Retention and Recruitment

Attitudes of South Carolina Youth Towards Aquatic Resources and Recreational Fishing

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Abstract: This study assessed South Carolina youths' attitudes toward, opinions on, knowledge of, and priorities toward South Carolina aquatic resources and recreational fishing. A telephone survey was administered to youth between the ages of 8 and 18 in South Carolina during April 2001 to examine fishing initiation, motivation, and fishing participation rates among South Carolina youth. Overall, a majority of youth (91%) in South Carolina had fished at least 1 time in their lives and a majority (53%) of youth would go fishing more often if they could. More male youths participated in fishing than female youths in the past 12 months, and fishing participation and interest decreased as grade cohort increased. There was also a steady decline in interest level in learning

about fishing as grade level increased. Survey results indicated that youth fishing occurs almost entirely in the familial context and initiation occurs almost universally through the youth's father or other male family member. A greater proportion of youth in grades 1–4 (23% relative to 16% in grades 5–8 and 10% in grades 9–12) indicated that they fished "to catch fish." As age increased, "to catch fish" became an ever increasingly unimportant reason for fishing. Only 10% of South Carolina youth could correctly identify the South Carolina Department of Natural Resources as the state agency that managed and conserved wildlife. The results of this study will be used by the South Carolina Department of Natural Resources (DNR) to develop effective aquatic education and fishing programs for youth.

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The future of hunting and fishing in the United States ultimately depends upon the commitment of future generations to these traditional outdoor recreation activities. Youth anglers and hunters represent the hope for the future of wildlife conservation and management in the United States. In addition to promoting the transmission of these traditional outdoor recreational activities from present generations to future generations, fish and wildlife professionals can use these activities as principle teaching tools in natural resource education programs.

Research by Kellert and Westervelt (1983) and Pomerantz (1977, 1985, 1986) indicate that children's knowledge and attitudes toward fish and wildlife evolve through predictable developmental stages during childhood years. Pomerantz (1986) recognized that the first step in developing a systematic and successful approach to fish and wildlife education was to learn about children's cognitive development and apply that information to children's acquisition of knowledge about wildlife and the natural environment. By understanding the attitudes and perceptions of youth towards fishing, fish and wildlife personnel can develop more effective aquatic education and fishing programs.

A study of South Carolina youth between the ages of 8 and 18 was completed in 2001 by Responsive Management in partnership with the South Carolina DNR. The purpose of this study was to examine aquatic resource knowledge levels as well as fishing initiation, motivation, and participation rates among South Carolina youth. The results of this study will be used by the South Carolina DNR to develop effective aquatic education and fishing programs for youth.

Methods

The survey questionnaire was developed cooperatively between the South Carolina DNR and Responsive Management (RM) and was administered by telephone to randomly selected South Carolina youth between the ages of 8 and 18 during April 2001. The select-targeted telephone sample was obtained from Survey Sampling, Inc. (SSI), in Fairfield, Connecticut, and was designed to reach those households

with a high likelihood of having youth. Pretests of the questionnaire determined that statements were clear in meaning and were appropriate for each grade level. Prior to the telephone interviews, a letter was sent to each potential respondent's home on behalf of the South Carolina Department of Natural Resources to inform the youth and their family that they would receive a telephone call from Responsive Management to ask them questions about natural resources and their outdoor activities. "Fishing" was not mentioned as part of the study to prevent bias. Parents were encouraged to stay on the phone with their children during the course of the interview.

Responsive Management Survey Center Managers conducted project briefings with each interviewer prior to his or her beginning work on this project. Professional Responsive Management staff edited each survey to check for clarity, understanding, completeness, and form. A multiple callback design was used to maintain the representativeness of the sample, avoid bias toward people easy to reach by telephone, and provide an equal opportunity for all to participate. Subsequent calls were placed at different times of the day and on different days of the week. All telephone interviews were completed during April 2001.

