

## 8 Cooperative Tagging Center and Cooperative Shark Tagging Program

### 8.1 Introduction

The evaluation of these two tagging programs for highly migratory species 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 8.1 and 8.2 and the Methods chapter (chapter 3) for more detail). This review summarizes the programs' history and focuses on how they have been affected by the recent shift to more restrictive fishery management plans for highly migratory stocks. The overall challenge facing these programs is finding a way to maintain a needed cooperative atmosphere when industry perceives that the data they help to gather are being used "against them" to restrict quotas and areas of operation. The Cooperative Tagging Center (CTC) and the Cooperative Shark Tagging Program (CSTP) (part of the Apex Predators Program) have many similarities and are therefore dealt with together in this chapter, although they are conducted and managed separately.

Table 8.1. Sources interviewed.

Name	Title & Organization	NMFS	Fisher
<b>Cooperative Tagging Center</b>			
Al Anderson	Captain, recreational charter boat		X
Nelson Beideman	Executive Director, Blue Water Fishermen's Association		X
Dr. John Graves	Virginia Institute of Marine Science; chair, ICCAT Advisory Committee		
Rebecca Lent	Chief, Highly Migratory Species Division	X	
Ellen Peel	Executive Director, The Billfish Foundation		X
Dr. Eric Prince	Chief, Migratory Fishery Biology Branch SEFSC; Director, Cooperative Tagging Center	X	
Dr. Jerry Scott	Chief, Sustainable Fisheries Resources Division, Southeast Fisheries Science Center	X	
Other fishers			X
<b>Coop. Shark Tagging Program</b>			
Nelson Beideman	Executive Director, Blue Water Fishermen's Association		
Teri Frady	Chief of Research Communications, Northeast Region	X	
Glen Hopkins	Commercial fisherman		X
Dr. Nancy Koehler	Director, Cooperative Shark Tagging Program	X	
Other fishers			X

Table 8.2. Additional sources.

Source	Description
<b>CTC</b>	
NMFS	Cooperative Tagging Center web page: <a href="http://www.sefsc.noaa.gov/public/tag.html">www.sefsc.noaa.gov/public/tag.html</a> .
NMFS	C. D. Jones, M. T. Judge, M. A. Ortiz, D. S. Rosenthal, and E. D. Prince. 1995. Cooperative Tagging Center Annual Newsletter: 1995. NOAA Technical Memorandum NMFS-SEFSC-364.
NMFS	C. D. Jones, D. S. Rosenthal, T. L. Jackson, M. T. Judge, and E. D. Prince. 1996. Cooperative Tagging Center Annual Newsletter: 1996. NOAA Technical Memorandum NMFS-SEFSC-391.
NMFS	M. Ortiz, D. S. Rosenthal, A. Venizelos, M. I. Farber, and E. D. Prince. 1998. Cooperative Tagging Center Annual Newsletter: 1998. NOAA Technical Memorandum NMFS-SEFSC-423.

Source	Description
NMFS	E. L. Scott, R. E. Bayley, J. Tashiro, and C. Watada. 1991. Cooperative Game Fish Tagging Program Annual Newsletter 1990. NOAA Technical Memorandum NMFS-SEFSC-295.
Publication	G. A. McFarlane, R. S. Wydoski, and E. D. Prince. 1990. External tags and marks: Historical review of the development of external tags and marks. American Fisheries Society Symposium. 7: 9-29.
Publication	E. L. Scott, E. D. Prince, and C. D. Goodyear. 1990. History of the Cooperative Game Fish Tagging Program in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea, 1954 – 1987. American Fisheries Society Symposium. 7: 841-853.
<b>CSTP</b>	
NMFS	Apex Predators Program web page: <a href="http://www.nefscsharks.nmfs.gov/">www.nefscsharks.nmfs.gov/</a> .
NMFS	The Shark Tagger: Newsletter of the Cooperative Shark Tagging Program.
Publication	J. G. Casey and N.E. Kohler. 1990. Long Distance Movements of Atlantic Sharks from the NMFS Cooperative Shark Tagging Program. In: S.H. Gruber, ed. Discovering Sharks. 1990. American Littoral Society, Highlands, N.J. pp.87-90.
Publication	Casey, J.G. 1985. Transatlantic Migrations of the blue shark; a case history of cooperative shark tagging. pp. 253-268. In: R.H. Stroud, ed. World Angling Resources and Challenges. Proceedings of the First World Angling Conference, Cap d'Agde, France, September 12 to 18, 1984. Int. Game Fish Assoc., Ft. Lauderdale, FL.

