainbow trout (not steelhead)

Inland trout angler survey

13. To you, how important are the following reasons in deciding whether or not to fish a trout stream?

	Very unimportant	Unimportant	Neutral	Important	Very important	I don't know
Chance to catch a brook trout	<input type="radio"/>					
Chance to catch a brown trout	<input type="radio"/>					
Chance to catch a rainbow trout	<input type="radio"/>					
Presence of trophy trout	<input type="radio"/>					
Presence of quality-sized trout	<input type="radio"/>					
Potential to catch large numbers of trout	<input type="radio"/>					
Presence of wild trout	<input type="radio"/>					
Presence of stocked trout	<input type="radio"/>					
Ease of access to the stream	<input type="radio"/>					
Aesthetic beauty of waters	<input type="radio"/>					
Regulations that allow harvest of trout	<input type="radio"/>					
Regulations that allow you to fish using the methods and gear you prefer	<input type="radio"/>					
Public lands adjacent to stream	<input type="radio"/>					
Stream size is small (less than 10 feet wide)	<input type="radio"/>					
Stream size is medium (10-30 feet wide)	<input type="radio"/>					
Stream size is large (more than 30 feet wide)	<input type="radio"/>					

14. Which number best represents the effect each item would have on whether or not you would fish a trout stream?

	Will only fish	Prefer to fish	Does not matter	Prefer not to fish	Will never fish	Unsure
Public access to stream is available	<input type="radio"/>					
Landowner permission is required to access stream	<input type="radio"/>					

Inland trout angler survey

15. For each species below, how often do you harvest legal-sized trout when you catch them in streams?

	Do not fish for	Never	Rarely	Sometimes	Often	Always
Brook trout	<input type="radio"/>					
Brown trout	<input type="radio"/>					
Rainbow trout	<input type="radio"/>					

16. For this question, assume there are no minimum size limits for trout in Michigan streams. When fishing for inland trout in a stream, please tell us the size range (in inches) that a fish of each species must be for you to keep it. Minimum size means that you would not keep a trout smaller than your answer; maximum size means you would not keep a trout larger than your answer. If you do not fish for a type of trout or would never keep it, select one of those options.

	Minimum length	Maximum length
Brook trout	<input type="text"/>	<input type="text"/>
Brown trout	<input type="text"/>	<input type="text"/>
Rainbow trout	<input type="text"/>	<input type="text"/>

17. How long (in inches) must a trout from a Michigan stream be for you to consider it a "Quality"-sized trout versus a "Trophy"-sized trout? If you are uncertain or do not fish for one of the species listed, indicate that in the dropdown.

	Minimum length for "Quality" trout	Minimum length for "Trophy" trout
Brook trout	<input type="text"/>	<input type="text"/>
Brown trout	<input type="text"/>	<input type="text"/>
Rainbow trout	<input type="text"/>	<input type="text"/>

18. How often do you use the following types of tackle when fishing for inland trout in streams?

	Never	Rarely	Sometimes	Often	Always
Live bait	<input type="radio"/>				
Spinners or artificial lures	<input type="radio"/>				
Artificial flies	<input type="radio"/>				

Inland trout regulations for streams and questions

Inland trout angler survey

The Michigan Fishing Guide details the sport fishing regulations for all trout waters. Michigan streams typically have one of four types of regulations for inland trout shown above, or they may have “Gear restricted” regulations which are specific to individual stream reaches. Gear restricted reaches typically limit anglers to fishing only with artificial flies or with only artificial lures (which includes artificial flies).

Stream Type (Colors below are indicated accordingly on the maps online.)	Fishing Season	Possession Season	Minimum Size Limit (inches)		All Trout and Salmon	Daily Possession Limit
			Brook Trout	Brown Trout		
1 (Approx. 1,400 streams)	Last Sat. in Apr. - Sep. 30	Last Sat. in Apr. - Sep. 30	7"	8"	Atlantic, Chinook, Coho & Pink Salmon, Lake Trout, Rainbow Trout (Steelhead), Splake	5 fish, but no more than 3 trout 15" or greater
2 (14 streams)	Last Sat. in Apr. - Sep. 30	Last Sat. in Apr. - Sep. 30	10"	12"		
3 (60 streams)	Open All Year	Open All Year	15"	15"		
4 (130 streams)	Open All Year	Last Sat. in Apr. - Sep. 30 for Brook Trout, Brown Trout, and Atlantic Salmon Open all year for all other Trout and Salmon	8"	10"		

19. Considering where you have fished this past year, do you know the regulation types for the streams you most often fish?