The software used for data collection was Questionnaire Programming Language (QPL) version 4.1 (Natl. Tech. Inst. 1999). The survey data was entered into the computer as the interviews were conducted, eliminating possible errors associated with manual data entry after the completion of the interviews. Data analyses were performed by computer using the Statistical Package for Social Sciences (SPSS 1999).

Data was weighted by age to match the naturally occurring age distribution of youth in the population in South Carolina. The data used was from the 1999 U.S. Census estimates (U.S. Census Bur. 1999).

Results

Survey results were based on a telephone survey completed by 1,147 youth between the ages of 8 and 18 in South Carolina. In order to obtain the survey sample, a total of 3,816 phone numbers were attempted. Eight hundred ninety-four phone numbers were called back resulting in no answers or busy signals 3 or more times, 71 phone numbers were called back resulting in no answers or busy signals < 3 times, 98 phone numbers resulted in no answers or busy signals 3 or more times, 8 phone numbers resulted in deaf or language barrier problems, 66 were business/government numbers, 148 were refusals; 1,120 were not eligible, 241 were disconnected telephones, and 26 were terminated interviews. The calculated response rate was 50.2%.

The response rate calculation above, however, is an underestimate. Households that were contacted but did not respond may or may not have had children between the ages of 8 and 18 and therefore may or may not have been eligible for the study. According to SSI, the targeted telephone sample they provided had a 45%–60% likelihood of having at least 1 child between the ages of 8 and 18 in the household. Using the mean of these 2 values (52.5%) and the values for telephone numbers that resulted in requests for a call back or resulted in a no answer or busy signal [3 or more times (894), or < 3 times (71)] results in a response rate of 1,147/678 (instead of

1,147/1,136) yielding a response rate of 59.1%. Throughout this report, findings are reported at a 95% confidence interval. For the entire sample of South Carolina youth, the sampling error is at most ± 2.89%.

The split for this study between male and female respondents was 55/45 with an even distribution between grade levels ranging from first grade to college, though the overwhelming majority of respondents for this study were between second grade and high school seniors. Most respondents (86%) were not of Hispanic ethnicity and most (74%) considered their race as white. Ten percent of respondents in this survey were African American. The largest percentage of respondents (43%) considered their place of residence a small city/town with 20% reporting residence in a suburb of a large metro or rural area. Nine percent lived in a big city or urban area.

Fishing Participation

Enjoyment of fishing and participation in fishing among South Carolina youth was nearly universal. Ninety-one percent of youth in South Carolina have gone fishing at least once in their lives and 53% of youth would go fishing more often if they could. Youth go fishing for a variety of reasons. The most popular response to why youth go fishing was "to have fun" reported by 45% of youth. The next most popular response, given by 15% of youth, was "to catch fish" followed by "to be with family" (10%). Numerous other reasons for fishing were reported by <10% of the youth population.

There exists a disparity in fishing participation between male and female youth anglers. Significantly [χ^2 (2, N = 1,147) = 11.58, $P < 0.01$] more male youth (94%) than female youth (88%) in South Carolina had gone fishing in their life. Male youth liked fishing significantly [χ^2 (6, N = 1,047) = 39.96, $P < 0.001$] more than female youth. The majority of male youth (55%) liked fishing "a lot," whereas the majority of female youth (54%) liked fishing "a little." Male youth spent considerably more days (17 days) fishing than female youth (8 days). Most all fishing done by youth, regardless of gender, is in freshwater (91% of males and 88% of females).

Male and female youth fished to have fun. The most popular reason youth go fishing regardless of gender was "to have fun," reported by 45% of both male and female youth anglers. There was a significantly [χ^2 (22, N = 997) = 54.08, $P < 0.001$] different distribution of reasons why male and female youth chose to go fishing. For male youth, fishing "to catch fish" (19% males relative to 11% females) and "to relax" (8% relative to 4% for females) are more important reasons to go fishing than for female youth. For female youth anglers, "to be with family" is a more important reason to fish than it is for male youth anglers (15% females relative to 6% males).

