

7 Cooperative Research Program Addressing Finfish Bycatch

7.1 Introduction

The evaluation of the Cooperative Research Program Addressing Finfish Bycatch in the Gulf of Mexico and South Atlantic Shrimp Fisheries (Program) is one part of a set of case studies performed by the National Fisheries Conservation Center and intended to assist NMFS and industry in designing more effective cooperative data gathering efforts. As with the other case studies, we relied primarily on interviews and a review of the available written record (see Tables 7.1 and 7.2 and the Methods chapter (chapter 3) for more detail). This review examines the development and implementation of the Program in both the Gulf of Mexico and the South Atlantic. It examines the influence of participants' recent experience with TEDs (turtle excluder devices) as well as regional differences in how the Program developed. This case study is unique in its combination of an extremely large number of participants and great geographic extent. The story below is therefore painted in relatively broad strokes (Table 7.3) that capture the main themes and provide a basis for the evaluation's findings and recommendations.

Table 7.1. Interviewees. NMFS refers to the National Marine Fisheries Service, State to a member of a state agency, Fisher to a member of industry or an industry organization, and Conser. to a member of a conservation organization.

Name	Title & Organization	NMFS	State	Fisher	Conser.
Wilma Anderson	Executive Director, Texas Shrimp Association			X	
Kenny Atwood	Ex-President, Georgia Shrimp Association			X	
Charles Brunell	Shrimp fisherman, involved in BRD testing			X	
Felix Cox	Snapper fisherman, ex-shrimper			X	
Kim Davis	Regional Fisheries Project Manager, Center for Marine Conservation				X
Larry DeLancey	Program Supervisor, Crustacean Management, South Carolina Dept. Natural Resources		X		
Fred Dennis	Gulf and S. Atlantic shrimper			X	
Greg Faulkner	Louisiana net designer				
Gary Graham	Fisheries specialist, Texas Sea Grant Program		X		
Judy Jamison	Executive Director, Gulf and South Atlantic Fisheries Foundation				
Mike Justen	Sustainable Fisheries Division	X			
Dr. Andy Kemmerer	Past regional administrator, southeast region	X			
Jim Murray	Formerly SeaGrant, North Carolina		X		
Scott Nichols	Director, Mississippi Lab	X			
Jerry Schill	Executive Director, North Carolina Fisherman's Association			X	
Susan Shipman	Georgia Department of Natural Resources		X		
Richard Vendetti	Fisheries economist, formerly fisheries coordinator, Univ. of Georgia Marine Extension		X		
Michael Weber	Independent consultant				

Table 7.2. Additional sources. NMFS refers to the National Marine Fisheries Service, Foundation to the Gulf and South Atlantic Fisheries Development Foundation, Inc., and Register to the Federal Register.