- Yes
 No

20. Which regulation type does your favorite reach of stream have? (check one)

- I don't know Type 3 Gear Restricted- artificial lures only
 Type 1 Type 4
 Type 2 Gear Restricted- artificial flies only

Inland trout angler survey

All types of natural and artificial baits may be used on stream Types 1-4			Minimum Size Limit (inches)			Daily Possession Limit
Stream Type (Colors below are indicated accordingly on the maps online.)	Fishing Season	Possession Season	Brook Trout	Brown Trout	Atlantic, Chinook, Coho & Pink Salmon, Lake Trout, Rainbow Trout (Steelhead), Splake	All Trout and Salmon
1 (Approx. 1,400 streams)	Last Sat. in Apr. - Sep. 30	Last Sat. in Apr. - Sep. 30	7"	8"	10"	5 fish, but no more than 3 trout 15" or greater
2 (14 streams)	Last Sat. in Apr. - Sep. 30	Last Sat. in Apr. - Sep. 30	10"	12"		
3 (60 streams)	Open All Year	Open All Year	15"	15"		
4 (130 streams)	Open All Year	Last Sat. in Apr. - Sep. 30 for Brook Trout, Brown Trout, and Atlantic Salmon Open all year for all other Trout and Salmon	8"	10"		

21. About how often do you fish Michigan streams having the following regulation types?

	Never	Rarely	Sometimes	Often	Always	I don't know
Type 1	<input type="radio"/>					
Type 2	<input type="radio"/>					
Type 3	<input type="radio"/>					
Type 4	<input type="radio"/>					
Gear Restricted- artificial flies only	<input type="radio"/>					
Gear Restricted- artificial lures only	<input type="radio"/>					

22. Currently, all Type 3 and 4 streams and most Gear Restricted streams are open to fishing for inland trout outside of the standard trout season (last Saturday in April to September 30). In a typical year, about how many times do you fish for inland trout on these streams outside the standard harvest season? (enter a number)

Inland trout angler survey

All types of natural and artificial baits may be used on stream Types 1-4			Minimum Size Limit (inches)			Daily Possession Limit
Stream Type (Colors below are indicated accordingly on the maps online.)	Fishing Season	Possession Season	Brook Trout	Brown Trout	Atlantic, Chinook, Coho & Pink Salmon, Lake Trout, Rainbow Trout (Steelhead), Splake	All Trout and Salmon
1 (Approx. 1,400 streams)	Last Sat. in Apr. - Sep. 30	Last Sat. in Apr. - Sep. 30	7"	8"	10"	5 fish, but no more than 3 trout 15" or greater
2 (14 streams)	Last Sat. in Apr. - Sep. 30	Last Sat. in Apr. - Sep. 30	10"	12"		
3 (60 streams)	Open All Year	Open All Year	15"	15"		
4 (130 streams)	Open All Year	Last Sat. in Apr. - Sep. 30 for Brook Trout, Brown Trout, and Atlantic Salmon Open all year for all other Trout and Salmon	8"	10"		

23. Please complete the following statement which pertains to the Michigan DNR's balance of regulation types for inland trout in streams. The number of streams having this regulation type should be:

	Much lower	Lower	About the same	Higher	Much higher
Type 1	<input type="radio"/>				
Type 2	<input type="radio"/>				
Type 3	<input type="radio"/>				
Type 4	<input type="radio"/>				
Gear Restricted- artificial flies only	<input type="radio"/>				
Gear Restricted- artificial lures only	<input type="radio"/>				

Inland trout angler survey

24. How satisfied are you with each of the following aspects of trout management on Michigan streams?

	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied
How streams are categorized for trout minimum size limits and bag limit	<input type="radio"/>				
Trout fishing seasons for streams	<input type="radio"/>				
Quality trout fishing opportunities on streams	<input type="radio"/>				
Michigan DNR Fishing Guide and companion Inland Trout and Salmon Regulations and Maps online	<input type="radio"/>				
Michigan's inland trout stream fishing regulations, in general	<input type="radio"/>				
Your experiences fishing for inland trout on Michigan streams	<input type="radio"/>				

*25. Do you fish for trout in Michigan inland lakes?