More youth in the lower grades (72% for grades 1–4, 69% for grades 5–8, and 64% for grades 9–12) reported having fished in the previous twelve months. Youth in grades 1–4 were the most enthusiastic about fishing with 55% reporting liking fishing "a lot," compared to 48% in grades 5–8 and 41% in grades 9–12 who liked fishing "a lot." Youth in the higher grades were significantly more reserved in their ratings of liking fishing. A greater proportion of youth in grades 1–4 (23% relative to 16% in grades 5–8 and 10% in grades 9–12) indicated they fished to "catch fish." As

age increased, "to catch fish" became an increasingly unimportant reason for fishing. Reasons for fishing that were tied to social connotations such as "to be with friends" became more important as grade level increased. A greater proportion of youth in grades 9–12 (6% relative to 2% for grades 5–8 and 1% for grades 1–4) indicated they fished to be with friends.

Fishing Initiation

Survey results indicated that youth fishing occurs almost entirely in the familial context and initiation occurs almost universally through a male family member. Regardless of gender, most youth were first taught to fish by their father (69% of males and 64% of females). In addition, most youth usually fished with their father (63%) and most youth preferred to fish with their father (51%). After father, the second most common fishing companion for male youth (19%) was "friends the same age." After father, the second most common fishing companion for female youth (14%) was their mother. It appears that though male and female youth liked fishing with their friends, had friends who fished, and reported youth their age thought of fishing as "cool," that male youth had slightly stronger opinions, knew more friends who fished and thought of fishing more highly than female youth.

The top 3 fishing companions who taught youth how to fish were the same regardless of grade cohort: a father, grandfather, or an uncle. Lower grade-level youth usually fished with immediate family, but as youth grew older their desire to fish with friends either older or of the same age became more apparent. Youth in grades 9–12 usually fished with friends more than any other grade cohort and preferred to fish with friends more than any other grade cohort. Fishing is viewed as being "cool" most strongly by youth in grades 1–4.

Fishing License and Species Data

Twenty-six percent of South Carolina youth between the ages of 16–18 have purchased a South Carolina fishing license and of those who purchased a fishing license, an overwhelming majority (72%) said the fact that they were required to buy a fishing license did not keep them from going fishing. However, 25% of those who had purchased a fishing license reported that the fact that they had to buy a fishing license was a restriction on going fishing. Of those who purchased a fishing license, the largest percentage (36%) purchased a combination fishing license, 23% purchased a resident fishing license, and 11% purchased a resident junior outdoorsman license. Thirty percent of those who had a fishing license did not know what type of fishing license they used.

Most youth who fished, fished for bass (38%) followed by "anything that bites" (26%). Other popular species for youth who fished were catfish (16%), bream (15%), and unidentified species (11%, youth reporting "don't know"). Eight other fish species were named, each with $<10\%$ reporting.

Most youth, regardless of age, usually fished for bass. More youth in grades 9–12 (28%) fished for "anything that bites" than younger youth (24% for both grades 1–4 and grades 5–8). As would be expected more youth in grades 1–4 did not know

what types of fish they usually fished for, compared to 10% of grades 5–8 and 11% of grades 9–12.

Interest in Outdoor Recreational Activities and Fishing Clubs

The number one outdoor recreational activity that South Carolina's youth participated in during the previous 12 months was biking. Biking was followed by fishing (saltwater or freshwater combined). Sixty-nine percent of South Carolina youth biked followed by 62% of youth who fished within the previous 12 months. A small percentage (11%) of South Carolina youth belonged to an animal or outdoor club. Despite the fact that 88% of youth do not belong to an animal or outdoor club, 60% of youth would join a club that helped them learn about South Carolina's rivers, ponds, lakes or streams, and the animals and plants that live there. Sixty-one percent of youth would join a club that helped them learn more about fishing.