## 8.2 The setting

Large, highly migratory species in the Atlantic Ocean, such as sharks, tunas, swordfish, and billfish, are targeted by both sport and commercial fishers. Their wide geographic range has made it difficult to gather basic information about distribution, movement patterns, and life histories, information that is essential to management. The Cooperative Tagging Center (CTC) is managed out of NMFS' Southeast Fisheries Science Center in Miami and focuses on highly migratory species such as tunas and billfishes. The Cooperative Shark Tagging Program (CSTP) focuses primarily on sharks and is managed from the Narragansett Lab of NMFS' Northeast Science Center. Both programs originated as research efforts to improve basic understanding of movement patterns and biology. Over time, the data they produced became more closely linked to the management and regulatory process. Both programs have a long history of cooperating with each other. For example, numerous shark recoveries are often reported to the CTC and then turned over to the CSTP. Alternatively, numerous swordfish and tuna are tagged and recaptured out the CSTP and are then report to the CTC.

## 8.3 The story

The history of both programs follows a similar pattern. An earlier, extended phase of program expansion and cooperation among participants is followed more recently by a period of building resentment and waning interest as management decisions impact industry.

### 8.3.1 Cooperative Tagging Center

**Phase I: Growth and expansion.** The Cooperative Tagging Center (CTC), formerly titled the Cooperative Game Fish Tagging Program, is a joint research effort by scientists at NMFS' Southeast Fisheries Science Center in Miami, FL and recreational and commercial fishermen. The program was created in 1954 by Frank Mather of the Woods Hole Oceanographic Institution to focus on bluefin tuna, but quickly expanded to include billfishes and other tunas. The program became a joint effort of NMFS and Woods Hole in 1973 and the sole responsibility of the NMFS Southeast Fisheries Science Center upon Mather's retirement in 1980. At present, target species include sailfish, blue marlin, white marlin, swordfish, bluefin and yellowfin tuna, and other tunas

such as albacore, bigeye, blackfin, and skipjack. The program became immensely popular with both recreational and commercial fishers and over 34,000 are listed as current participants. Ellen Peel, Executive Director of the Billfish Foundation, an association of sport fishers, pinpointed a key reason for sport fisher's support for the program, "From an angler's perspective, they saw first-hand that catch numbers were going down and that they weren't catching as many fish as before." The opportunity to become directly involved in improving the scientific data base for management decisions was thus attractive to both sport and commercial fishers.

Ellen Peel describes the importance of the tagging effort to the sport fishery at greater length:

The tagging program has been very important to us. What we have found here is that it has been the single most important tool or conduit for educating the public in a hands-on experience of scientific data gathering and contributing to data. It provides us an opportunity to explain why data are important, how to place tags, and manage the data. We send out brochures with every tag kit we sell or give away and we have a video we're in the process of updating to provide free to clubs. When we go to fishing events or clubs in person, then we do demos and share information.

During this first phase, which extended from 1954 to about the mid-1990's, the program exhibited many traditional indicators of growth. The species list expanded, as did the numbers and types of participants. Program staff conducted outreach activities to publicize the program and the value of tagging information. Scientists visited numerous fishing tournaments beginning in the early 1970s and this, according to long-time participants, provided the sport fishing public an opportunity to get to know scientists first-hand. Long-term participants described anglers' excitement at participating in improving the scientific knowledge base. Similar outreach activities increased support and interest among commercial fishers.