- Yes
 No

Questions pertaining to fishing for trout in Michigan's inland lakes

26. About how many times did you fish for trout in Michigan inland lakes in 2014? (enter a number)

27. Where do you do most of your fishing for trout in Michigan inland lakes? (choose one)

- Upper Peninsula
 Northern half of Lower Peninsula
 Southern half of Lower Peninsula

Inland trout angler survey

28. In about how many different lakes did you fish for inland trout in 2014? (enter a number)

29. In which two counties do you do most of your fishing for trout in inland lakes?

County

County

30. Which species of inland trout do you typically target in inland lakes? (check all that apply)

- Brook trout
- Brown trout
- Rainbow trout
- Splake
- Lake trout

Inland trout angler survey

31. To you, how important are the following reasons in deciding whether or not to fish an inland lake for trout?

	Very unimportant	Unimportant	Neutral	Important	Very important	I don't know
Chance to catch a brook trout	<input type="radio"/>					
Chance to catch a brown trout	<input type="radio"/>					
Chance to catch a rainbow trout	<input type="radio"/>					
Chance to catch a lake trout	<input type="radio"/>					
Chance to catch a splake	<input type="radio"/>					
Presence of trophy trout	<input type="radio"/>					
Presence of quality-sized trout	<input type="radio"/>					
Potential to catch large numbers of trout	<input type="radio"/>					
Presence of wild trout	<input type="radio"/>					
Presence of stocked trout	<input type="radio"/>					
Vehicular access to lake	<input type="radio"/>					
Walk-in access to lake	<input type="radio"/>					
Aesthetic beauty of waters	<input type="radio"/>					
Regulations that allow harvest of trout	<input type="radio"/>					
Regulations that allow you to fish using the methods and gear you prefer	<input type="radio"/>					
Lake size <10 acres	<input type="radio"/>					
Lake size 10-50 acres	<input type="radio"/>					
Lake size >50 acres	<input type="radio"/>					

32. For each species below, how often do you harvest legal-sized trout when you catch them in inland lakes?

	Do not fish for	Never	Rarely	Sometimes	Often	Always
Brook trout	<input type="radio"/>					
Brown trout	<input type="radio"/>					
Rainbow trout	<input type="radio"/>					
Splake	<input type="radio"/>					
Lake trout	<input type="radio"/>					

Inland trout angler survey

33. When fishing for inland trout in an inland lake, please tell us the size range (in inches) that a fish of each species must be for you to keep it. Minimum size means that you would not keep a trout smaller than your answer; maximum size means you would not keep a trout larger than your answer. If you do not fish for a type of trout or would never keep it, select one of those options.

	Minimum length	Maximum length
Brook trout	<input type="text"/>	<input type="text"/>
Brown trout	<input type="text"/>	<input type="text"/>
Rainbow trout	<input type="text"/>	<input type="text"/>
Lake trout	<input type="text"/>	<input type="text"/>
Splake	<input type="text"/>	<input type="text"/>

34. How long (in inches) must a trout from a Michigan inland lake be for you to consider it a "Quality"-sized trout versus a "Trophy"-sized trout? If you are uncertain or do not fish for one of the species listed, indicate that in the dropdown.

	Minimum length for "Quality" trout	Minimum length for "Trophy" trout
Brook trout	<input type="text"/>	<input type="text"/>
Brown trout	<input type="text"/>	<input type="text"/>
Rainbow trout	<input type="text"/>	<input type="text"/>
Lake trout	<input type="text"/>	<input type="text"/>
Splake	<input type="text"/>	<input type="text"/>

35. How often do you use the following types of tackle when fishing for inland trout in inland lakes?

	Never	Rarely	Sometimes	Often	Always
Live bait	<input type="radio"/>				
Spinners or artificial lures	<input type="radio"/>				
Artificial flies	<input type="radio"/>				

Inland lake trout regulations table and questions

The Michigan Fishing Guide details the sport fishing regulations for all trout waters. Michigan inland lakes typically have one of the six types of regulations for inland trout shown here.

Inland trout angler survey

38. How often do you fish for trout in Michigan inland lakes that have the following regulation types?

	Never	Rarely	Sometimes	Often	Always	I don't know
Type A	<input type="radio"/>					
Type B	<input type="radio"/>					
Type C	<input type="radio"/>					
Type D	<input type="radio"/>					
Type E	<input type="radio"/>					
Type F	<input type="radio"/>					