The most popular type of fishing youth were interested in was fishing from a boat (85%). Other types of fishing that had high interest were fishing from the bank of a lake or river (80%) and fishing from a spot in your area made for fishing (70%). Sixty-seven percent of youth were interested in bait fishing, 59% in deep-sea fishing, and 53% in fishing from the beach. The only type of fishing that did not have a majority reporting interest was fly fishing which had just under a third (32%) of youth reporting being interested in fly fishing.

Both male and female youth reported the same top 2 outdoor recreational activities participated in during the previous 12 months: biking and fishing (saltwater or freshwater), though female youth participated in fishing at lower rates than male youth. Freshwater fishing, specifically, was the third most popular outdoor recreational activity for male youth (63%) but was the fifth most popular outdoor recreational activity for female youth (46%). When male and female youth were presented with different types of fishing and asked if they were interested in participating in each type of fishing, female youth, in general, showed less interest than male youth in all of the different types of fishing presented to them.

A significantly [χ^2 (2, N = 1,144) = 12.02, $P < 0.01$] greater proportion of male youth (13% relative to 7% of females) indicated that they belonged to an outdoor club, though as noted overall, most South Carolina youth do not belong to an animal or outdoor club. A significantly [χ^2(2, N = 1,143) = 33.04, $P < 0.001$] greater proportion of male youth (68% relative to 52% of females) indicated that they would join a club that helped them learn more about fishing. Female youth (62%) were slightly more likely than male youth (59%) to join a club that helped them learn about South Carolina aquatic habitats than taught them how to fish.

Awareness of the South Carolina DNR and its Fishing Programs

Ten percent of youth were able to name the South Carolina Department of Natural Resources and an additional 4% gave an inaccurate derivative of the South Carolina DNR as the state agency responsible for managing and conserving fish and wildlife in South Carolina. Few youth were aware of South Carolina Department of

Natural Resources' programs that targeted fishing participation. Twenty-one percent of youth had awareness of the programs Hooked on Fishing, Fishing Tackle Loaner Program, or South Carolina Reel Kids.

Respondents of this survey were asked to rate the South Carolina Department of Natural Resources' efforts to help kids learn about lakes, ponds, and rivers and the animals that live there as well as South Carolina DNR's events that teach kids about fishing. Respondents were read a series of questions that targeted nineteen different topics related to fishing and aquatic education that might be included in South Carolina DNR events and/or classes and asked to rate each topic for whether it would make a fishing event or class better, worse or not make a difference. All 19 topics presented to respondents were rated by a majority as making a class better. The 3 topics with the highest support were 1) if they could be at the event or class with their friends (95%), 2) if they could win prizes at the event (93%), and 3) if they could enjoy nature and the outdoors while at the event (91%).

A significantly [χ^2 (1, N = 1,142) = 18.46, $P < 0.001$] greater proportion of male youth (14%) compared to 6% of female youth correctly identified the South Carolina Department of Natural Resources as the state agency responsible for managing and conserving fish and wildlife in South Carolina. Male youth were generally more supportive of activities that dealt with the physical act of catching a fish. More male than female youth reported "catching a big fish," "catching a lot of fish," "keeping the fish they caught," and "being able to eat the fish they caught" would make the class or event better. More female youth reported ethical/moral activities would have made the event or class better including, "learning how to fish safely such as how to cast properly and that hooks are sharp" and "learning how to safely handle and release a fish."

As would be expected, as grade level increased, the ability to correctly identify the South Carolina Department of Natural Resources as the state agency responsible for managing and conserving wildlife in South Carolina also increased. Significantly [χ^2 (2, N = 1,130) = 39.74, $P < 0.001$] more youth (17%) in grades 9–12 correctly identified the South Carolina DNR as the agency responsible for managing and conserving wildlife in South Carolina than any other grade cohort (relative to 8% in grades 5–8, and 3% in grades 1–4).

