

# **Human Dimensions Research and Programmatic Planning for the South Carolina Department of Natural Resources Freshwater Fisheries Section: A Case History**

**Mark D. Duda**, *Responsive Management, 130 Franklin Street, Harrisonburg, VA 22801*

**Carol A. Zurawski**, *Responsive Management, 130 Franklin Street, Harrisonburg, VA 22801*

**C. Wade Bales**, *South Carolina Department of Natural Resources, 1000 Assembly Street, Columbia, SC 29202*

**Peter E. De Michele**, *Responsive Management, 130 Franklin Street, Harrisonburg, VA 22801*

**Bebe Harrison**, *South Carolina Department of Natural Resources, 1000 Assembly Street, Columbia, SC 29202*

**Gene Hayes**, *South Carolina Department of Natural Resources, 108 Highland Drive, Greenwood, SC 29649*

**Ross Self**, *South Carolina Department of Natural Resources, 1000 Assembly Street, Columbia, SC 29202*

---

*Abstract:* This paper demonstrates the applicability of human dimensions research to the development of programmatic priorities and strategies for the South Carolina Department of Natural Resources (SCDNR), Freshwater Fisheries (FWF) Section. Responsive Management (RM), a Virginia-based research firm specializing in public attitudes toward natural resources, conducted telephone surveys in 1998, 2002, and 2004 of South Carolina residents and licensed anglers to examine their attitudes and opinions toward fishing, fisheries management, aquatic resources, and various programs of the SCDNR. Survey results showed that South Carolina residents valued the State's aquatic resources and wanted more emphasis and education on aquatic resource programs rather than fishing-specific programs. Furthermore, research revealed public support for a shift from the FWF Section's primary mission of sport fishery management to a more broad-based aquatic resources program.

*Key words:* aquatic resources, planning, marketing

Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies 58:113-122

---

The South Carolina Department of Natural Resources (SCDNR), Freshwater Fisheries (FWF) Section began in the early 1930s and evolved as a hatchery-based program. By the 1950s, fish population sampling and research related to stocking and

propagation procedures was implemented and the Federal Aid in Sport Fish Restoration program was established. Striped bass propagation technique development in the 1960s led to a broader sport fish stocking program. Through the 1980s, the primary scope of the FWF Section was sport fish stocking, regional stock monitoring and assessment, and assessment of South Carolina's public water resources.

This paper is a case history of the FWF Section's commitment and progression to change the focus of its mission in order to meet the current needs of its public. The FWF Section's primary focus has been sport fish management and, to a lesser degree, general aquatic resource assessment. While many South Carolina residents and licensed anglers felt strongly that the FWF Section was successful in meeting its responsibilities, many ranked the need for aquatic resource protection as very important, and certain angler groups wanted to see more effort toward specific sport fish (Responsive Management [RM] 1998, 2002, and 2004). The FWF Section staff acknowledged that their narrow focus on recreational fisheries had in turn limited their opportunity to focus on broader aquatic resource needs. The FWF Section is now using RM research as a foundation to assess its current mission, opportunities, and challenges as it analyzes and develops alternative opportunities in aligning itself with the needs and desires of South Carolina's residents and anglers, as well as the demographic trends taking place within the state.

## Methods

### Internal Review

An internal review was conducted to provide detailed information in the FWF Section's current programs in order to tailor the survey instrument and the study's purpose accordingly. A cross-section of FWF Section staff, which represented all program areas, was assembled to conduct the internal review. Current programs were then systematically reviewed and activities were prioritized based on the resource needs, budget, manpower availability, and survey findings from the RM South Carolina resident and angler studies. This process took approximately two years to accomplish; it was important to allow ample time for the entire staff to review the task group's recommendations and provide input throughout the review process.

### Survey Methodology

Surveys were conducted in 1998, 2002 and 2004. RM and the SCDNR's fisheries and administrative staff cooperatively developed all three telephone survey instruments. The complete general population sample was obtained from Survey Sampling, Inc., of Fairfield, Connecticut. For the licensed anglers' sample, names were obtained from the SCDNR and telephone numbers were obtained from Survey Sampling, Inc., of Fairfield, Connecticut.

Professional RM staff edited each survey to check for completeness and format, and pretests were conducted to ensure that statements were clear in meaning. RM Survey Center managers conducted project briefings with each interviewer prior to his or her beginning work on the project. A multiple callback design was used to maintain the representativeness of the sample by avoiding bias toward people easy to

reach by telephone. To provide an equal opportunity for all prospective respondents to participate, subsequent calls were placed at different times of the day and on different days of the week.