Source	Description
NMFS	Cooperative Research Program Addressing Finfish Bycatch in the Gulf of Mexico and South Atlantic Shrimp Fisheries: A Report to Congress. Southeast Regional Office, April 1995.
NMFS	J. Watson, A. Shah, S. Nichols, D. Foster. 1997. Bycatch reduction estimates for selected species in the Gulf of Mexico for bycatch reduction devices evaluated under the regional bycatch program. Southeast Fisheries Science Center.
NMFS	Red Snapper / Shrimp Research Program Summer 1998 Project. Final Report. April 1999.
NMFS	Gulf of Mexico bycatch reduction device testing protocol manual. April 4, 1999 draft. Mississippi Laboratories, Pascagoula, MS.
NMFS	NMFS Response to the 1997 Peer Review of Red Snapper (<i>Lutjanus campechanus</i>) Research and Management in the Gulf of Mexico. Prepared by MRAG Americas, Inc. for NMFS Southeast Regional Office. May 1999.
NOAA	News bulletins: nr97-01, 06, 17, 18, 26, 29; nr97R191; nr98-022, 024, 029, 030, 034, 038, 039, 044, 045, 057, 058, 065, 067; nrg98-61; nr99-022, 024.
Foundation	P. Hoar, J. Hoey, J. Nance, and C. Nelson, eds. 1992. A research plan addressing finfish bycatch in the Gulf of Mexico and South Atlantic shrimp fisheries. Tampa, FL.
Foundation	An industry workshop addressing bycatch issues in southeastern U.S. fisheries: A report to the National Marine Fisheries Service. November 1995. Tampa, FL.
Foundation	Final report: Continued observer coverage of the Gulf of Mexico and South Atlantic shrimp fisheries to characterize the catch and evaluate the efficiency of bycatch reduction devices. November 1995. Tampa, FL.
Foundation	S. Branstetter. 1995. Bycatch and its reduction in the Gulf of Mexico and South Atlantic shrimp fisheries. Tampa, FL.
Foundation	Final report: Continued efforts to reduce bycatch in the Gulf of Mexico and South Atlantic shrimp fisheries and disseminate such information to the fishing industry. August 1998. Tampa, FL.
Other	Civil Action No. 96V-217. Georgia Fishermen's Association, Inc. and Jack D'Antignac, Plaintiffs, vs. Georgia Department of Natural Resources, Defendant. August 8, 1996. Superior Court of McIntosh County, State of Georgia.
Press	Numerous news articles from newspapers in Gulf and South Atlantic states.
Register	50CFR Part 622, Vol 62, No. 82, April 29, 1997
Register	50CFR Part 622, Vol 62, No. 127, July 2, 1997
Register	50CFR Part 622, Vol 63, No. 71, April 14, 1998
Register	15 CFR Part 902, 50CFR Part 622, Vol 63, No. 96, May 19, 1998
Register	50CFR Part 622, Vol 63, No. 166, August 27, 1998
Register	50CFR Part 622, Vol 64. No. 82, April 29, 1999

7.2 The setting

The shrimp industry in the Gulf of Mexico and the South Atlantic is geographically widespread and made up of a large and diverse fleet. The absence of formal and standardized permitting or registration requirements makes it difficult to determine the size of the fleet, but there may be as many as 7,000 vessels (longer than 15 feet) and 20,000 boats operating in the area from North Carolina to Texas. The relative lack of industry organization, with a few exceptions, complicates the dissemination of information and the clarification and resolution of problems.

Within this broad context, there are important differences between the Gulf and South Atlantic regions, and among states within these regions. In general, the shrimp fishery in the Gulf takes place predominantly in offshore, or federal, waters, where most of the concern about the bycatch of juvenile red snapper is focused. In contrast, the shrimp fishery in the South Atlantic is

primarily an inshore fishery concentrated in state waters. In this region, regulatory agencies' bycatch concerns focused on weakfish and spanish mackerel. As a result of this onshore – offshore difference, regulatory responsibility in the Gulf falls mainly to NMFS and the regional fishery management councils, while state agencies and the Atlantic States Marine Fisheries Commission (ASMFC) play a much more dominant role in the South Atlantic.

Other differences in the nature of the bycatch problem in these two broad regions affected regulatory approaches to BRD (bycatch reduction device) development, as well as industry responses to these. Juvenile red snapper are relatively rare in any one shrimp trawl in the Gulf and the bycatch impact on the stock stems from the extremely high number of shrimp hauls in the region. In contrast, weakfish and spanish mackerel are a more visible component of finfish bycatch in the South Atlantic and their bycatch was thus more easily related to interest in reducing finfish bycatch in general, for both economic and conservation reasons.

The Program was created and carried out against the backdrop of complex and ongoing regulatory, political, and legal processes that operated within the regional fishery management councils, state and federal agencies, state and federal governments, and the courts. The broad outlines of this history are presented in the timeline in Table 7.3, however, we will not deal with it in detail except where it directly affected the Program.