Youth in grades 1–4 liked to keep the fish they caught more than any other grade cohort. Youth in grades 1–4 viewed receiving some token or certificate as a positive component to a fishing event or class. A significantly greater proportion of children in the lower grade levels, grades 1–8, indicated that learning how to identify fish and learning facts about fish would have made the event better. Middle grade-level youth appeared to have advanced in their participation in and thinking of fishing to areas of skill development. The combination of fishing and socializing is more important to higher grade-level youth. Older youth were much more concerned than lower grade-level youth with the act of fishing and of fishing in order "to relax and get away from it all while fishing."

Aquatic Information and Computers

The majority of youth had contact with computer fishing games or hand held fishing games and the internet. However, few youth used the internet as a resource for aquatic or fishing information. Those electronic resources available through the South Carolina DNR and other websites are either unknown to youth or youth simply do not have the need or desire to find information on aquatic resources or fishing via the internet.

More male than female youth played computer fishing games or hand held fishing games and used the internet to find information about fishing. A significantly [χ^2 (2, N = 1,144) = 39.75, $P < 0.001$] greater proportion of male youth (78% relative to 61% of females) than female youth had played a computer fishing game. There was little difference between male and female youth in their use of the Internet, though male and female internet users used the internet to find different kinds of information. Significantly [χ^2 (2, N = 892) = 9.52, $P < 0.01$] more male youth (22% relative to females 14%) used the Internet to find information about fishing, while a significantly [χ^2 (2, N = 892) = 17.29, $P < 0.001$] greater proportion of female youth (55% relative to 42% males) used the internet to find information about aquatic animals.

A significantly [χ^2 (4, N = 1,131) = 15.61, $P < 0.01$] greater proportion of children in the upper grade levels had played a computer fishing game or hand-held fishing game (62% in grades 1–4 relative to 75% and 72% in grades 5–8 and grades 9–12 respectively). As age increased, usage of the internet increased dramatically. Although slightly more youth in grades 9–12 used the internet than youth in grades 5–8, those youth in grades 5–8 used the internet considerably more to find information on fishing and aquatics. Youth internet users in grades 5–8 followed by youth internet users in grades 1–4 and then youth internet users in grades 9–12 used the internet to find information mostly on aquatic animals, then aquatic habitats, and finally fishing.

The internet was used least to find information about fishing. Significantly [χ^2 (4, N = 885) = 12.59, $P < 0.05$] more youth in grades 5–8 used the Internet to find information about fishing (18% for grades 1–4, 23% for grades 5–8, and 14% for grades 9–12).

Fishing and Aquatic Resource Information within Schools

More youth had seen or heard information that helped them learn more about fishing or increased their interest in going fishing outside of school (45%) than in school (22%). Despite the fact that only 22% of youth reported having seen or heard information about fishing in schools, 53% of youth reported they were in a school class within the previous 12 months that did something to help them learn about the oceans and the animals and plants that live in the ocean. Forty-six percent of youth reported they were in a school class within the previous 12 months that did something to help them learn about South Carolina's rivers, ponds, lakes, or streams and the animals and plants that live in South Carolina's aquatic habitats.

South Carolina youth are very interested in learning about aquatic resources. A large majority of youth (80%) reported they would like to learn more in school about

South Carolina's rivers, ponds, lakes, or streams and the animals and plants that live in South Carolina's aquatic habitats. Sixty-eight percent of youth also wanted to learn more about fishing in school. A significantly [χ^2 (2, N = 1,142) = 19.33, $P <$ 0.001] greater proportion of male youth (51% relative to 38% of females) indicated that they had heard information outside of school that helped them learn more about fishing and/or that increased their interest in fishing. More male youth had seen or heard information about fish species, the act of fishing, and fishing skills than female youth in school. A significantly [χ^2 (1, N = 250) = 4.87, $P < 0.05$] greater proportion of male youth (9% relative to 3% females) indicated that they heard information in the schools about fishing skills that made them more interested in fishing. Female youth were more likely than male youth to have heard about fishing through formal classroom instruction.