The software used for data collection was Questionnaire Programming Language (QPL) version 4.1 (National Technical Institute 1999). The survey data were entered into the computer as the interviews were conducted, eliminating possible errors associated with manual data entry after the completion of the interviews. Statistical Package for Social Sciences (SPSS 1999) and proprietary software developed by RM was used to analyze survey data.

## **Results**

### **2002 Survey Results**

The 2002 RM study involved a telephone survey of 809 South Carolina residents to assess their attitudes and behaviors toward aquatic resources in South Carolina. Findings of this general population telephone survey are accurate at a 95% confidence interval. The sampling error is at most  $\pm 3.45\%$  and was calculated based on a sample size of 809 and a U.S. Census Bureau-projected population size of 3.066 million South Carolina residents  $\geq 16$  years of age in 2002.

*Performance and Awareness of the SCDNR.* —The survey showed that a majority (52%) of respondents said that the SCDNR does an excellent or good job of managing the state's freshwater fisheries and aquatic resources; only 1% rated the SCDNR's performance as poor, and 35% answered that they did not know. Regarding the SCDNR's programs, a large majority (80%) of respondents knew little or nothing about the SCDNR's freshwater fisheries and aquatic resources programs, while 19% knew a great deal or moderate amount (RM 2002).

*Importance of Aquatic Resources and Values Associated with Aquatic Resources.* —When asked to rate the importance of nine statements relating to fisheries and aquatic resource management, a majority rated eight of the nine statements as very important (Table 1). South Carolina residents and anglers place a higher importance on ecological values than on recreational values. For example, 92% of South Carolina residents said that it was very important that South Carolina's rivers, lakes, and streams provide places for fish and wildlife to live, while only 37% said that it was very important that South Carolina's rivers, lakes, and streams provide places to catch trophy fish (RM 2002).

*Attitudes Toward Programs of the SCDNR.* —Respondents were asked to rate the SCDNR's efforts in six aquatic-related areas. The survey results showed the following ratings: 17% of South Carolina residents said that the SCDNR's efforts to provide fishing opportunities were excellent, 16% said efforts to enforce freshwater fishing laws and regulations were excellent, 13% said that efforts to ensure that there is adequate freshwater habitat were excellent, 13% said that efforts to provide opportunities for watching fish and aquatic wildlife were excellent, 9% said efforts to educate the public about recreational fishing were excellent, and 6% said that efforts to educate the public about freshwater aquatic resources were excellent.

Respondents rated 13 out of 17 SCDNR programs as very important, with the

**Table 1.** Rating the importance of statements.

Statement	% Rating it as very important	% Rating it as very or somewhat important
Is it important or unimportant that South Carolina's rivers, lakes, and streams provide places for fish and wildlife to live?	92	98
Is it important or unimportant that freshwater aquatic resources are safe and well protected in South Carolina?	89	98
Is it important or unimportant that fish and other aquatic animals exist in South Carolina?	87	96
Is it important or unimportant that people can watch fish and wildlife on and near South Carolina's rivers, lakes, and streams?	76	95
Is it important or unimportant that there are a lot of freshwater fish to catch in South Carolina?	73	92
Is it important or unimportant that people in South Carolina receive education about fishing?	63	91
Is it important or unimportant that people in South Carolina receive education regarding aquatic resources other than fishing?	63	93
Is it important or unimportant that people have the opportunity to make a living through commercial freshwater fishing in South Carolina?	54	82
Is it important or unimportant that there are trophy fish to catch in South Carolina's lakes, rivers, and streams?	37	66

highest-rated program being "protecting natural areas like rivers, lakes, and wetlands," which 91% rated as very important (Table 2). Also among the highest-rated programs were "raising fish in hatcheries for stocking in public lakes and rivers" and "enforcing freshwater fishing regulations." The lowest-rated programs were "raising fish for people to buy for private ponds," "helping people with their private fishing ponds," and "building more boat ramps."