In general, sport fishers do the majority of the tagging and retrieval for the billfishes, while the bulk of the tag retrieval and reporting for swordfish and bluefin tuna are from the commercial fishers. This reflects the fact that, historically, recreational fishers have released a greater percentage of their catch for the recreational species. However, some commercial fishers have tagged significant numbers of fish. Given the wide distribution of the target stocks, tag retrieval and reporting is necessarily an international activity. As described below, fostering and increasing the participation of foreign fishers and scientists has been one of the program's main challenges.

Over time, however, the program's popularity began to exceed its abilities to provide tags and manage the return data. Again, Ellen Peel comments that, "The Billfish Foundation realized that NMFS couldn't keep up with the demand [for tags]," and longtime commercial fishers made similar observations (see next section). Participants had also historically tagged a wide range of non-target (mostly nearshore) species of interest to them (such as king mackerel and red drum) and, by the late 1980s, almost 50% of available tags were being placed in non-target fishes. The program's growth led to the development of cooperative alliances (formalized in an official memorandum of understanding) between the CTC and the Billfish Foundation in 1990 and the BOAT/U.S. Clean Water Trust in 1996. The Billfish Foundation, which represents recreational fishers of large game fish, helps fund the purchase and distribution of tags for the program's target species. The BOAT/U.S. Clean Water Trust has taken over the provision of tags for nearshore, non-target species that are of great interest to many participants but not part of the central mission of the CTC. Also in 1996, the Federation of Japan Tuna Fisheries (FJTF) began volunteer billfish tagging from their high seas longline operations, as part of an international tagging program initiated under ICCAT.

The CTC also worked cooperatively with the Billfish Foundation to develop improved tags with better retention characteristics. For example, a lengthy cooperative double tagging study rigorously compared the effectiveness, in terms of infection rates, retention, and effects on growth of new, more biologically compatible, tag designs. In addition, the program has continuously worked to develop, systematize, and publicize methods for capture, tagging, release, and data management (see McFarlane et al. 1990, Jones et al. 1995, 1996, and Ortiz et al. 1998). While not part of the CTC, a large-scale volunteer industry effort, beginning in 1990, to gather samples of gonads and other tissues to aid stock assessment built on the relationships established through previous tagging efforts. An important aspect of the CTC's efforts has been its participation in reward programs to recognize fishers who tag or release fish. For example, the Axelson Fishing Tackle Company (AFTCO), in cooperation with the CTC, awards trophies to those tagging the most of each of the seven designated species. CTC participants are also eligible for \$500 annual lottery awards from ICCAT. The CTC lists its most active taggers in the annual newsletter and awards a special embroidered program cap to each person reporting a recapture.

The only problems identified in a formal review of the program's efforts through 1987 (Scott et al. 1990) were an inability to generate adequate international participation and the inaccuracy of volunteer taggers' size estimates of tagged and released fish. For example, Dr. Prince, the Center's current director, tells about a Venezuelan captain who refused to return tags because he thought they were FAO (United Nations Food and Agricultural Organization) tags and FAO had never benefited him. In response to this information, the cooperative international efforts through the ICCAT Enhanced Research Program for Billfish rented a small office on the dock in Cumana, Venezuela, with posters (in Spanish) advertising cash payments for tag returns. This approach increased tag returns in the southeastern Caribbean by 30% compared to the same area during the previous 15 years. Most recently, in 1996, the Federation of Japan Tuna Fisheries (FJTF) started its volunteer tagging activities for billfish from their high seas longline operations in 1996 as part of an international tagging program initiated under the auspices of ICCAT.