More youth in grades 5–8 than any other grade cohort reported having seen or heard information both inside (27%) and outside (51%) of school about fishing within the previous 12 months. A significantly [χ^2 (4, N = 1,129) = 19.20, $P < 0.001$] greater proportion of youth in grades 5–8 (27% in grades 5–8 relative to 19% in grades 1–4 and 21% in grades 9–12) had heard information in school and outside [χ^2 (4, N = 1,130) = 21.88, $P < 0.001$] (51% in grades 5–8, 41% in grades 1–4, 43% in grades 9–12) of school that had increased their interest in fishing. Generally, few youth in grades 1–4 had seen or heard information either inside or outside of school about fishing, and youth in grades 9–12 fell somewhere in between for having seen or heard information about fishing inside or outside of school within the previous 12 months. Youth in the eighth grade and under, with their strong ties of fishing and family, reported their father gave them information about fishing. Significantly [χ^2 (2, N = 1,121) = 15.47, $P < 0.001$] more youth in the lowest grade levels indicated that they had their interest in fishing increased outside of school by their father (11% each for grades 1–4 and grades 5–8, 4% for grades 9–12). Regardless of grade cohort, learning about fish species and types in school increased interest in fishing. Over half (56%) of youth in grades 1–4, 48% of grades 5–8, and 31% in grades 9–12 reported learning about fish species in school increased their interest in going fishing. Generally, as grade level increased, youth reporting having learned about South Carolina's aquatic resources in a school class within the last year decreased. A significantly [χ^2 (4, N = 1,130) = 65.52, $P < 0.001$] greater proportion of lower grade level youth indicated they had learned about oceans and the animals and plants that live there, (66% in grades 1–4, 58% in grades 5–8, 43% in grades 9–12) in a school class in the past 12 months.

An overall majority of all grade cohorts wanted to learn more about both "rivers, ponds, lakes, or streams and the animals and plants that live in South Carolina's aquatic habitats" and "fishing." There was a steady decline in interest level in learning about "fishing" as grade increased.

Knowledge Levels of Aquatic Resources

Virtually all youth knew what the word habitat meant. The question pertaining to habitat was a completely open-ended response in which respondents defined the

word "habitat" any way they wished. However, in summation of those comments, virtually all youth explained habitat as a place where animals live... their home. Over two-thirds of youth (67%) did not know what largemouth bass eat. The majority of youth (63%) did not know what river otters usually eat. A majority of youth (68%) knew the correct food of sharks.

In relation to the defining of the word habitat, a nearly significantly [χ^2 (1, N = 1,142) = 3.73, P = 0.053] greater proportion of female youth used the word "home" to describe habitat (9% females relative to 6% males). Majorities of both male and female youth did not know what a largemouth bass ate for food. Significantly [χ^2 (1, N = 1,143) = 21.77, $P < 0.001$] more male youth (23% relative 12% females) did correctly identify "other fish"—bream as the correct answer. More male than female youth also gave other responses of worms and bugs to what a largemouth bass eats. Significantly [χ^2 (1, N = 1,143) = 13.29, $P < 0.001$] more male youth (9% relative to 4% females) indicated that largemouth bass eat bugs. Identifying what largemouth bass eat may have been a tough question for children, as obviously fish must eat bugs and worms if they go after bait. In keeping with the observation, male youth were significantly [χ^2 (1, N = 1,142) = 35.78, $P < 0.001$] more likely to have indicated that largemouth bass eat worms than female youth (20% males relative to 8% females) which may be a result of more fishing exposure for males and their experience with using worms as bait. Exposure to fishing may be antagonistic to the proper response to this question; males, who have more fishing experience than females, tended to give the wrong answer per an association with bait. There was a significantly [χ^2 (1, N = 1,143) = 5.26, $P < 0.05$] greater proportion of female youth who answered that they did not know what a river otter ate (67% females relative to 60% of males). Identical percentages of male and female youth (68%) correctly identified saltwater fish as the food sharks usually eat.