#### 2004 Survey Results

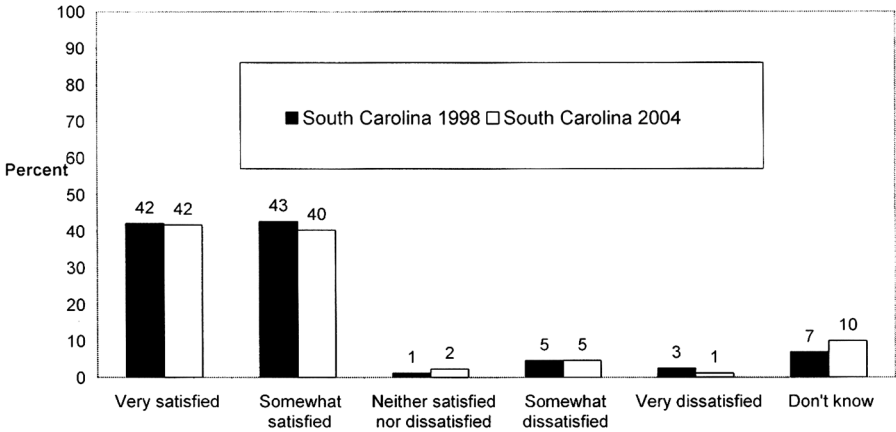
The 2004 RM study involved a telephone survey of 1,562 South Carolina licensed anglers to assess their opinions on and attitudes toward fisheries management and the SCDNR. Survey results were accurate at a 95% confidence interval. The sampling error is at most 2.48%.

*Awareness of and Opinions on the Responsibilities of the SCDNR.*—The study found that over a third of licensed anglers (37%) said that they did not know the primary responsibilities of the FWF Section. Otherwise, respondents most commonly named stocking/hatcheries (30%), habitat restoration/enhancement (19%), and enforcing fishing regulations/laws (16%) as responsibilities of the FWF Section (RM 2004).

Licensed anglers were told that the SCDNR, FWF Section, is responsible for the protection, conservation, and enhancement of the state's fisheries resources while

**Table 2.** Rating of SCDNR programs.

Program	% Rating program as very important	% Rating program as very or somewhat important
Do you think protecting natural areas like rivers, lakes, and wetlands is an important or unimportant program for the South Carolina DNR?	91	97
Do you think raising fish in hatcheries for stocking in public lakes and rivers is an important or unimportant program for the South Carolina DNR?	79	94
Do you think enforcing freshwater fishing regulations is an important or unimportant program for the South Carolina DNR?	79	93
Do you think being involved with the restoration of nongame fish species that are possibly threatened with extinction is an important or unimportant program for the South Carolina DNR?	77	92
Do you think maintaining existing boat ramps is an important or unimportant program for the South Carolina DNR?	76	92
Do you think conducting educational programs on freshwater fishing and aquatic natural resources is an important or unimportant program for the South Carolina DNR?	73	95
Do you think providing good places to go and catch freshwater fish is an important or unimportant program for the South Carolina DNR?	69	95
Do you think conducting research to answer questions about the state's freshwater natural resources is an important or unimportant program for the South Carolina DNR?	68	92
Do you think controlling water plants that bother boaters, anglers, and homeowners using lakes and rivers is an important or unimportant program for the South Carolina DNR?	68	87
Do you think managing small lakes, accessible by bank or boat anglers, around the state for public fishing is an important or unimportant program for the South Carolina DNR?	66	95
Do you think producing educational materials about freshwater fish and fishing, such as brochures, is an important or unimportant program for the South Carolina DNR?	66	94
Do you think developing freshwater fishing regulations is an important or unimportant program for the South Carolina DNR?	61	85
Do you think building/adding structures to attract more fish in lakes is an important or unimportant program for the South Carolina DNR?	53	77
Do you think building fishing piers in lakes is an important or unimportant program for the South Carolina DNR?	46	79
Do you think raising fish for people to buy for their private fishing ponds is an important or unimportant program for the South Carolina DNR?	43	82
Do you think helping people with their private fishing ponds is an important or unimportant program for the South Carolina DNR?	39	74
Do you think building more boat ramps is an important or unimportant program for the South Carolina DNR?	27	53



**Figure 1.** Satisfaction with performance of the SCDNR, FWF Section, in meeting responsibilities. Performance satisfaction rankings asked of active South Carolina anglers.

providing recreational fishing opportunities. Eighty-nine percent of licensed anglers felt these responsibilities were appropriate, and 82% were satisfied with the FWF Section’s efforts to fulfill these responsibilities. Among those few anglers who did not think the responsibilities were appropriate, 47% thought the FWF Section’s primary responsibility should be maintaining clean water, followed by stocking/hatcheries (20%).