Despite the expanding participation during this first phase, and the active support from many industry segments, there remained visible signs of resistance, particularly among foreign fishers, to providing regulatory agencies with information. For example, Dr. Prince reports that, according to the ICCAT landings data base, high-seas longline vessels (from numerous nations) land about 70-90% of all Atlantic billfish in any given year. However, the offshore longline fleet provides less than 20% of returned tags to the CTC. In addition, the overall tag return rate for billfish is much lower than for bluefin tuna, swordfish, and yellowfin tuna where commercial fisheries exist. The presence of such disproportionate returns suggests intentional underreporting of tag recaptures, even after making allowances for fish mortality and tag shedding. In fact, Center personnel and others have heard both first- and second-hand accounts of captains with jars of NMFS tags on board that they will not return, partly because they do not want to provide tangible evidence they are "handling fish they claim they never handle" and partly because of deep-seated suspicion toward any regulatory agency. There is some evidence, in higher return rates from the eastern Atlantic, that pressure from ICCAT in recent years has improved reporting in foreign fleets. This additional source of information has proved extremely valuable in improving the understanding of larger-scale stock structure in the Atlantic.

This lengthy growth phase was marked by relationship building, expanding interest and participation, the improvement and standardization of tags and tagging methods, and the development of useful new knowledge. Trends in some of these indicators began to reverse in the mid-1990s as both recreational and commercial fishers took issue with NMFS' management decisions and as budget constraints limited the program's ability to provide tags and process data.

***Phase II: Resentment and resistance.*** The program's second phase has occurred against the backdrop of more restrictive management decisions. These decisions have resulted from increased pressure from conservation groups, information that indicated key stocks have declined, and new policies on overfishing in the 1996 Magnuson-Stevens Fisheries Conservation and Management Act. It is not unusual for members of both the commercial and recreational segments to be suspicious of the data underlying management decisions that restrict their activities. In this instance, however, the fact that U.S. fishers had actively cooperated in gathering some of the data on which these decisions were based helped create a sense of betrayal. As one captain who has been an active tagger for many years put it:

I can tell you this, recent decisions with regard to the management of pelagic species have put a sour taste in the mouths of those who have been long-time supporters of NMFS. Many in the ... community have decided not to support NMFS any further... Some ask me why I tag fish for people who limit our access to the resource. I'm being asked some very difficult questions.

It is impossible to quantify how much such anger about management decisions has reduced participation in the tagging program. However, it is not difficult to find U.S. captains, both recreational and commercial, who will admit, off the record, that they have reduced or discontinued their tagging and/or reporting efforts for this reason.

We found that resentment about management decisions took two forms. The first was a more general anger, among both commercial and recreational fishers, that quotas and other restrictions were increasing, often based on data provided cooperatively through the tagging program. The second took the form of more specific complaints about the analysis and interpretation of tag return data. Fishers voiced explicit disagreements with the way conclusions were drawn about stock boundaries, distribution patterns, and other parameters that entered into management decisions. They pointed to particular results and/or perceived discrepancies in analyses to argue that management decisions were, in some cases, more influenced by politics than science.

In addition to these resentments, funding constraints hampered the CTC's ability to produce enough tags to fill all requests from participants. While support from the Billfish Foundation has helped ease this shortage, it has not completely resolved it. Both CTC staff and participants in the commercial industry, in particular, cited restrictions on the availability of conventional (as opposed to the newer archival) tags. Commercial captains are no longer routinely given 50 or 100 tags at a time and this has contributed to reduced interest in the program.

We found, however, that another factor may have also contributed to a decline in fishers' interest. Nelson Beideman, Executive Director of Blue Water Fishermen's Association, observed that:

The reason the program got started was that scientists said they needed the information. Everybody now just figures that they got what they needed. If there was a push [from scientists] then industry would get more involved again. There's been no recent push... There needs to be a plan that everybody is a part of so they can see what's necessary [in terms of knowledge and additional data] for each of the highly migratory species and lay out a plan for how to get there.

