2013 Kansas Licensed Angler Survey Report

Kansas Department of Wildlife, Parks and Tourism

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Introduction

The Kansas Department of Wildlife, Parks and Tourism (KDWPT) conducts periodic surveys of its licensed anglers to maintain current information about the fishing characteristics, preferences, and attitudes of its anglers. One goal of the 2013 Kansas Licensed Angler Survey was to get information about special topics including: socialization into fishing, walleye and crappie management, and harmful algal-blooms. Also, KDWPT wanted to know angler demographics and their fishing participation and characteristics; these questions were similar to previous surveys to identify trends. Regularly obtaining human dimensions data from our angling constituents is as important as spring electrofishing, fall test netting, and creel surveys.

Methods

Mail Survey

A mail survey (Appendix A) was implemented to determine general fishing participation and characteristics, socialization into fishing, walleye and crappie management preferences, attitudes toward harmful algal blooms, and demographics of anglers fishing Kansas waters. First, the mail survey was pretested on a random selection of 100 individuals in December 2013. Some questions were slightly modified to improve questions based on feedback from the pretest respondents. A total of 5,500 names were randomly selected from individuals who purchased a fishing privilege in 2013. Each individual had an equal chance of being selected (i.e., individuals who purchased more than one privilege were only in the sampling frame once). The large sampling frame was needed to ensure sufficient useable surveys would be returned to achieve a 5% margin of error on population estimates (Salant and Dillman 1994). The first licensed angler survey was mailed on February 4, 2014 and included a postage paid reply envelope. The second survey was mailed on March 28, 2014 to nonrespondents. To increase response rate, a third survey was mailed to the remaining nonrespondents on June 9, 2014. This is a modification to the Tailored Design Method for sending mail surveys (Dillman et al. 2009). Administrative staff at the Emporia Research and Survey office processed and data entered surveys.

Data Analysis

Survey results were divided into seven categories:

1. Angler demographics
2. General fishing participation patterns and characteristics
3. Socialization into fishing
4. Walleye management
5. Crappie management
6. Harmful algal blooms
7. Comparisons to the 2006 Kansas Licensed Angler Survey

Descriptive statistics were reported according to the appropriate level of measurement involved (nominal, ordinal, interval, or ratio). Due to the variety of question response formats (single and multiple responses) and the levels of measurement involved (nominal, ordinal, interval, and ratio), various tests and post hoc tests were used to determine significant differences including t-test, Cochran-Mantel-Haenszel chi-square, and test for homogeneity when comparing 2013 survey results to the 2006 survey. Binary logistic regression was used to model variables that predicted respondent's odds of fishing participation and their children's odds of fishing participation.

Questions pertaining to catch-related attitudes were conceptualized by sixteen statements (Anderson et al. 2007) and operationalized in a five-point Likert measurement scale with response format 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. The sixteen attitudinal statements were separated into four constructs: catching something, catching numbers, catching large fish, and retaining fish. These constructs have previously been found to be reliable measures of catch-related attitudes (Anderson et al. 2007; Hunt et al. 2007). SAS, v. 9.2, was used to calculate Cronbach's alpha to determine scale reliability for each construct. For those with item nonresponse on some scale items, the Markov chain Monte Carlo (MCMC) algorithm in PROC MI in SAS, v. 9.2 was used to replace missing values because this method repeatedly provided robust estimates when the percentage of missing values was low (Schafer 1997).

Potential Conflict Indices

Potential Conflict Indices (PCIs) were calculated for anglers' level of support toward walleye management options. The PCI is a useful approach to translate human dimensions findings to managers because it indicates the likelihood of conflict and level of consensus among the group (Manfredo, Vaske,

and Teel 2003; Vaske, Beaman, and Barreto 2010). Values range from 0 to 1, where 0 indicates no conflict and 1 represents the potential for greatest conflict. PCIs were graphed to show the dispersion and central tendency of the measure. More information about PCIs can be found at http://warnercnr.colostate.edu/~jerryv/PCI2/.

Thematic Analysis of Walleye and Crappie Angler Motivation Groups

To understand angler motivations, thematic analysis was performed on open-ended questions for which respondents provided feedback. Subject matter expertise was used to segment anglers' responses into motivation groups. This is a common technique for analyzing qualitative data (Lacey and Luff 2009). The four main motivation groups for the walleye angler portion were sustain, grow, better fishing, and eat. The four main motivation groups for the crappie angler portion were fair, sustain, grow, and eat. More detail about each angler motivation group is provided in the results section.

Results

A total of 1,555 anglers returned useable surveys for an effective response rate of 30.0%. Variables tested for nonresponse bias included age, gender, residency, and whether the respondent had an email address provided in the Kansas Outdoor Automated Licensing System (KOALS) database from which the sample was pulled. Respondents' gender and residency were not significant factors in nonresponse. Younger respondents were less likely to respond to the survey; respondents with an email address were more likely to respond. Age and email were significant such that data were weighted to correct for nonresponse bias as described by Fisher (1996). However, attitude and opinion responses were not weighted to maintain the integrity of each respondent's individual answers.

Angler Demographics

The plurality of respondents, or 26.9%, lived in communities classified as small cities with a population of 5,000 to 50,000 people (Table 1). The remaining respondents were dispersed almost evenly across other types of communities: medium cities of 50,000 to 1 million people (19.7%), towns of 1,000 to 5,000 people (19.3%), rural or small towns of 1,000 people or less (16.9%), farms or ranches (13.0%), and metropolitan areas of 1 million people or more (4.4%). The majority of respondents, or 76.1%, were male (Table 2). About twenty-three percent (23.4%) were female and eleven respondents, or 0.5%, declined to provide their gender. Half of anglers (49.9%) reported college as their highest

completed level of education (Table 3). Forty-two percent (42.0%) completed high school and a small minority completed graduate school (7.6%) or elementary school (0.6%) as their highest level of education. The majority of anglers described themselves as White or Anglo (88.4%) (Table 4). Three percent (3.1%) declined to provide their ethnic background. The remaining ethnicities represented the minority of anglers: Hispanic or Latino (2.6%), other (1.7%), Asian (1.5%), Black or African American (1.4%), American Indian or Alaska Native (1.1%), and Native Hawaiian or other Pacific Islander (0.2%).

General Fishing Participation and Characteristics

The majority of respondents (56.1%) had fished in Kansas five out of the five last years (Table 5). The other remaining 43.9% had fished sporadically in the previous 5 years. Most (93.4%) had fished in Kansas in 2013 (Table 6). The top three fishing methods included bank or shoreline (88.9%), motorized boat (47.9%), and non-motorized boat (15.3%) (Table 7). Anglers fished in Kansas waters an average of 29.59 days (Table 8). The most fished water types in Kansas by mean number of days included: State Fishing Lakes (8.32 days), private ponds (7.39 days), and reservoirs (6.74 days). On average, 28.7% of anglers' fishing days were from a boat (Table 9). Anglers traveled an average of 66.85 round trip miles for their 1-day fishing trips in Kansas (Table 10). If they did not approve of the way their favorite lake was being managed, anglers were willing to travel an average of 140.02 round trip miles to fish another lake (Table 11). The five most preferred species to catch were Largemouth Bass *Micropterus salmoides* (weighted rank score 245.46), Crappie *Pomoxis* spp. (weighted rank score 230.32), Channel Catfish *Ictalurus punctatus* (weighted rank score 214.13), Walleye *Sander vitreus* (weighted rank score 145.26), and Flathead Catfish *Pylodictus olivaris* (weighted rank score 119.90) (Table 12). When asked which they actually fish for the most, anglers responded with their top five: Channel Catfish (weighted rank score 109.37), Crappie (weighted rank score 108.21), Largemouth Bass (weighted rank score 94.65), Flathead Catfish (weighted rank score 48.15), and Walleye (weighted rank score 46.12) (Table 13).

The most preferred locations to fish overall were reservoirs (weighted rank score 295.4) (Table 16), followed by Community Fisheries Assistance Program (CFAP) Lakes (weighted rank score 73.8), and private waters (weighted rank score 67.9). The rank of the actually most fished locations was the same; reservoirs were ranked first with a weighted rank score of 248.0, followed by CFAP lakes with 91.6, and private waters ranked third with a weighted rank score of 82.1. We examined the rank order of the most popular reservoirs from both a preference order and what was actually fished the most. The top ten preferred reservoirs were: 1 Wilson, 2 Milford, 3 Perry, 4 Hillsdale, 5 Glen Elder, 6 Clinton, 7 El Dorado, 8 Melvern, 9 Kanopolis, and 10 Marion (Table 18). The ten most fished reservoirs according to

the respondents were: 1 Wilson, 2 Milford, 3 Perry, 4 Clinton, 5 El Dorado, 6 Glen Elder, 7 Hillsdale, 8 Cheney, 9 Melvern, and 10 Kanopolis (Table 19).

The plurality of anglers (40.0%) go fishing most often with family (Table 20). Thirty-one percent (31.6%) go fishing with family and friends. Ninety-one percent (91.1%) indicated they planned to go fishing in Kansas in 2014, whereas 1.8% said they were not and 7.0% were unsure (Table 21).

To be outdoors was the most important reason why anglers fished, with 87.2% rating it as very or extremely important (Table 22). Other important reasons that anglers rated as very or extremely important were: *for relaxation* (82.3%), *for the fun of catching fish* (81.1%), *to experience natural surroundings* (75.6%), and *to get away from the daily routine* (74.2%). The least important reasons why anglers fished and rated as not at all or slightly important were: *to compete for prizes or money* (93.5%), *to catch trophy-sized fish* (55.1%), *for physical exercise* (44.1%), *to develop my skills* (36.7%), and *to experience new things* (29.2%).

KDWPT wanted to determine what factors limit or enable angler participation. The most commonly reported factors that enabled or greatly enabled participation in fishing included: *my comfort level being outdoors* (69.1%) and *my interest in fishing* (67.1%) (Table 23). The most commonly reported factors that limited or greatly limited participation in fishing included: *crowding at fishing areas* (54.2%), *work commitments* (55.1%), *travel costs and entrance fees* (45.0%), *limited access to good places to go fishing* (39.6%), and *weather conditions* (46.1%). Factors that were highest in the neutral category (neither limits nor enables) included: *people of my gender or ethnic background are discriminated against by outdoor recreation managers* (84.5%), *people of my gender or ethnic background are discriminated against by other anglers* (79.9%), *don't like to be outside* (78.3%), and *fear or safety concerns* (78.3%).

The plurality of anglers (34.0%) rated fishing as their second most important outdoor recreational activity (Table 23A). Twenty-nine percent (29.7%) rated fishing as their most important outdoor recreational activity. KDWPT wanted to determine what factors are important to anglers when selecting a place to fish. Factors rated as very or extremely important included: water close to home (51.9%), trash receptacles (49.6%), fishing where you cannot see or hear busy traffic (49.1%), fishing where others are not engaged in other recreational activities (46.5%), and fishing at an area that doesn't have a user fee (45.8%) (Table 24). Factors rated as not at all or somewhat important were: boat rentals (70.8%), fish cleaning stations (51.5%), campsites (48.5%), picnic tables (45.5%), and fishing where there

are other recreational activities available (41.1%). Factors that were highest in the neutral category included seeing few man-made structures (55.2%), fishing where alcohol consumption is allowed (47.8%), fishing where there are other recreational activities available (43.1%), fishing in remote areas (41.9%), and fishing where you are likely to see only a small number of other anglers (38.3%).

To determine if certain services would help increase fishing participation, KDWPT asked how likely anglers would be to take advantage of services such as on-site license purchases and boat and equipment rentals at an urban or rural lake. Results were similar for both the urban and rural setting. Forty-four percent (44.3%) were likely or very likely to purchase a license available on-site at an urban lake and 47.0% at a rural lake (Tables 25-26). Similarly, the plurality of anglers would make use of knowledgeable employees on-site, 40.9% and 39.9% at urban and rural lakes, respectively. The majority were unlikely or very unlikely to be interested in fishing equipment rentals at an urban (52.8%) or rural lake (54.1%). Similarly, 47.2% and 47.7% were not likely to utilize canoe or kayak rentals at an urban or rural lake, respectively. Boat rentals were not popular, with 46.4% who indicated they were unlikely to use this service at an urban lake and 46.8% at the rural lake.

Anglers were asked to rate their angling skill level and the majority (50.7%) rated themselves as average (Table 27). The plurality (35.8%) rated themselves as above average, while 9.4% self-reported as beginners and 3.9% as experts. For catch-related attitudes, Cronbach's alpha scores for scale items within constructs were reasonably reliable, with the least Cronbach's alpha score 0.72 and the greatest 0.80 (Table 28). Cronbach's alpha scores of 0.70 or greater were considered reliable (Nunnally 1978). All items in the catch-related attitude scale analysis were retained because the items reliably measured their respective constructs. The greatest mean construct score was 13.13 (SE = 0.08, n = 1,498) for catching large fish (Table 29). The second greatest mean construct score was 12.83 (SE = 0.08, n = 1,498) for catching numbers. The third greatest mean construct score was 10.79 (SE = 0.08, n = 1,497) for catching something. The least mean construct score was 10.56 (SE = 0.09, n = 1,500) for retaining fish.

Socialization into Fishing

Many people learned to fish as a young child, usually by a male figure like their father or grandfather. The average age that respondent's first began to fish was 7 years old (Table 30). Most anglers (55.3%) learned to fish from their father; 11.9% learned from their grandfather and 11.4% were

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self-taught (Table 31). Sixty-percent (60.4%) responded that their children fish (Table 32). Some anglers did not have children (29.6%) and the remaining 10.0% responded that their children did not fish.

The average age of respondents' children was 23 years old (Table 33). Overall, 52.6% of respondents' children were male and 47.4% were female (Table 34). There was a high participation rate among children, with 80.0% participating in fishing and 20.0% that did not (Table 35). The majority of children (79.1%) learned to fish from their fathers (Table 36). The most common reason for participating in fishing (26.3%) among respondents' children was that they enjoyed the outdoors (26.3%), followed by interested in fishing (20.9%), and 15.6% did not provide a reason (Table 37).

Walleye Management

Reservoirs were the predominant location in Kansas that anglers preferred (47.8%) and actually (45.6%) fished for walleye (Tables 38-39). Otherwise, anglers generally had no preference for water type to fish for walleye. The top five ranked preferred reservoirs to fish for walleye in Kansas were: 1) Wilson (weighted rank score 87.8), 2) Milford (weighted rank score 70.5), 3) Glen Elder (weighted rank score 67.0), 4) Kanopolis (weighted rank score 41.5), and 5) Cheney (weighted rank score 40.4) (Table 40). The top five most actually fished reservoirs for walleye in Kansas were: 1) Milford (weighted rank score 73.2), 2) Wilson (weighted rank score 65.2), 3) Glen Elder (weighted rank score 58.6), 4) Kanopolis (weighted rank score 44.2), and 5) Cheney (weighted rank score 43.6) (Table 41). On average, anglers considered a "keeper" sized walleye to be 17.5 inches; a trophy walleye was about 25 inches (Table 42). Walleye anglers (those who included walleye in their top five most preferred or top three most fished for species) were willing to travel on average 182.84 round-trip miles (n = 397, SE = 10.87, 95% confidence limits 161.46, 204.22) to fish another lake if they did not approve of how their favorite lake was being managed. KDWPT asked respondents to give their level of support of four walleye management strategies. Percentages and means are provided in Table 43 and a more thorough analysis of the management strategies was presented in several sections below.

Walleye PCIs: Anglers Overall

Potential conflict indices of various respondent groups and their preferences for walleye management strategies were scrutinized. For anglers overall, PCIs ranged from 0.25 to 0.37 (Figure 1). The greatest potential for conflict was toward the 15-inch minimum because it had the highest PCI (0.37). Anglers overall did not support the 21-inch minimum length limit and this management strategy had a relatively low PCI of 0.29. Anglers overall supported the 18-inch minimum and this management

strategy had a low PCI of 0.25. Anglers overall supported the 24-inch seasonal minimum length limit and the PCI of 0.25 was low.

Walleye PCIs: Anglers who ranked walleye in their top five preferred species or ranked walleye as one of the top three fish they actually fish for the most

Those who ranked walleye in their top five preferred species or ranked walleye as one of the top three fish they actually fished for the most were classified as walleye anglers so KDWPT could better understand their walleye management strategies. Walleye anglers supported the 15- and 18-inch minimum length limits although the PCI for the 15-inch minimum length limit was relatively high at 0.42 (Figure 14). This PCI was significantly different than all the other management strategy PCIs. Walleye anglers opposed the 21-inch minimum length limit and the PCI was moderate at 0.31. This PCI was significantly different than the PCIs of the 15- and 18-inch minimum length limit and seasonal management strategies.

Walleye PCIs: Fished for walleye v. had not fished for walleye in Kansas

Respondents were divided into two groups: those who indicated they had fished for walleye in Kansas (i.e., did not check the box on the survey "I have not fished for walleye in Kansas.") and those who had not fished for walleye in Kansas (i.e., checked the box on the survey "I have not fished for walleye in Kansas."). Thirty-five percent (35.5%), or 318 anglers, indicated they had not fished for walleye in Kansas. The PCIs of the walleye anglers ranged from 0.26 to 0.38 (Figure 2). The PCIs of the non-walleye anglers ranged from 0.23 to 0.34; PCIs between the two groups were not significantly different.

Walleye PCIs: Anglers who preferred or fished for walleye at Kansas lakes with a 15-inch minimum length limit

PCIs for those who preferred or fished for walleye at Kansas lakes with a 15-inch minimum length limit ranked from 0.17 to 0.30 (Figure 3). The highest PCI of 0.30 was toward the 15-inch minimum, which represented a mild level of conflict. This regulation had the highest level of support with this group. The 18-inch minimum length limit had the lowest PCI of 0.17 and was significantly different than all other PCIs. The scale mean toward the seasonal length limit was 3.17, which indicated slightly positive support.

Walleye PCIs: Anglers who preferred or fished for walleye at Kansas lakes with an 18-inch minimum length limit

Similar PCIs and level of support was seen among the group who preferred or fished at Kansas lakes with an 18-inch minimum length limit as those who preferred or fished at the 15-inch minimum length limit lakes. The highest PCI was 0.44 toward the 15-inch minimum length limit and the mean was 3.54; although there this group supported the 15-inch minimum length limit, the moderately high PCI value of 0.44 indicated there was less consensus toward that regulation (Figure 4). The lowest PCI was 0.25 for the 18-inch minimum length limit. The PCI was 0.29 for the 21-inch minimum length limit and with a mean scale value of 2.42, anglers did not support that regulation. The PCI for the seasonal length limit was 0.28, which indicated a low potential for conflict. However, the mean was 2.97, thus that group was neutral to slightly negative in opposition of that regulation.

Walleye PCIs: Anglers who preferred or fished for walleye at Kansas lakes with a 21-inch minimum length limit

The highest PCI among the group who preferred or fished for walleye at Kansas lakes with a 21-inch minimum length limit was 0.52 toward the 15-inch minimum length limit (Figure 5). This was the highest PCI of the study and indicated this group was much in conflict and did not have a consensus toward this regulation. The scale mean was 3.29, which indicated support of the regulation but there was certainly a subset of anglers in this group that did not support the 15-inch minimum length limit. PCIs among this group were generally higher than the other groups we examined. PCIs toward the 18-inch minimum length limit, the 21-inch minimum length limit, and the seasonal length limit were 0.37, 0.38, and 0.38, respectively. All scale means were above neutral, which indicated support for those walleye management strategies, although there was enough disagreement for the PCIs to be high.

PCIs of Walleye Angler Motivation Groups

Sustain: Those who want to see naturally-reproducing, self-sustaining walleye populations; less emphasis on sustaining populations through stocking walleye.

In the Sustain group, angler PCIs ranged from 0.26 to 0.43 (Figure 6). Anglers not in the Sustain group had PCIs ranging from 0.18 to 0.24. Anglers not in the Sustain group had significantly lower PCIs than the Sustain group except for the 24-inch minimum seasonal length limit. Mean scale values varied among the Sustain and other group; sustain motivated anglers supported the 21-inch minimum length limit. However, anglers not in the sustain motivated group opposed the 21-inch minimum length limit.

Grow: Those who want to give walleye a chance to get bigger.

In the Grow motivated angler group, PCIs ranged from 0.29 to 0.42, whereas anglers not in the Grow motivated group had PCIs ranging from 0.19 to 0.27 (Figure 7). Grow motivated anglers had the highest PCI of 0.27 for the 15-inch minimum length limit. This was significantly different than anglers not in this group who had a PCI of 0.27. PCIs between the two groups also differed for the 21-inch minimum length limit. Grow motivated anglers had a PCI of 0.33 and anglers not in this group had a PCI of 0.23. Additionally, mean scale values for the Grow motivated group and non-grow motivated group were 3.44 and 2.81, respectively. Grow motivated anglers supported the 21-inch minimum length limit and those not in the Grow motivated group opposed it.

Better fishing: Those who emphasize quality walleye fisheries and having a good trip.

In the Better Fishing motivated angler group, PCIs ranged from 0.17 to 0.44, whereas anglers not in the Better Fishing motivated group had PCIs ranging from 0.20 to 0.28 (Figure 8). Better Fishing motivated anglers had the highest PCI of 0.44 for the 15-inch minimum length limit. This was significantly different than the other anglers who had a PCI of 0.28. All scale mean values were above the neutral line for both groups except for the 21-inch minimum length limit of other motivated anglers which had a scale mean of 2.99, indicating slightly neutral to opposed to that management strategy. Better Fishing and the other motivated group had the same level of support for the seasonal length limit with scale means of 3.21. The highest level of support for the better fishing motivated anglers was for the 18-inch minimum length limit, with a scale mean of 3.89 and a PCI of 0.17. This indicated a high level of agreement for that management strategy.

Eat: Those who want to harvest walleye to eat.

Eat motivated anglers had PCIs that ranged from 0.15 to 0.37, whereas the other anglers had PCIs that ranged from 0.19 to 0.29 (Figure 9). Eat motivated anglers had the lowest PCI of 0.15 and the lowest scale mean of 2.11 for the 21-inch minimum length limit. This indicated a strong consensus that eat motivated anglers opposed the 21-inch minimum length limit. This was not significantly different than the other anglers' PCI of 0.24 but the others supported that regulation. Eat motivated anglers' highest PCI of 0.37 was for the seasonal length limit and this was significantly different than the other anglers' PCI of 0.19. Also, eat motivated anglers opposed the seasonal length limit but the PCI was moderately elevated which indicated less agreement toward that management strategy. The other

angler group supported the seasonal length limit and had a low PCI, indicating a higher level of agreement for the seasonal length limit.

15-Inch Minimum Length Limit Management Strategy and Differences in Motivation Groups

Next we examined differences between the four motivation groups' PCI values. For the 15-inch minimum length limit, there were no significant differences in PCIs between the motivation groups (Figure 10). Sustain motivated anglers were neutral to slightly supportive of the 15-inch minimum length limit. Grow, Better Fishing, and Eat motivated anglers supported the 15-inch minimum length limit.

18-Inch Minimum Length Limit Management Strategy and Differences in Motivation Groups

PCIs for the 18-inch minimum length limit were significantly different; sustain motivated anglers had a PCI of 0.30 which was significantly different than the Better fishing motivated anglers' PCI of 0.17 (Figure 11). Better fishing motivated anglers' PCI was significantly different than the other three groups. Eat motivated anglers' PCI of 0.34 was significantly different than better fishing motivated anglers' PCI of 0.17. All angler groups supported the 18-inch minimum, with the highest support among the Better fishing motivated anglers.

21-Inch Minimum Length Limit Management Strategy and Differences in Motivation Groups

The lowest PCI and scale mean of the whole study were among the Eat motivated anglers, 0.15 and 2.11, respectively (Figure 12). This PCI was significantly lower than the PCIs of the Sustain and Grow motivated anglers. The highest level of support was among the Sustain motivated anglers and their PCI was moderately low at 0.29. Grow motivated anglers supported the 21-inch minimum length limit and their PCI was moderate at 0.33. Better fishing motivated anglers were neutral to slightly supportive of the 21-inch minimum length limit and had a low PCI of 0.23.

15-Inch Minimum Length Limit Except 24-Inch Minimum Length Limit April Through June Seasonal Management Strategy and Differences in Motivation Groups

The seasonal management strategy had a similar pattern of support as the 21-inch minimum length limit. Eat motivated anglers opposed the seasonal management strategy and had a moderately high PCI of 0.37 (Figure 13). This PCI was significantly different than the PCI of 0.23 among the better fishing motivated anglers. Sustain, grow, and better fishing motivated anglers had low PCIs of 0.26, 0.29, and 0.23, respectively. These three groups supported the seasonal management strategy.

Crappie Management

Tables 44-47 refer to anglers' preferences for locations to fish for crappie and where they actually fished for crappie the most. Anglers preferred to fish in reservoirs (weighted rank score 304.1). They did not have a preference for the second most preferred location (weighted rank score 69.2). Private waters ranked as the third most preferred location (weighted rank score 68.5). The rank of the actually most fished locations for crappie was similar; reservoirs were ranked first with a weighted rank score of 298.7, followed by CFAP lakes with 81.8, and private waters ranked third with a weighted rank score of 78.8. We examined the most popular crappie fishing reservoirs from both a preference order and what was actually fished the most. The most preferred reservoirs from number 1 to 10 were: 1 Glen Elder, 2 Perry, 3 Clinton, 4 Hillsdale, 5 Milford, 6 Wilson, 7 Kanopolis, 8 Melvern, 9 Kirwin, and 10 Pomona (Table 48). The most fished reservoirs for crappie according to the respondents were: 1 Glen Elder, 2 Hillsdale, 3 Perry, 4 Clinton, 5 Milford, 6 Melvern, 7 Wilson, 8 Kirwin, 9 El Dorado, and 10 Kanopolis (Table 49). Only 10.8% (n = 105) of respondents had not fished for crappie in Kansas previously. On average, anglers considered a "keeper" crappie to be 10 inches; a trophy crappie was 16 inches (Table 50). KDWPT asked respondents to give their level of support toward six crappie management strategies. Percentages and means are provided in Table 51 and a more thorough analysis of the management strategies is presented in several sections below.

Crappie PCIs: Anglers Overall

Crappie regulation preferences and potential conflict indices of various angler groups were examined. For anglers overall, PCIs ranged from 0.31 to 0.41 (Figure 14). The highest PCI, or the greatest potential for conflict, was toward the 50 creel limit. Anglers opposed the 50 creel limit, the 10 creel limit, the 10-inch minimum 50 creel limit, and the 10-inch minimum 10 creel limit regulations. Anglers supported the 20 creel limit and 10-inch minimum 20 creel limit regulations. The lowest PCI, or the lowest potential for conflict, was toward the 20 creel limit. The PCI of 0.41 toward the 50 creel limit was significantly different that all other PCIs.

Crappie PCIs: Anglers who ranked crappie in their top five preferred species or ranked crappie as one of the top three fish they actually fished for the most

Similar patterns and levels of support were seen among anglers who ranked crappie in their top five preferred species or ranked crappie as one of the top three fish they actually fish for the most; PCIs ranged from 0.30 to 0.38 (Figure 15). The PCI of 0.38 for the 50 creel limit was significantly different

than the PCIs of 0.30, 0.32, and 0.30 for the 20 creel limit, 10 creel limit, and 10-inch minimum 10 creel limit, respectively. Again, the only two crappie regulations that anglers in this group supported were the 20 creel limit and the 10-inch minimum 20 creel limit regulation. Crappie anglers opposed the 50 creel limit, 10 creel limit, 10-inch minimum 50 creel limit, and the 10-inch minimum 10 creel limit.

Crappie PCIs: Fished for crappie v. had not fished for crappie in Kansas

KDWPT wanted to know the level of support for crappie regulations based on an angler's previous experience fishing for crappie in Kansas. We compared those who had fished for crappie in Kansas, termed "crappie-experienced anglers," and those who had not fished for crappie in Kansas, termed "non crappie-experienced anglers," to determine if their PCIs' toward crappie regulations differed. Only 10.8% (n = 105) of respondents had not fished for crappie in Kansas previously. Crappie-experienced anglers had PCIs ranging from 0.31 to 0.42 (Figure 16). Non crappie-experienced anglers had PCIs ranging from 0.26 to 0.40. Although both groups opposed the 50 creel limit, there was significantly more potential for conflict with the 50 creel limit. The other PCIs were not significantly different. Crappie-experienced anglers opposed the 10 creel limit but the non crappie-experienced anglers were neutral to slightly supportive of that regulation. Similarly, crappie-experienced anglers opposed the 10-inch minimum 10 creel limit regulation, but non crappie-experienced anglers were neutral to slightly supportive of that regulation. Both experienced and non crappie-experienced anglers supported the 20 creel limit and the 10-inch minimum 20 creel limit regulation and had similar PCIs toward those regulations.

PCIs of Crappie Angler Motivation Groups

FAIR: Those who think it's unfair or greedy to take too many fish

In the Fair motivated angler group, PCIs ranged from 0.14 to 0.34 (Figure 17). Anglers not in the Fair group had PCIs ranging from 0.26 to 0.37. Fair motivated anglers had significantly lower PCIs than those not in the Fair motivation group when it came to the 50 creel limit and the 10-inch minimum 50 creel limit. Fair motivated anglers were in strong agreement that they opposed these two regulations. Both groups supported the 20 creel limit and the 10-inch minimum 20 creel limit and had low PCI values, indicating a high level of agreement. Fair motivated anglers supported the 10 creel limit and were neutral to slightly supportive of the 10-inch minimum 10 creel limit as opposed to the anglers not in the Fair motivated group who did not support these two regulations.