The results were compared to a similar study that was conducted in 1998. There were few changes between 1998 and 2004 regarding respondents’ opinions on the appropriateness of the FWF Section’s responsibilities. Also, respondents’ satisfaction with the FWF Section’s performance in fulfilling its responsibilities changed little between 1998 and 2004 (Fig. 1).

*Opinions on Efforts Directed Toward SCDNR Programs.* —Anglers were asked their opinions on the amount of effort that should be directed toward a series of SCDNR programs. The highest-ranked program was one designed to protect habitat: 69% of anglers felt that more effort should be directed toward protecting habitat. The lowest-ranked program was one designed to provide opportunities to catch wild fish: 47% of anglers felt that more effort should be directed toward providing opportunities to catch wild fish (RM 2004).

Compared to the results of the 1998 study, fewer anglers favored an increase in the SCDNR’s efforts regarding fish stocking programs, information and education programs, providing opportunities to catch wild fish, enforcing regulations, and protecting fish habitat. Also compared to the results of the 1998 study, fewer anglers wanted an increase in the SCDNR’s efforts to maintain existing public fishing lakes. The fish attractor program and issues regarding shore fishing access and the development of state lakes all had similar results in both the 1998 and 2004 surveys.

## Marketing Strategies

The marketing plan developed by RM identified an important opportunity for the FWF Section to expand—not shift—its core mission to manage the entire freshwater aquatic environment for all of South Carolina residents. The marketing plan recognized the success of the FWF Section in meeting its historical mission to provide recreational fishing opportunities for South Carolina anglers, but acknowledged that this represents only a portion of South Carolina residents and a fraction of the freshwater aquatic environment. Public opinion research indicated that South Carolina residents and anglers place a higher importance on ecological values rather than on recreational values (RM 2003). The 2002 RM study showed that 98% of South Carolina residents felt it was very or somewhat important for South Carolina's rivers, lakes, and streams to provide places for fish and wildlife to live, while only 66% felt it was very or somewhat important for places to catch trophy fish be provided (RM 2002). These findings led to the conclusion that appealing to a broader-based constituency does not mean a shift in the agency's mission, but rather an expansion of the current mission.

The 2002 RM study showed that a large majority (80%) of South Carolina residents knew little or nothing about the SCDNR's freshwater fisheries and aquatic resources programs, and the 1998 RM study showed that over one-third of active anglers did not know the primary responsibilities of the FWF Section. Well-developed information and education programs to increase public awareness of and knowledge levels about the resource can lead to higher public support for the FWF Section. Increased knowledge levels will lead to a more informed and concerned citizenry and will help in fostering positive behaviors and actions on behalf of the resource. Both of these recommendations were used by the FWF Section in its internal review process.

## Discussion

The structured internal review of the FWF Section resulted in a "priority plan for change." The original mission of the FWF Section was to conserve, protect, and enhance the freshwater fisheries resources of South Carolina. The plan identified an expanded mission for the FWF Section: to wisely manage the aquatic resources in South Carolina. Management may include monitoring, protecting, controlling, harvesting, using, restoring or enhancing a natural resource or its surrounding habitat as individual circumstances dictate.

RM survey findings showed that the majority of South Carolina residents felt that protecting the State's aquatic resources was very important while majorities of active anglers felt that more effort should be directed toward protecting habitat (RM 1998, 2002, 2004). However, the survey also showed that when asked to rate six of the SCDNR's efforts and responsibilities, only 6% of South Carolina residents said that efforts to educate the public about freshwater aquatic resources were excellent. These findings suggest that South Carolina residents are interested in aquatic resources but are not receiving enough information or education on this issue (RM 2002).

FWF Section programmatic changes were identified and approaches to change were developed. Survey results showed that raising fish for people to buy for private ponds and helping people with private fishing ponds were two of the lowest-ranked programs by South Carolina residents in 2002 (RM 2002). Only 39% of South Carolina residents and 43% of active anglers said that helping people with private fishing ponds was a very important program of the SCDNR (RM 1998, 2002). Only 43% of South Carolina residents felt raising fish for sale to private pond owners was very important (RM 2002). Therefore, two high-visibility programs were terminated in 2003: on-site technical assistance to private pond owners and the sale of fish to private pond owners. Time previously devoted to technical assistance would be spent on an expanded statewide stream survey project and other non-sport fish projects.