Finally, every person we spoke to said that, in one way or another, the TED experience dominated participants' perception and behavior during the development and implementation of BRDs. Effective TED designs, full compliance by industry, and industry involvement in the protection and restoration of nesting beaches was achieved only after a long and bitter conflict. This left a residue of suspicion and resentment toward NMFS in some quarters of the shrimp industry. However, it also fostered a strong desire among all parties never to go through that experience again. So, when concerns about finfish bycatch began to arise, there was a conscious decision to try a different approach. All the managers we spoke to, as well as the majority of the fishers, wanted to avoid the mistakes they believed were made by all parties to the disputes over TEDs. As one state manager put it:

I was the manager and my real fear was getting into another TED controversy. That was the reverse Midas touch; everyone got tarnished in one way or another.

The large degree of industry involvement in the Program, and in similar but smaller efforts in some of the South Atlantic states, was described by early participants in these efforts as a deliberate attempt to learn from the TED experience. Many fishers described themselves as more fatalistic as a result of their experience with TED regulations; they had little hope of permanently forestalling regulations mandating BRDs and were intent instead on helping to improve them and reduce their economic impact. Largely as a result of these factors, the overall level of "heat" with the BRD issue was much less. As one key participant in both issues related,

With TEDs we had public demonstrations, public hearings with 4000 to 5000 people. We had some tough hearings with the BRDs but there was no comparison, with usually 50 to 60 people at meetings or sometimes 100. We were always treated with respect and the shrimpers in general were courteous. With the TED stuff though, there was always a question about whether we were going to walk out alive [said facetiously]. These were the same people too, but there was a profound difference.

On a more pragmatic level, the presence of TEDs in shrimp nets has led to interest in developing one device to solve both turtle and finfish bycatch problems and to pressure from industry to

include reductions in finfish bycatch due to TEDs when assessing progress toward bycatch reduction targets.

7.3 The story

While the Program covered both the Gulf of Mexico and the South Atlantic, the story in these two regions follows two parallel and somewhat different plots (Table 7.3). Concerns in the Gulf focused primarily on red snapper bycatch, which occurred mostly in federal waters. Attention in the South Atlantic centered on weakfish and then spanish mackerel and the bycatch of both occurred largely in state waters. Despite these and other important differences, some consistent themes play out in both regions.

7.3.1 Genesis of the Program

Concerns about the red snapper stock in the Gulf of Mexico led to a 1989 stock assessment that concluded that both direct and incidental harvest would have to be greatly restricted to permit stock rebuilding. It also showed that over 90 percent of the fishing mortality on age 0 and age 1 red snapper was due to shrimp trawling. The only way to rebuild snapper stocks without halting all directed commercial and recreational take of red snapper was to significantly reduce mortality due to shrimp trawling. The Gulf of Mexico Fishery Management Council considered large-scale closures of the shrimp fishery to protect red snapper juveniles. However, analyses suggested these closures would be of little benefit and the Council began searching for alternative management approaches. At that time, many parties questioned the adequacy of current shrimp bycatch estimates and expressed concern about the potential economic impacts on the shrimp fishery of proposed management measures.

This issue was addressed by Congress during the 1990 reauthorization of the Magnuson Act. It prohibited until January 1, 1994 any implementation of shrimp fishery closures or bycatch reduction devices (BRDs) in federal waters and set up a three-year research program to:

- identify fish stocks subject to significant incidental harvest by shrimp trawling;
- collect and evaluate data on the extent of such incidental mortality on such stocks;
- assess the status and condition of such stocks;
- collect and evaluate data on sources of fishing mortality on such stocks from sources other than shrimp trawling; and
- evaluate the effectiveness of bycatch reduction devices.

At about the same time, attention began to turn to the potential impacts of finfish bycatch in shrimp trawls in the South Atlantic. As Jim Murray, formerly of North Carolina Sea Grant, remembers:

In the course of dealing with TEDs in the mid to late 1980s, it became clear to us that the next major issue was going to be bycatch...As TEDs were being dumped on deck [during a field test of TED designs] there was a lot of bycatch and the environmental community was very concerned...once the TED issue was addressed properly there was still going to be another issue and that would be bycatch.