SUSTAIN: Those who want to see naturally-reproducing, self-sustaining crappie populations.

Sustain motivated anglers that fished for crappie in Kansas had PCIs ranging from 0.31 to 0.37 (Figure 18). Non-sustain motivated anglers that fished for crappie in Kansas had PCIs ranging from 0.25 to 0.36. There were significant differences between sustain motivated anglers and non-sustain motivated anglers' PCIs of 0.37 and 0.28, respectively, for the 10-inch minimum 20 creel limit regulation. Also, there were significant differences between sustain motivated anglers and non-sustain motivated anglers' PCIs of 0.35 and 0.27, respectively, for the 10-inch minimum 10 creel limit. Both groups of anglers overall opposed the 50 creel limit and the 10-inch minimum 50 creel limit. Both groups overall supported the 20 creel limit and the 10-inch minimum 20 creel limit. However, sustain motivated anglers supported the 10 creel limit but non-sustain motivated anglers opposed it. Similarly, sustain motivated anglers supported the 10-inch minimum 10 creel limit but non-sustain motivated anglers opposed it.

GROW: Those who want to give crappie a chance to get bigger.

Grow motivated anglers that fished for crappie in Kansas had PCIs ranging from 0.31 to 0.42 (Figure 19). Non-grow motivated anglers that fished for crappie in Kansas had PCIs ranging from 0.26 to 0.36. There were significant differences between grow motivated anglers and non-grow motivated anglers' PCIs of 0.41 and 0.28, respectively, for the 10-inch minimum 20 creel limit regulation. Also, there were significant differences between sustain motivated anglers and non-sustain motivated anglers' PCIs of 0.39 and 0.29, respectively, for the 10-inch minimum 10 creel limit. Both groups overall supported the 20 creel limit and the 10-inch minimum 20 creel limit. Both groups overall opposed the 50 creel limit, 10 creel limit, 10-inch minimum 50 creel limit, and the 10-inch minimum 10 creel limit regulations.

EAT: Those who want to harvest crappie to eat.

Eat motivated anglers that fished for crappie in Kansas had PCIs ranging from 0.27 to 0.53 (Figure 20). Non-eat motivated anglers that fished for crappie in Kansas had PCIs ranging from 0.26 to 0.35. There were significant differences between eat motivated anglers and non-eat motivated anglers' PCIs of 0.52 and 0.35, respectively, for the 50-inch minimum length limit regulation. Eat motivated anglers' PCI of 0.52 toward the 50 creel limit indicated a high potential for conflict with that regulation. There were significant differences between eat motivated anglers and non-eat motivated anglers' PCIs of 0.53 and 0.30, respectively, for the 10-inch minimum 50 creel limit. Eat motivated anglers' PCI of 0.53

toward the 10-inch minimum 50 creel limit indicated a high potential for conflict with that regulation. Both groups overall supported the 20 creel limit and the 10-inch minimum 20 creel limit. Both groups overall opposed the 50 creel limit, 10 creel limit, 10-inch minimum 50 creel limit, and the 10-inch minimum 10 creel limit regulations.

Differences in Motivation Groups toward the 50 Creel Limit

We examined differences between the four motivation groups' PCI values. For the 50 creel limit, there were several significant differences. Fair motivated anglers were most opposed to the 50 creel limit and had the lowest PCI of 0.14. Fair motivated anglers' PCI was significantly different from the sustain, grow, and eat motivated anglers PCIs of 0.34, 0.41, and 0.52, respectively (Figure 21). Sustain motivated anglers' PCI was significantly lower than eat motivated anglers' PCI. All angler groups opposed the 50 creel limit. However, eat motivated anglers were closest to neutral.

Differences in Motivation Groups toward the 20 Creel Limit

PCIs ranged from 0.24 to 0.31 (Figure 22). There were no significant differences between anglers' motivations and their PCIs. All motivation groups supported the 20 creel limit and the fair motivated angler group had the highest level of support for that regulation.

Differences in Motivation Groups toward the 10 Creel Limit

PCIs ranged from 0.27 to 0.33 (Figure 23). There were no significant differences between anglers' motivations and their PCIs. Fair and sustain motivated anglers were neutral to slightly supportive of the 10 creel limit regulation. Grow and eat motivated anglers opposed the 10 creel limit.

Differences in Motivation Groups toward the 10-Inch Minimum and 50 Creel Limit

PCIs ranged from 0.22 to 0.53 (Figure 24). Fair motivated anglers had a significantly lower PCI of 0.22 than sustain, grow, and eat motivated anglers PCIs' of 0.34, 0.42, and 0.53, respectively. Sustain motivated anglers had a higher PCI of 0.34 than fair motivated anglers and a lower PCI than eat motivated anglers. All groups opposed the 10-inch minimum 50 creel limit regulation. The strongest level of opposition to this regulation was among the fair motivated anglers and the lowest level of opposition to this regulation was among eat motivated anglers.

Differences in Motivation Groups toward the 10-Inch Minimum and 20 Creel Limit

PCIs ranged from 0.28 to 0.41 (Figure 25). PCIs between the fair (0.28) and grow (0.41) were significantly different. All groups supported the 10-inch minimum 20 creel limit regulation. The highest level of support was among the fair motivated anglers; sustain, grow, and eat motivated anglers had similar levels of support.

Differences in Motivation Groups toward the 10-Inch Minimum and 10 Creel Limit

PCIs toward the 10-inch minimum 10 creel limit regulation were similar across groups and ranged from 0.33 to 0.39 (Figure 26). There were no significant differences among PCIs and motivation groups. Fair motivated anglers were neutral to slightly opposed to this regulation. Grow and eat motivated anglers were opposed to the 10-inch minimum 10 creel limit regulation. Sustain motivated anglers were the only group that supported it.

Harmful Algal Blooms (HABs)

KDWPT wanted to know the level of awareness of harmful blue-green algal blooms by the anglers and its potential impact on their recreational activities. Most anglers (75.1%) were aware of HABs before receiving the survey (Table 52). Eighteen percent (18.2%) reported they were not aware of HABs before receiving the survey and about seven percent (6.7%) were unsure. About twenty-four percent (23.5%) had recreated at a lake with a HAB advisory or warning (Table 53). Fifty-three percent (53.0%) had not recreated at a lake with a HAB advisory or warning and 23.5% were unsure. Almost thirty-one percent (30.8%) avoided recreating at a lake with a HAB (Table 54). Forty-five percent (45.1%) did not avoid recreating at a lake with a known HAB advisory or warning; twenty-four percent (24.1%) were unsure.

Respondents were asked how HABs have impacted them; Table 55 documented the impacts from HABs as provided by survey respondents. The plurality responded HABs did not impact them (31.7%) and 12.9% were unsure. Eleven percent (11.5%) did not go fishing or reported fishing was poor as a result of HAB advisories or warnings. Similarly, eleven percent (11.1%) did not participate in recreational activities such as boating, camping, and swimming. Several more impacts were cited by respondents and were included in Table 55.

Comparison to the 2006 Licensed Angler Survey

Anglers had 1.30 times the odds of having fished in Kansas in 2006 compared to 2013 (case-control odds ratio estimated value of risk of 1.30; 95% confidence intervals (1.07, 1.58)). More anglers than expected did not fish in 2013 whereas fewer anglers than expected did not fish in 2006 (Table 6; χ^2 = 6.978, df = 1, *P* = 0.008). The age at which respondents first learned to fish is getting significantly younger (t = 3.02, df = 4189, *P* = 0.003). On average, in 2006 respondents were 7.56 years old when they first learned to fish compared to 6.96 years old in 2013 (Table 30). The percentage of male and female anglers remained unchanged. In 2006 and 2013, anglers were approximately 77% male and 23% female (Table 2; χ^2 = 0.139, df = 1, *P* = 0.709). Income was significantly different among respondents in 2006 and 2013 (χ^2 = 92.60, df = 5, *P* < 0.001). More anglers than expected made $20,000 to $30,000 in 2006 whereas fewer than expected made this income in 2013 (Table 56). More anglers than expected made $30,001 to $50,000 in 2006 whereas fewer than expected made this income in 2013. Similarly, fewer anglers than expected made $70,001 to $100,000 in 2006 whereas more than expected made this income in 2013. Fewer anglers than expected made over $100,000 in 2006 while more than expected made this income in 2013.

In 2006, anglers were willing to travel an average of 86.02 miles for their one day fishing trips in Kansas (Table 57). This is significantly more than the 66.76 miles anglers were willing to travel for their one day fishing trips in Kansas in 2013 (t = 4.71, df = 3924, *P* < 0.001). This is likely due to the increased price of gasoline. In 2006, the average price of gasoline was $2.618 per gallon and in 2013 it was $3.575 per gallon (EIA 2015). There were slight differences in anglers' self-reported skill level in the 2006 and 2013 surveys (Table 27; χ^2 = 12.022, df = 3, *P* = 0.007). In 2006, more anglers than expected rated themselves as average and fewer than expected rated themselves as experts. In 2006, more children than expected fished and fewer respondents than expected did not have children (Table 32; χ^2 = 76.291, df = 2, *P* < 0.001). However, in 2013 we see the opposite: fewer children than expected fished in 2013 and more respondents than expected did not have children.

There were some differences in the rankings of species preferences among anglers on the 2006 and 2013 surveys. On the 2013 survey, more anglers than expected ranked flathead catfish as their number one preferred fish to fish for on the 2013 licensed angler survey (Table 12A; χ^2 = 41.805, df = 4, *P* < 0.001). Also, more anglers ranked walleye number one in the 2006 survey. Respondents from the 2013 survey were more likely to rank channel catfish as their second preferred species than respondents from the 2006 survey (χ^2 = 35.536, df = 4, *P* < 0.001). Respondents from the 2006 survey were more

likely to rank crappie as their second preferred species than those from the 2013 survey. More anglers than expected ranked flathead catfish as their third preferred species among the 2013 survey respondents (χ^2 = 10.262, df = 4, P = 0.036). There were no differences in species preference for the fourth most preferred species (χ^2 = 6.065, df = 4, P = 0.194). More anglers than expected ranked largemouth bass as their fifth most preferred species to fish for in the 2013 survey (χ^2 = 35.302, df = 4, P < 0.001). More anglers than expected ranked walleye as their fifth most preferred species to fish for in the 2006 survey.

There were differences in species rankings for those actually fished for the most between the two groups of respondents. More anglers than expected ranked flathead catfish as their number one fished for species in the 2013 survey group (Table 13A; χ^2 = 71.765, df = 4, P < 0.001)). Fewer anglers ranked walleye as their number one fished for species in the 2013 survey group. Anglers from the 2006 survey were more likely to rank walleye as their second most targeted species compared to the 2013 surveyed anglers (χ^2 = 29.077, df = 4, P < 0.001). More anglers than expected indicated white bass as their third most targeted species among the 2006 survey group (χ^2 = 38.869, df = 4, P < 0.001). The 2013 survey group was more likely to list flathead catfish as their third most targeted species.

Predicting Fishing Participation in Kansas in 2013

A binary logistic regression model was used to determine which variables predicted if respondents fished in Kansas in 2013 (Tables 59-60). Gender was not a significant demographic variable in the model to predict fishing participation. Respondents who lived in a medium city (50,000 - 1,000,000 population) had 1.95 times the odds of fishing participation in Kansas in 2013 compared to those who lived in a small city (5,000 – 50,000 population). Those who lived in towns (1,000 - 5,000 population) had 33.0% lower odds of fishing participation in Kansas in 2013 compared to those who lived in a small city. Education was a significant predictor variable; those with a 4-year college degree had 42.1% lower odds of having fished in Kansas in 2013 compared to those with a high school education. Similarly, those with a graduate degree had 55.4% lower odds of having fished in Kansas in 2013 compared to those with a high school education. Respondents with an above median household income ($50,000 to $100,000) had 3.178 times the odds of having fished in Kansas in 2013 compared to those with a median income of $50,000. Similarly, respondents with an income above $100,000 had 3.06 times the odds of having fished in Kansas in 2013 compared to those with a median income of $50,000. Only one ethnic background was a significant predictor. Hispanic or Latino respondents had 62.6% lower odds of having fished in Kansas in 2013 compared to White or Anglo respondents. Age had

a negative impact on fishing participation; for every 10 years older the age of the respondent, there were 17.5% lower odds of having fished in Kansas in 2013.

KDWPT also wanted to identify factors that may be enablers or constraints to fishing participation. Several factors were identified as significant predictors of fishing participation, including: crowding at fishing areas, anglers' interest in fishing, travel costs and entrance fees, and interest in indoor activities. Respondents who believed crowding at fishing areas was a constraint had 1.61 times the odds of having fished in Kansas in 2013 compared to those who were neutral about crowding at fishing areas. Respondents with a lack of interest in fishing had 66.6% lower odds of having fished in Kansas in 2013 compared to those who were neutral. Those who were not constrained with travel costs and entrance fees had 2.26 times the odds of reported fishing participation in Kansas in 2013 compared to those who were neutral toward travel costs and entrance fees. Respondents who were enabled by their interest in indoor activities had 45.0% lower odds of having fished in Kansas in 2013 compared to those who were neutral. Other factors that were investigated but were not significant predictors of fishing participation in Kansas in 2013 included: work commitments, presence of ANS, cost of fishing licenses and permits, and anglers' comfort level being outdoors.

Predicting Fishing Participation of Respondents' Children

A binary logistic regression model was used to determine which variables predicted if survey respondents' children fished (Tables 61-62). Several demographic variables were useful in the model, including: respondent's ethnicity, community where he or she resided, respondent's recent fishing participation (i.e., respondent fished all of the previous 5 years, respondent fished some of the previous 5 years but not all, respondent fished none of the previous five years), and the child's age and gender. Children of Hispanic or Latino respondents had 77.5% less odds of fishing participation compared to children of White or Anglo respondents. Female children had 47.4% less odds of fishing participation compared to male children. For every five year increase in age, children had 17.0% less odds of fishing participation. Of respondents who resided in medium cities of 50,000 to 1,000,000 people, their children had 29.8% less odds of fishing participation compared to the children of respondents who resided in small cities of 5,000 to 50,000 people. Conversely, children of respondents who lived in metropolitan areas with over 1 million people had 3.41 times the odds of fishing participation compared to the children of respondents who resided in small cities of 5,000 to 50,000 people. Children of respondents that fished none of the previous five years had 58.2% less odds of fishing participation compared to children of respondents who fished infrequently in the previous five years. Children of

respondents that fished all of the previous five years had 1.36 greater odds of fishing participation than the children of respondents who fished infrequently in the previous five years.

Discussion

Results from the 2013 survey represent the diversity of Kansas anglers because data were weighted to mitigate nonresponse bias. Future licensed angler surveys should be shorter (i.e., take less time for respondents to complete) which would likely boost response rates. Similar questions should be asked on future licensed angler surveys for consistency and to detect trends. Some of the demographic changes from the 2006 and 2013 survey were concerning because they predicted declining fishing participation. Although direct comparisons could not be made concerning the 2006 and 2013 survey groups due to differences in question response formats, respondents with a college or graduate degree had decreased odds of fishing participation in 2013. College enrollment is projected to steadily increase (National Center for Education Statistics 2015), thus it is concerning that we may experience further decreases in fishing participation as our populace becomes more formally educated. In a previous study of catfish anglers in 2010, there was a trend of declining participation among female anglers and anglers with more formal education (Steffen 2011). The opposite trend occurred for those with increased income: the 2013 survey group had higher income than the 2006 group and there were increased odds of fishing participation in Kansas in 2013 among respondents with an annual household income above the median of $50,000.

The most common reasons for not fishing in the 2006 survey were "no time" and "work commitments" (KDWPT 2006). However, the constraint "work commitments" was a poor predictor of decreased fishing participation in the 2013 survey. Also, crowding at fishing areas was cited as one of the top constraints for anglers in the 2013 survey, but crowding was not found to decrease the odds of fishing participation. This likely is due to the perception of crowded areas (Manning 1999). KDWPT conducted a study of crowding at State Fishing Lakes during the 2010 Memorial Holiday weekend. The study took place during one of the busiest fishing times of the year (KDWP 2010) and the people surveyed reported no negative impacts due to being crowded (Steffen 2010A). Because the majority of anglers fish from shore, KDWPT could focus on increasing shoreline access to disperse anglers. If these anglers were more dispersed, it may improve the perception that fishing areas were not crowded.

KDWPT had a special section on the 2013 survey to determine how people become socialized into fishing because future anglers are critical to KDWPT since it is funded partially through the sale of fishing privileges. Family was an extremely important factor in socialization. Respondents from the 2013 survey fished most often with family. Specifically, fathers and grandfathers were crucial to teaching respondents to fish at an early age as the majority of respondents with children taught their children how to fish. For most, fishing was about enjoying the outdoors with family. Some captured this sentiment when they responded why their children fish:

- *Likes it [fishing] because Dad likes it*

- *Being with family at lake*

Although respondents learned to fish primarily from their father or grandfather, respondents' children learned primarily from their father and mother (usually the person filling out the survey). However, respondents' female children were less likely to fish than male children. Fishing is considered a male-dominated leisure activity (Manning 1999). However, preliminary data from this survey indicates there might be a shift in fishing socialization from primarily male family mentors to an increased role of female family mentors. Does it matter from whom a child learns to fish? Although KDWPT cannot always control who teaches a child to fish (the exception being KDWPT hosted fishing clinics), it would benefit KDWPT to do further research to understand how to create enduring fishing participation. Specifically, why are female children at such a disadvantage compared to their male counterparts? There were twenty-six items on the 2013 survey that were suspected constraints or enablers of fishing participation. However, none of these were useful in predicting respondents' children's fishing participation. Study results indicated KDWPT should target recruitment and retention efforts more on Hispanics or Latinos and their children. KDWPT should continue to measure angler demographics and research other variables to determine their effect on participation rates.

General Fishing Participation and Characteristics

Some of the most important locations for anglers were those that do not require an entrance fee, such as State Fishing Lakes and private ponds. Data from the 2013 survey was used to create a model which predicted less odds of participating in fishing for those who were constrained by travel costs and entrance fees. KDWPT needs to continue to offer access to free fishing areas such as State Fishing Lakes, CFAP lakes, FISH waters because KDWPT could lose anglers if these were not available.

The most important motivations for fishing were related to being outdoors, being with family, and relaxation. Least important motivations were fishing to compete for prizes or money, to catch trophy-sized fish, and for physical exercise. Respondents indicated fishing was not their most important outdoor recreational activity. Although not specifically asked to list their number one activity in this study, Hyun and Ditton (2006) determined hunting, camping, and golf were acceptable substitutes for fishing. If KDWPT does not offer the opportunities that address the preferences of its constituents, it risks losing them to substitute activities.

KDWPT wanted to know if there were differences in species preferred and fished for to determine if the "demand" was meeting the "supply" of fishing opportunities; using this paradigm, KDWPT is likely providing channel catfish and flathead catfish fishing opportunities such that it exceeds demand. Kansas anglers would like to fish more for largemouth bass and walleye. KDWPT should set a goal of increasing largemouth bass from the third most fished for species to the first most fished for species to be measured in the next licensed angler survey. This may be a difficult goal to reach in large reservoirs because quality largemouth bass fishing has declined. This decline was attributed to recruitment-limited largemouth bass fisheries because these aging reservoirs lost a significant amount of aquatic vegetation habitat as the initial boom of productivity decreased (Marteney 1997). KDWPT is currently conducting a research project to assess if stocking early-spawned largemouth bass in Hillsdale and Clinton reservoirs improves largemouth bass fishing. If this is deemed successful, it could be a useful tool to help improve largemouth bass fishing opportunities in reservoirs and address angler demand.

One way to reach the goal of largemouth bass becoming the most targeted species would be concentrating on providing more quality largemouth bass fishing opportunities in smaller impoundments like State Fishing Lakes and Community Fisheries Assistance Program (CFAP) lakes. According to creel survey data from 1997 to 2014, largemouth bass were the most targeted species at 12% of waters (14 out of 117 total). Impoundments where largemouth bass were the most targeted species included: Kingman, Miami, and Pottawatomie #1 state fishing lakes; Bone Creek, Fort Scott City Lake, Banner Creek, Critzer, and Mound City lakes which are enrolled in CFAP; and five FISH waters. Cedar Bluff Reservoir was the only large reservoir where largemouth bass were the number one most targeted species. Overall, the most targeted species from creel surveys conducted from 1997 to 2014 were crappies (28.1%), channel catfish (23.8%), "anything" (15.9%), largemouth bass (10.0%), and walleye (7.6%). If "anything" (anglers who do not provide a specific target species) is disregarded then

largemouth bass were the third most targeted species, similar to the 2013 licensed angler survey results. KDWPT could focus additional quality largemouth bass fisheries in waters similar to the ones where they are already the most targeted species. State fishing lakes should be the priority because those received the most use on average with 8.3 days per year compared to other waters. The second priority to accomplish the goal of making largemouth bass the most targeted species would be to focus on CFAP lakes and manage those specifically for quality largemouth bass fishing opportunities because they were some of the waters where largemouth bass were the most targeted species according to creel survey data and they were the fourth most fished waters, an average of 6.3 days per year.

Walleye Management Strategies

Walleye management in Kansas may not be as controversial as other natural resource management issues. Potential for conflict index values for walleye management strategies were relatively low, ranging from 0.17 to 0.52, thus indicating a low potential for conflict in general. For comparison, researchers examined PCI values for the public's level of acceptability of euthanizing mountain lions in response to various scenarios, which ranged from 0.23 to 0.61. Some issues will incite more of an intense reaction out of constituents, but Kansas residents were known to be more apathetic and neutral than residents of other states (Teel et al 2005). Anglers' level of support was highest for the 15-inch minimum length limit. However, the PCI values were slightly higher, indicating there were some anglers who were unsettled about this regulation. There will unlikely be much disagreement among the public with walleye management strategies like the 15-inch minimum length limit because it is currently in place at several reservoirs and the public is already familiar with that regulation. The 18-inch minimum length limit was the most acceptable to anglers, meaning it had a fairly high level of support and a low PCI. Managers should consider the 18-inch minimum length limit as the most overall palatable walleye management strategy to the angling public. The 21-inch minimum length limit was the most opposed walleye management strategy. However, anglers who had fished at reservoirs with a 21-inch minimum length limit in place (Cheney or El Dorado reservoirs) supported the regulation. The 21-inch minimum length limit should be used with caution with the understanding that anglers' initial feelings toward the regulation will likely be negative and acceptance will be gradual. Anglers were neutral to slightly supportive of the seasonal 15-inch minimum length limit, except 24-inch minimum length limit from April through June; this was likely due to their lack of experience with this regulation.

Anglers were motivated to fish for walleye for different reasons (e.g., sustain, grow, better fishing, and eat motivated angler groups) and this affected how they responded to the level of support

for walleye management strategies. For example, eat motivated anglers were the group most opposed to the 21-inch minimum length limit. KDWPT should acknowledge these different motivations when considering walleye management changes. For example, implementing a 21-inch minimum length limit on walleye at a reservoir that previously had a 15-inch minimum length limit for several years will likely upset the eat-motivated anglers that have been fishing there to harvest 15-inch walleye. Armed with this knowledge in advance, KDWPT could initiate a press release explaining the reason for the regulation change and hold public meetings to let constituents voice their opinion. The goal would be to allow KDWPT to present a well-rounded view of its walleye management strategy and how the regulation change at that impoundment fits into our statewide walleye management plan using the complete set of data available (i.e., population data and human dimensions data) to back up its decision. This would be a more positive interaction with our constituents than waiting until the commission meeting to announce changes and dealing with opposition as it arises. It is recommended that if changes are made to walleye management strategies at specific impoundments, there should be another impoundment within a ninety-one mile radius (which is half the average number of round trip miles walleye anglers were willing to travel if they did not approve of how their favorite lake was being managed) with alternate regulations to provide anglers an acceptable substitute walleye fishery.

KDWPT fisheries staff met in February 2015 to discuss the future of walleye management in Kansas and results from this survey were discussed. KDWPT should set a goal of increasing walleye from the fifth most fished for species to the fourth most to be measured in the next licensed angler survey. This is possible through dynamic walleye fisheries that our staff are eager to make happen through a statewide walleye initiative. Kansas can offer walleye fishing opportunities unlike anywhere else because several reservoirs support naturally-reproducing walleye populations, Kansas walleye grow fast (Quist et al 2010), we have experienced management and hatchery biologists, anglers are demanding more walleye fishing opportunities (e.g., walleye are the fourth most preferred but the fifth most fished for species), and we have human dimensions data to indicate angler acceptance for management strategies. KDWPT will be able to predict which angler groups will be most likely to voice opposition to regulation changes, thus allowing KDWPT to proactively address these concerns in a public forum (i.e., commission meetings) and strategically announce changes in a way to minimize anticipated opposition (e.g., announcing the walleye initiative). KDWPT can apply this biological and sociological information to produce walleye fishing experiences that exceed anglers' expectations.

Crappie Management Strategies

Potential for conflict index values for crappie management strategies were relatively low, ranging from 0.14 to 0.53, thus indicating a low potential for conflict in general. I examined differences in PCIs for several different groups. Anglers across all groups consistently supported the 20 creel limit on crappie and the 10-inch minimum length limit, 20 creel limit management strategies. These two management strategies had the lowest PCIs. Anglers consistently were opposed to the 50 creel limit, 10-inch minimum length limit and 50 creel limit, the 10 creel limit, and the 10-inch minimum length limit and 10 creel limit. Angler motivation groups and their level of support for the six crappie management strategies were examined. Three of the same motivation groups emerged similar to those in the walleye management strategy analysis: sustain, grow, and eat motivated anglers. A different group emerged in the thematic analysis: fair motivated anglers. From their open-ended comments, fair motivated anglers considered a 50 creel limit "greedy" and they were most opposed to the 50 creel limit:

> *- 50 limit is rather greedy, 20 is worth a trip to fish, 10 is not worth the time & trouble*

> *- 50 fish is a lot per person, especially if there's a drought that year, 10-20 limit is more fair and reasonable.*

Eat motivated anglers were the least opposed to the 50 creel limit. The widespread support for the 20 creel limit and 10-inch minimum, 20 creel limit may be because these are in the middle and Kansans are known to have apathetic, neutral attitudes. High crappie creel limits usually do not affect fish populations because few anglers actually harvest a full creel limit on a daily basis (Radomski et al 2001). Creel harvest data from 2007 to 2012 at Glen Elder Reservoir, a popular Kansas crappie fishing impoundment, revealed less than 3% of interviewed angling parties met or exceeded the creel limit of 50 fish per day (18 out of 670 completed trip angler interviews). KDWPT has a statewide 50 crappie creel limit for sociological reasons, which is commonly done *"…since these regulations remind anglers that fish populations are finite"* (Radomski et al 2001, page 9). Therefore, it is recommended the statewide crappie creel limit be reduced to 20 fish per day because of anglers' tremendous support for this regulation, their strong opposition for the current statewide 50 creel limit, creel data that shows few angling parties would be affected, and previous research that shows high creel limits generally do not impact the fishery. However, the 20 crappie creel limit should not be the only regulation available to fisheries managers; other creel and minimum length limits could be utilized on an impoundment by impoundment basis. Similar to what was stated in the walleye management section above, KDWPT

should be aware of the angler groups that would most likely voice opposition if a 20 crappie statewide creel limit (e.g., eat motivated anglers) was implemented and proactively address their concerns.

Crappie were the second most preferred and targeted fish in Kansas. A word of caution is necessary for future management of this popular species because of the importance anglers placed on private waters as their most preferred and fished locations for crappie specifically. Crappie can easily become stunted in small impoundments such as farm ponds (Gabelhouse et al 2004). Poorly managed private waters can fail to produce the quality crappie fisheries that many crappie enthusiasts prefer, which could lead to decreased fishing participation. Previous research highlights the inconsistency of crappie fisheries for reasons such as variable year class recruitment and growth overfishing (Webb and Ott 1991), thus complicating management strategies. However, KDWPT biologists have the expertise to effectively manage crappie populations more so than private landowners who likely are not trained in fisheries management. An evaluation of the FISH program is currently in progress from a creel survey conducted in 2012, but KDWPT may consider a targeted goal of increasing crappie fishing opportunities in these small FISH impoundments, especially since private waters (i.e., farm ponds) were one of the most fished locations for crappie. This would help eliminate the barrier of access to private waters at the same time providing more consistent crappie fisheries that would be managed by KDWPT biologists. However, this should not occur to the detriment of already existing fisheries in other public impoundments.

Harmful Algal Blooms

Anglers were generally aware of HABs and some chose to recreate at lakes under an advisory or warning. Although we cannot quantitatively measure the impact HABs had on fishing participation from this study, it seems likely that HABs negatively impacted fishing participation because a plurality of anglers avoided recreating at a lake with a harmful algal bloom. From respondents' open-ended comments:

> - *Keeps me from going to the lake to fish*

> - *With a child and a pet we would avoid camping and/or fishing at a place w/ blue-green algae (just to be safe)*

Also, a plurality of anglers indicated HABs had not impacted them.

> - *Has not impacted me*

> - *It doesn't [impact me] & how harmful is it really…GOV says eating beef & driving cars bad also*

From a recreational aspect, respondents may have not been impacted by HABs. Some indicated HABs impacted them in other ways, such as affecting the taste of their drinking water or making the water unsafe for livestock and pets; some respondents referenced this in their open-ended comments:

- *I read that dogs drank water and died, frightened for my dog and family*

- *They affect the smell of potable water from lakes processed for drinking water.*

More research is needed to quantify the impact of HABs on fishing participation because HABs advisories and warnings will continue to be issued.