The stream survey project incorporates a statistically valid random approach to stream sampling and quantitative assessment of stream fish assemblage and habitat quality. Aquatic habitat was also given high priority in programmatic activities, with the recommendation to hire personnel over time with expertise in aquatic habitats and macroinvertebrates. Both the South Carolina angler and resident survey findings supported the increased focus on aquatic habitats. Eighty-nine percent of South Carolina residents said that it was very important that freshwater aquatic resources are safe and well-protected in South Carolina and 87% felt that it was very important that fish and other aquatic animals exist in South Carolina (RM 2002).

An internal review process was developed for regional and statewide FWF Section projects to ensure ample consideration was given to both sport fish and other aquatic resources. The FWF staff felt it was essential to increase the program's emphasis on research at all levels. Research staff would assist management staff in reaching regional aquatic resource goals and provide necessary guidance, expertise, and tools to accomplish research projects. Additional expertise needed on staff was identified and a plan was developed to replace personnel with appropriate candidates during a projected turnover of senior staff in the next two to four years.

Aquatic resource stakeholders were identified, and a systematic standardized process for reaching users and nonusers of aquatic resources was developed for FWF Section staff. A brief, standardized informational presentation package was recommended for all staff to use that could be tailored to highlight specific FWF Section activities. Outreach requirements for staff were also included in annual performance review procedures.

Survey results showed that education on South Carolina's aquatic resources was one of the top three areas where the FWF Section should direct more effort (RM 1998, 2002, 2004). Also, 63% of residents said that people in South Carolina should receive education regarding aquatic resources other than fishing (RM 2002). Additional organizational changes were recommended such as establishment of regional management, research, and hatchery coordinators. These organizational changes were recommended to ensure proper implementation of management and research activities statewide. An agency-wide reorganization in 2003 accelerated the timeline.



## **Lessons Learned**

A commitment to change was necessary to initiate and follow through with priority planning; simple reorganization of personnel and new program titles would not have achieved desired results. An increased emphasis on total aquatic resource management required staff acceptance and direct staff involvement in the process.

The priority planning process coincided with the worst budget reductions experienced in South Carolina since inception of the FWF Section. Though budget constraints eliminated the option of adding new programs and new personnel, the environment for streamlining programs was timely. For example, terminating technical assistance to private pond owners was justified from a budgetary standpoint and was corroborated by angler and resident surveys showing that this program was a low priority.

The decision to revise the FWF Section was not due to budgetary shortfalls but was due to the acknowledged need to better address the aquatic resource issues in South Carolina and to improve the public's knowledge of the FWF Section's responsibilities. RM survey results indicated that both anglers and residents felt it was important to protect lakes, rivers, streams, and wetlands as natural areas used by fish and other wildlife, yet 80% of residents surveyed knew little or nothing about the FWF Section. Increased emphasis on aquatic habitats and subsequent publication of findings both in the technical arena and through local publication mediums should increase the public's awareness of the FWF Section.

Assessment of public natural resource programs should include an internal and external review of scientific needs and an assessment of needs and awareness of both traditional and non-traditional public resource users. Angler and resident public opinion surveys were an important management tool that provided critical data on the attitudes, opinions, and values of the South Carolina public. While the priority planning process challenged the traditional role of the FWF Section, results from the surveys supported many of the difficult decisions associated with the change.

## **Literature Cited**

- National Technical Institute. 1999. QPL reference manual version 3.0. U.S. Department of Commerce, National Technical Institute, Springfield, Virginia.
- Responsive Management. 1998. South Carolina fishing license holders' opinions on and attitudes toward fisheries management in the South Carolina Department of Natural Resources. Prepared for the South Carolina Department of Natural Resources. Responsive Management, Harrisonburg, Virginia.
- \_\_\_\_\_. 2002. South Carolina residents' attitudes and behaviors toward aquatic resources. Prepared for the South Carolina Department of Natural Resources. Responsive Management, Harrisonburg, Virginia.
- \_\_\_\_\_. 2003. A marketing plan for the freshwater fisheries section of the South Carolina Department of Natural Resources. Prepared for the South Carolina Department of Natural Resources. Responsive Management, Harrisonburg, Virginia.
- \_\_\_\_\_. 2004. South Carolina fishing license holders' opinions on and attitudes toward fish-

eries management in the South Carolina Department of Natural Resources. Prepared for the South Carolina Department of Natural Resources. Responsive Management, Harrisonburg, Virginia.

Statistical Package for Social Sciences (SPSS). 1999. SPSS reference guide. SPSS, Inc., Chicago, Illinois.