And Jerry Schill, Executive Director of the North Carolina Fisherman's Association, said that, "I knew in the late 1980s that the buzzword for the 1990s was going to be bycatch." As a result, North Carolina Sea Grant was awarded a Saltonstall-Kennedy grant in 1989 to investigate gear modifications to reduce finfish bycatch. Shortly thereafter, in 1991, the ASMFC adopted

Amendment 1 to the Weakfish Fishery Management Plan (FMP), which recommended that South Atlantic states implement measures, by January 1, 1994, to reduce bycatch mortality of weakfish in their shrimp trawl fisheries by 50%.

Only North Carolina implemented measures to reduce weakfish bycatch, but gave fishers wide latitude in the choice of bycatch reduction devices. As a result, the ASMFC adopted Amendment 2 to the weakfish FMP, which required that the South Atlantic states implement, by the 1996 shrimping season, measures to achieve a 50% reduction in weakfish bycatch in shrimp trawls.

Thus, despite different initial motivations, the shrimp industry, as well as state and federal regulatory agencies, in both the Gulf of Mexico and the South Atlantic were deeply involved in the issue of finfish bycatch and the development of methods to reduce this bycatch. The Program launched by the 1990 reauthorization of the Magnuson Act would provide impetus, direction, and needed coordination to efforts in both regions.

7.3.2 Results

All BRD designs basically entail cutting a hole in the shrimp net to allow fish to escape before the net is hauled on board. This is a traditional practice of long standing in the shrimp industry, especially in inshore areas where high densities of finfish and/or jellyfish can clog nets, reduce tow times, and increase sorting time. The regulations that were pending in both the Gulf of Mexico and the South Atlantic raised significant concerns within industry for two primary reasons. First, BRDs would have to meet explicit, quantitative targets for the removal of particular species of bycatch and, second, they would have to be used at all times and in all areas, removing the element of choice for individual shrimpers.

In developing the details of Program, NMFS attempted to address these concerns, and learn from past experience with TEDs, in two ways. It determined to ensure both scientific credibility throughout the design and implementation of all studies and the substantive participation of all affected parties. As Andy Kemmerer, formerly the regional administrator of the southeast region put it:

We looked back at TEDs and didn't want to do the same thing. We wanted industry to be an active participant, to be more involved in collecting and evaluating data, both organizationally and individually.

Initial attempts to directly fund industry organizations showed that most of them did not have the administrative capacity to manage government grants. The bulk of Program funding therefore flowed through the Gulf and South Atlantic Fisheries Development Foundation (Foundation), which had industry members on its board of directors and had better relationships with industry than did NMFS. The Foundation set up a 34-member Finfish Bycatch Steering Committee with representatives from:

- commercial and recreational fisheries;
- conservation groups;
- Sea Grant;
- NMFS;
- both the Gulf of Mexico and South Atlantic fishery management councils;
- both the Atlantic and Gulf States Marine Fisheries Commissions; and
- resources agencies of North Carolina, South Carolina, Louisiana, and Texas.

The Foundation also set up a 15-member Technical Review Panel and an 8-member Gear Review Panel to advise the Steering Committee on specific issues related to biological research, gear technology, and sociology and economics. These three groups developed a formal research plan which was published in August 1992 and which guided the next few years worth of research and testing. These groups held frequent meetings during the early 1990s to review results and reassess the Program's priorities. An early priority was to develop explicit protocols for selecting and then field testing candidate BRD designs, as well as quantitative criteria for eventual certification. These efforts resulted in the certification of the fisheye, Gulf fisheye, and Jones-Davis BRDs for use in the Gulf of Mexico.

By all accounts, the Program achieved significant accomplishments, from better characterization of bycatch patterns to improved understanding of net dynamics and the behavior of fish swimming inside shrimp trawls. In addition, our sources were unanimous in praising the high level of cooperation and the open exchange of information the Program fostered. The Program accomplished its primary goal of identifying BRD designs that met the formal certification requirements.