Comparison to the 2006 Survey

Anglers in 2006 were more likely to have fished compared to the anglers in the 2013 survey. It is not uncommon for people to purchase a fishing privilege with the intent of fishing but not actually participate. A survey of anglers who purchased floatline fishing permits in 2009 revealed that 56% actually went floatline fishing (Steffen 2010B). People that purchase a license and don't actually participate may be more likely to not purchase a license next year.

There were differences in the popularity of certain species in the 2006 and 2013 surveys. For example, flathead catfish were the 6th most fished for species in 2006 and went up to 4th most fished for species in 2013. White bass were the 5th most fished for species in 2006 and fell to the 9th most fished for species in 2013. Is this in response to what is actually going on with flathead and white bass fisheries, whether due to abiotic (i.e., drought) or biotic factors? KDWPT needs to continue to monitor target species in future licensed angler surveys to track this trend. Also, we could look at the fluctuations in targeted species and determine if these were precipitated by changes in the fisheries (i.e., fish population sampling data in ADAS and the fishing forecast). Angler shifts in species preferences or targeted species may be an indicator of the quality of our fisheries. If this is the case, it would be difficult to distinguish a cause and effect relationship between the species shift and whether this was caused by our management, abiotic factors out of our control, or more likely a combination of both.

Several recommendations were made as a result of information from the 2013 Kansas Licensed Angler Survey, including: tracking demographics and socialization of anglers to detect trends and identify measures to prevent declining participation among targeted groups (e.g., female children and Hispanics), increase the popularity of largemouth bass and walleye angling (i.e., increasing largemouth bass fishing from the third most targeted to the first most targeted species and increasing walleye

fishing from the fifth most targeted to the fourth most targeted species), reducing the statewide creel limit on crappie from 50 to 20 fish per day, offering fishing opportunities that match the preferences of our anglers (e.g., less emphasis on channel catfish stocking), and areas to prioritize staff and resources to offer fishing opportunities that match the preferences of our anglers (e.g., increasing shoreline access and access to free fishing areas). KDWPT should continue to conduct periodic licensed angler surveys to develop trends on repeated measures, stay current on the desires of its constituents, and research special topics as they arise. Also, it would be beneficial to conduct similar research concurrent with the general public to make comparisons between anglers and non-anglers to determine if KDWPT could improve the likelihood of attracting new anglers. The need for more information prompted areas of future research such as socialization into fishing and the impacts of HABs on fishing participation. The goal of human dimensions information is to understand what people do with wildlife and why. Fisheries staff should apply this survey data to inform their management decisions.

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Tables

Table 1. Frequency and percent of the type of community anglers lived in according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Community	Frequency	Percent (%)
On a farm or ranch	208	13.0
Rural or small town (under 1,000 pop.)	255	16.9
Town (1,000-5,000 pop.)	260	19.3
Small city (5,000-50,000 pop.)	383	26.9
Medium city (50,000-1 million pop.)	276	19.7
Metropolitan (over 1 million pop.)	73	4.4

Table 2. Frequency and percent of the gender of anglers from the 2006 and 2013 Kansas Licensed Angler Surveys; 2013 survey data were weighted.

	2006		2013	
Gender	Frequency	Percent (%)	Frequency	Percent (%)
Male	2,212	76.9	1,121	76.5
Female	665	23.1	302	23.5

X^2 = 0.1392, p-value = 0.709, df = 1

Table 3. Frequency and percent of anglers' highest level of education from the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Highest completed level of education	Frequency	Percent (%)
Elementary	8	0.6
High School	570	42.0
College	700	49.9
Graduate School	138	7.6

Table 4. Frequency and percent of the ethnic background of anglers from the 2013 Kansas Licensed
Angler Survey; survey data were weighted.

Ethnic background	Frequency	Percent (%)
White	1290	88.4
Declined to answer	49	3.1
Hispanic or Latino	30	2.6
Other	20	1.7
Asian	20	1.5
Black or African American	24	1.4
American Indian or Alaska Native	12	1.1
Native Hawaiian or Other Pacific Islander	2	0.2

Table 5. Frequency and percent of years fished in the last five years in Kansas according to the 2013
Kansas Licensed Angler Survey; survey data were weighted.

Years fished in the last 5 years	Frequency	Percent (%)
5 out of 5 years	846	56.1
4 out of 5 years	131	8.7
3 out of 5 years	190	13.2
2 out of 5 years	165	10.2
1 out of 5 years	122	8.4
0 out of 5 years	64	3.4

Table 6. Frequency and percent who fished in Kansas in 2013 according to the 2013 Kansas Licensed
Angler Survey. *Cells contributed to significant differences in homogeneity; 2013 survey data
were weighted.

	2006		2013	
Did you go fishing?	Frequency	Percent (%)	Frequency	Percent (%)
Yes	2,786	94.5	1407	93.0
No	161	5.5*	116	7.0*

X^2 = 6.978, p-value = 0.008, df = 1

Table 7. Frequency and percent of fishing methods anglers used in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Fishing methods	Frequency	Percent (%)
Bank/Shore	1,189	88.9
Ice fishing	57	3.6
Motorized boat	722	47.9
Non-motorized boat	191	15.3
Floatline fishing (jugfishing)	37	3.1
Setlines or Trotlines	137	11.1
Handfishing	26	2.8
Other	19	1.3

Table 8. Mean, standard error (SE), and confidence intervals of the number of days fished in the following waters types according to the 2013 Kansas License Angler Survey (n=1,393); survey data were weighted.

Water type	Mean	SE	Confidence Interval	
			Lower	Upper
State Fishing Lakes	8.32	0.56	7.22	9.43
Private Ponds	7.39	0.52	6.36	8.4
Reservoirs	6.74	0.43	5.89	7.59
City/county owned lakes	6.25	0.44	5.38	7.11
Rivers or streams	5.68	0.42	4.87	6.50
Other	0.45	0.10	0.26	0.65
Total	29.59	0.79	28.04	31.14

Table 9. Frequency, mean, standard error (SE), and confidence intervals of the percent of fishing days that were fished from a boat in Kansas according to the 2013 Kansas License Angler Survey; survey data were weighted.

	Frequency	Mean	SE	Confidence Interval	
				Lower	Upper
Percent of days fished from a boat	1,258	28.71	1.02	26.72	30.71

Table 10. Frequency, mean, standard error (SE), and confidence intervals of the number of miles anglers traveled for most of their 1-day fishing trips in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

| | Frequency | Mean | SE | Confidence Interval | |
				Lower	Upper
Miles	1,382	66.85	2.59	61.76	71.94

Table 11. Frequency, mean, standard error (SE), and confidence intervals of the maximum distance in miles anglers would be willing to travel to fish another lake if they did not approve of the way their favorite lake was being managed according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

| | Frequency | Mean | SE | Confidence Interval | |
				Lower	Upper
Miles	1,304	140.02	4.72	130.77	149.27

Table 12. Rank, frequency, and weighted rank score of anglers' favorite species to catch in Kansas
according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Rank	Species	Frequency	Weighted rank score
1	Largemouth bass	792	245.46
2	Crappie	828	230.32
3	Channel catfish	719	214.13
4	Walleye	567	145.26
5	Flathead catfish	399	119.90
6	Blue catfish	357	106.57
7	Smallmouth bass	378	91.76
8	White bass	383	75.85
9	Wiper (hybrid striped bass/white bass)	295	57.73
10	Bluegill	277	55.35
11	Striped bass	213	46.22
12	Trout	155	39.07
13	Spotted bass (Kentucky bass)	71	13.84
14	Northern pike	69	13.66
15	Sauger	58	11.39
16	Bullhead	54	11.33
17	Carp	44	9.07
18	Paddlefish (spoonbill)	30	5.72
19	Drum	23	4.56
20	Other	13	2.76

Table 12A. Rank category, frequency, and percent of the ranking of anglers' favorite species to catch in Kansas according to the 2006 and 2013 Kansas Licensed Angler Surveys. *Cells contributed to significant differences in homogeneity; 2013 survey data were weighted.

Rank Category	Species	2006		2013	
		Frequency	Percent (%)	Frequency	Percent (%)
1	Largemouth bass	654	28.8	240	28.0
	Crappie	545	24.0	249	25.7
	Channel catfish	501	22.1	174	20.4
	Walleye	446	19.7*	176	16.3*
	Flathead catfish	123	5.4*	71	9.6*
	X^2 = 41.805, p-value < 0.001, df = 4				
2	Crappie	582	31.5*	189	24.6*
	Channel catfish	382	20.7*	171	25.4*
	Largemouth bass	375	20.3	147	21.0
	Walleye	282	15.3	112	14.0
	Flathead catfish	228	12.3	89	15.0
	X^2 = 35.536, p-value < 0.001, df = 4				
3	Crappie	372	24.9	128	21.7
	Largemouth bass	358	23.9	129	24.1
	Channel catfish	340	22.7	124	23.6
	Walleye	264	17.6	105	16.7
	Flathead catfish	163	10.9*	70	13.8*
	X^2 = 10.262, p-value = 0.036, df = 4				
4	Crappie	315	24.8	142	27.9
	Largemouth bass	278	21.9	109	22.2
	Channel catfish	267	21.0	111	21.0
	Walleye	219	17.2	80	14.9
	Flathead catfish	193	15.2	75	14.1
	X^2 = 6.065, p-value = 0.194, df = 4				
5	Channel catfish	300	28.5	118	24.4
	Walleye	237	22.5*	79	16.0*
	Largemouth bass	195	18.5*	113	25.0*
	Crappie	180	17.1	89	18.3
	Flathead catfish	141	13.4	77	16.3
	X^2 = 35.302, p-value < 0.001, df = 4				

Table 13. Rank, frequency, and weighted rank score of anglers' most actually fished for species in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Rank	Species	Frequency	Weighted rank score
1	Channel catfish	529	109.37
2	Crappie	623	108.21
3	Largemouth bass	429	94.65
4	Flathead catfish	220	48.15
5	Walleye	300	46.12
6	Blue catfish	152	31.19
7	Bluegill	157	22.95
8	White bass	174	22.93
9	Smallmouth bass	119	21.04
10	Wiper (hybrid striped bass/white bass)	111	14.44
11	Trout	69	10.69
12	Striped bass	50	6.59
13	Carp	19	3.24
14	Spotted bass (Kentucky bass)	23	2.94
15	Bullhead	19	2.38
16	Sauger	16	1.84
17	Drum	11	1.55
18	Northern pike	8	1.03
19	Gar	3	0.65
20	Paddlefish (spoonbill)	5	0.45
21	Redear	1	0.18
22	Saugeye	1	0.12
23	Green sunfish	1	0.04

Table 13A. Rank category, frequency and percent of the three ranked species actually fished for the most in Kansas according to the 2006 and 2013 Kansas Licensed Angler Surveys. *Cells contributed to significant differences in homogeneity; 2013 survey data were weighted.

Rank Category	Species	2006		2013	
		Frequency	Percent (%)	Frequency	Percent (%)
1	Crappie	577	26.5	255	26.3
	Largemouth bass	562	25.8	209	23.5
	Channel catfish	507	23.3	240	26.2
	Walleye	351	16.1	128	11.8*
	Flathead catfish	108	5.0	76	10.0*
	White bass	70	3.2	22	2.3
	X^2 = 71.765, p-value < 0.001, df = 4				
2	Crappie	546	29.2	233	28.3
	Channel catfish	408	21.9	180	25.5
	Largemouth bass	285	15.3	112	17.1
	Walleye	231	12.4*	78	8.6*
	Flathead catfish	207	11.1	85	12.1
	White bass	190	10.2	75	8.4
	X^2 = 29.077, p-value < 0.001, df = 4				
3	Crappie	434	27.6	159	24.6
	Channel catfish	302	19.2	121	20.9
	Walleye	250	15.9	108	16.2
	Largemouth bass	238	15.1	89	16.4
	White bass	227	14.4*	78	10.1*
	Flathead catfish	121	7.7*	67	12.0*
	X^2 = 38.869, p-value < 0.001, df = 4				

Table 14. Frequency and percent of the first, second, and third most preferred water types to fish in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Water Type	First most preferred locations to fish		Second most preferred locations		Third most preferred locations	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Reservoirs	342	49.3	364	52.4	296	42.7
Private waters	105	15.1	40	5.8	76	11.0
CFAP	76	11.0	98	14.1	98	14.1
State Fishing Lakes	62	8.9	77	11.1	75	10.8
Rivers	58	8.4	49	7.1	69	9.9
Other	34	4.9	41	5.9	38	5.5
Community Lakes	11	1.6	10	1.4	6	0.9
Streams	3	0.4	5	0.7	15	2.2
Out of state	2	0.3	7	1.0	3	0.4
No preference	1	0.1	3	0.4	13	1.9
FISH waters	0	0.0	5	0.7	5	0.7
Total	694	100.0	694	100.0	694	100.0

Table 15. Frequency and percent of the first, second, and third most actually fished water types in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Water Type	First most actually fished locations		Second most actually fished locations		Third most actually fished locations	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Reservoirs	274	39.5	321	46.3	257	37.0
Private	131	18.9	49	7.1	79	11.4
CFAP	98	14.1	118	17.0	106	15.3
State Fishing Lakes	77	11.1	70	10.1	88	12.7
Rivers	56	8.1	59	8.5	74	10.7
Other	33	4.8	49	7.1	42	6.1
Community Lakes	15	2.2	10	1.4	10	1.4
Streams	6	0.9	11	1.6	15	2.2
Out of state	3	0.4	2	0.3	4	0.6
FISH waters	1	0.1	1	0.1	6	0.9
No preference	0	0.0	4	0.6	13	1.9
Total	694	100.0	694	100.0	694	100.0

Table 16. Rank, frequency, and weighted rank score of the most preferred locations to fish in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Rank	Water Type	Frequency	Weighted Rank Score
1	Reservoirs	1,002	295.4
2	CFAP Lakes	267	73.8
3	Private waters	221	67.9
4	State Fishing Lakes	214	59.8
5	Rivers	176	49.1
6	Other	113	32.0
7	Community lakes	27	8.5
8	Streams	23	4.9
9	Out of state waters	12	3.3
10	No preference	17	3.2
11	FISH waters	10	2.2

Table 17. Rank, frequency, and weighted rank score of the actually most fished water types in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Rank	Water Type	Frequency	Weighted Rank Score
1	Reservoirs	852	248.0
2	CFAP Lakes	322	91.6
3	Private waters	259	82.1
4	State Fishing Lakes	235	66.1
5	Rivers	189	51.9
6	Other	124	34.4
7	Community lakes	35	10.8
8	Streams	32	7.9
9	Out of state waters	9	2.4
10	No preference	17	3.0
11	FISH waters	8	1.6

Table 18. Rank, frequency, and weighted rank score of the most preferred reservoirs to fish in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Rank	Water Type	Frequency	Weighted Rank Score
1	Wilson	126	79.8
2	Milford	100	63.3
3	Perry	68	40.2
4	Hillsdale	62	39.1
5	Glen Elder	58	34.5
6	Clinton	54	32.2
7	El Dorado	50	31.4
8	Melvern	45	29.4
9	Kanopolis	46	25.1
10	Marion	39	23.2
11	Cheney	39	23.1
12	Cedar Bluff	36	21.3
13	Fall River	32	18.7
14	Tuttle Creek	30	18.4
15	Big Hill	29	17.5
16	Pomona	29	17.2
17	Webster	25	14.3
18	Kirwin	23	13.7
19	John Redmond	19	10.6
20	Lovewell	17	10.2
21	LaCygne	16	9.3
22	Toronto	13	8.4
23	Council Grove	12	6.9
24	Elk City	9	5.3
25	Norton	6	3.6
26	Wolf Creek	7	3.2

Table 19. Rank, frequency, and weighted rank score of the most actually fished reservoirs in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Rank	Reservoir	Frequency	Weighted Rank Score
1	Wilson	77	56.4
2	Milford	77	52.9
3	Perry	65	47.4
4	Clinton	56	39.2
5	El Dorado	47	36.8
6	Glen Elder	44	34.7
7	Hillsdale	52	34.4
8	Cheney	42	32.7
9	Melvern	41	30.5
10	Kanopolis	42	29.0
11	Fall River	32	23.0
12	Marion	35	22.7
13	Cedar Bluff	31	20.9
14	Tuttle Creek	28	20.4
15	Pomona	28	19.7
16	Webster	25	16.7
17	Kirwin	23	15.4
18	Big Hill	23	15.2
19	Lovewell	14	10.7
20	Toronto	13	9.1
21	John Redmond	10	6.8
22	Wolf Creek	10	6.5
23	Elk City	8	5.5
24	Council Grove	8	4.8
25	LaCygne	7	4.4
26	Norton	6	4.0

Table 20. Frequency and percent of the group anglers fished with most often according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Group fished with most often	Frequency	Percent (%)
Fish alone	187	12.6
Family	567	40.0
Friends	199	14.4
Family and friends	381	31.6
Club	7	0.4
Coworker	4	0.2
Other	12	0.7

Table 21. Frequency and percent of anglers who plan to fish in Kansas in 2014 according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Plan on fishing in 2014?	Frequency	Percent (%)
Yes	1,362	91.1
No	37	1.8
Unsure	109	7.0
Total	1,508	100.0

Table 22. Percent and mean of the importance of items related to why people fish based on a Likert scale with responses ranging from 1 = Not at all important to 5 Extremely important according to the 2013 Kansas Licensed Angler Survey; data were not weighted.

Items	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important	Mean
To be outdoors (n=1,500)	1.3	1.3	10.2	37.1	50.1	4.33
For relaxation (n=1,494)	1.7	2.1	13.8	35.8	46.5	4.23
For the fun of catching fish (n=1,498)	1.1	2.5	15.3	35.1	46.0	4.22
To experience natural surroundings (n=1,490)	1.5	3.8	19.1	37.3	38.3	4.07
To get away from the daily routine (n=1,493)	4.0	4.1	17.8	34.4	39.8	4.02
To be close to nature (n=1,485)	3.1	5.5	23.4	35.7	32.3	3.89
For the experience of the catch (n=1,495)	2.2	6.6	27.2	30.6	33.5	3.87
For family recreation (n=1,491)	6.1	6.4	20.3	32.5	34.8	3.84
To be with friends (n=1,490)	7.3	10.5	23.1	28.8	30.3	3.64
To experience solitude or tranquility (n=1,487)	7.4	10.7	27.4	27.6	26.8	3.56
For the challenge or sport (n=1,486)	7.7	13.7	28.9	29.0	20.6	3.41
To get away from other people (n=1,476)	14.0	14.2	24.9	21.1	26.0	3.31
To experience adventure and excitement (n=1,480)	10.7	15.3	28.7	28.5	16.9	3.26
To obtain fish for eating (n=1,495)	19.1	13.8	24.2	22.7	20.3	3.11
To experience new things (n=1,480)	12.2	17.0	35.4	21.6	13.7	3.08
To develop my skills (n=1,484)	17.8	18.9	30.1	18.6	14.6	2.93
For physical exercise (n=1,483)	23.7	20.4	30.8	17.0	8.2	2.65
To catch a trophy-sized fish (n=1,484)	37.5	17.6	21.4	12.7	10.9	2.42
To compete for prizes or money (n=1,475)	85.4	8.1	3.9	1.4	1.3	1.25

Table 23. Percent and mean of how limiting or enabling the following items were to respondents' fishing participation based on a Likert scale from 1 = Greatly limits and 5 = Greatly enables according to the 2013 Kansas Licensed Angler Survey; data were not weighted.

Items	Greatly limits	Limits	Neither limits nor enables	Enables	Greatly enables	Mean
My interest in fishing (n=1,459)	2.3	3.5	27.2	31.1	36.0	3.95
My comfort level being outdoors (n=1,454)	2.5	2.8	35.6	34.2	34.9	3.86
Interest in indoor activities (n=1,446)	4.3	6.2	52.8	18.7	18.1	3.40
My age (n=1,448)	2.9	5.2	75.1	7.8	9.1	3.15
Don't like to be outside (n=1,433)	5.6	2.8	78.3	4.5	8.8	3.08
Inadequate fishing skills (n=1,454)	4.6	7.9	73.5	8.1	5.9	3.03
No desire to participate in fishing (n=1,423)	7.0	4.2	77.7	4.4	6.8	3.00
The amount of planning required to go fishing (n=1,450)	2.7	9.5	76.6	7.4	3.9	3.00
People of my gender or ethnic background are discriminated against by outdoor recreation managers (n=1,445)	4.4	3.5	84.5	2.5	5.1	3.00
Fear of safety concerns (n=1,449)	4.8	7.0	78.3	4.0	5.9	2.99
Family commitments (n=1,450)	5.2	25.3	44.5	16.9	8.1	2.98
People of my gender or ethnic background are discriminated against by other anglers (n=1,445)	7.5	3.3	79.9	2.9	6.4	2.98
Health problems (n=1,450)	5.2	10.1	72.6	5.6	6.6	2.98
Fishing locations where alcohol consumptions is allowed (n=1,448)	7.5	9.1	70.9	6.4	6.3	2.95

Table 23. Continued

	Greatly limits	Limits	Neither limits nor enables	Enables	Greatly enables	Mean
Availability of people to go fishing with (n=1,455)	3.8	15.5	68.0	8.3	4.4	2.94
The other people who fish are not friendly (n=1,451)	6.3	11.2	74.0	4.7	3.9	2.89
Fishing regulations are too restrictive or unclear (n=1,451)	5.9	15.4	70.6	5.17	3.0	2.84
Cost of fishing equipment (n=1,456)	6.9	20.2	61.1	8.0	3.8	2.81
Cost of fishing license and permits (n=1,460)	8.5	20.9	59.5	6.6	4.5	2.78
No good fishing opportunities near my home (n=1,455)	10.8	17.5	61.2	5.2	5.4	2.77
Presence of aquatic nuisance species (ANS) (n=1,450)	9.2	19.8	63.1	4.55	3.4	2.73
Weather conditions (n=1,463)	9.6	36.5	41.2	7.5	5.3	2.62
Limited access to good places to go fishing (n=1,448)	13.1	26.5	50.6	5.4	4.5	2.62
Travel costs and entrance fees (n=1,467)	12.3	32.7	44.6	6.8	3.6	2.57
Work commitments (n=1,445)	20.8	34.3	33.4	6.8	5.0	2.41
Crowding at fishing areas (n=1,451)	20.7	33.5	38.1	4.2	3.5	2.36

Table 23A. Frequency and percent of the level of importance fishing was compared to other outdoor recreational activities according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Level of importance of fishing	Frequency	Percent (%)
Most	439	29.7
Second most	468	34.0
Third most	303	22.9
None of the above	185	13.4

Table 24. Percent and mean of the importance of items when respondents select a place to fish based on a Likert scale from 1 = Not at all important to 5 = Extremely important according to the 2013 Kansas Licensed Angler Survey; data were not weighted.

Items	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important	Mean
Fishing at an area that doesn't have a user fee (n=1,492)	8.5	12.0	33.7	23.8	22.0	3.39
Fishing where you cannot see or hear busy traffic (n=1,491)	9.3	11.3	30.2	32.1	17.0	3.36
Water close to home (n=1,475)	10.6	12.3	25.2	34.9	17.0	3.35
Fishing where others are not engaged in other recreational activates (n=1,483)	10.7	11.8	31.1	29.6	16.9	3.30
Fishing waters that are free of aquatic nuisance species (ANS) (n=1,490)	9.9	11.0	36.8	25.2	17.1	3.29
Trash receptacles (n=1,487)	15.4	12.7	22.3	31.1	18.5	3.25
Fishing where you are likely to see only a small number of other anglers (n=1,476)	9.7	10.4	38.3	28.9	12.8	3.25
Shade (n=1,486)	13.3	13.5	28.8	29.5	14.9	3.19
Fishing where you don't have to walk for more than 15 minutes (n=1,489)	15.7	11.8	29.0	24.9	18.7	3.19
Fishing where you feel far away from people and cities (n=1,491)	11.7	11.9	38.2	25.9	12.3	3.15
Fishing in remote areas (n=1,489)	11.8	10.4	41.9	24.9	11.0	3.13
Restrooms (n=1,494)	20.7	17.4	23.8	23.2	15.0	2.94
Boat ramps (n=1,489)	26.0	12.6	22.4	21.8	17.2	2.92
Piers or jetties (n=1,485)	19.5	14.8	35.6	23.0	7.3	2.84

Table 24. Continued

	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important	Mean
Bait and tackle shops (n=1,485)	22.2	18.2	25.4	25.7	8.5	2.80
Seeing few man-made structures (n=1,479)	17.4	9.1	55.2	12.7	5.7	2.80
Fishing where alcohol consumptions is allowed (n=1,491)	26.6	7.3	47.8	11.7	6.6	2.64
Waters close to work (n=1,481)	30.1	9.7	36.5	16.3	7.4	2.61
Campsites (n=1,484)	34.2	14.3	25.9	16.5	9.1	2.52
Fishing where there are other recreational activates available (n=1,479)	27.8	13.3	43.1	11.2	4.7	2.52
Picnic tables (n=1,484)	33.4	12.1	35.7	13.4	5.4	2.45
Fish cleaning stations (n=1,488)	36.4	15.1	26.8	14.8	7.0	2.41
Boat rentals (n=1,478)	63.6	7.2	23.1	4.3	1.8	1.74

Table 25. Percent and mean of how likely anglers would be to use the following fishing-related services if they were available at urban lakes in Kansas based on a Likert scale from 1 = Very unlikely to 5 = Very likely according to the 2013 Kansas Licensed Angler Survey; data were not weighted.

Services	Very Unlikely	Unlikely	Neutral	Likely	Very Likely	Mean
License purchase available on-site (n=1,411)	18.2	9.1	28.5	22.0	22.3	3.21
Knowledgeable employees on-site (n=1,410)	15.6	8.9	34.5	24.3	16.6	3.17
Boat rental (n=1,409)	33.3	13.1	31.9	13.7	8.0	2.50
Canoe or kayak rental (n=1,407)	35.8	11.4	30.8	13.2	8.9	2.48
Fishing equipment rental (n=1,406)	38.6	14.2	31.4	9.0	6.8	2.31

Table 26. Percent and mean of how likely anglers would be to use the following fishing-related services if they were available at rural lakes in Kansas based on a Likert scale from 1 = Very unlikely to 5 = Very likely according to the 2013 Kansas Licensed Angler Survey; data were not weighted.

Use of these services if available	Very Unlikely	Unlikely	Neutral	Likely	Very Likely	Mean
License purchase available on-site (n=1,438)	17.6	8.1	27.3	23.2	23.8	3.28
Knowledgeable employees on-site (n=1,431)	13.7	9.0	34.4	23.2	16.7	3.23
Boat rental (n=1,442)	34.5	12.3	30.7	14.7	7.8	2.49
Canoe or kayak rental (n=1,441)	36.2	11.5	29.4	14.0	9.0	2.48
Fishing equipment rental (n=1,441)	39.4	14.7	31.0	8.2	6.7	2.28

Table 27. Frequency and percent of how anglers rated their angling skill level in the 2006 and 2013 Kansas Licensed Angler Surveys. *Cells contributed to significant differences in homogeneity; 2013 survey data were weighted.

Angling skill level	2006		2013	
	Frequency	Percent (%)	Frequency	Percent (%)
Beginner	231	8.2	118	9.1
Average	1,514	53.9*	753	50.3
Above average	967	34.5	560	36.1
Expert	95	3.4*	62	4.5

X^2 = 12.022, p-value = 0.007, df = 3

Table 28. Scale items used to measure constructs and scale reliability related to the catch-related aspects of fishing according to the 2013 Kansas Licensed Angler Survey; scale items were not weighted.

Catch-related attitude scale items [a]	Cronbach's Alpha
Catching something	
A trip can be successful even if no fish are caught. [b]	
When I go fishing, I'm just as happy if I don't catch fish. [b]	0.74
If I thought I wouldn't catch any fish, I wouldn't go fishing.	
When I go fishing, I'm not satisfied unless I catch at least something.	
Catching numbers	
The more fish I catch, the happier I am.	
A successful fishing trip is one in which many fish are caught.	0.76
A full stringer is the best indicator of a good fishing trip.	
I'm happiest with a trip if I at least catch the daily bag limit.	
Catching large fish	
I would rather catch one or two big fish than ten smaller fish.	
The bigger the fish I catch, the better the fishing trip.	0.72
I'm happiest with the fishing trip if I catch a challenging game fish.	
I like to fish where I know I have a chance to catch a "trophy" fish.	
Retaining fish	
I usually eat the fish I catch.	
I'm just as happy if I don't keep the fish I catch. [b]	0.80
I want to keep all the fish I catch.	
I'm just as happy if I release the fish I catch. [b]	

[a] Respondents were asked whether they agreed or disagreed with each of the 16 items on a 5-point Likert scale with response format: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.
[b] Item reverse coded for analysis purposes.

Table 29. Frequency, mean, and standard error (SE) of anglers' construct scores on catch-related attitude items according to the 2013 Kansas Licensed Angler Survey; constructs were not weighted.

Construct	Frequency	Mean Construct Scores	Standard Error (SE)
Catching something	1,497	10.79	0.08
Catching numbers	1,498	12.83	0.08
Catching large fish	1,498	13.13	0.08
Retaining fish	1,500	10.56	0.09

Table 30. Frequency, mean, standard error (SE), and confidence interval of the age anglers were when they first began to fish according to the 2013 Kansas Licensed Angler Survey; 2013 survey data were weighted.