In relation to what a largemouth bass usually ate, similar percentages regardless of grade cohort responded they "did not know" or identified worms or bugs. A significantly [χ^2 (2, N = 1,130) =9.46, $P < 0.01$] greater proportion of youth grades 9–12 gave the correct answer (bream) than any other grade cohort (21% for those in grades 9–12, 17% for grades 5–8, 13% for grades 1–4). In relation to what a river otter usually ate, most youth regardless of grade cohort "did not know" what type of food a river otter usually ate. Just around a quarter of all grade cohorts identified the correct answer—fish and frogs (25% of grades 1–4, 24% of grades 5–8, and 27% of grades 9–12). A significantly [χ^2 (2, N = 1,130) = 16.65, $P < 0.001$] greater proportion of youth in grades 1–4 indicated that they thought river otters ate some sort of generic type of plant (6% in grades 1–4, 3% in grades 5–8, and 1% in grades 9–12).

In relation to what sharks usually ate, slightly more youth in grades 5–8 (70%) identified freshwater fish than youth in grades 9–12 (68%). More youth in grades 9–12 (22%) reported they "did not know" what sharks ate than any other grade cohort. A significantly [χ^2 (2, N = 1,129) = 7.15, $P < 0.05$] greater proportion of youth in grades 1–4 indicated that they thought sharks ate freshwater fish (10% in grades 1–4, 6% in grades 5–8, and 5% in grades 9–12).

Discussion

It was speculated in "Youth and Fishing in South Carolina," a focus group report and literature review (Responsive Manage. 1999), that 75% to 80% of youth in South Carolina would have fished at least once in their lives. Through our quantitative study, we can now say that the percentage of youth in South Carolina who participated in fishing is even higher (91%). Conversely, this means that <10% of South Carolina youth have not been introduced to the sport of fishing. The current research finds a projected 548,847 of the 601,268 youth (91%) between the ages of 8 and 18 in South Carolina have been fishing at least 1 time in their lives. Therefore, as suggested in the focus group report, the promotion of fishing among youth should be focused on retention rather than initiation. Angler education and promotion programs for youth should focus on those anglers who already fish.

Supported by focus group findings, youth fishing occurs almost entirely in the familial context and initiation occurs almost universally through a male family member. Angler education programs that focus on initiation are merely replicating the type of initiation process that occurs naturally in the family setting. Programs that seek to augment initiation, particularly with young girls, should aim at complementing these natural processes by targeting fathers. Fathers are the most frequent, and most highly desired, points of contact for fishing experiences with all members of a family. Appeals to fathers should aim at including wives and daughters in the sport.

The incorporation of childhood development into the design of aquatic education programs will greatly improve program effectiveness. For example, when information on childhood learning is applied to aquatic education programs that use fishing as a principle teaching tool, slight design changes can result in more effective programs. Past research shows that young elementary school children are very egocentric in their perception of the outdoors (Kellert and Westervelt 1983; Fig. 1). They relate to the world in very concrete ways. For example, this study shows that a greater proportion of youth in grades 1–4 indicated they fished "to catch fish" and as age increased, "to catch fish" became an ever increasingly unimportant reason for fishing. This may translate into allowing elementary children to keep the fish they catch or providing them with fishing equipment, such as lures or bobbers, as ways to increase enjoyment of their early fishing experiences.

Slightly older children, from fifth to eighth grade, are more receptive to learning facts about the natural world. For example, this study found that more youth in grades 5–8 than any other grade cohort reported having seen or heard information both inside (27%) and outside (51%) of school about fishing within the previous 12 months. Education programs targeting fifth to eighth graders should include scientific facts, statistics, and the identification of fish. Developing fishing skills, not just catching fish, also becomes more important.