Despite the passage of Amendment 9 in the Gulf of Mexico and the ASMFC regulation in the South Atlantic (see below), and the fading away of the Program's formal structure, there are several pieces of unfinished business still under active consideration. First, there is continuing disagreement over the actual effectiveness of BRDs, in terms both of the reduction in mortality of target bycatch species and of shrimp loss rates. The wide range of fishing styles and oceanographic and ecological conditions makes it extremely difficult to resolve this issue. Second, studies in the Program's later stages documented a lower than expected rate of mortality reduction. While efforts are underway to improve performance through design adjustments and better training in installation and use, this aspect of the Program remains incomplete. Third, the Program's estimates of the economic impact of the BRD regulations are open to question because of ongoing controversy about shrimp loss rates and the difficulty of accurately characterizing the shrimp fleet and its fishing effort. Finally, an effort is underway in the South Atlantic to modify the statistical criteria for BRD certification in order to somewhat reduce the burden of proof required for certification.

7.3.3 Fallout and current prospects

After years of stock assessment studies, research into a wide range of BRD designs, and political activity at both the state and federal level, events in the Gulf came full circle in 1998 with the passage of Amendment 9 to the shrimp FMP by the Gulf of Mexico Fishery Management Council. Amendment 9 mandated the use of approved BRDs in shrimp nets throughout most of the Gulf. It followed the establishment of similar requirements by the ASMFC in 1996 for state waters in the South Atlantic and by the South Atlantic Fishery Management Council in 1997 for federal waters in this region.

The passage of Amendment 9 and related regulations had two immediate consequences. The first was separate lawsuits filed by the Texas Shrimp Association (TSA) and conservation organizations against the Department of Commerce. The TSA suit challenged the validity of the Program's data used by NMFS in developing and justifying the regulations and the other suit argued that BRD use should also be required in the eastern Gulf of Mexico in order to reduce finfish bycatch in general (bycatch of juvenile red snapper is less of a problem in that region). The second consequence was a striking decrease in the level of industry cooperation in some aspects of the Program's ongoing research efforts. As one key participant remarked:

Overall, there was very good cooperation in the research and development program but this started to fall apart when the regulations came out in 1998. Nobody signed up [for the randomized observer program; see below]. There were also problems with the vessel monitoring systems on boats to compare with port sampling data... Up until that point [regulation], we had great cooperation... We didn't get around that problem.

For example, NMFS attempted, through an interim rule, to implement a randomly designed study in the summer of 1998 to obtain the first statistically valid, fleetwide estimates of BRD effectiveness. Only 51 of 350 targeted vessels supplied logbook information and NMFS received only one response to its first 100 attempts to place observers on randomly selected vessels, despite a regulatory requirement to comply with the observer study. Different sources pointed to different reasons for the failure of this study. Industry sources pointed to the sudden shift from a cooperative approach during the Program's earlier years to mandating a study under a regulatory requirement. Industry sources also argued that simply sending letters to randomly selected shrimpers was insulting and culturally insensitive. As one shrimper put it, "You send me a letter like that I'll go out of business first before I comply." Industry sources also raised concerns about the difficulty of obtaining insurance coverage for observers and the expense of purchasing extra safety equipment to comply with Coast Guard regulations. In contrast, other sources noted the Program's past history of relatively trouble-free observer studies and suggested that anger at Amendment 9's BRD requirements and the regulatory mandate behind the 1998 study underlay the failure of the 1998 study.

Whatever the reason, the failure of the 1998 study represented the end of the Program's history of widespread cooperative research efforts, open communication, and data sharing. Faced with a possible lengthy fight to enforce compliance vs. the immediate need for some information to make decisions about the snapper quota, NMFS abandoned its randomized effort, and relied on voluntary, paid participants to carry observers. The data from this effort are acceptable as an example of BRD capabilities and identified some important, until then undiscovered, characteristics that affect performance. However, the ability to estimate effectiveness for the fleet as a whole was lost and with it the opportunity to improve admittedly poor estimates of overall BRD effectiveness.