Survey year	Frequency	Mean	SE	Confidence Interval		t	p-value
				Lower	Upper		
2006	2,909	7.56	0.12	7.33	7.80	3.02	0.003
2013	1,282	6.96	0.17	6.63	7.30		

Table 31. Frequency and percent of the people who taught respondents how to fish according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Who taught you how to fish	Frequency	Percent (%)
Father	771	55.3
Grandfather	162	11.9
Self-taught	183	11.4
Friend(s)	98	6.3
Uncle	50	4.1
Other	50	3.3
Mother	46	3.2
Brother	40	2.6
Grandmother	25	1.5
Aunt	5	0.3
Fishing clinic or program	2	0.1
Sister	0	0

Table 32. Frequency and percent of respondents' children's participation in fishing according to the 2006 and 2013 Kansas Licensed Angler Surveys. *Cells contributed to significant differences in homogeneity; 2013 survey data were weighted.

	2006		2013	
Do your children (child) fish	Frequency	Percent (%)	Frequency	Percent (%)
Yes	2,086	71.1*	1,044	60.4*
No	324	11.0*	166	10.0*
I don't have children	525	17.9*	277	29.6*

X^2 = 76.2907, p < 0.001, df = 2

Table 33. Frequency, mean, standard error (SE), and confidence intervals of the age of respondents' children according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

	Frequency	**Mean**	**SE**	**Confidence Interval**	
				Lower	**Upper**
Age in years	2,692	23.25	0.23	22.80	23.71

Table 34. Frequency and percent of respondents' male and female children according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Gender	**Frequency**	**Percent (%)**
Male	1,414	52.6
Female	1,273	47.4
Total	2,687	100.0

Table 35. Frequency and percent of respondents' children's participation in fishing according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Gender	**Frequency**	**Percent (%)**
Participates in fishing	2,154	80.0
Does not participate in fishing	539	20.0
Total	2,693	100.0

Table 36. Frequency and percent of who taught respondents' children how to fish according to the 2013
Kansas Licensed Angler Survey; survey data were weighted.

Who taught child how to fish	Frequency	Percent (%)
Father	1,846	79.1
Mother	250	10.7
Other	85	3.6
Parents	82	3.5
Grandfather	70	3.0
Total	2,333	100.0

Table 37. Frequency and percent of respondents' children's reasons for why they do or do not
participate in fishing according to the 2013 Kansas Licensed Angler Survey; reasons were not
weighted.

Reason why do or do not fish	Frequency	Percent (%)
Enjoy the outdoors	711	26.3
Interested in fishing/enjoy it	565	20.9
No reason provided	422	15.6
Being with family	305	11.3
Like catching fish	174	6.4
Not interested	172	6.4
Other reason	144	5.3
No time	117	4.3
Too young to fish	63	2.3
Haven't tried fishing yet	29	1.1
Total	2,702	100.0

Table 38. Frequency and percent of the first, second, and third most preferred water type to fish for walleye in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Water Type	First most preferred locations to fish for walleye		Second most preferred locations to fish for walleye		Third most preferred locations to fish for walleye	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Reservoirs	475	47.8	315	31.7	204	20.5
No preference	412	41.5	616	62.0	720	72.5
CFAP	39	3.9	18	1.8	31	3.1
Other	23	2.3	8	0.8	6	0.6
State Fishing Lakes	19	1.9	13	1.3	17	1.7
Private waters	10	1.0	5	0.5	6	0.6
Rivers	8	0.8	9	0.9	5	0.5
Out of state	5	0.5	5	0.5	2	0.2
Community Lakes	2	0.2	2	0.2	1	0.1
Streams	0	0.0	1	0.1	1	0.1
FISH waters	0	0.0	1	0.1	0	0.0
Total	993	100.0	993	100.0	993	100.0

Table 39. Frequency and percent of the first, second, and third most actually fished water type for walleye in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Water Type	First most actually fished locations for walleye		Second most actually fished locations for walleye		Third most actually fished locations for walleye	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Reservoirs	453	45.6	270	27.2	161	16.2
No preference	443	44.6	659	66.4	777	78.2
CFAP	36	3.6	25	2.5	28	2.8
Other	19	1.9	5	0.5	6	0.6
State Fishing Lakes	19	1.9	14	1.4	12	1.2
Private waters	9	0.9	14	1.4	2	0.2
Rivers	6	0.6	10	1.0	4	0.4
Out of state	4	0.4	4	0.4	2	0.2
Community Lakes	4	0.4	1	0.1	0	0.0
Streams	0	0.0	0	0.0	1	0.1
Total	993	100.0	993	100.0	993	100.0

Table 40. Rank, frequency, and weighted rank score of the most preferred reservoirs to fish for walleye
in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Rank	Reservoir	Frequency	Weighted Rank Score
1	Wilson	145	87.8
2	Milford	116	70.5
3	Glen Elder	110	67.0
4	Kanopolis	71	41.5
5	Cheney	66	40.4
6	El Dorado	52	31.7
7	Hillsdale	45	27.6
8	Marion	42	25.6
9	Kirwin	43	25.3
10	Melvern	38	23.3
11	Cedar Bluff	38	22.8
12	Webster	38	22.5
13	Lovewell	35	21.2
14	Clinton	34	21.0
15	Perry	27	16.8

Table 41. Rank, frequency, and weighted rank score of the most actually fished reservoirs for walleye in
Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Rank	Reservoir	Frequency	Weighted Rank Score
1	Milford	108	73.2
2	Wilson	96	65.2
3	Glen Elder	87	58.6
4	Kanopolis	65	44.2
5	Cheney	64	43.6
6	El Dorado	49	33.8
7	Hillsdale	47	31.4
8	Marion	43	29.0
9	Melvern	40	27.0
10	Cedar Bluff	35	23.6
11	Clinton	34	22.8
12	Kirwin	32	22.1
13	Webster	33	21.9
14	Lovewell	30	21.0
15	Perry	26	17.8
16	Norton	19	12.9

Table 42. Frequency, mean, standard error (SE), and confidence intervals of the length of keeper and trophy-sized walleye according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

	Frequency	Mean	SE	Confidence Interval	
				Lower	Upper
Keeper	928	17.52	0.11	17.30	17.74
Trophy	842	25.68	0.20	25.28	26.07

Table 43. Percent and mean level of support for walleye management strategies at anglers' favorite walleye lake in Kansas based on a Likert scale from 1 = Strongly oppose to 5 = Strongly support according to the 2013 Kansas Licensed Angler Survey (n = 978); data were not weighted.

Walleye Management Strategy	Strongly Oppose	Oppose	Neutral	Support	Strongly Support	Mean
Option A 15-inch minimum length limit	12.1	11.7	17.9	30.1	28.2	3.51
Option B 18-inch minimum length limit	6.9	17.9	29.0	29.6	16.7	3.31
Option C 21-inch minimum length limit	15.5	27.4	28.2	17.1	11.8	2.82
Option D 15-inch minimum length limit year-round, except a 24-inch minimum length limit from April to June	12.0	15.4	34.3	25.3	13.0	3.12

Table 44. Frequency and percent of the first, second, and third most preferred water type to fish for crappie in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Water Type	First most preferred locations to fish for crappie		Second most preferred locations to fish for crappie		Third most preferred locations to fish for crappie	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Reservoirs	525	46.8	375	56.5	240	50.6
No preference	242	21.6	7	1.1	11	2.3
Private waters	136	12.1	68	10.2	55	11.6
CFAP lakes	84	7.5	97	14.6	78	16.5
State Fishing Lakes	73	6.5	63	9.5	43	9.1
Other	40	3.6	25	3.8	26	5.5
Rivers	10	0.9	7	1.1	7	1.5
Community Lakes	5	0.4	11	1.7	8	1.7
FISH waters	4	0.4	4	0.6	3	0.6
Out of state	2	0.2	5	0.8	2	0.4
Streams	0	0.0	2	0.3	1	0.2
Total	1,121	100.0	664	100.0	474	100.0

Table 45. Frequency and percent of the first, second, and third most actually fished water type for crappie in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Water Type	First most actually fished locations for crappie		Second most actually fished locations for crappie		Third most actually fished locations for crappie	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Reservoirs	492	50.0	322	50.4	210	47.9
Private	145	14.7	80	12.5	42	9.6
CFAP	103	10.5	104	16.3	78	17.8
No preference	98	10.0	5	0.8	5	1.1
State Fishing Lakes	81	8.2	75	11.7	51	11.6
Other	37	3.8	24	3.8	27	6.2
Rivers	10	1.0	10	1.6	11	2.5
Community lakes	9	0.9	7	1.1	4	0.9
FISH waters	5	0.5	2	0.3	5	1.1
Out of state	3	0.3	5	0.8	4	0.9
Streams	1	0.1	5	0.8	1	0.2
Total	984	100.0	639	100.0	438	100.0

Table 46. Rank, frequency, and weighted rank score of the most preferred locations to fish for crappie in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Rank	Water Type	Frequency	Weighted Rank Score
1	Reservoirs	1,140	304.1
2	No preference	260	69.2
3	Private waters	259	68.5
4	CFAP lakes	259	68.2
5	State Fishing Lakes	179	47.6
6	Other	91	23.7
7	Community lakes	24	6.3
7	Rivers	24	6.3
8	FISH waters	11	2.9
9	Out of state	9	2.5
10	Streams	3	0.8

Table 47. Rank, frequency, and weighted rank score of the actually most fished locations for crappie in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Rank	Water Type	Frequency	Weighted Rank Score
1	Reservoirs	1,024	298.7
2	CFAP Lakes	285	81.8
3	Private waters	267	78.8
4	State Fishing Lakes	207	59.8
5	No preference	108	32.6
6	Other	88	25.0
7	Rivers	31	8.7
8	Community lakes	20	5.8
9	Out of state waters	12	3.4
10	FISH waters	12	3.3
11	Streams	7	2.1

Table 48. Rank, frequency, and weighted rank score of the most preferred reservoirs to fish for crappie in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Rank	Reservoir	Frequency	Weighted Rank Score
1	Glen Elder	106	58.9
2	Perry	95	50.8
3	Clinton	83	44.3
4	Hillsdale	80	42.6
5	Milford	80	40.5
6	Wilson	68	36.1
7	Kanopolis	62	33.2
8	Melvern	61	32.7
9	Kirwin	56	30.0
10	Pomona	46	24.0
11	Cedar Bluff	43	22.4
12	Big Hill	38	20.8
13	Tuttle Creek	37	19.9
14	Fall River	36	19.4
15	Marion	36	18.6
16	Cheney	31	16.4
17	Webster	31	16.1
18	El Dorado	28	14.2
19	Council Grove	27	13.7
20	Lovewell	24	12.5
21	Toronto	17	8.9
22	Norton	13	7.3
23	Elk City	11	5.8
24	LaCygne	8	4.3
25	Wolf Creek	8	4.2
26	John Redmond	5	2.6

Table 49. Rank, frequency, and weighted rank score of the most actually fished reservoirs for crappie in Kansas according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Rank	Reservoir	Frequency	Weighted Rank Score
1	Glen Elder	79	74.3
2	Hillsdale	82	72.0
3	Perry	80	66.2
4	Clinton	75	62.6
5	Milford	77	58.9
6	Melvern	59	48.9
7	Wilson	53	43.9
8	Kirwin	43	34.6
9	El Dorado	42	33.9
10	Kanopolis	43	32.3
11	Pomona	41	31.6
12	Big Hill	34	31.4
13	Cheney	39	30.6
14	Cedar Bluff	38	28.3
15	Tuttle Creek	31	27.9
16	Fall River	33	26.8
17	Marion	34	26.2
18	Webster	29	23.4
19	Council Grove	21	16.9
20	Lovewell	21	16.5
21	Norton	16	15.6
22	Toronto	17	15.1
23	Elk City	12	8.9
24	LaCygne	4	3.3
25	Wolf Creek	3	2.7
26	John Redmond	4	2.4

Table 50. Frequency, mean, standard error (SE), and confidence intervals of the lengths of keeper and trophy-sized crappie according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

	Frequency	Mean	SE	Confidence Interval	
				Lower	Upper
Keeper	1,040	9.92	0.06	9.80	10.04
Trophy	917	15.91	0.12	15.67	16.15

Table 51. Percent and mean level of support for crappie management strategies at anglers' favorite crappie lake in Kansas based on a Likert scale from 1 = Strongly oppose to 5 = Strongly support according to the 2013 Kansas Licensed Angler Survey (n = 978); data were not weighted.

Crappie Management Strategy	Strongly Oppose	Oppose	Neutral	Support	Strongly Support	Mean
50 fish daily creel limit on crappie	28.4	26.3	16.9	15.8	12.7	2.58
20 fish daily creel limit on crappie	9.7	14.1	19.5	38.2	18.4	3.42
10 fish daily creel limit on crappie	21.0	28.8	22.9	16.8	10.5	2.67
10-inch minimum length limit AND 50 fish daily creel limit on crappie	29.6	28.1	18.8	13.6	9.9	2.46
10-inch minimum length limit AND 20 fish daily creel limit on crappie	12.8	14.7	20.6	34.3	17.7	3.29
10-inch minimum length limit AND 10 fish daily creel limit on crappie	21.9	25.9	24.7	16.3	11.3	2.69

Table 52. Frequency and percent of whether anglers were aware of harmful blue-green algae blooms before receiving the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Aware of blue-green algae	Frequency	Percent (%)
Yes	1,117	75.1
No	252	18.2
Unsure/I don't know	83	6.7

Table 53. Frequency and percent of whether anglers recreated at a lake with a harmful blue-green algae bloom advisory or warning according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Recreated at a lake with blue-green algae advisory or warning	Frequency	Percent (%)
Yes	329	23.5
No	814	53.0
Unsure/I don't know	295	23.5

Table 54. Frequency and percent of whether anglers avoided recreating at a lake with harmful blue-green algae according to the 2013 Kansas Licensed Angler Survey; survey data were weighted.

Avoided recreating at lakes with blue-green algae	Frequency	Percent (%)
Yes	432	30.8
No	669	45.1
Unsure/I don't know	327	24.1

Table 55. Frequency and percent of the impacts anglers experienced from harmful blue-green algae blooms according to the 2013 Kansas Licensed Angler Survey; impact data were not weighted.

Impacts from harmful algal blooms	Frequency	Percent (%)
No impact	165	31.7
Unsure or did not know	67	12.9
Did not go fishing or the fishing was poor	60	11.5
Did not participate in recreational activities (boating, camping, swimming)	58	11.1
Would not go to the lake with an HAB advisory or warning	46	8.8
Safety concerns about getting ill or exposing family to HABs	35	6.7
Concerned about danger to pets, livestock, and wildlife	24	4.6
Would not eat fish; caught and released their catch	17	3.3
Went somewhere else or were displaced by others getting away from HABs	16	3.1
Needed to clean their boat or equipment after recreating at a lake with an HAB	14	2.7
Affected water quality or drinking water taste and smell	11	2.1
Concerned about HABs in farm ponds	6	1.2
Negative economic impact	2	0.4

Table 56. Frequency and percent of the household incomes of anglers from the 2006 and 2013 Kansas Licensed Angler Surveys. *Cells contributed to significant differences in homogeneity; 2013 survey data were weighted.

	2006		2013	
Household income	Frequency	Percent (%)	Frequency	Percent (%)
Under $20,000	281	10.0	85	8.8
$20,000 - $30,000	329	11.7*	93	8.1*
$30,001 - $50,000	725	25.8*	249	21.9*
$50,001 - $70,000	650	23.2	262	22.0
$70,001 - $100,000	505	18.0*	279	22.0*
Over $100,000	316	11.3*	233	17.3*

X^2 = 92.595, p-value < 0.001, df = 5

Table 57. Frequency, mean, standard error (SE), and confidence intervals of the average number of miles anglers drove for most of their 1-day fishing trips from the 2006 and 2013 Kansas Licensed Angler Surveys; 2013 survey data were weighted.

Survey year	Frequency	Mean	SE	Confidence Interval		t	p-value
				Lower	Upper		
2006	2,729	86.02	3.04	80.06	91.98	4.71	< 0.001
2013	1,197	66.76	2.82	61.23	72.28		

Table 59. Variable names and descriptions and Wald Chi-square output from the binary logistic regression model used to predict the odds of respondents' fishing participation in Kansas in 2013 according to the 2013 Kansas Licensed Angler Survey; variables were weighted.

Variable	Description	df	Wald Chi-Square	*p*-value
Demographic				
COMMUNITY	Community live in (1 = farm or ranch to 6 = Metropolitan)	5	28.903	<0.001
GENDER	1 = Male, 2 = Female	1	1.463	0.227
EDUC	Highest completed level of education (high school, college, or graduate school)	2	13.693	0.001
INCOME	Annual household income (below median 50k, median 50k, above median 50k, or above 100k)	3	35.265	<0.001
ETHNIC	Ethnic background (3 = Asian, 4 = Black or African American, 5 = Hispanic or Latino, 7 = White, 9 = Other)	4	8.572	0.073
ANGLERAGE	Anglers' age	1	11.273	0.001
Factors				
WORKCOMM	Work commitments (constraint, neutral, enabler)	2	2.240	0.326
CROWDING	Crowding at fishing areas (constraint, neutral, enabler)	2	31.286	<0.001
INTEREST	Anglers' interest in fishing (constraint, neutral, enabler)	2	79.571	<0.001
TRAVELCOST	Travel costs and entrance fees (constraint, neutral, enabler)	2	13.734	0.001
ANS	Presence of aquatic nuisance species (constraint, neutral, enabler)	2	4.343	0.114
COSTLIC	Cost of fishing licenses and permits (constraint, neutral, enabler)	2	0.135	0.935
COMFORT	My comfort level being outdoors (constraint, neutral, enabler)	2	3.369	0.186
INDOORS	Interest in indoor activities (constraint, neutral, enabler)	2	17.860	0.001

Table 60. Estimates and confidence intervals of odds ratios from the variables used in the binary logistic regression model to predict respondents' fishing participation in Kansas in 2013 according to the 2013 Kansas Licensed Angler Survey. Only significant variables at the 0.05 level were included.

Variable	Value vs reference level	Odds Ratio Estimate	95% Confidence Limits	
Demographic				
COMMUNITY	Town vs small city	0.670	0.454	0.989
	Medium city vs small city	1.950	1.215	3.213
EDUC	College vs high school	0.579	0.418	0.796
	Graduate school vs high school	0.446	0.256	0.795
INCOME	Above median 50k vs median 50k	3.178	2.051	4.929
	Above 100k vs median 50k	3.057	1.851	5.103
ETHNIC	Hispanic or Latino vs White	0.374	0.186	0.827
ANGLERAGE	Units = 10 years	0.825	0.737	0.923
Factors				
CROWDING	Enabler vs neutral	0.406	0.252	0.662
	Constraint vs neutral	1.612	1.150	2.266
INTEREST	Enabler vs neutral	2.831	2.008	3.995
	Constraint vs neutral	0.334	0.202	0.557
TRAVELCOST	Enabler vs neutral	2.255	1.178	4.490
	Constraint vs neutral	1.776	1.254	2.533
INDOORS	Enabler vs neutral	0.550	0.396	0.762

Table 61. Variable names and descriptions and Wald Chi-square output from the binary logistic regression model used to predict the odds of respondents' children's fishing participation in Kansas in 2013 according to the 2013 Kansas Licensed Angler Survey; demographic variables were weighted.

Variable	Description	df	Wald Chi-Square	*p*-value
Demographic				
ETHNIC	Ethnic background (5 = Hispanic or Latino, 7 = White or Anglo)	3	59.149	< 0.001
COMMUNITY	Community live in (1 = farm or ranch to 6 = Metropolitan)	5	28.661	< 0.001
PARTICIP	Category for number of years respondent fished in the previous 5 years (0 out of 5, sporadic, all 5 years)	2	33.110	< 0.001
KIDAGE	Age of respondent's child	1	69.037	< 0.001
KIDGENDER	1 = Male, 2 = Female	1	37.509	< 0.001

Table 62. Estimates and confidence intervals of odds ratios from the variables used in the binary logistic regression model to predict respondents' children's fishing participation in Kansas in 2013 according to the 2013 Kansas Licensed Angler Survey. Only significant variables at the 0.05 level were included.