There may be a perception among some of the CTC's participants that the program's original purpose has been fulfilled and that further effort will not pay useful dividends. This perception may also exist among some scientists and NMFS managers. The program's emphasis has traditionally been on documenting basic patterns of distribution, movement, and growth and it has achieved significant progress in these areas. Because additional improvements in these areas does

not necessarily require continued large-scale, long-term tagging efforts, the base of scientific support for the program may be shrinking. While recent improvements in data analysis methods have permitted the use of tagging data in stock assessments, this new application for the program's data is relatively new and has not been widely publicized.

At this point, despite its past accomplishments, a combination of factors is contributing to an erosion of interest and participation in and support for the Cooperative Tagging Center.

### **8.3.2 Cooperative Shark Tagging Program**

In most respects the structure, history, and purpose of the Cooperative Shark Tagging Program (CSTP) parallel that of the CTC. The CSTP is a joint research effort by scientists at the Narragansett (RI) Laboratory of NMFS's Northeast Fisheries Science Center and recreational and commercial fishermen. The program was created in 1962 by Jack Casey of the U.S. Fish and Wildlife Service's Sandy Hook (NJ) Laboratory and moved to its current home at NMFS's Narragansett Laboratory in 1966. The program targets large Atlantic sharks and, beginning from a base of fewer than 100 volunteer taggers, has expanded to include over 6,500 volunteers from the Atlantic and Gulf coasts of North America and Europe. Volunteers in the program's early years were primarily recreational fishers because there was little commercial fishing on sharks at that time. Participants were motivated primarily by an interest in helping to improve basic knowledge on stock identity, movement, rates and routes of migration, abundance, age and growth, mortality, and behavior, as well as by the excitement of tagging itself. As the commercial fishery developed and the program grew, participants became increasingly interested in providing information to improve management decisions.

As with the CTC, recreational fishers account for most of the tagging and both commercial and recreational fishers for the recaptures. Between 1962 and 1995, more than 128,000 sharks of 40 species have been tagged and more than 6,000 sharks of 32 species have been recaptured. The program has had difficulty meeting the demand for tags from participants and, on occasion, has had to ration them and target distribution to specific regions.

By all accounts, Jack Casey's personality was a key to the program's development. Nancy Koehler describes Jack Casey's early efforts to begin the shark tagging program:

Success has been largely because of Jack's personality... there are some people who are just so interested in what they are doing that they suck you in. He was very charismatic, involved, and willing to listen. He would go to the docks, talk to the guys, keep in contact throughout the year, and help out whenever he could. His approach has always been very sincere.

Just as with the CTC, the program's expansion phase was followed, beginning in the mid-1990's, by a period of more restrictive management decisions and increasing resentment, particularly among commercial participants. Just as with the CTC, we found fishers who acknowledged they have reduced or discontinued their tagging and/or reporting efforts.

The program has attempted to respond to this by maintaining a clear distinction between their role as scientists and management decisions made elsewhere in NMFS. As Nancy Koehler describes it:

... this is an area where those problems [conflicts over management] are ignored. In many cases we have been able to be outside or above those problems. That [science] is our role and

we are very careful; we aren't enforcement. This is part of the reason for our success. They are willing to be more open with us because we focus on the science, go to tournaments, they show us their fish. In the past, this has worked to give us better communication. [But] there is no question that regulations do hurt us in terms of their participation or good will. They don't feel they can participate because of regulatory restrictions.

The CSTP thus faces the same central challenge the CTC does, maintaining involvement in the face of increasing concern and contention over management decisions.

## **8.4 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.

### **8.4.1 Fishers were deeply interested in marine ecosystems**

Both programs tapped into a deep reservoir of interest among commercial and recreational fishers in improving the basic knowledge base about fish stocks. For example, Nancy Koehler says, "There is no question that high-seas fishermen want to know more. They are unbelievable observers." This formed the raw material the programs built upon. While a necessary ingredient, this interest alone was not enough to ensure success. It had to be matched with an equivalent input from scientists that provided the specific rationale for how tagging results would be useful in management. Conversations with fishers in the other cases and more broadly in other fisheries indicate that this level of interest is typical. Many, although certainly not all, fishers are both curious about marine ecosystems and willing to contribute in some way to improved understanding.