The fallout from the 1996 ASFMC regulations in the South Atlantic was much different and varied somewhat from state to state. In North Carolina, which had implemented its own BRD requirement in 1992, an estimated 70% of shrimpers were using one kind of BRD or another by 1996. Because of the economic benefits of reducing finfish bycatch (longer tow times, reduced sorting time, improved shrimp quality), "they wouldn't have taken them out if you had told them to," according to Jerry Schill, Executive Director of the North Carolina Fisherman's Association.

There was also little or any reaction to the regulations in South Carolina, where state managers with good credibility with industry had for years been warning about the pending need to deal with weakfish bycatch. In addition, field trials involving shrimpers showed that shrimp loss was low enough to be acceptable. Despite some complaints, BRDs have apparently been accepted as part of normal routine.

There was greater resistance in Georgia, where the Georgia Fisherman's Association filed suit against the state and where anecdotal evidence suggests a much greater degree of noncompliance with BRD requirements. Many shrimpers in this state assert that shrimp loss rates are higher than claimed by the state's Department of Natural Resources and that they simply cannot survive economically with the high loss rates caused by BRDs. The state's estimates of shrimp loss are

based largely on replicated studies carried out by the University of Georgia's Marine Extension office. Because the tow times in these studies were much shorter than those used in commercial hauls (1 hour vs. 2 – 4 hours) there may well have been less net clogging and thus less shrimp loss.

At present, the Program's formal, centralized structure is no longer active and the Program's research did not definitively resolve uncertainties about rates of either finfish exclusion or shrimp loss. However, many of the Program's participants sit on local and regional advisory panels and working groups that continue to address these issues and to identify ways to improve BRD effectiveness. In important ways, the Program succeeded in institutionalizing its original commitments to scientific rigor and to the substantive involvement of all affected parties.

Table 7.3. Timeline of key events in the history of BRD development in the Gulf of Mexico and the South Atlantic.

Date	Event
1989	Voluntary bycatch reduction efforts begin in North Carolina, with wide latitude on choice of devices by industry
1990	Magnuson reauthorization prohibits BRDs in Gulf until 1994 and sets up 3-year research program
1991	Organized bycatch reduction efforts begin in South Carolina, targeted on weakfish
1991	South Carolina awarded an S-K grant to investigate BRDs
1991	ASMFC passes Amendment 1 to weakfish FMP, which recommended that South Atlantic states implement, by 1994, measures to reduce bycatch mortality of weakfish by 50%
1991	Program structure of Steering Committee, Technical Review Panel, and Gear Review Panel in place
1991	South Carolina awarded an S-K grant to investigate BRDs
1992	Program research plan published by Gulf and South Atlantic Fisheries Development Foundation
1992	North Carolina enacts regulations requiring BRDs but giving industry wide latitude in choice of device
1994	ASMFC passes Amendment 2 to weakfish FMP, which required that South Atlantic states implement, by 1996, measures to reduce weakfish bycatch by 50%

Date	Event
1995	South Atlantic states submit bycatch reduction plans to ASMFC
1996	Regulations requiring BRDs in state waters implemented in South Atlantic states
1996	Gulf Council passes regulation mandating BRDs in offshore shrimp trawls
1996	Georgia Fisherman's Association files suit contesting BRD requirements
1996	Congress imposes one-year delay on BRD regulations in Gulf of Mexico to allow for additional red snapper assessment
1997	Georgia Fisherman's Association loses suit on technicality
1997	Regulations requiring BRDs in federal waters implemented in the South Atlantic
1997	Gulf of Mexico Fishery Management Council approves Amendment 9, which requires BRDs in federal waters of the Gulf of Mexico
1998	Regulations requiring BRDs in federal waters implemented in the Gulf of Mexico
1998	Texas Shrimp Association files suit against BRD requirements in Amendment 9
1998	Randomized study of fleetwide BRD effectiveness in Gulf of Mexico fails due to lack of response from industry

7.4 Conclusions and lessons learned

Several conclusions are readily apparent from the story described above. We describe these and assess the degree to which these might be applicable in other situations.