Variable	Value vs reference level	Odds Ratio Estimate	95% Confidence Limits	
Demographic				
ETHNIC	Hispanic or Latino vs White or Anglo	0.225	0.155	0.334
COMMUNITY	Medium city vs small city	0.702	0.533	0.926
	Metropolitan vs small city	3.405	1.446	10.525
PARTICIP	0 out of 5 years vs sporadic	0.418	0.277	0.642
	All 5 years vs sporadic	1.357	1.098	1.676
KIDAGE	Units = 5 years	0.830	0.794	0.867
KIDGENDER	Female vs male	0.526	0.427	0.645
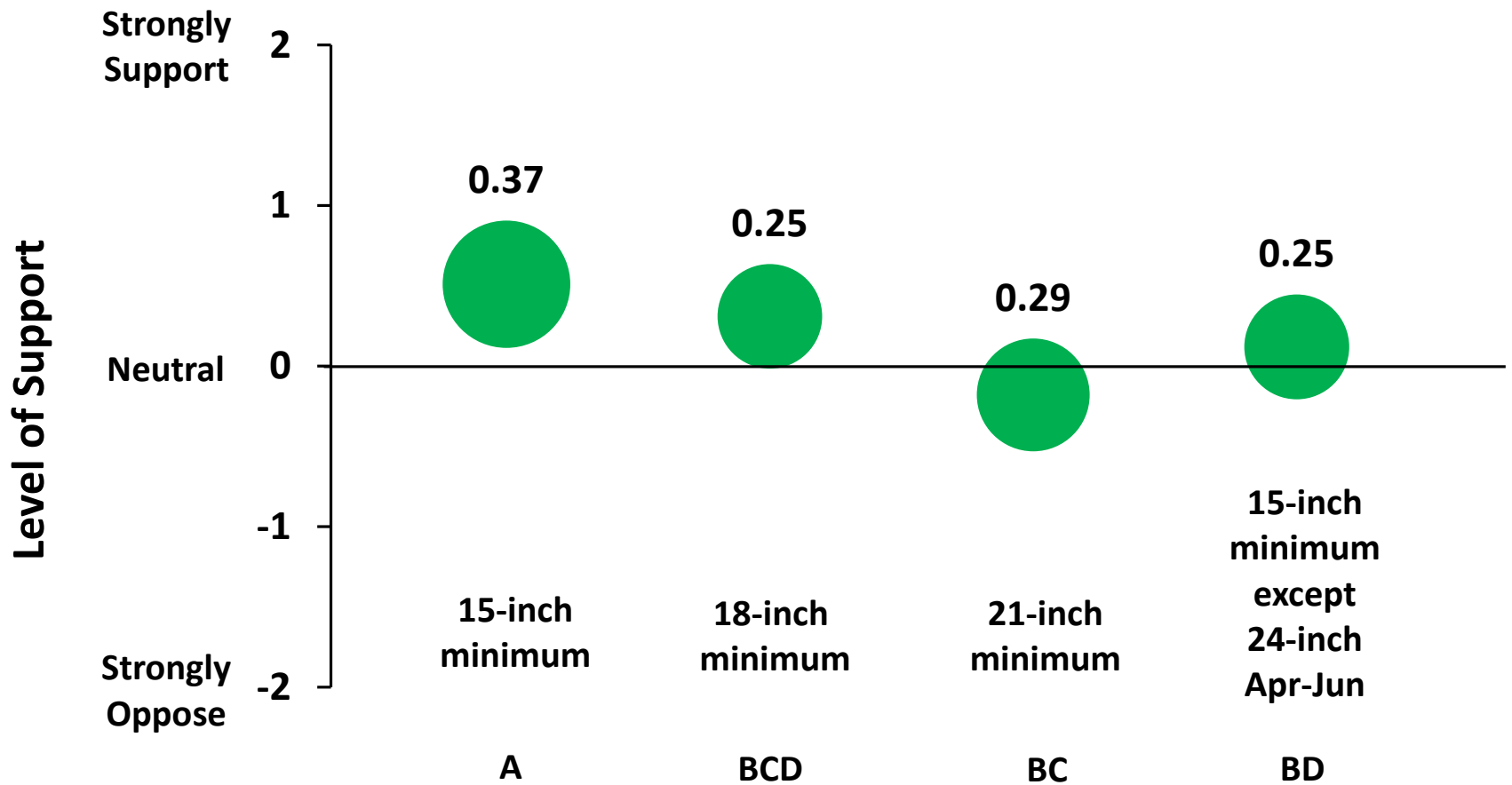
Figure 1. Potential Conflict Indices (PCIs) of anglers' level of support (n = 883) for walleye regulations according to results from the 2013 Kansas licensed angler survey. PCIs with the same letter were not significantly different at $p \leq 0.05$.
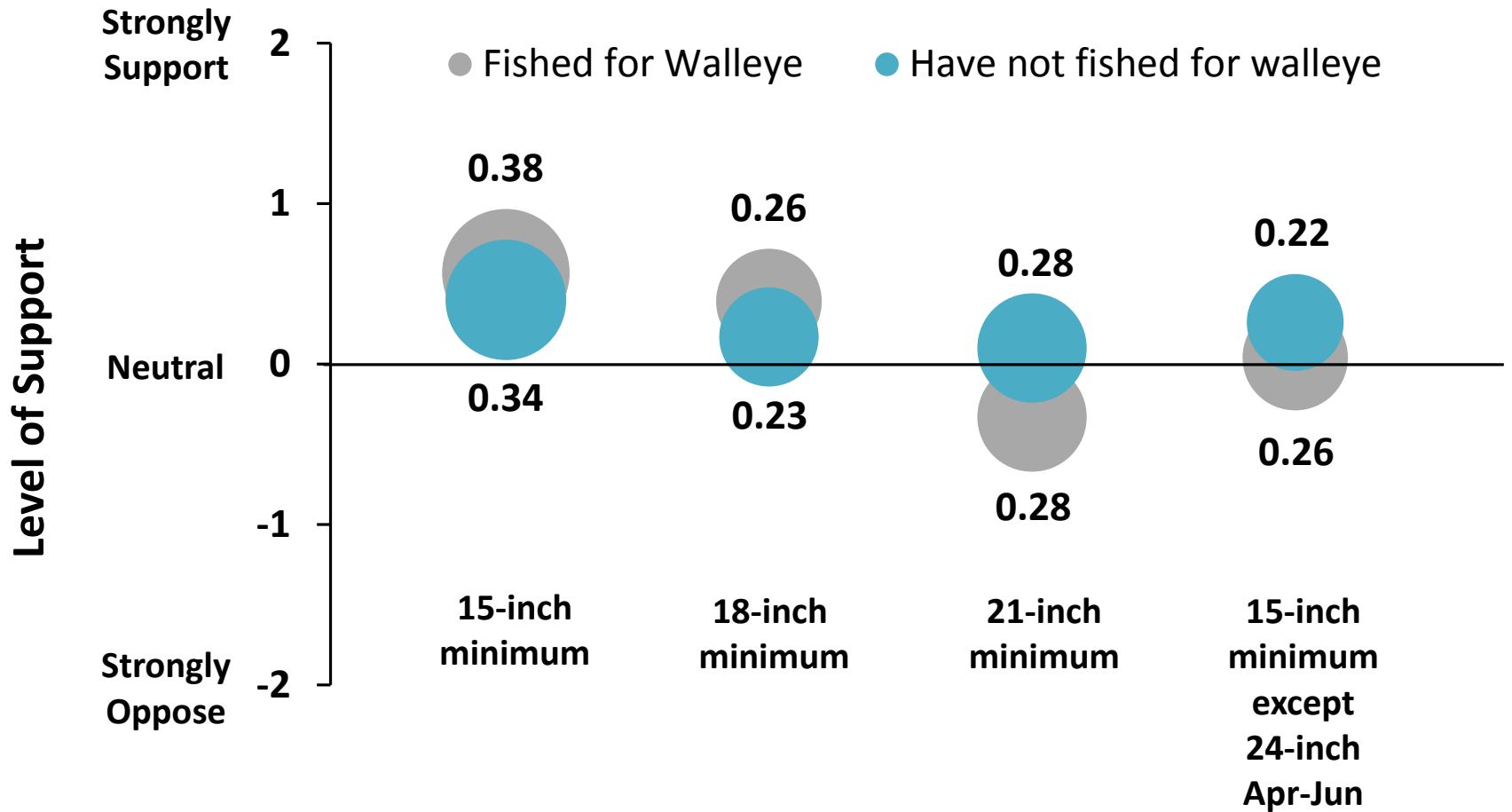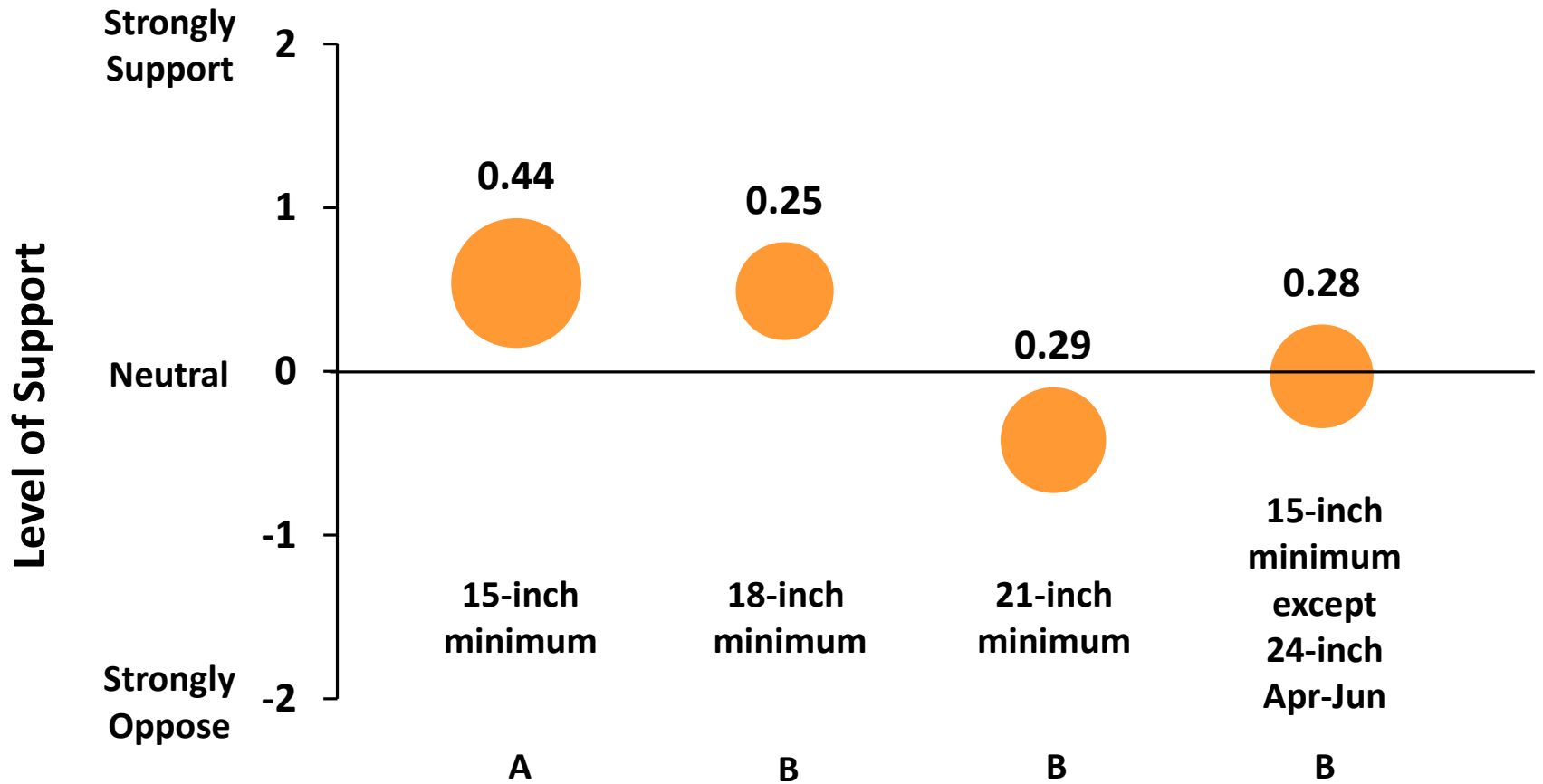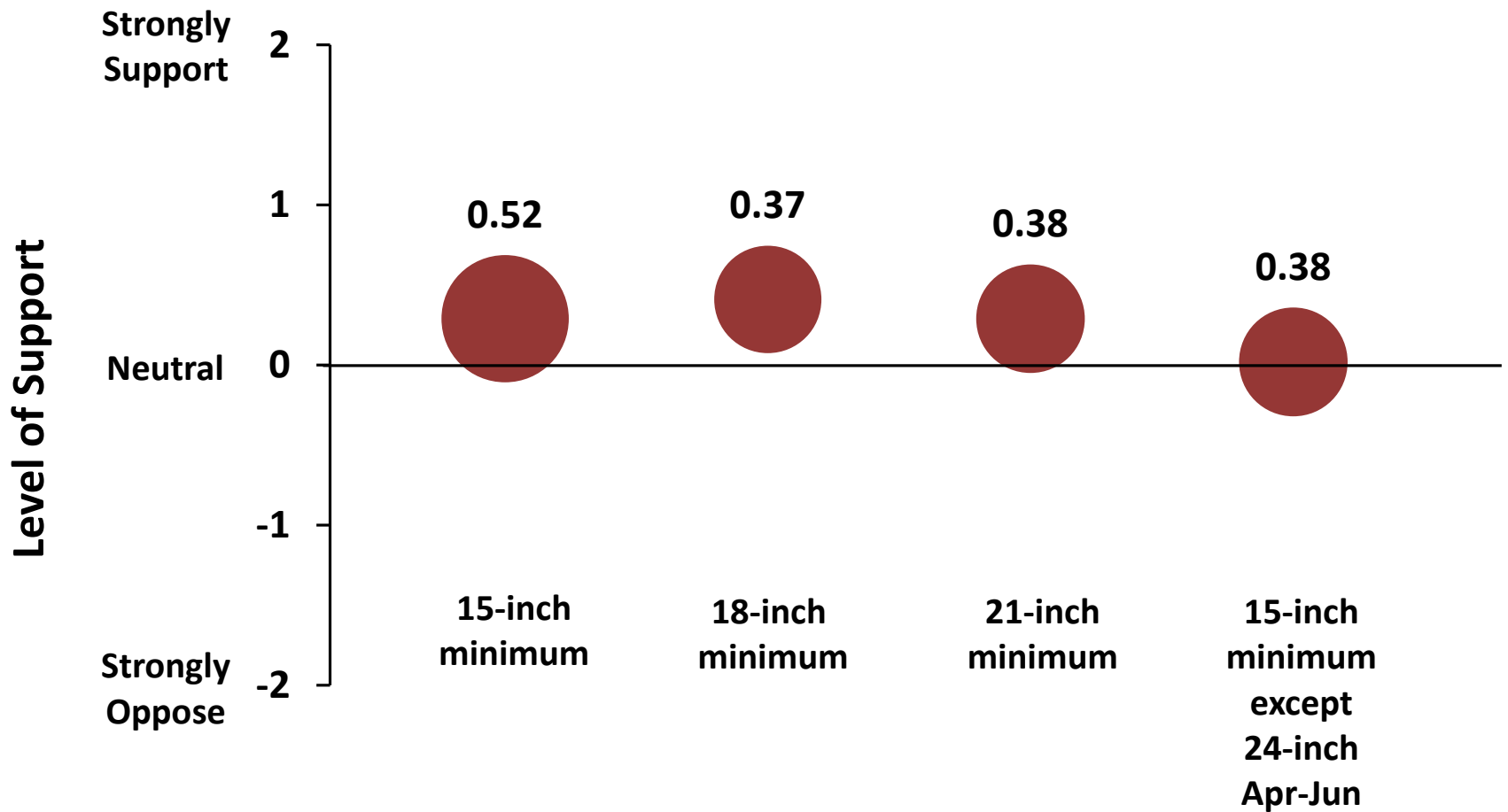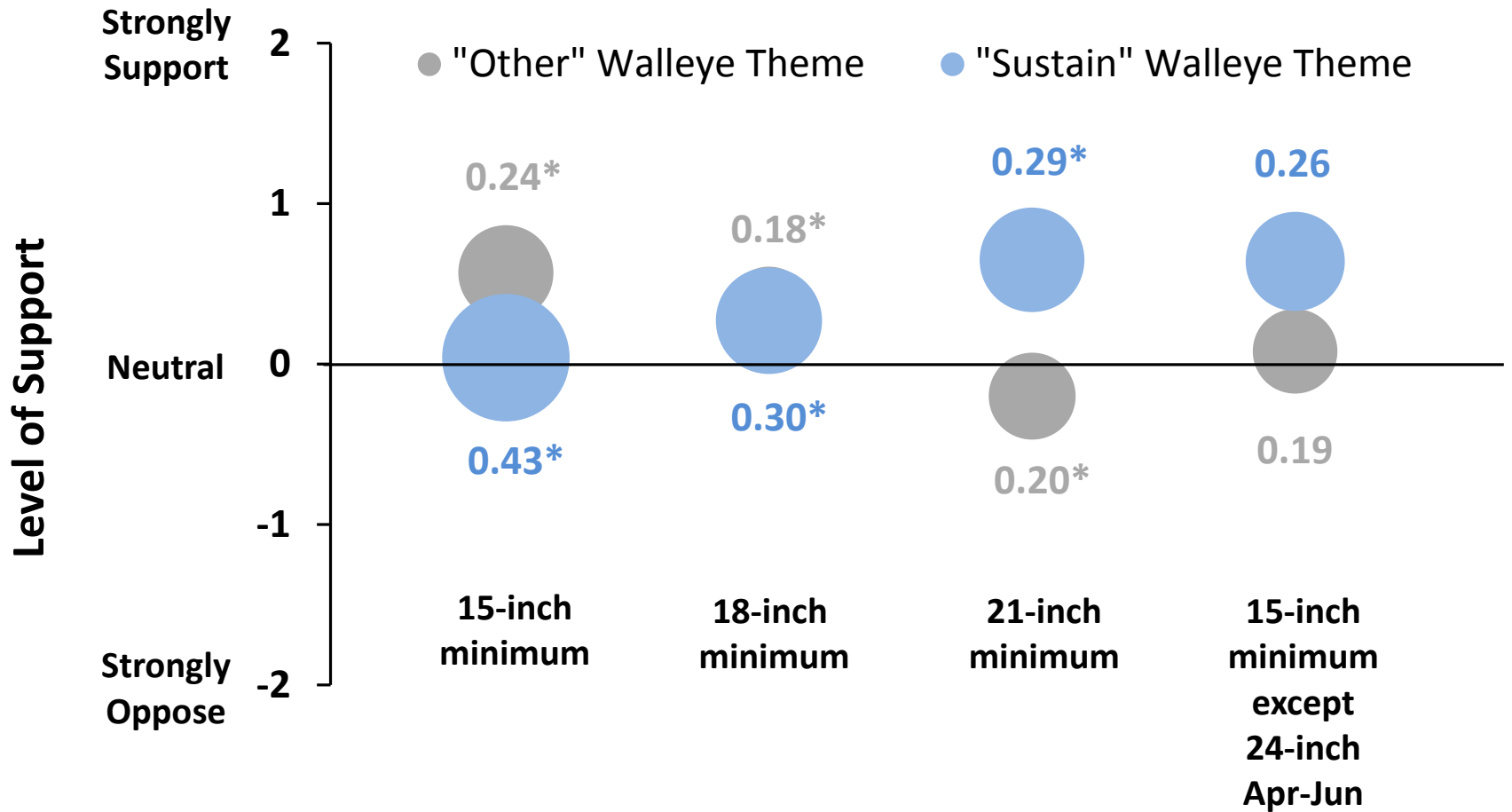
Figure 2. Potential Conflict Indices (PCIs) of anglers' level of support for walleye regulations by those who have fished for walleye in Kansas (n = 565) versus those who have not fished for walleye in Kansas (n = 318) according to results from the 2013 Kansas licensed angler survey. None of the PCIs were significantly different at $p \leq 0.05$.
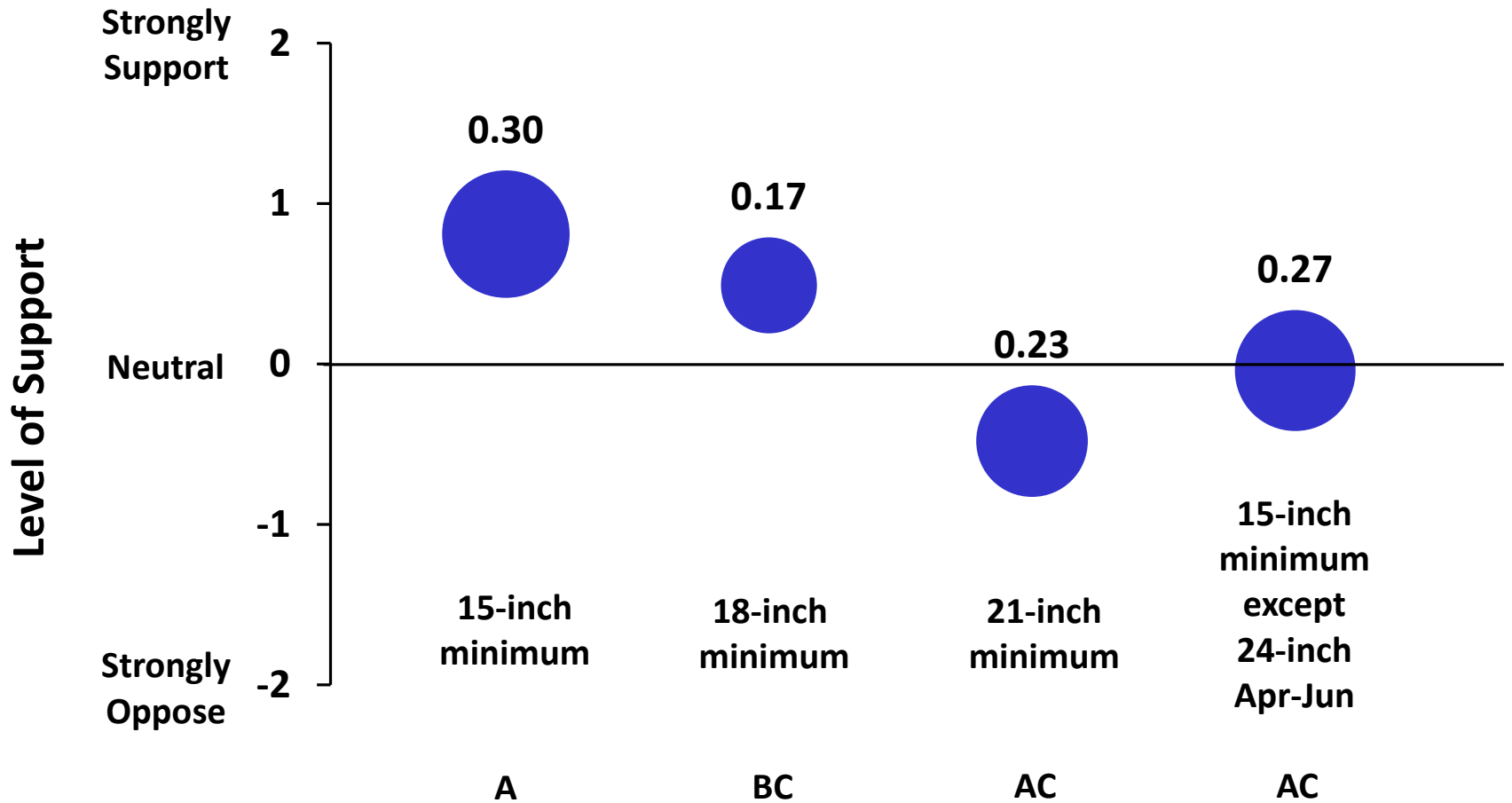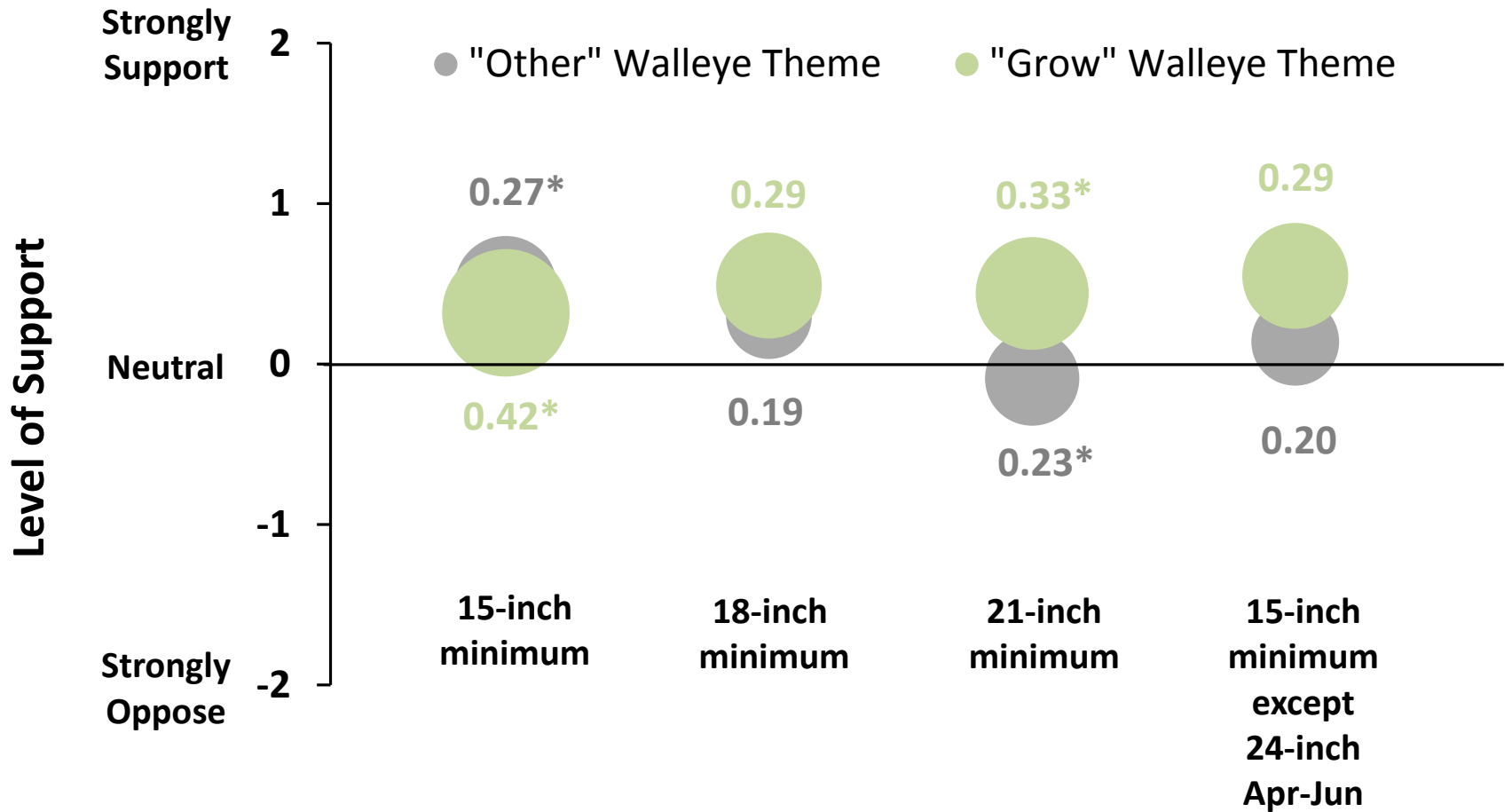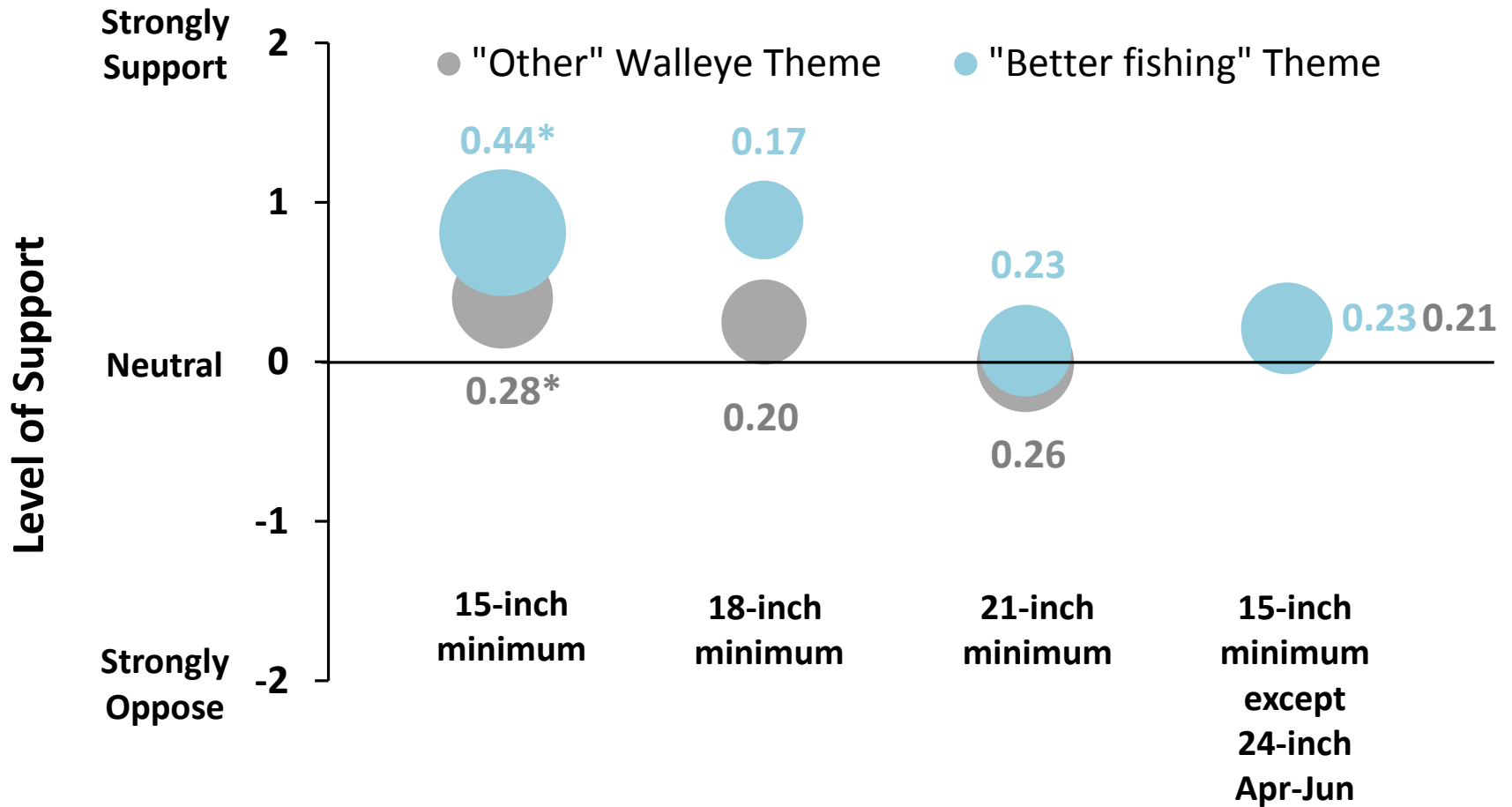
Figure 3. Potential Conflict Indices (PCIs) of anglers' who preferred or fished for walleye at Kansas lakes with a 15-inch minimum length limit for walleye (n = 133; Kanopolis, Kirwin, Webster, Wilson, Clinton, and John Redmond reservoirs) and their level of support for walleye regulations according to results from the 2013 Kansas licensed angler survey. PCIs with the same letter were not significantly different at $p < 0.05$.

Figure 4. Potential Conflict Indices (PCIs) of anglers' who preferred or fished for walleye at Kansas lakes with an 18-inch minimum length limit for walleye (n = 230; Cedar Bluff, Glen Elder, Norton, Lovewell, Hillsdale, Milford, Perry, Marion, Melvern, and Pomona reservoirs) and their level of support for walleye regulations according to results from the 2013 Kansas licensed angler survey. PCIs with the same letter were not significantly different at $p < 0.05$.

Figure 5. Potential Conflict Indices (PCIs) of anglers' who preferred or fished for walleye at Kansas lakes with a 21-inch minimum length limit for walleye (n = 58; Cheney and El Dorado reservoirs) and their level of support for walleye regulations according to results from the 2013 Kansas licensed angler survey. None of the PCIs were significantly different at $p \leq 0.05$.

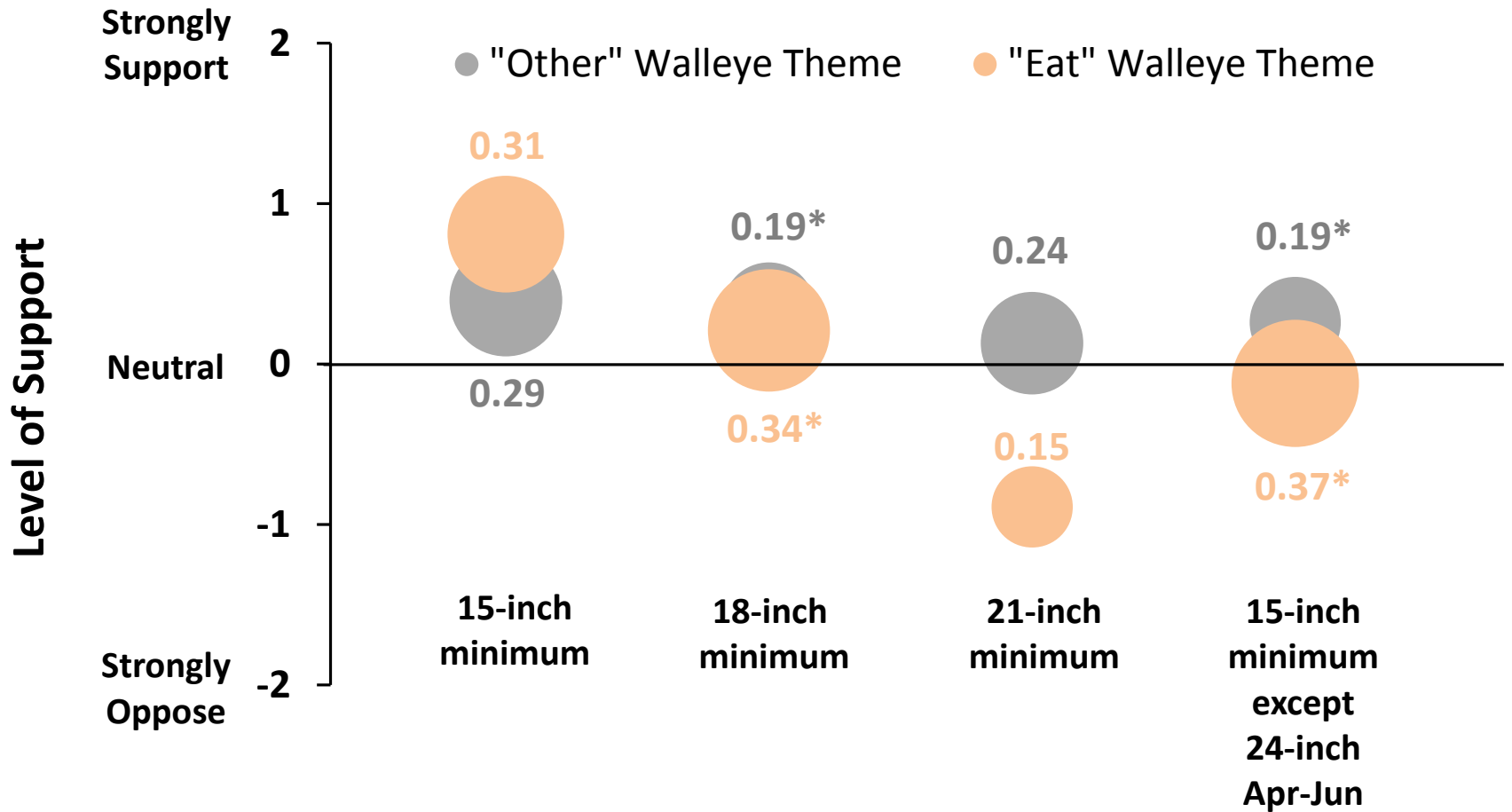Figure 6. Potential Conflict Indices (PCIs) of anglers' level of support for walleye regulations by those who were motivated by sustaining populations through natural reproduction (n = 210) and those with other motivations (n = 732) according to results from the 2013 Kansas licensed angler survey. *PCIs were significantly different at $p \leq 0.05$.
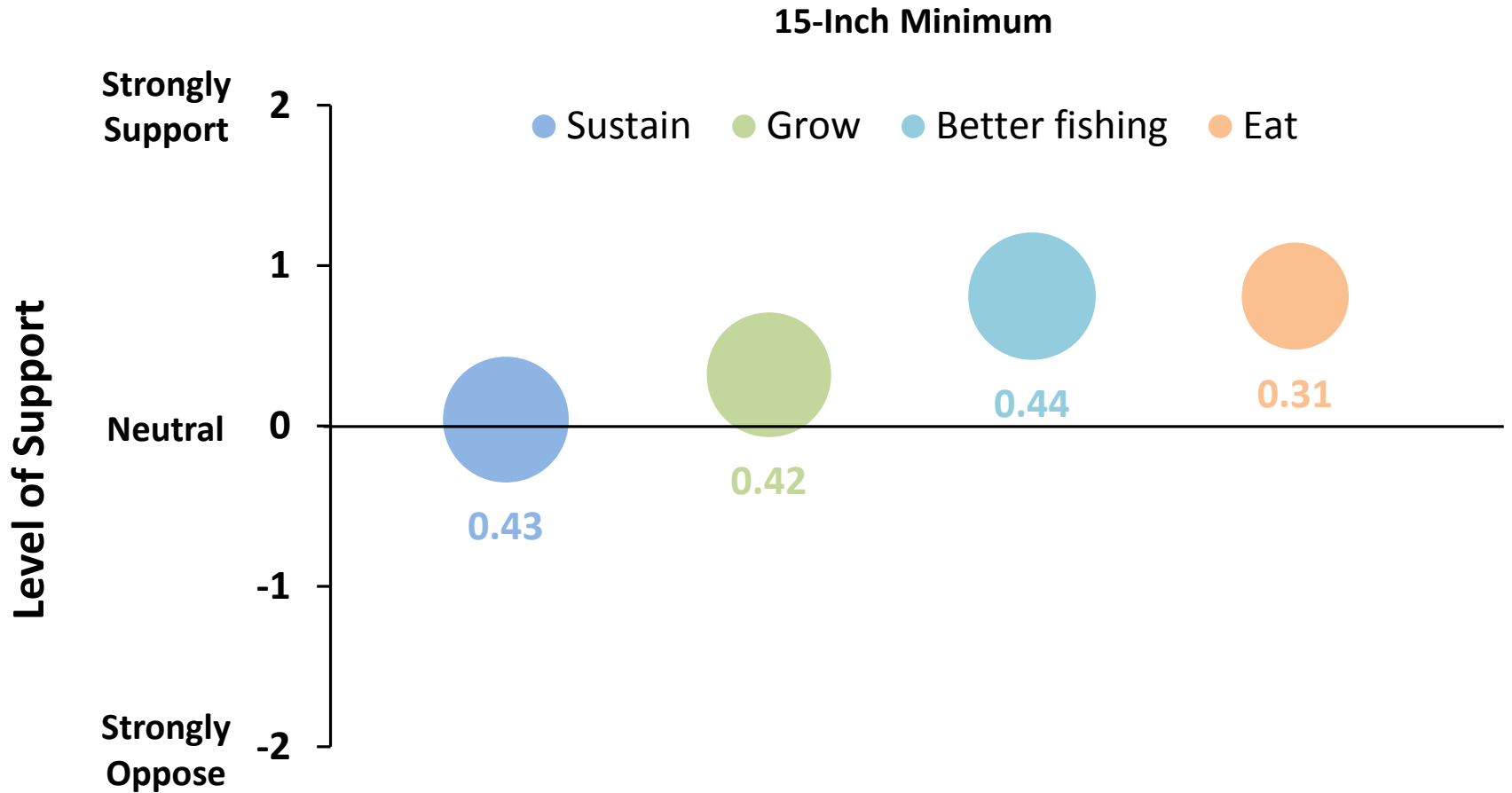
Figure 7. Potential Conflict Indices (PCIs) of anglers' level of support for walleye regulations by those who were motivated by wanting to grow bigger walleye (n = 148) and those with other motivations (n = 767) according to results from the 2013 Kansas licensed angler survey. *PCIs were significantly different at $p \leq 0.05$.