### **8.4.2 Consistent, personal outreach fostered involvement**

This reservoir of interest was tapped primarily through consistent outreach at the personal level. Nancy Koehler's description of Jack Casey's early efforts is paralleled by Ellen Peel's account of a scientist from the Panama City (FL) Laboratory who in the early 1970s attended every angling tournament he could to explain the importance of tagging. As a result, the involvement of early participants was asked for, encouraged, and fostered, often on an individual basis. While, as Nancy Koehler puts it, "There is only one Jack," several of the other cases show that consistent relationship-building can have a lasting beneficial impact on cooperative programs. In fact, one key finding of this case is that such benefits can last as long as ten or 20 years, especially if consciously reinforced by program managers.

### **8.4.3 Industry was an equal partner**

Both tagging programs also demonstrated that fishers are willing and able to learn and apply new techniques, perform high-quality data gathering, participate in field tests of new methods, and understand the uses and implications of data, e.g., how differential return rates in different areas impact on assumptions about stock structure. This was consistently true across the other cases as well, indicating that industry members can be equal partners in many aspects of the design and implementation of cooperative data gathering efforts.

#### **8.4.4 Two key weaknesses of voluntary programs**

However, the CTC and, to a lesser extent, the Cooperative Shark Tagging Program also highlighted two key weaknesses of such cooperative, voluntary programs. First, fishers from other countries are often not as responsive to incentives as the U.S. fishers active in these two programs. Such incentives include an interest in improving basic knowledge, which often reflects a longer-term perspective, the excitement of being involved in science, competition for awards with other participants, and monetary rewards. Second, neither program has solved the riddle of how to maintain interest when management decisions restrict catch quotas and fishing activity. Thus, NMFS has had a difficult time maintaining a distinction between its management and science activities. The agency's regulatory role inevitably spills over into science activities. For example, shark fishers' respect and liking for Nancy Koehler on a personal level has not overcome their anger at management decisions nor prevent a reduction in their level of cooperation. This is a structural problem for NMFS that we identified in other case studies as well. It may be impossible to successfully maintain this distinction, especially as the stakes for both recreational and commercial fishers rise and science becomes ever more critical in decision making. As the next paragraph suggests, the tagging programs may benefit from removing this distinction and linking their data gathering efforts more explicitly to the information needs of management decisions.

#### **8.4.5 It may be time to redefine goals**

The CTC is now over 40 years old and it may be time to redefine its basic purpose and communicate this through renewed outreach activities. This could provide a means of recapturing attention and maintaining involvement among recreational and commercial fishers, even in the face of restrictive management decisions. In fact, conflicts over specific management decisions, and over the interpretation of data used in stock assessments, could provide a starting point for discussions about what information is needed to resolve disagreements. These in turn could help define agreements about specific data gathering activities needed to fill these information gaps. Soliciting fishers' involvement in defining knowledge gaps and identifying how these relate to management decisions that directly affect them could re-engage them in data gathering efforts. Fishers' past involvement in data gathering has given them some sense of ownership about the programs and this has actually been fostered by programs. The down side of this sense of ownership is the feeling of betrayal that "our data is being used against us." However, this sense of ownership can also provide the leverage needed to revive interest and participation. In any case, periodically reexamining its underlying scientific purpose (i.e., what are we trying to learn, how can we learn it, how can we tell when we've arrived?) is a healthy exercise for any long-term program.

#### **8.4.6 Summary**

To summarize, the shared interest in improving basic biological understand, fostered by the personal outreach of key fisheries scientists, laid the foundation for the long-term success of these tagging programs. More recently, industry reactions to regulatory restrictions and improvements in scientific understanding make the time ripe for a careful reconsideration of the programs' goals.