7.4.1 Past history played a dominant role

More so than in any other case study, past history influenced the perceptions and behavior of participants in government agencies, fisheries, and conservation organizations. The memory of bitter conflicts over TEDs is fresh enough that virtually all of our contacts said that one of their primary motivations was to avoid repeating that history with BRDs. As a result, commercial fishers in general were resigned to the fact that some sort of BRD would be required. They were intent on focusing less of their energy on outright resistance and more on ensuring that BRDs that were implemented were as effective as possible. Industry's experience with TEDs also demonstrated that their suggestions would be heard and would result in improved designs. As a result, there was broad support for the cooperative research program throughout the Gulf and South Atlantic. However, the TED experience also increased fishers' cynicism about the regulatory system. We heard many comments to the effect that their experience with TEDs had

increased their skepticism about how data from the research program would be used and whether their concerns would be heard and addressed.

7.4.2 A formal structure was necessary

As in all the case studies, the development of working relationships and some degree of trust among participants was a key part of the story. However, the Program's number of participants and the large geographic area involved made it impossible to depend on informal, ad hoc approaches and the development of close personal relationships. The research program instead effectively used a series of committees and working groups and established clear, written procedures for how BRD candidates would be selected and how studies would be carried out. These detailed procedures were essential for creating the necessary confidence that there was a "level playing field." In contrast, personal relationships among shrimpers, Sea Grant or university extension staff, and state agency personnel played a large role at the state level in the South Atlantic.

7.4.3 Regional differences affected outcomes

We found that regional differences in the regulatory environment and the nature of the shrimp fishery strongly affected both approaches and outcomes in different regions. In general, BRD implementation proceeded with less industry resistance in the South Atlantic states. There are two factors that seem to explain this difference. First, the state agencies with responsibility for managing the mostly inshore fishery in the South Atlantic had closer and more personal relationships with fishers than did NMFS in the Gulf of Mexico and were able to utilize non-regulatory Sea Grant and marine extension personnel to a larger extent in proselytizing about BRDs. Thus, fishers in general had a more positive assessment of state agencies' motives and performance, although, as one put it, "Fishermen are not much more kind to state regulators than to the feds. But still, they would like to deal with the ones they know [state] rather than the ones they don't [feds]. We don't separate bureaucrats, it's 'us' and 'them.'"

Second, representatives of state government were generally more supportive of bycatch reduction measures in the South Atlantic. In addition to the efforts of state resource agencies described elsewhere in this chapter, two public statements by elected officials illustrate this regional contrast. In a meeting with shrimpers in the early spring of 1987, Congressman Lindsey Thomas told shrimpers that he would help with issues related to implementing TEDs but that they had to bring an end to this bycatch. One month later, in a meeting with thousands of shrimpers in Louisiana, Governor Edwin Edwards made a statement to the effect that, if it comes to shrimp vs. turtles, then it's "bye bye turtles."

7.4.4 State agencies took advantage of greater flexibility

In addition, greater flexibility at the state level allowed some state agencies to begin promoting BRDs as a voluntary measure long before the federal regulations were enacted. The second factor involves the nature of the shrimp fishery itself. Overall bycatch of fish is higher in the inshore, state-managed, fisheries of the South Atlantic than in the offshore, federally-managed, fisheries of the Gulf. As a result, inshore fishers were much more receptive to the economic argument that BRDs would improve economic yield by reducing fish bycatch and catch processing time. In contrast, Gulf fishers' were predominantly concerned about the negative economic impact of BRD-caused shrimp loss.