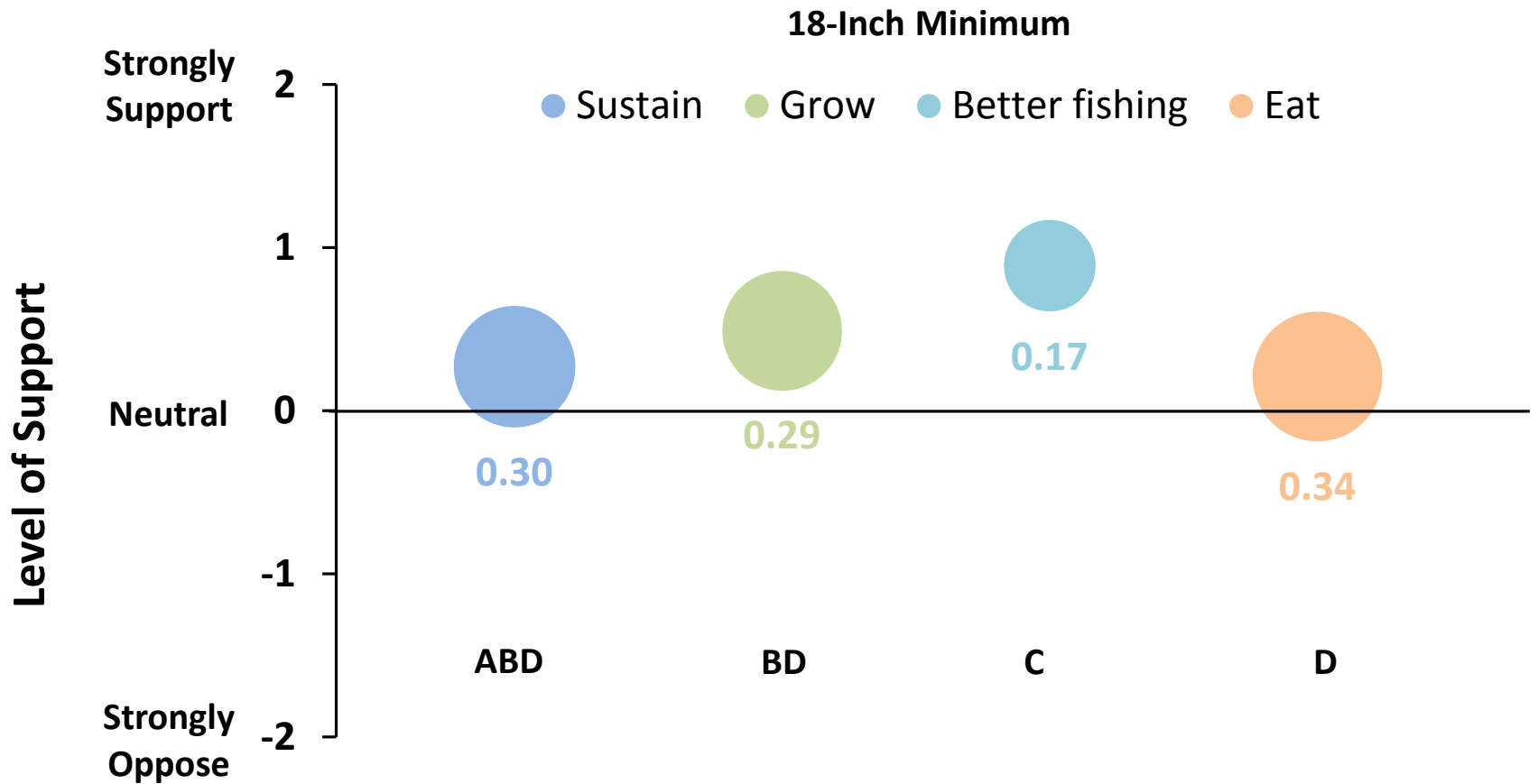Figure 8. Potential Conflict Indices (PCIs) of anglers' level of support for walleye regulations by those who were motivated by wanting better fishing opportunities for walleye (n = 112) and those with other motivations (n = 772) according to results from the 2013 Kansas licensed angler survey. *PCIs were significantly different at $p \leq 0.05$.

Figure 9. Potential Conflict Indices (PCIs) of anglers' level of support for walleye regulations by those who were motivated by eating walleye (n = 110) and those with other motivations (n = 774) according to results from the 2013 Kansas licensed angler survey. *PCIs were significantly different at $p \leq 0.05$.
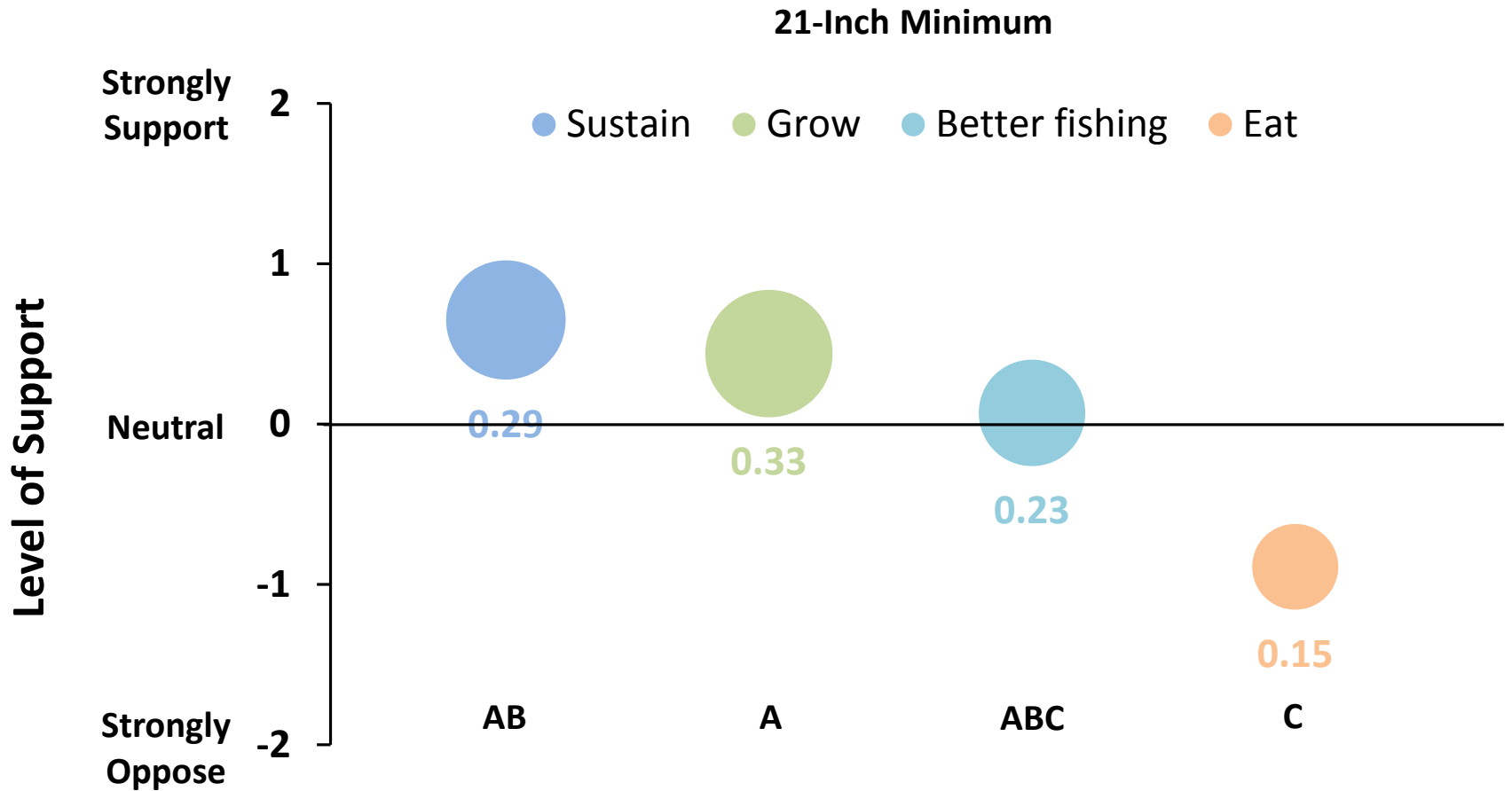
15-Inch Minimum

Figure 10. Potential Conflict Indices (PCIs) of anglers' level of support for the 15-inch minimum length limit on walleye by those with various motivations (Sustain n = 207; Grow n = 148; Better fishing n = 112; Eat n = 110) according to results from the 2013 Kansas licensed angler survey. None of the PCIs were significantly different at $p \le 0.05$.

18-Inch Minimum

Figure 11. Potential Conflict Indices (PCIs) of anglers' level of support for the 18-inch minimum length limit on walleye by those with various motivations (Sustain n = 207; Grow n = 147; Better fishing n = 112; Eat n = 109) according to results from the 2013 Kansas licensed angler survey. PCIs with the same letter were not significantly different at $p \leq 0.05$.
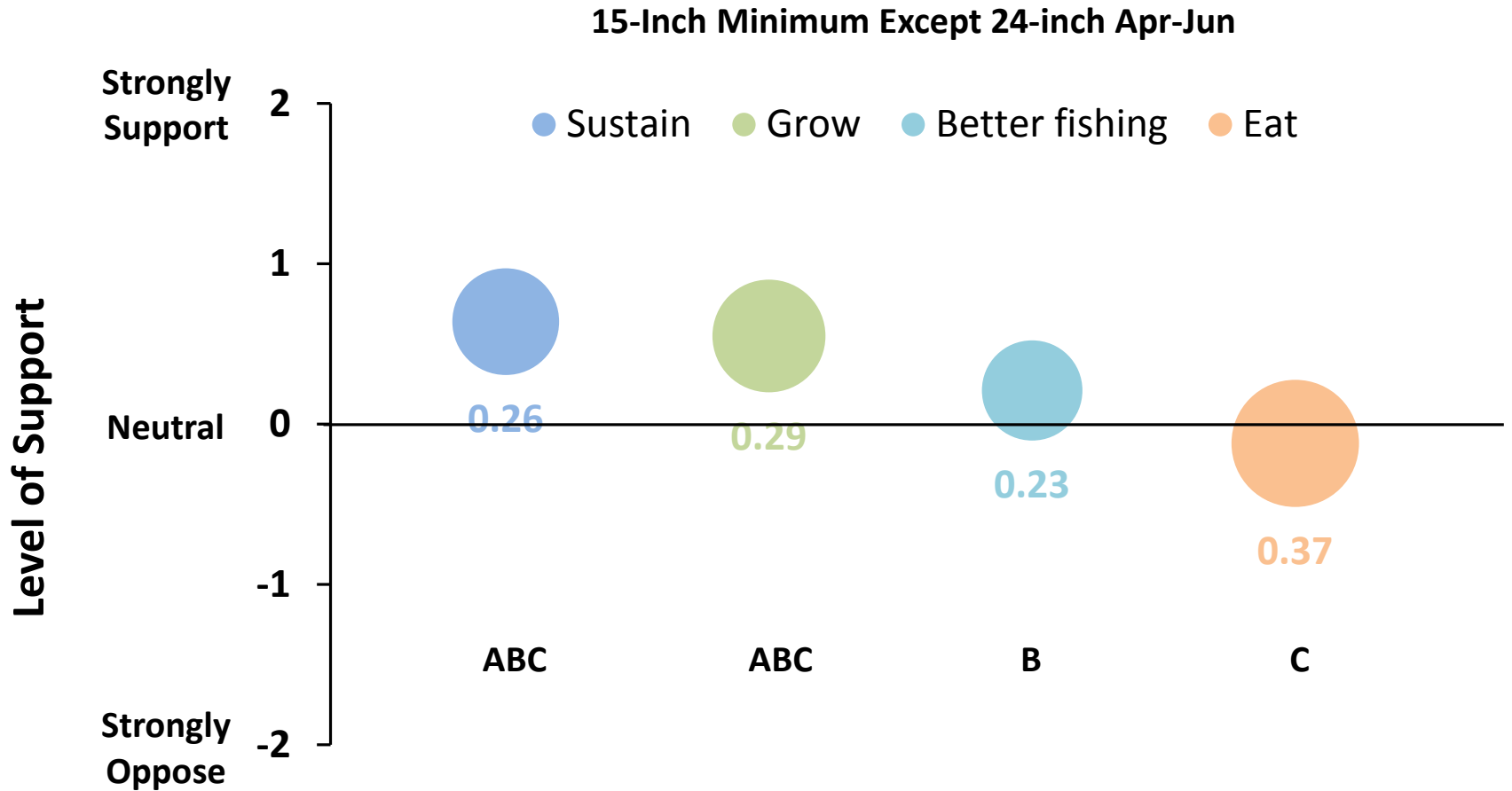
21-Inch Minimum

Figure 12. Potential Conflict Indices (PCIs) of anglers' level of support for the 21-inch minimum length limit on walleye by those with various motivations (Sustain n = 210; Grow n = 147; Better fishing n = 112; Eat n = 108) according to results from the 2013 Kansas licensed angler survey. PCIs with the same letter were not significantly different at $p \leq 0.05$.

15-Inch Minimum Except 24-inch Apr-Jun

Figure 13. Potential Conflict Indices (PCIs) of anglers' level of support for the 15-inch minimum length limit except 24-inch minimum April through June on walleye by those with various motivations (Sustain n = 209; Grow n = 147; Better fishing n = 112; Eat n = 110) according to results from the 2013 Kansas licensed angler survey. PCIs with the same letter were not significantly different at $p \leq 0.05$.
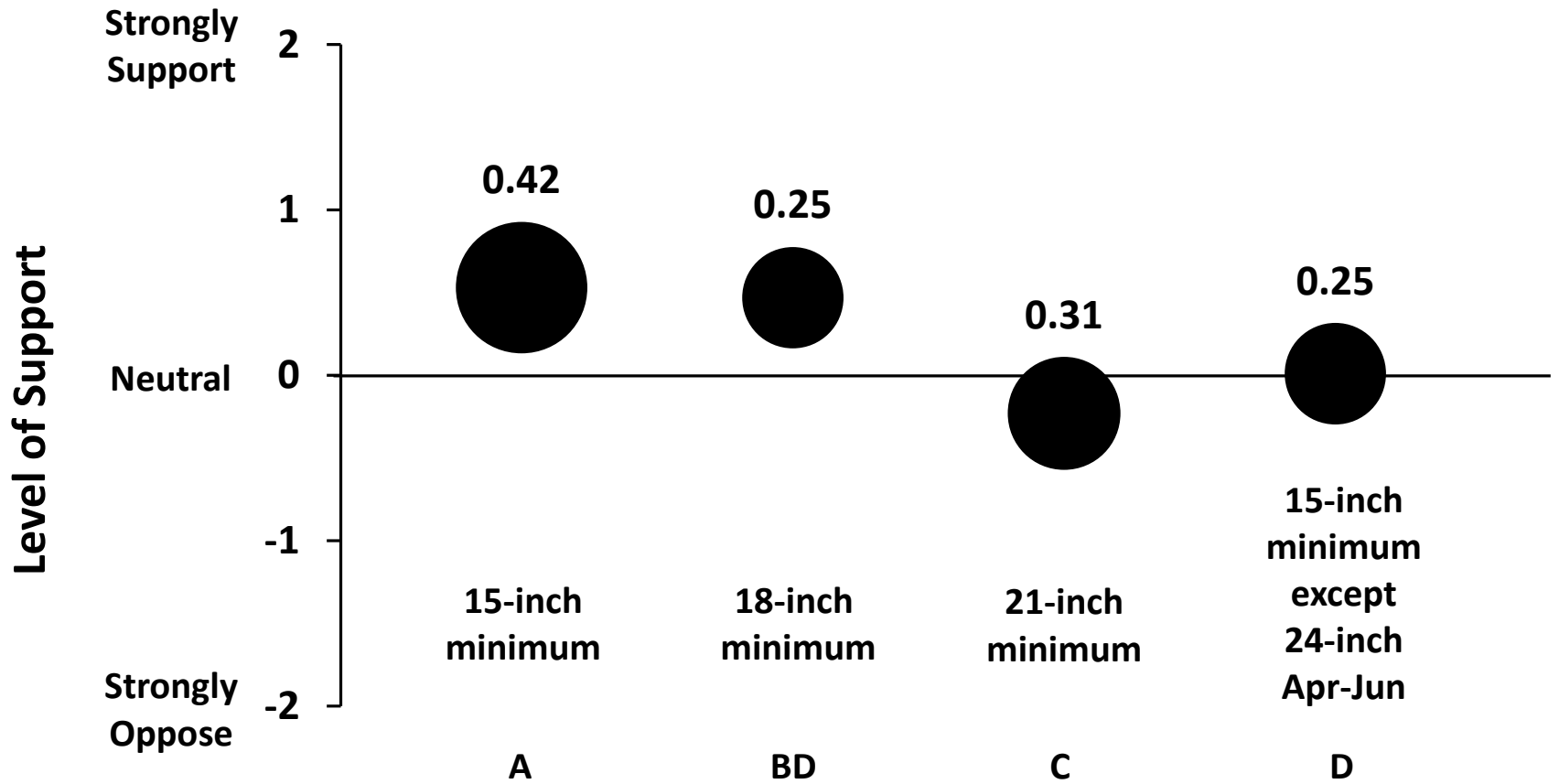
Figure 14A. Potential Conflict Indices (PCIs) of anglers' who ranked walleye in their top five preferred species or ranked walleye as one of the top three fish they actually fish for the most (n = 418) and their level of support for walleye regulations according to results from the 2013 Kansas licensed angler survey. PCIs with the same letter were not significantly different at $p \leq 0.05$.
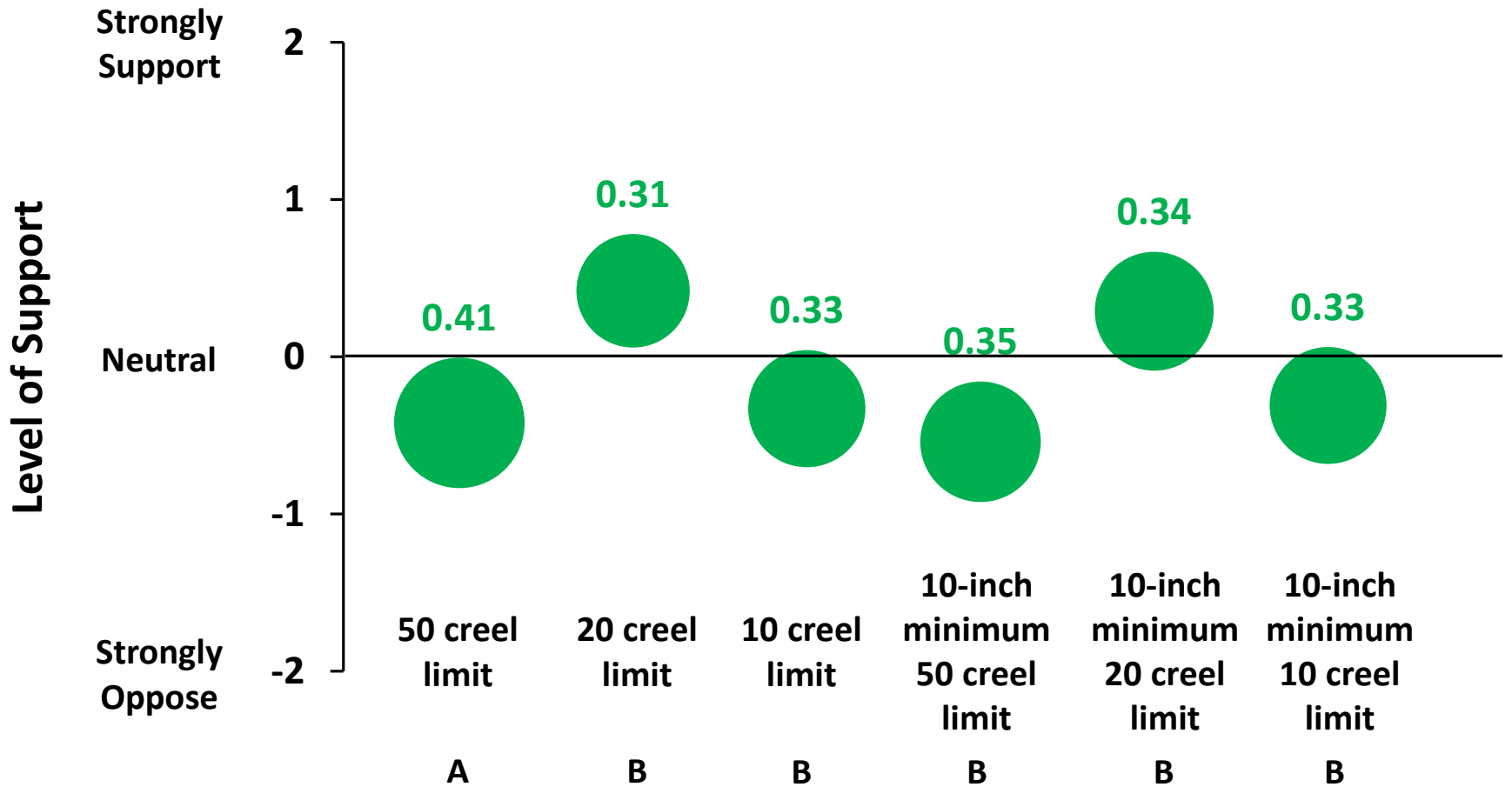
Figure 14B. Potential Conflict Indices (PCIs) of anglers' level of support for crappie regulations according to results from the 2013 Kansas licensed angler survey. PCIs with the same letter were not significantly different at $p < 0.05$.
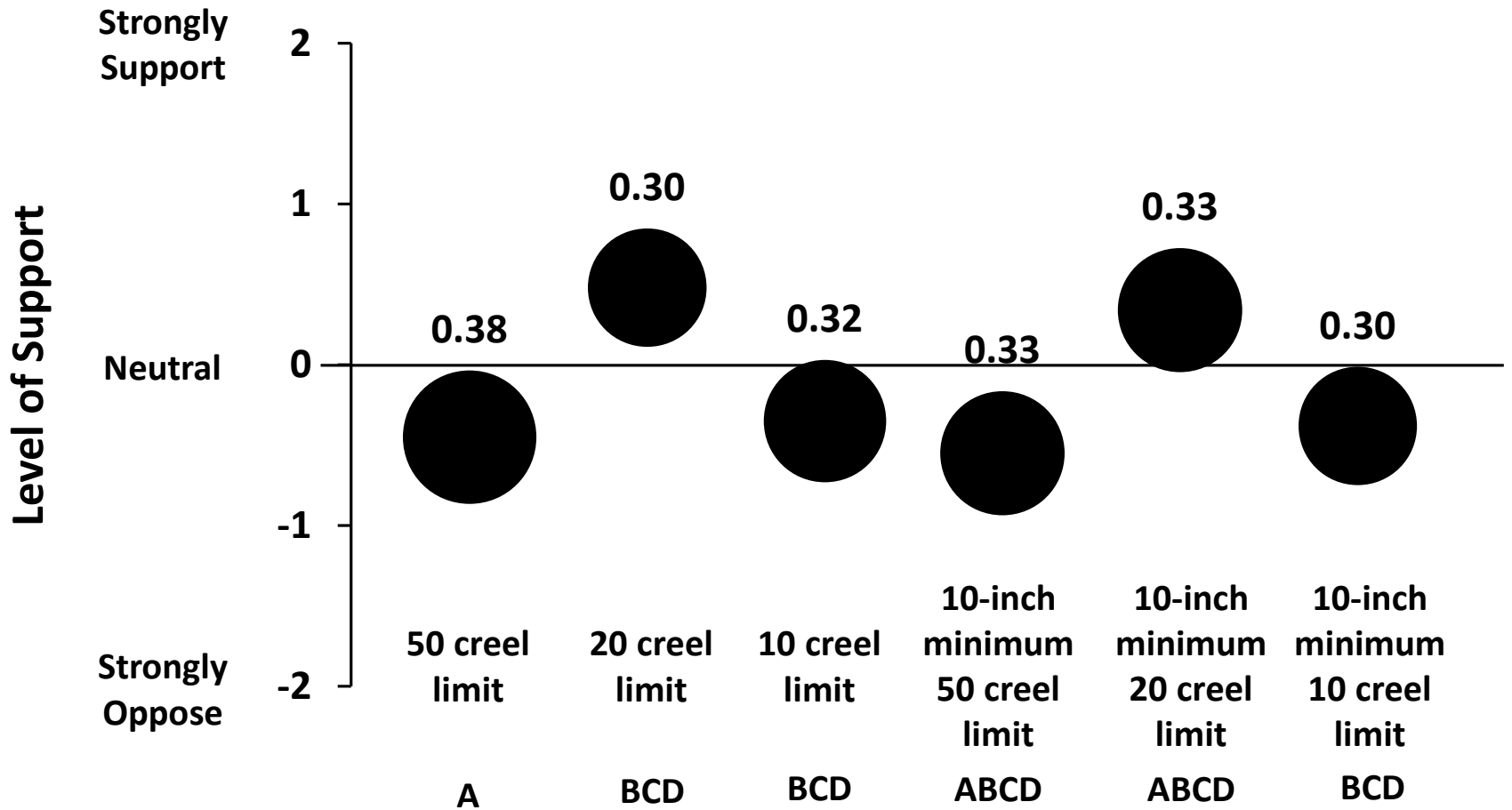
Figure 15. Potential Conflict Indices (PCIs) of anglers' who ranked crappie in their top five preferred species or ranked crappie as one of the top three fish they actually fish for the most (n = 630) and their level of support for crappie regulations according to results from the 2013 Kansas licensed angler survey. PCIs with the same letter were not significantly different at $p < 0.05$.
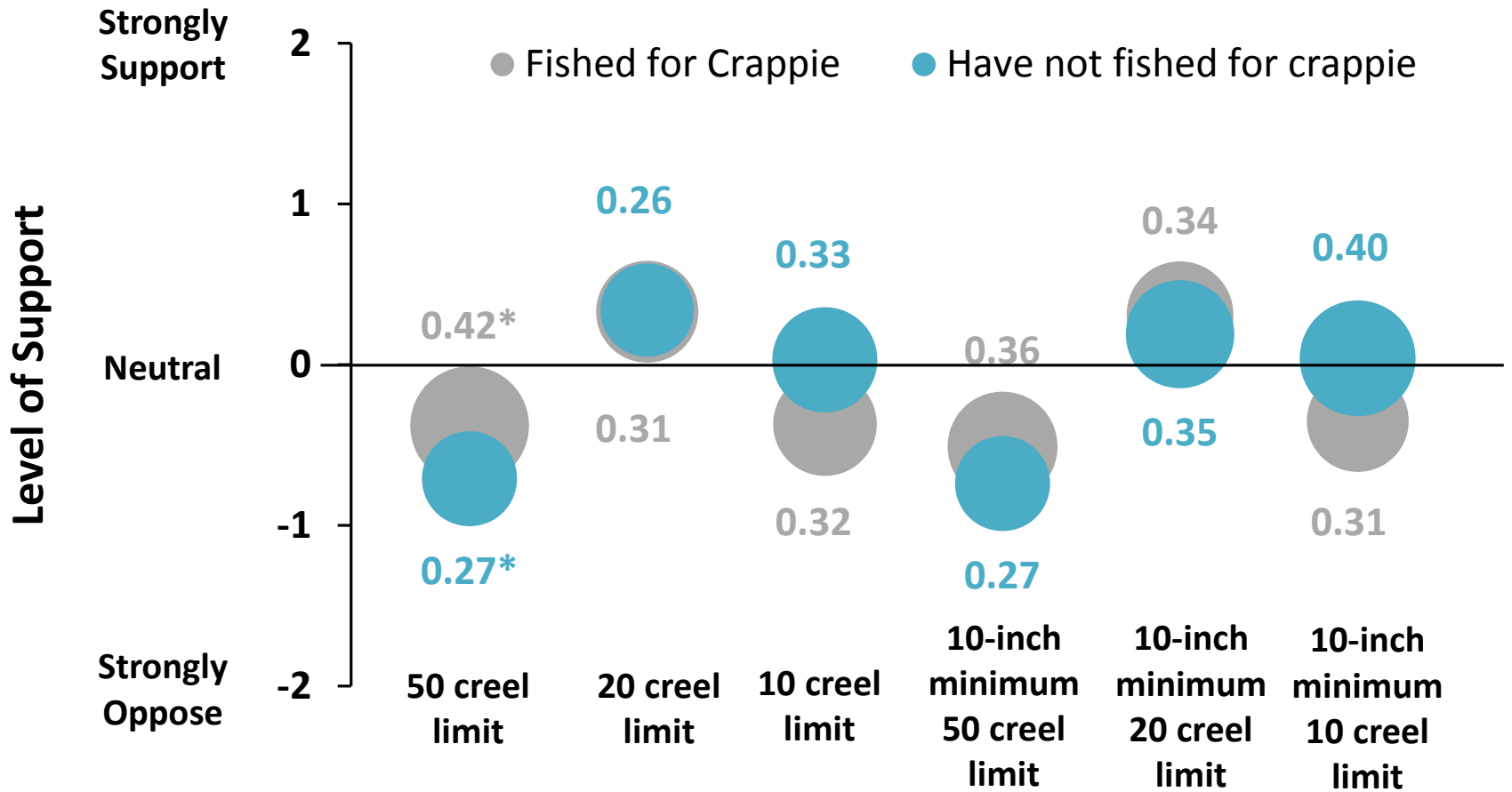
Figure 16. Potential Conflict Indices (PCIs) of anglers' level of support for crappie regulations by those who have fished for crappie in Kansas (n = 873) versus those who have not fished for crappie in Kansas (n = 105) according to results from the 2013 Kansas licensed angler survey. *PCIs were significantly different at $p < 0.05$.
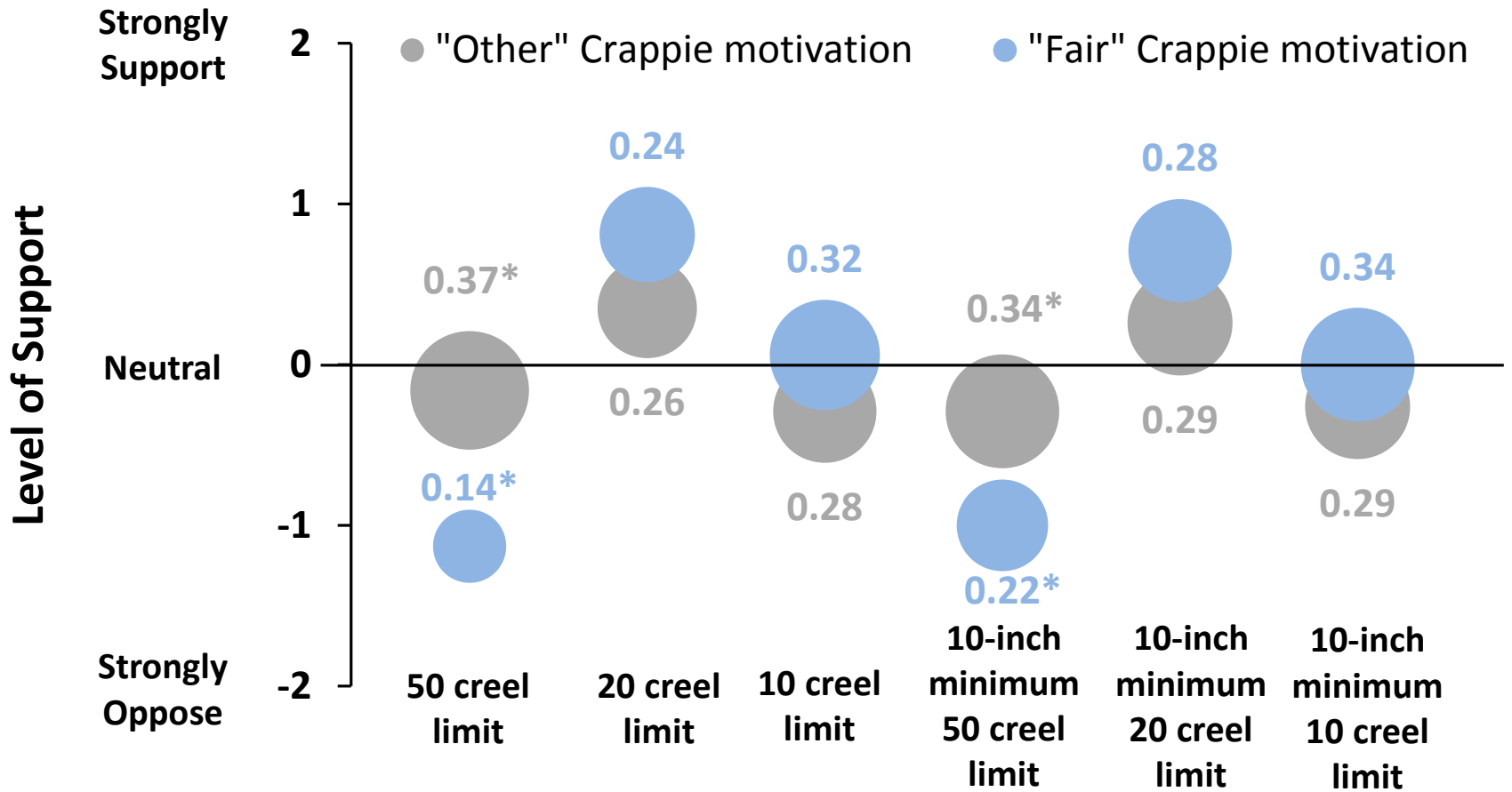
Figure 17. Potential Conflict Indices (PCIs) of anglers' level of support for crappie regulations by those who were motivated by what they considered fair (n = 223) and those with other motivations (n = 697) according to results from the 2013 Kansas licensed angler survey. *PCIs were significantly different at $p < 0.05$.
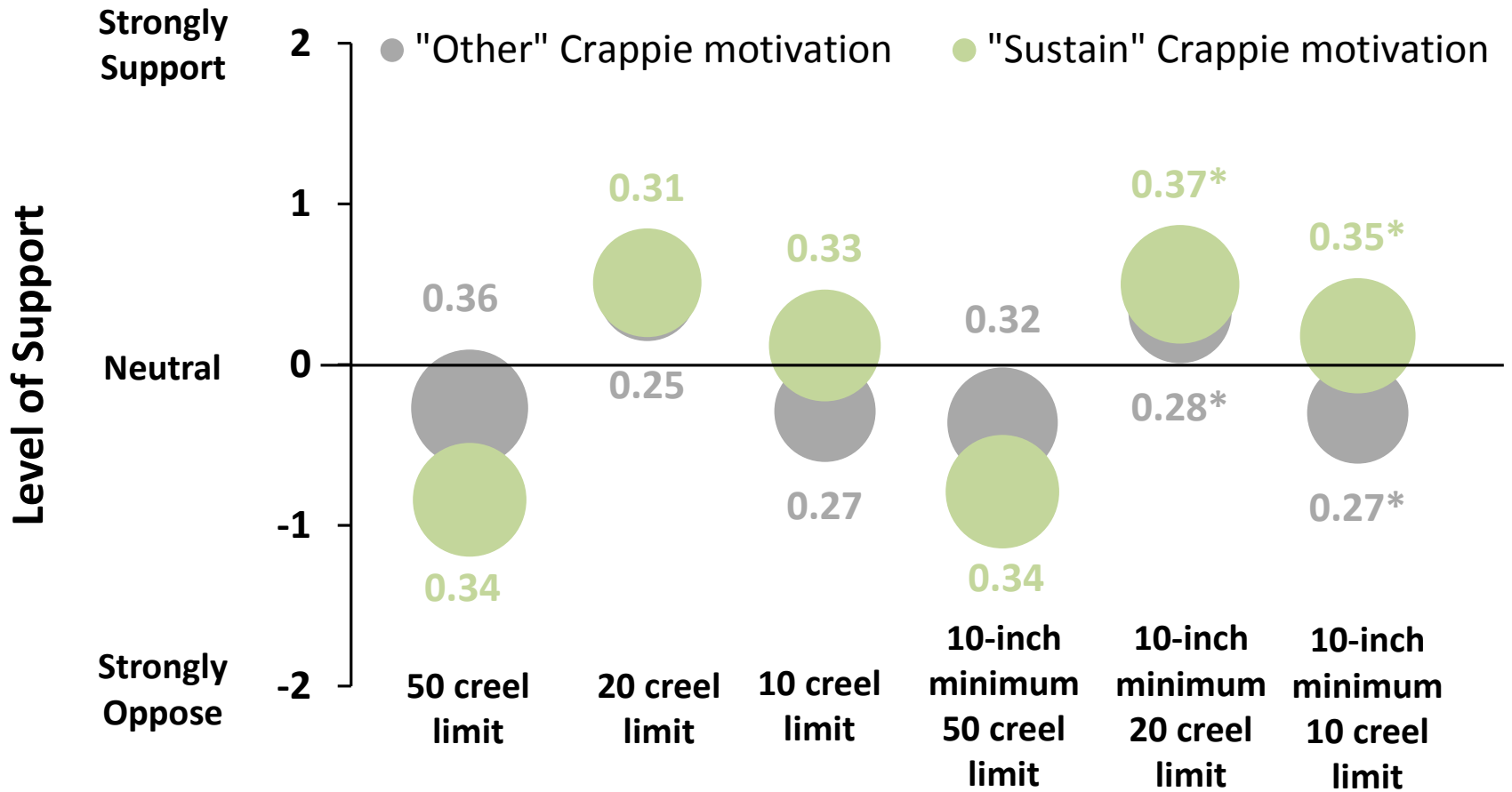
Figure 18. Potential Conflict Indices (PCIs) of anglers' level of support for crappie regulations by those who were motivated by sustaining populations through natural reproduction (n = 114) and those with other motivations (n = 806) according to results from the 2013 Kansas licensed angler survey. *PCIs were significantly different at $p < 0.05$.
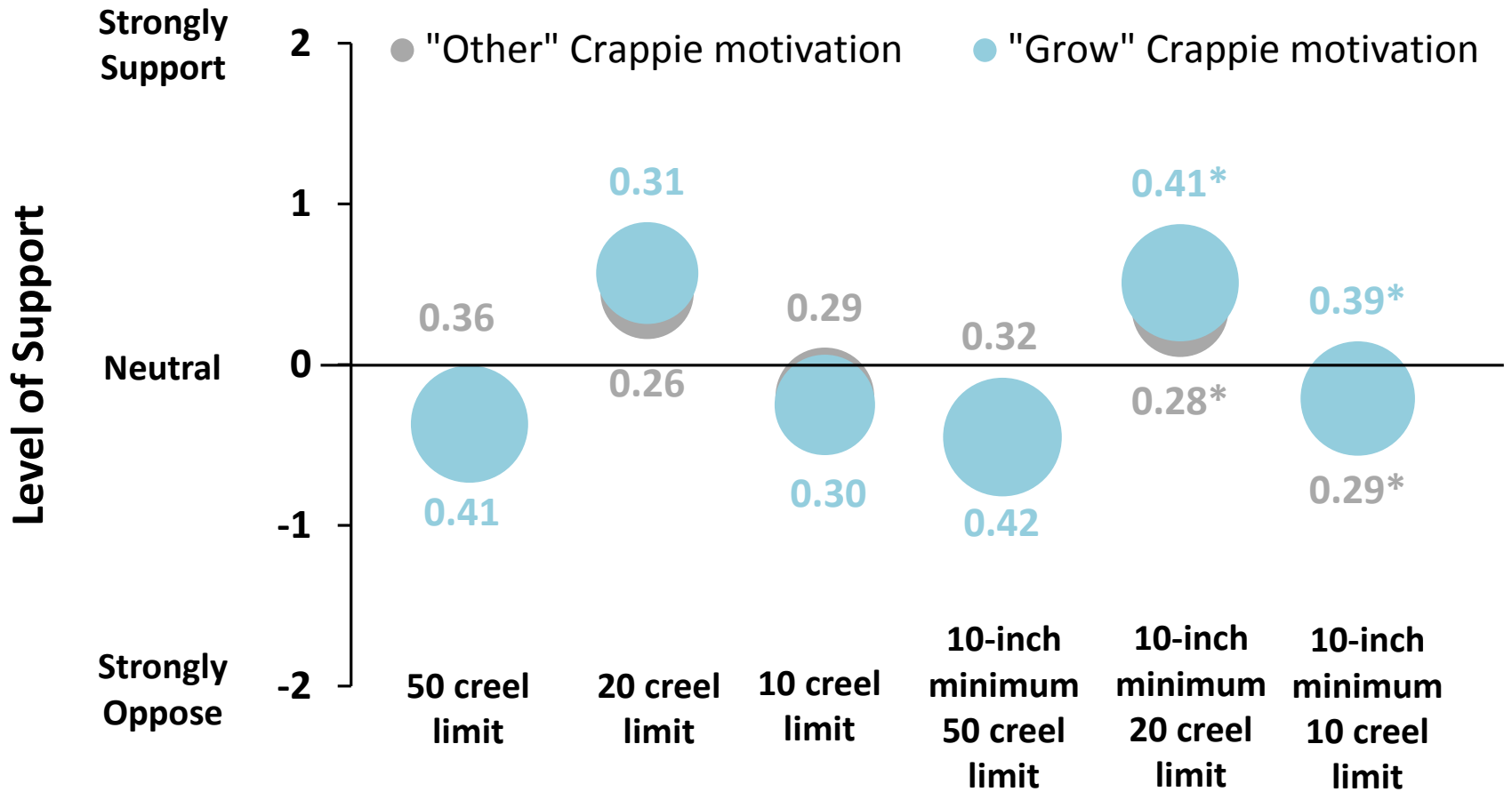
Figure 19. Potential Conflict Indices (PCIs) of anglers' level of support for crappie regulations by those who were motivated by wanting to grow bigger crappie (n = 114) and those with other motivations (n = 806) according to results from the 2013 Kansas licensed angler survey. *PCIs were significantly different at $p < 0.05$.