Lake Type	Fishing Season	Possession Season	Tackle	Daily Possession Limit	Brook Trout	Brown Trout, Rainbow Trout, & Splake	Lake Trout	Coho, Chinook, & Pink Salmon	Atlantic Salmon
Minimum Size Limit (inches)									
A	Last Sat. in Apr. - Sep. 30	Last Sat. in Apr. - Sep. 30	All except minnows	5/3*	10"	12"	15"	10"	15"
B	Open All Year	Open All Year	All	5/3*	10"	12"	15"	10"	15"
C	Open All Year	Open All Year	All	5/3*	8"	8"	8"	10"	15"
D	Last Sat. in Apr. - Sep. 30	Last Sat. in Apr. - Sep. 30	Artificial lures only**	1	15"	15"	15"	10"	15"
E	Open All Year	Open All Year	All	3	15"	15"	15"	10"	15"
F	Open All Year	Lake Trout- Jan. 1 - Oct. 31 Other Trout & Salmon open all year	All	5/3^	10"	10"	10"	10"	10"

39. Please complete the following statement which pertains to the Michigan DNR's balance of regulation types for inland trout in inland lakes and ponds. The number of lakes having this regulation type should be:

	Much lower	Lower	About the same	Higher	Much higher
Type A	<input type="radio"/>				
Type B	<input type="radio"/>				
Type C	<input type="radio"/>				
Type D	<input type="radio"/>				
Type E	<input type="radio"/>				
Type F	<input type="radio"/>				

Inland trout angler survey

40. How satisfied are you with each of the following aspects of trout management on Michigan streams?

	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied
How lakes are categorized for trout size and bag limit	<input type="radio"/>				
Trout fishing seasons for lakes	<input type="radio"/>				
Quality trout fishing opportunities on lakes	<input type="radio"/>				
Michigan DNR Fishing Guide and companion Inland Trout and Salmon Regulations and Maps online	<input type="radio"/>				
Michigan's fishing regulations for trout in inland lakes, in general	<input type="radio"/>				
Your experiences fishing for trout on Michigan's inland lakes	<input type="radio"/>				

41. For you personally, how easy or difficult would you say the inland lake trout fishing regulations are to understand?

- Very difficult
- Difficult
- Neutral
- Easy
- Very easy

Demographic data

To help group your responses with those of other individuals and to ensure that we have an adequate sample, we would like to know a little about you. The demographic data we collect may be summarized in a report but will remain confidential and not contain any personal information about individuals. The DNR is committed to confidentiality and anonymity of records, and will not share personal information with others.

42. About how old were you the first time you went fishing? (even if you did not catch a fish)

43. How many people in your household have a current fishing license, including yourself? (enter a number)

Inland trout angler survey

44. Which of the following best describes who you usually fish with?

- No one else
- Family / relatives
- Friends
- Other (please specify)

45. Do any of the following live in your household? (check all that apply)

- Spouse or significant other
- Children age 5 and under
- Children age 6 to 17 years old
- Other immediate family
- Extended family members or other adults
- None of these

46. Which of the following best describes your employment status? (check one)

- Employed full-time
- Un-employed
- Part-time
- Retired
- Other

47. What is your highest level of education? (check one)

- Less than High School degree
- High School degree or GED
- Some post High School or some college
- Bachelor's degree
- Graduate degree

Inland trout angler survey

48. What is your race or ethnic background? (check all that apply)

- Asian
- American Indian or Alaska Native
- Black or African American
- Native Hawaiian or Pacific Islander
- Hispanic, Latino or Spanis origin
- White, non-Hispanic
- Other

49. Which of the following best describes your annual household income? (check one)

- \$0 – 24,999
- \$25,000 – 49,999
- \$50,000 – 74,999
- \$75,000 – 99,999
- \$100,000 – 149,999
- \$150,000 or more

50. What is the 5-digit zip code of your primary residence?

51. In what year were you born?

52. What is your sex?

- Female
- Male

Inland trout angler survey

53. In the past 12 months, have you attended any fisheries-related public meetings, citizen advisory committee meetings, or other fisheries meetings?

Yes

No

54. In the past 12 months, have you fished in other countries or in other states, besides Michigan?

Yes

No

55. Do you belong to any of the following clubs or organization? (check all that apply)

Anglers of the Au Sable

Federation of Fly Fishers

Lake association or watershed groups

Local fishing and hunting clubs

Michigan United Conservation Clubs (MUCC)

Michigan River Guides Association

Michigan Steelhead and Salmon Fishermen's Association (Steelheaders)

Trout Unlimited

Other (please specify)

Inland trout angler survey

56. How did you hear about this inland trout angler survey? (select one)

- Friend or relative
- Newspaper or outdoor magazine
- Fishing club or organization
- Email
- DNR website
- DNR press release
- Other internet source
- Other (please specify)

57. Thanks for taking this survey. Please record any additional comments you may have below.