7.4.5 NMFS' science and regulatory roles conflict

This case highlighted the inescapable tension between NMFS' scientific and regulatory roles. Despite the Program's clearly defined procedures, fishers retained an inherent mistrust and cynicism about NMFS' underlying motivations. We heard numerous comments about the role that regulatory politics unavoidably plays in federal management decisions. Whatever the relative merits of these comments, the important issue is that this widespread perception tends to undermine confidence in NMFS-sponsored science, especially where the stakes are perceived to be high, as in the Gulf shrimp fishery. As one Sea Grant scientist working at the state level put it, "Our biggest advantage is that we're *not* NMFS." NMFS' dual role complicates the task of building trust with industry. One participant from at the state level in the South Atlantic said, "I get so mad at them for shooting themselves in the foot" when they assign enforcement responsibility to gear specialists, and continued by arguing, "That's the problem with NMFS; there's no way they can be a regulator in the morning and an educator in the afternoon."

7.4.6 Amendment 9 decreased cooperation

The evidence seems is clear that the overall level of cooperation dropped dramatically in 1998 after the regulations mandating BRDs were released. This timing was unfortunate because it prevented development of valid estimates of fleetwide BRD performance. Because regulations often, but not always, reduce cooperation, at least in the short term, it would have been ideal to ensure that key pieces of information are in hand before regulations are implemented. The timing of regulations cannot always be so finely tuned, but their possible impact on the availability of crucial information should be considered in the planning process.

7.4.7 Better industry organization could promote problem solving

Many sources, from industry, government, and other groups, noted that the shrimp industry is poorly organized. One observer noted that, "One of the biggest problems in working with the shrimp industry is that it was closer to dealing with 15,000 to– 20,000 small businesses." One shrimper complained about the difficulty of building an active organization and acknowledged industry's role in the lack of effective problem solving, "Fishermen are poorly organized and this makes it hard to reach agreement; there's nobody to deal with." For example, there were only a total of 15 attendees at two public hearings in late 1995 to consider Georgia's proposed BRD rule and a total of three written comments received over a period of two months. There was equally low turnout at similar meetings in South Carolina. Many industry associations have shrunk in size over the years and shrimpers are often reluctant to pay dues or otherwise fund organizations. One knowledgeable long-term participant from the South Atlantic claimed that a better organized industry would "absolutely" promote the development and implementation of improved solutions. It may be useful for NMFS to consider ways of fostering the development of active industry organizations, perhaps working through local Sea Grant or marine extensions programs.

7.4.8 Single-species bycatch reduction can be problematic

One long-term participant in the South Atlantic argued that focusing bycatch reduction efforts on one or two species can be counterproductive and create unnecessary resistance:

It would have been less contentious if we had just said, "Come on, let's reduce fish bycatch, we're catching a lot of fish." But managers may not have been able to turn that into a law; the

good of the overall ecosystem is not a good enough argument. The regulatory and legal system doesn't really support ecosystem management yet.

As a result of the focus on weakfish, some fishermen contest the need for BRDs by maintaining they don't catch weakfish. In addition, the removal of bycatch reduction requirements for spanish mackerel undermined the credibility of the stock assessment and decision-making process that had, just a short time before, asserted that spanish mackerel stocks were in serious trouble. It may be worth investigating the usefulness of alternative, ecosystem-level arguments for reducing bycatch in some situations.

7.4.9 Large-scale gear development has inherent contradictions

The Program provided the information needed to certify a small number of BRDs for use over wide geographic areas. According to some participants in the South Atlantic, smaller-scale differences in bottom habitat, tidal dynamics, boat sizes, net types, and target and bycatch species made it problematic to certify one or a very few BRDs that worked effectively in all conditions. However, it can be prohibitively expensive to duplicate gear research for a wide range of local conditions and this can also lead to a complex administrative system in which different regulations are promulgated and enforced in different areas. While uncomfortable with the "one size fits all" approach generally used in the BRD research program, individual shrimpers would be equally uncomfortable with the increased costs stemming from a patchwork of BRD regulations that required different BRDs in different areas.

7.5 Summary

To summarize, the cooperative BRD research program was an ambitious, large-scale undertaking that broke significant ground by setting up formal structures for collaborative decision making about research and BRD certification. The program achieved its goals of certifying BRDs that met minimum requirements. It also highlighted the importance of past history in influencing attitudes as well as how differences in states' roles affected the course of events.