Figure 20. Potential Conflict Indices (PCIs) of anglers' level of support for crappie regulations by those who were motivated by eating crappie (n = 104) and those with other motivations (n = 817) according to results from the 2013 Kansas licensed angler survey. *PCIs were significantly different at $p < 0.05$.

50 Creel Limit

Figure 21. Potential Conflict Indices (PCIs) of anglers' level of support for the 50 daily creel limit on crappie by those with various motivations according to results from the 2013 Kansas licensed angler survey. PCIs with the same letter were not significantly different at $p \leq 0.05$.

20 Creel Limit

Figure 22. Potential Conflict Indices (PCIs) of anglers' level of support for the 20 daily creel limit on crappie by those with various motivations according to results from the 2013 Kansas licensed angler survey. None of the PCIs were significantly different at $p \leq 0.05$.
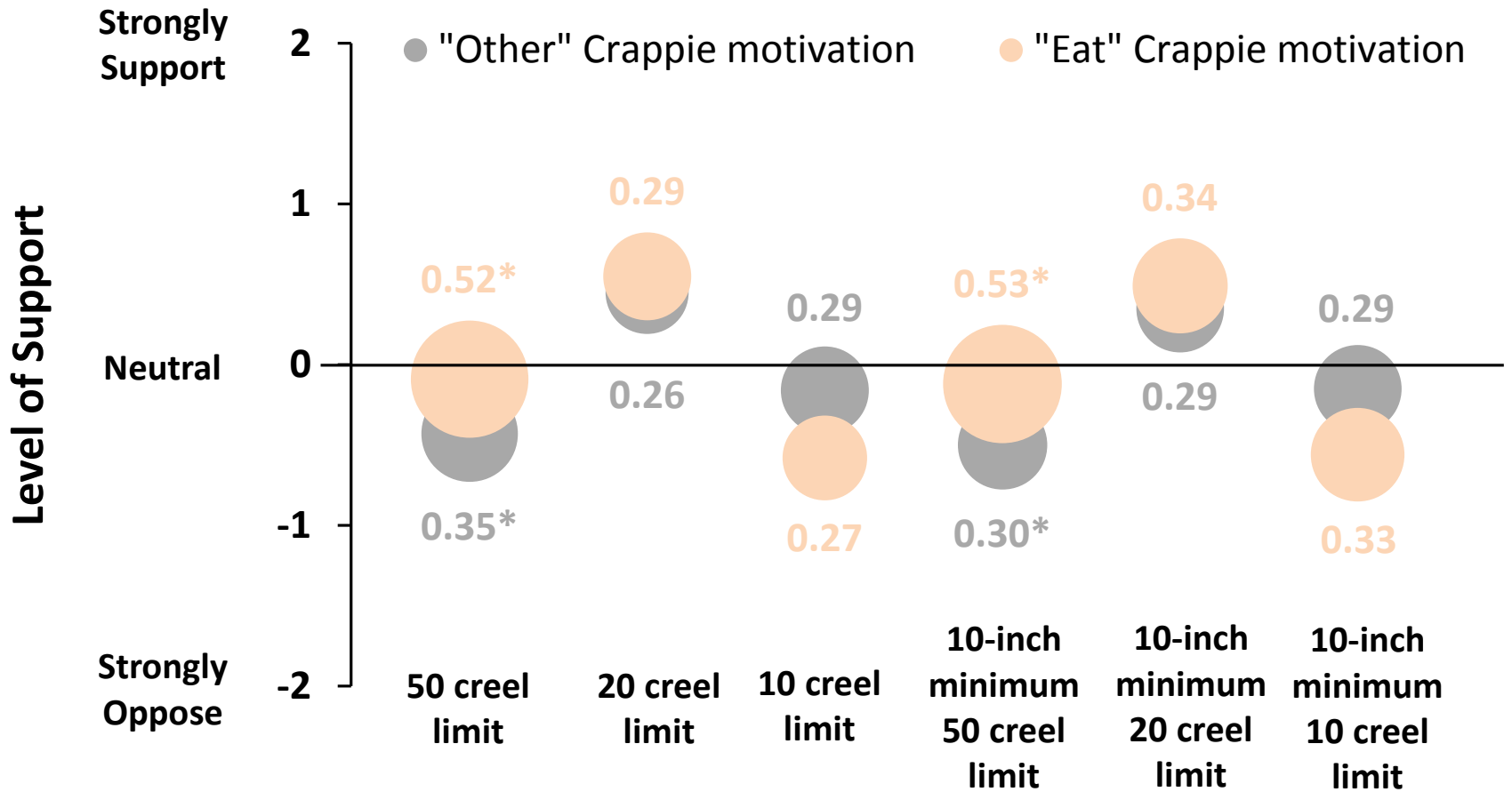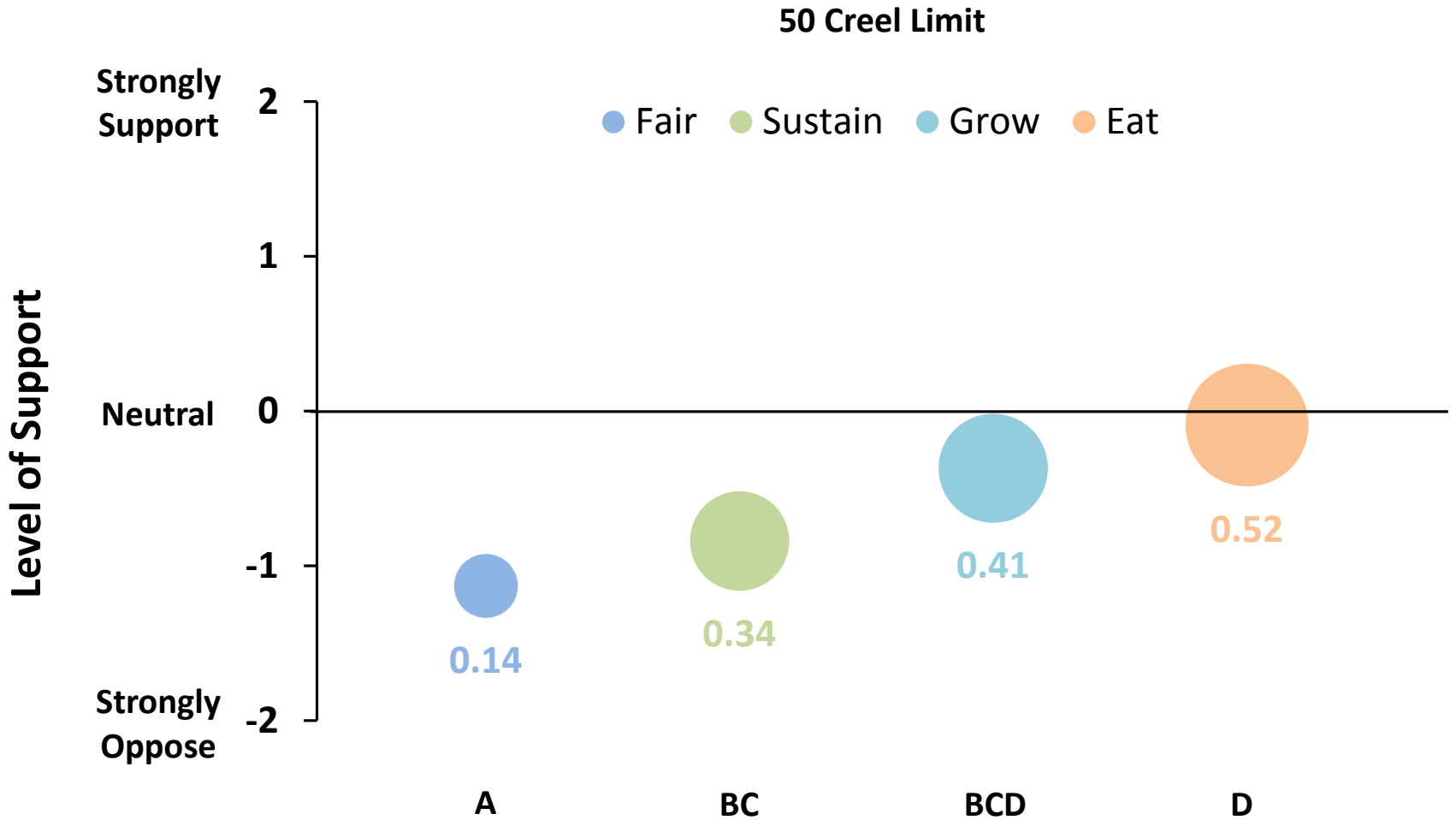
Figure 23. Potential Conflict Indices (PCIs) of anglers' level of support for the 10 daily creel limit on crappie by those with various motivations according to results from the 2013 Kansas licensed angler survey. None of the PCIs were significantly different at $p \leq 0.05$.

Figure 24. Potential Conflict Indices (PCIs) of anglers' level of support for the 10-inch minimum, 50 daily creel limit on crappie by those with various motivations according to results from the 2013 Kansas licensed angler survey. PCIs with the same letter were not significantly different at $p \leq 0.05$.