The main thrust of aquatic education and fishing promotion programs at the high school level must be to entice participants to stay active in angling. The teenage years are a major period of desertion from recreational fishing. More youth in lower grades (72% for grades 1–4, 69% for grades 5–8, and 64% for grades 9–12) reported

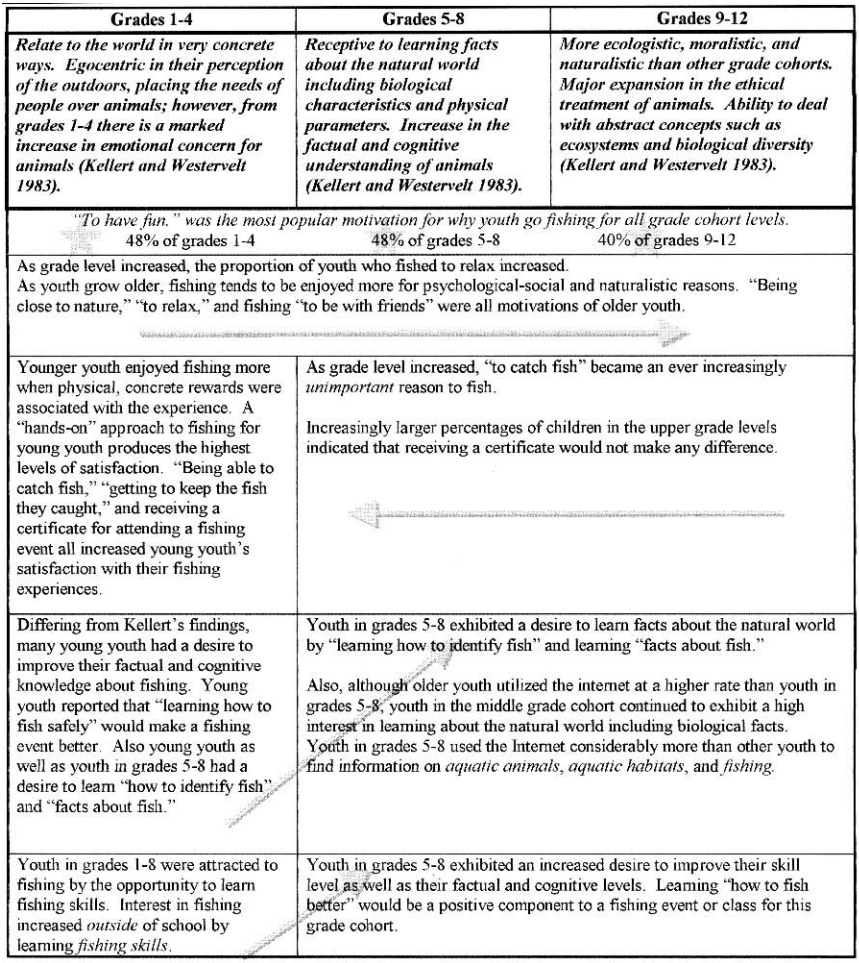

Figure 1. Fishing and developmental stages in youth in South Carolina.

having fished in the previous 12 months. This study showed that youth in grades 1–4 were the most enthusiastic about fishing with 55% reporting liking fishing "a lot" compared to 41% in grades 9–12 who liked fishing "a lot." Many teens report becoming too busy with competing activities to continue fishing. Teens enjoy social activities more at this time, and so as a way to bring teenagers together for aquatic education programs and within the sport of fishing, more competitive events might be planned. Additionally, promoting fishing activities through existing social structures such as school, church clubs or other groups should be an effective way of keeping teens interested in fishing. This is vital because fishing involvement during the teen years is one of the strongest predictors of long-term fishing involvement (Dann 1993).

The results of this study can be used by numerous agencies and organizations to assist with aquatic education program development. Fisheries professionals and educators must keep in mind that programs targeting youth must address the wide spectrum of satisfactions, motivations, values, and socio-cultural needs of youth if they are to implement effective aquatic education and youth angling programs.

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