10-Inch Minimum, 20 Creel Limit

Figure 25. Potential Conflict Indices (PCIs) of anglers' level of support for the 10-inch minimum, 20 daily creel limit on crappie by those with various motivations according to results from the 2013 Kansas licensed angler survey. PCIs with the same letter were not significantly different at $p \leq 0.05$.
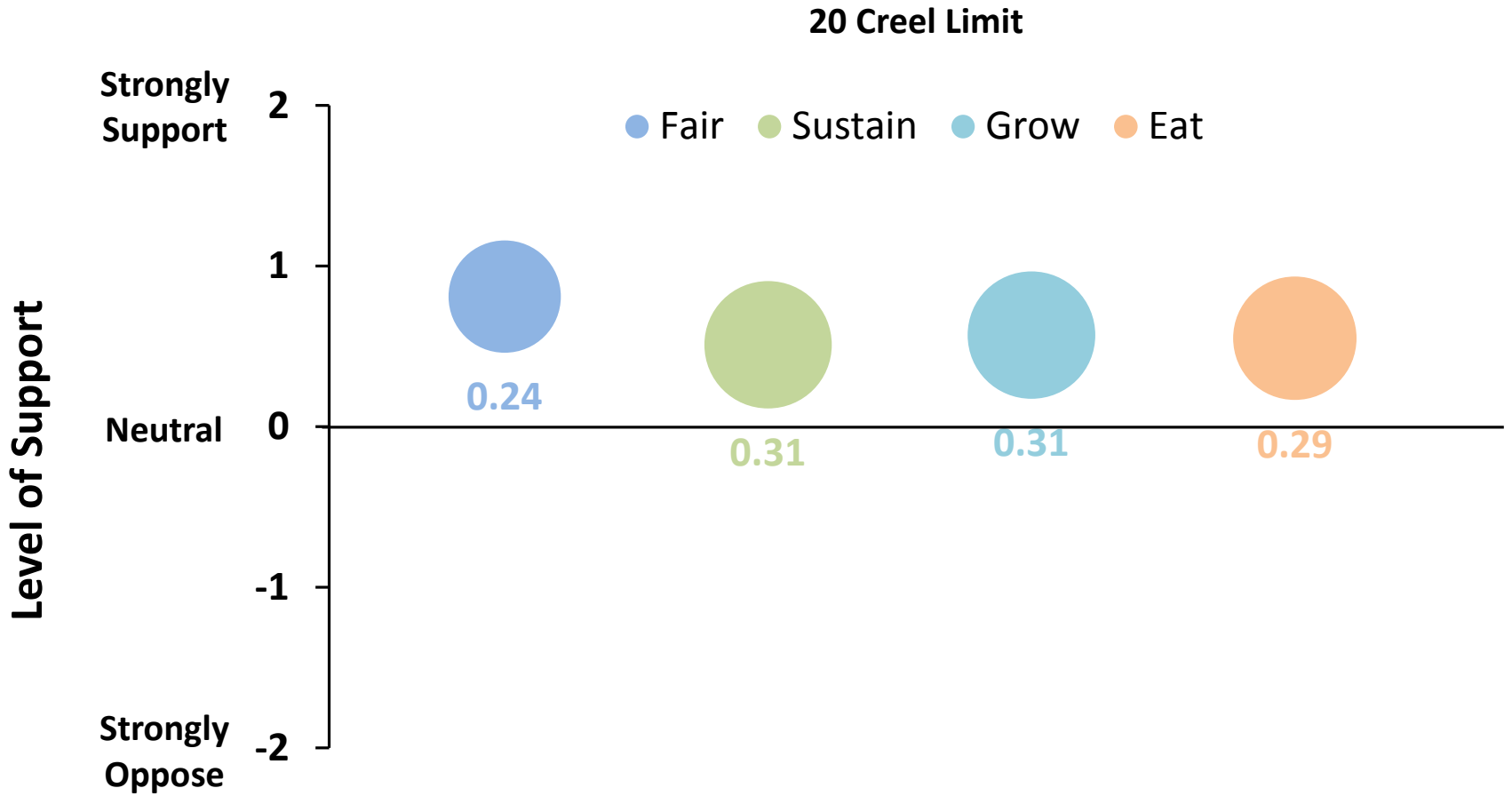
Figure 26. Potential Conflict Indices (PCIs) of anglers' level of support for the 10-inch minimum, 10 daily creel limit on crappie by those with various motivations according to results from the 2013 Kansas licensed angler survey. None of the PCIs were significantly different at $p \leq 0.05$.
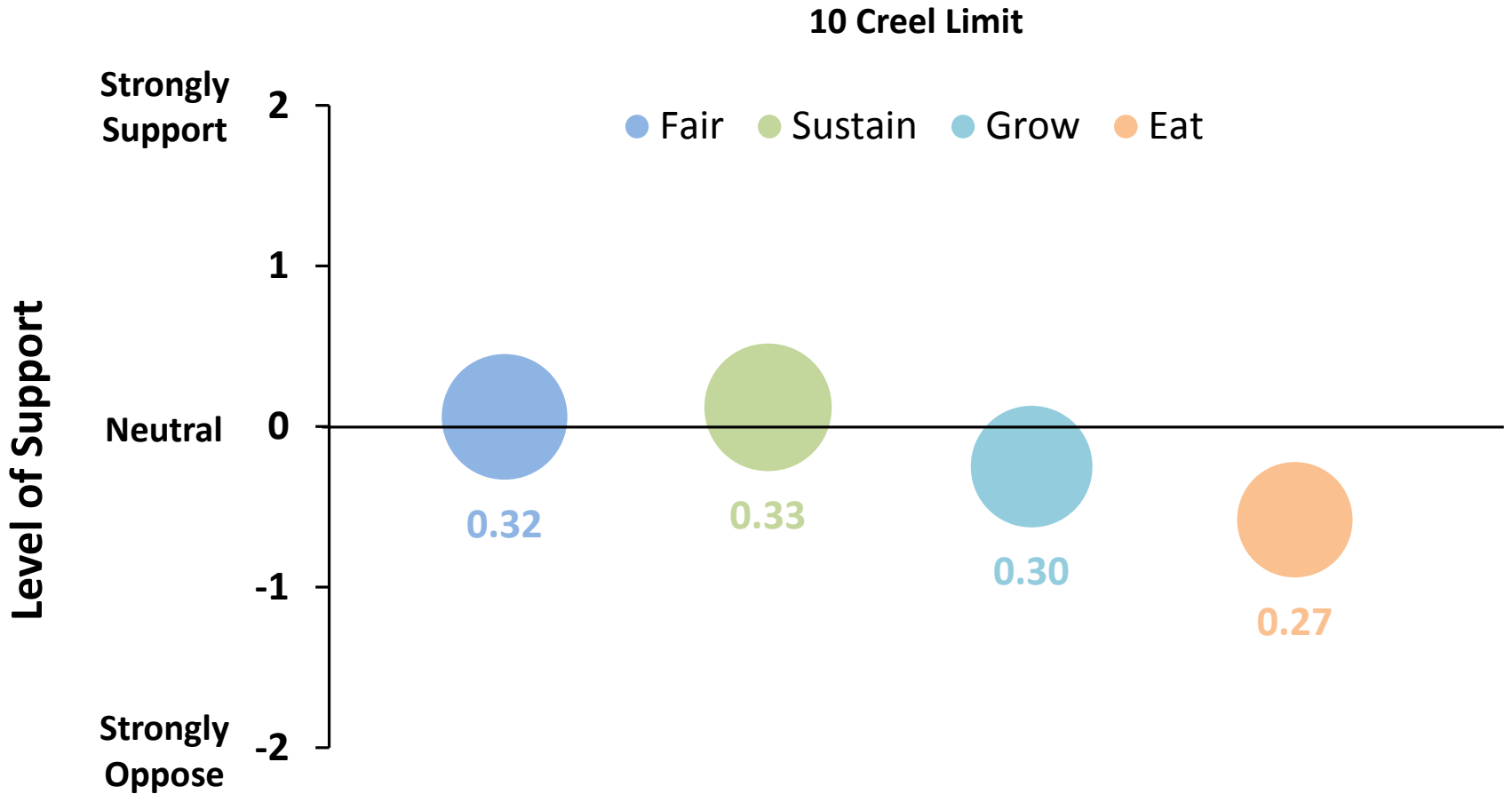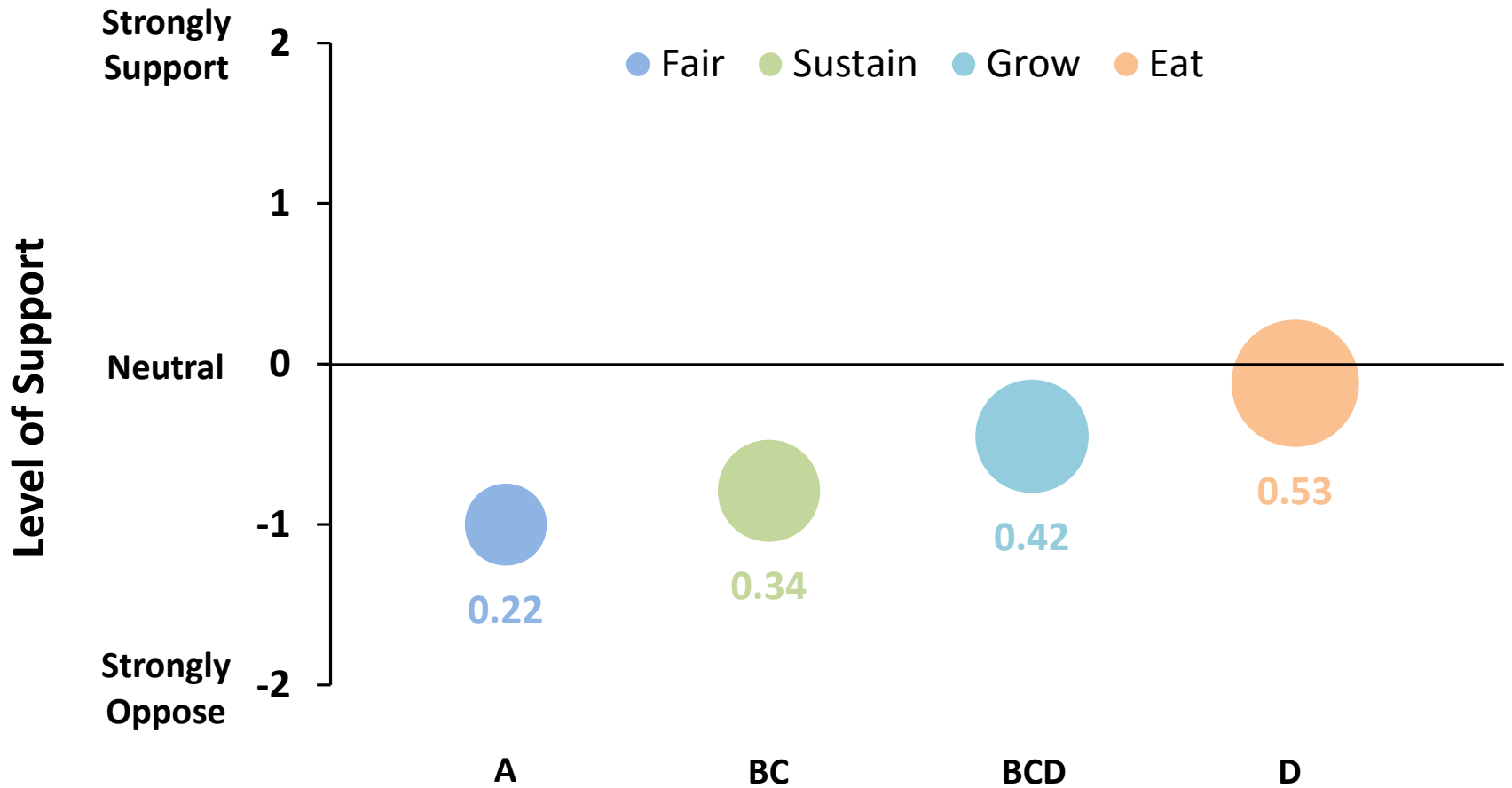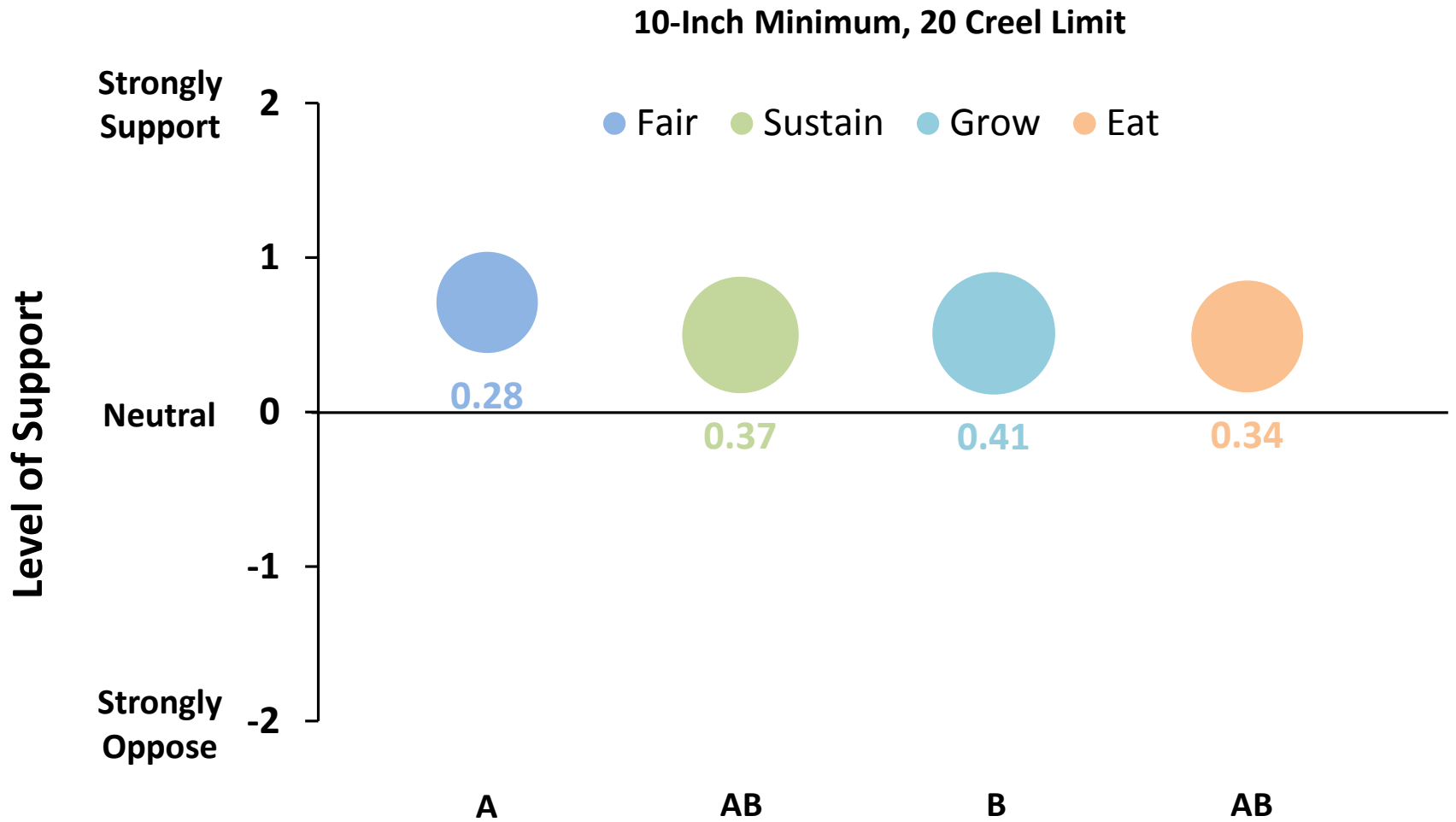
Kansas Licensed Angler Survey

2013

Conducted by the

Kansas Department of Wildlife, Parks and Tourism

You were selected to participate in this survey because you had a Kansas fishing license in 2013. We would like to know your opinions about fishing in Kansas so we can use this information to help provide quality experiences for anglers. Your participation in this survey is voluntary, but greatly appreciated.

Section I. General Fishing Participation and Characteristics

1. How many of the previous five years did you go fishing in Kansas? *(Please select only <u>one</u>)*

1) 5 out of 5 years
2) 4 out of 5 years
3) 3 out of 5 years

4) 2 out of 5 years
5) 1 out of 5 years
6) 0 out of 5 years

2. Did you fish in Kansas in 2013?

> 1) YES → **Continue to Question #3**
> 2) NO → **Go to Question #12**

3. Which of the following fishing methods did you use in Kansas in 2013?
   (Please select all that apply)

1) Bank/Shore
2) Ice fishing
3) Motorized boat
4) Non-motorized boat

5) Floatline fishing (jugfishing)
6) Setlines or trotlines
7) Handfishing
8) Other *(Please specify)* _____

4. Please estimate the number of days (single day or any portion of a day) that you fished in the following water types in Kansas in 2013:

Reservoirs: _____ days   City/county owned lakes: _____ days

State Fishing Lakes: _____ days   Private ponds: _____ days

Rivers or streams: _____ days   Other: _____ days

5. What percent of your fishing days (single day or any portion of a day) did you fish from a boat in Kansas in 2013? If none, please write 0.

_____ % of fishing days that I fished from a boat

6. How far did you travel for most of your 1-day fishing trips in Kansas in 2013?

_____ round trip miles

7. What is the maximum distance you would be willing to travel to fish another lake if you did not approve of the way your favorite lake in Kansas was being managed?

_____ round trip miles

8. Please rank five of your favorite species to catch in Kansas from the list below where 1 is your most favorite. Note: We are interested in your <u>preferences</u>, rather than which fish are readily accessible to you. Use each number 1, 2, 3, 4, and 5 only once.

_____ Blue catfish		_____ Paddlefish (spoonbill)	
_____ Bluegill		_____ Sauger	
_____ Bullhead		_____ Smallmouth bass	
_____ Carp		_____ Spotted bass (Kentucky bass)	
_____ Channel catfish		_____ Striped bass	
_____ Crappie		_____ Trout	
_____ Drum		_____ Walleye	
_____ Flathead catfish		_____ White bass	
_____ Largemouth bass		_____ Wiper (hybrid striped bass/white bass)	
_____ Northern pike		_____ Other *(Please specify below)*	

_____

9. Of the 5 fish you ranked above, which 3 do you actually fish for most?

1) _____ , 2) _____ , 3) _____

10. In the table below, please write your <u>*preferred*</u> locations to go fishing, and the locations you <u>*actually*</u> go fishing the most in Kansas. (Example locations may include: Wilson Reservoir, Lyon State Fishing Lake, your farm pond, the Arkansas River, FISH waters, etc.) If you do not have a preference, please write "no preference."

Top 3 locations I <u>*prefer*</u> to go fishing:	Top 3 locations I <u>*actually*</u> go fishing:
1)	1)
2)	2)
3)	3)

11. What type of group do you go fishing with _most often_? *(Please select only _one_)*

1) Fish alone	5) Club
2) Family	6) Coworker
3) Friends	7) Other *(Please specify)*
4) Family and friends	_____

12. Do you plan to go fishing in Kansas in 2014?

1) YES
2) NO --- If NO, please tell us why not:_____
3) Unsure

13. Please indicate the importance of each item as a reason _why_ you fish:

	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important
a) To be outdoors	1	2	3	4	5
b) For the experience of the catch	1	2	3	4	5
c) To experience natural surroundings	1	2	3	4	5
d) To be with friends	1	2	3	4	5
e) For the challenge or sport	1	2	3	4	5
f) For relaxation	1	2	3	4	5
g) To experience new things	1	2	3	4	5
h) To get away from other people	1	2	3	4	5
i) To compete for prizes or money	1	2	3	4	5
j) To experience adventure and excitement	1	2	3	4	5
k) To obtain fish for eating	1	2	3	4	5
l) To be close to nature	1	2	3	4	5
m) For physical exercise	1	2	3	4	5
n) To catch a trophy-sized fish	1	2	3	4	5
o) To get away from the daily routine	1	2	3	4	5
p) For family recreation	1	2	3	4	5
q) For the fun of catching fish	1	2	3	4	5
r) To develop my skills	1	2	3	4	5
s) To experience solitude or tranquility	1	2	3	4	5

14. How important are the following in either limiting or enabling your participation in recreational fishing?

	Greatly limits participation	Limits participation	Neither limits nor enables participation	Enables participation	Greatly enables participation
a) My interest in fishing	1	2	3	4	5
b) Family commitments	1	2	3	4	5
c) Work commitments	1	2	3	4	5
d) Crowding at fishing areas	1	2	3	4	5
e) Cost of fishing equipment	1	2	3	4	5
f) Cost of fishing licenses and permits	1	2	3	4	5
g) Travel costs and entrance fees	1	2	3	4	5
h) Presence of aquatic nuisance species (ANS)	1	2	3	4	5
i) Fishing regulations too restrictive or unclear	1	2	3	4	5
j) People of my gender or ethnic background are discriminated against by other anglers	1	2	3	4	5
k) My comfort level being outdoors	1	2	3	4	5
l) Inadequate fishing skills	1	2	3	4	5
m) Health problems	1	2	3	4	5
n) Fear or safety concerns	1	2	3	4	5
o) No desire to participate in fishing	1	2	3	4	5
p) Weather conditions	1	2	3	4	5
q) Interest in indoor activities	1	2	3	4	5
r) The other people who fish are not friendly	1	2	3	4	5
s) The amount of planning required to go fishing	1	2	3	4	5
t) Availability of people to go fishing with	1	2	3	4	5
u) Fishing locations where alcohol consumption is allowed	1	2	3	4	5
v) My age	1	2	3	4	5
w) People of my gender or ethnic background are discriminated against by outdoor recreation managers	1	2	3	4	5
x) Limited access to good places to go fishing	1	2	3	4	5
y) Don't like to be outside	1	2	3	4	5
z) No good fishing opportunities near my home	1	2	3	4	5

15. Compared to your other outdoor recreational activities, would you rate fishing as:

1) Your most important outdoor recreational activity
2) Your second most important outdoor recreational activity
3) Your third most important outdoor recreational activity
4) None of the above

16. How important are the following when you select a place to fish?

	Not at all Important	Somewhat Important	Neutral	Very Important	Extremely Important
a) Campsites	1	2	3	4	5
b) Restrooms	1	2	3	4	5
c) Picnic tables	1	2	3	4	5
d) Boat ramps	1	2	3	4	5
e) Boat rentals	1	2	3	4	5
f) Fish cleaning stations	1	2	3	4	5
g) Bait and tackle shops	1	2	3	4	5
h) Trash receptacles	1	2	3	4	5
i) Shade	1	2	3	4	5
j) Piers or jetties	1	2	3	4	5
k) Waters close to work	1	2	3	4	5
l) Waters close to home	1	2	3	4	5
m) Fishing where you don't have to walk for more than 15 minutes	1	2	3	4	5
n) Fishing where others are not engaged in other recreational activities	1	2	3	4	5
o) Fishing where there are other recreational activities available	1	2	3	4	5
p) Fishing where you are likely to see only a small number of other anglers	1	2	3	4	5
q) Seeing few man-made structures	1	2	3	4	5
r) Fishing where you feel far away from people and cities	1	2	3	4	5
s) Fishing in remote areas	1	2	3	4	5
t) Fishing where you cannot see or hear busy traffic	1	2	3	4	5
u) Fishing waters that are free of aquatic nuisance species (ANS)	1	2	3	4	5
v) Fishing where alcohol consumption is allowed	1	2	3	4	5
w) Fishing at an area that doesn't have a user fee	1	2	3	4	5

In general, fishing participation has been declining for several years. The number one reason people give for not fishing is they don't have enough time, usually due to work or family commitments. KDWPT would like to offer fishing licenses and equipment at the same location in a hassle-free environment at a reasonable price to make it easier for you to gather your family and friends to go fishing.

17. How likely would you be to use the following services if they were available at an urban or rural lake?

(Please only select one for each item.)   (Please only select one for each item.)

At an urban lake in Kansas   ## At a rural lake in Kansas

Very Unlikely	Unlikely	Neutral	Likely	Very Likely	Services	Very Unlikely	Unlikely	Neutral	Likely	Very Likely
1	2	3	4	5	License purchase available on-site	1	2	3	4	5
1	2	3	4	5	Knowledgeable employees on-site	1	2	3	4	5
1	2	3	4	5	Fishing equipment rental	1	2	3	4	5
1	2	3	4	5	Boat rental	1	2	3	4	5
1	2	3	4	5	Canoe or kayak rental	1	2	3	4	5

18. Mark the category that best describes how you rate yourself as an angler.
    (Please select only one)

    1) Beginner
    2) Average
    3) Above average
    4) Expert

19. **Please indicate the extent to which you agree or disagree with each of the following statements about fishing.**

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a) The more fish I catch, the happier I am	1	2	3	4	5
b) A fishing trip can be successful even if no fish are caught	1	2	3	4	5
c) I usually eat the fish I catch	1	2	3	4	5
d) A successful fishing trip is one in which many fish are caught	1	2	3	4	5
e) I would rather catch one or two big fish than ten smaller fish	1	2	3	4	5
f) When I go fishing, I'm just as happy if I don't catch a fish	1	2	3	4	5
g) If I thought I wouldn't catch any fish, I wouldn't go fishing	1	2	3	4	5
h) The bigger the fish I catch, the better the fishing trip	1	2	3	4	5
i) I'm just as happy if I don't keep the fish I catch	1	2	3	4	5
j) A full stringer is the best indicator of a good fishing trip	1	2	3	4	5
k) I want to keep all the fish I catch	1	2	3	4	5
l) I'm happiest with a fishing trip if I at least catch the daily creel limit	1	2	3	4	5
m) I'm just as happy if I release the fish I catch	1	2	3	4	5
n) I'm happiest with a fishing trip if I catch a challenging game fish	1	2	3	4	5
o) I like to fish where I know I have a chance to catch a "trophy fish"	1	2	3	4	5
p) When I go fishing, I'm not satisfied unless I catch something	1	2	3	4	5

20. How old were you when you first began to fish?

_____ years old

21. Who primarily taught you how to fish? *(Please select only <u>one</u>)*

1) Self-taught	7) Grandmother
2) Friend(s)	8) Grandfather
3) Brother	9) Uncle
4) Sister	10) Aunt
5) Mother	11) Fishing clinic or program
6) Father	12) Other *(Please specify)* _____

22. Do your children (child) fish?

1) YES
2) NO
3) I do not have children. → **If you don't have children, go to Question #24**

23. Please list the ages and gender of all your children and whether they fish. Include all your children, even if they are over 18 years old. If you have more than five children, please continue below the table.

	Age of child	Gender	Participates in fishing?	If they fish, who taught them how to fish?	Why the child does or does not participate in fishing:
Examples:	13	Female	Yes	Mother	Likes being outside
	8	Male	No		Never gone
Child #1					
Child #2					
Child #3					
Child #4					
Child #5					

24. In the table below, please write the three locations you _prefer_ to fish for the most, and those you _actually_ fish for the most for _walleye_ in Kansas. (Examples for locations may include: Wilson Reservoir, Lyon State Fishing Lake, your farm pond, the Arkansas River, FISH waters, etc.) If you do not have a preference, please write "no preference."

Three locations I _prefer_ to fish for _walleye_:	Three locations I _actually_ fish for _walleye_:
1)	1)
2)	2)
3)	3)

☐   I have not fished for walleye in Kansas.   →   **Please continue with this section because we still value your opinion about walleye management.**

Background Information
Walleye are an important recreational resource in Kansas. We conducted studies to understand the biology and management of walleye in Kansas reservoirs and we learned that walleye grow fast and are harvested in high numbers. Walleye fisheries in Kansas reservoirs are dominated by young, smaller fish because many fish are harvested as soon as they reach the legal minimum length limit in place. We have management concerns and potential solutions that we would like to know your input.

Concerns
- There may not be enough large walleye to naturally replenish populations, so KDWPT helps maintain populations through stocking.
- We rely on wild broodstock walleye (larger walleye used for spawning) collected from a few reservoirs for the stocking program.
- Wild broodstocks may become less reliable, potentially impacting the success of the stocking program.

Solutions
To address these concerns, KDWPT utilized the best science in evaluating the biology and population characteristics of our walleye populations and developed four potential walleye management options. We want to know your level of support for these options to make sure we are meeting the desires of our anglers.

Please indicate your level of support for the following at your <u>favorite</u> walleye lake in Kansas:

Option A
15-inch minimum length limit
(walleye under 15 inches must be released
immediately)

	Strongly Oppose	Oppose	Neutral	Support	Strongly Support
…………………..1	1	2	3	4	5

- Greater opportunity to harvest 15 to 17 inch walleye.
- Less opportunity to harvest 18+ inch walleye.
- In some reservoirs, there is limited natural reproduction because most walleye are harvested before they reach a size at which they can reproduce.
- In some reservoirs, the walleye population must be sustained through stocking.
- In some reservoirs, overharvest of walleye remains a concern.

Option B
18-inch minimum length limit
(walleye under 18 inches must be released
immediately)

	Strongly Oppose	Oppose	Neutral	Support	Strongly Support
…………………..1	1	2	3	4	5

- Greater opportunity to harvest 18 to 20 inch walleye.
- Less opportunity to harvest 21+ inch walleye.
- In some reservoirs, there is limited natural reproduction because most walleye are harvested before they reach a size at which they can reproduce.
- In some reservoirs, the walleye population must be sustained through stocking.
- In some reservoirs, overharvest of walleye remains a concern.

Option C
21-inch minimum length limit
(walleye under 21 inches must be released
immediately)

	Strongly Oppose	Oppose	Neutral	Support	Strongly Support
…………………..1	1	2	3	4	5

- Greater opportunity to harvest 21+ inch walleye.
- Walleye are able to reach spawning size because they are protected from harvest.
- Walleye population is sustained through natural reproduction.
- Overharvest of walleye no longer remains a concern.

Option D
15-inch minimum length limit year-round,
EXCEPT a 24-inch minimum length limit from
April to June
NOTE: This option would be used at a limited number
of waters regionally spaced across the state, allowing
for close access to waters with 15, 18, or 21-inch
minimum length limits.

	Strongly Oppose	Oppose	Neutral	Support	Strongly Support
…………………..1	1	2	3	4	5

- Greater opportunity to harvest 24+ inch walleye.
- Walleye are able to reach spawning size because they are protected from harvest.
- Walleye population is sustained through natural reproduction.
- Overharvest of walleye no longer remains a concern.

25. **What are your reasons for supporting or opposing the management strategies for walleye in the previous questions?**

26. **What do you consider to be the lengths of "keeper" (the minimum-sized fish you would keep) and trophy-sized walleye?**

	"Keeper"	Trophy
Walleye	_____ inches	_____ inches

Section IV. Crappie Management

27. **In the table below, please write the three locations you _prefer_ to fish for the most, and those you _actually_ fish for the most for _crappie_ in Kansas. (Examples for locations may include: Wilson Reservoir, Lyon State Fishing Lake, your farm pond, the Arkansas River, FISH waters, etc.) If you do not have a preference, please write "no preference."**

Three locations where I _prefer_ to fish for _crappie_:	Three locations where I _actually_ fish for _crappie_:
1)	1)
2)	2)
3)	3)

☐ I have not fished for crappie in Kansas. →	**Please continue with this section because we still value your opinion about crappie management.**

Background Information

Management of crappie fisheries can be very difficult because crappie fishing will be good for several years followed by several poor years. This is due to conditions KDWPT cannot control, such as drought cycles, which cause fluctuating water levels and limit ideal spawning habitat. Fishery biologists manage crappie populations on a lake by lake basis, which is why crappie regulations may vary so widely across the state. The following regulations are in place at various lakes across the state. We would like to know your opinion about these regulations for us to continue to provide quality crappie fishing opportunities.

28. **Please indicate your level of support or opposition to the following at your <u>favorite</u> crappie lake in Kansas:**

	Strongly Oppose	Oppose	Neutral	Support	Strongly Support
a) 50 fish daily creel limit on crappie	1	2	3	4	5
b) 20 fish daily creel limit on crappie	1	2	3	4	5
c) 10 fish daily creel limit on crappie	1	2	3	4	5
d) 10-inch minimum length limit AND 50 fish daily creel limit on crappie	1	2	3	4	5
e) 10-inch minimum length limit AND 20 fish daily creel limit on crappie	1	2	3	4	5
f) 10-inch minimum length limit AND 10 fish daily creel limit on crappie	1	2	3	4	5

29. **What are your reasons for supporting or opposing the management strategies for crappie listed above?**

30. **What do you consider to be the lengths of "keeper" (the minimum sized fish you would keep) and trophy-sized crappie?**

	"Keeper"		Trophy	
Crappie		inches		inches

Section V. Harmful Algal Blooms

Blue-green algae are a natural part of water-based ecosystems. They become a problem when nutrients (phosphorus and nitrogen) are present in concentrations above what would occur naturally. Under these conditions, the algae can "bloom," or grow very quickly to extreme numbers. Blue-green algae produce toxins which can cause skin reactions, respiratory problems, diarrhea, vomiting or even death if ingested, especially in children or the elderly.

The Kansas Department of Health and Environment (KDHE) samples recreational bodies of water for blue-green algae when alerted of a potential algae bloom. If harmful algal blooms are present, state agencies and other lake managers inform the public of these conditions. When harmful algae blooms are present, marinas, lakeside businesses, and park camping facilities remain open for business, although swim beaches will be closed. Park drinking water and showers are safe and not affected by the algae bloom. It is safe to eat fish caught during a harmful blue-green algae outbreak, as long as the fish is rinsed with clean, potable water and anglers only consume the fillet portion.

31. Were you aware of harmful blue-green algae blooms before receiving this survey?

    1)   Yes
    2)   No
    3)   Unsure/I don't know

32. Have you recreated (fished, boated, camped, etc.) at a lake with a harmful blue-green algae bloom advisory or warning?

    1)   Yes → **If Yes, which lake(s)?**_____
    2)   No
    3)   Unsure/I Don't Know

33. Have you avoided recreating (fishing, boating, camping, etc.) at a lake with a harmful blue-green algae bloom advisory or warning?

    1)   Yes → **If Yes, which lake(s)?**_____
    2)   No
    3)   Unsure/I Don't Know

34. How else have harmful blue-green algae blooms impacted you? Please explain:

Section VI. Angler Demographics

In this section, we would like you to tell us about yourself. These questions are necessary to conduct analysis of fishing preferences and behaviors across a wide variety of anglers. If you feel uncomfortable answering any questions, please leave them blank or select "Decline to answer."

35. What type of community do you live in?

1) On a farm or ranch
2) Rural or small town (under 1,000 pop.)
3) Town (1,000 – 5,000 pop.)
4) Small city (5,000 – 50,000 pop.)
5) Medium city (50,000 – 1 million pop.)
6) Metropolitan (over 1 million pop.)

36. Are you:
1) Male
2) Female
3) Decline to answer

37. What is your highest completed level of education? *(Please select only <u>one</u>)*

<u>1 2 3 4 5 6 7 8</u>   <u>9 10 11 12</u>   <u>13 14 15 16</u>   <u>17 18 19 20 21 22+</u>

Elementary   High School   College   Graduate school

38. Which of the following best describes your ethnic background? *(Please select only <u>one</u>)*

1) Decline to answer
2) American Indian or Alaska Native
3) Asian
4) Black or African American
5) Hispanic or Latino
6) Native Hawaiian or Other Pacific Islander
7) White
8) Other *(Please specify)* _____

39. What is your approximate annual household income before taxes?

1) Decline to answer
2) Under $10,000
3) $10,000 - $19,999
4) $20,000 - $29,999
5) $30,000 - $39,999
6) $40,000 - $49,999
7) $50,000 - $59,999
8) $60,000 - $69,999
9) $70,000 - $79,999
10) $80,000 - $89,999
11) $90,000 - $99,999
12) $100,000 and Above

40. What do you like best about fishing in Kansas?

41. Is there anything else you would like to share with us about fishing in Kansas?

Your contribution of time to this study is greatly appreciated. Please return your completed survey in the postage paid envelope as soon as possible. Thank you!

Kansas Department of Wildlife, Parks and Tourism
Emporia Research and Survey Office
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