

# **The Nature and Extent of Marine Recreational Fishing and Associated Development Efforts in the Caribbean**

**RONALD L. SCHMIED**  
*Southeast Regional office*  
*National Marine Fisheries Service*  
*9450 Koger Boulevard*  
*St. Petersburg, Florida U.S.A. 33702*

## **ABSTRACT**

The paper discusses the extent to which marine recreational fishing has been or is being developed as a visitor attraction/activity in the various Caribbean countries, and the extent to which tourism and fisheries development personnel are interacting and cooperating. Unique organizational or development techniques should be noted along with any major MRF development constraints reported by the various countries.

## **INTRODUCTION AND PURPOSE**

Caribbean Island nations are beginning to more carefully evaluate the role that marine recreational fisheries (MRF) can play in their fisheries and tourism development programs. The 1983 Western Central Atlantic Fisheries Commission report recommended that Caribbean countries formulate effective marine recreational fishing statistics collection methods, assess the economic importance of saltwater sport fishing, and examine the role of recreational fisheries in tourism development. Tourism was recognized as a good foreign exchange earner having high economic multiplier effects (FAO, 1983).

In a presentation at the 38th Annual meeting of the Gulf and Caribbean Fisheries Institute, a good case was presented for development of marine recreational fisheries in the Caribbean (Schmied, 1987). It was recommended that sport fishing be developed as a tourist attraction to help maintain the appeal of the Caribbean to U.S. travelers who account for nearly 65% of all overnight visitors to the region. It was also pointed out that saltwater sport fisheries development could help increase the supply of seafood to local markets, stimulate growth of support industries (bait tackle, charter boat businesses, etc.), and help generate additional public support for improved management conservation of Caribbean fishery resources and associated habitat. These same sentiments are echoed in a number of Caribbean marine resource development studies (Dalhousie, 1982; 1984a; 1984b; 1985; Woods Hole, 1984).

In response to growing interest, the Gulf and Caribbean Fisheries Institute (GCFI) has held several technical sessions on marine recreational fisheries development as part of its annual meeting. The 1982 GCFI annual meeting in Nassau, Bahamas, included such a session which resulted in the recommendation that GCFI member countries assess the extent and quality of MRF in their areas to determine whether a worthwhile need and opportunity for MRF development existed. Further, it was recommended that another major MRF session be held by 1985 to evaluate and discuss MRF development progress.

The 1985 GCFI meeting in Martinique did, in fact, include another MRF program which was well attended and generated considerable interest among fishery officers and other attendees. However, while several speakers attempted

to assess the extent of MRF within their respective countries or the Caribbean region, the near absence of published information severely handicapped this effort.

Subsequent to the 1985 meeting, an ad hoc planning group was established to develop a MRF technical session for the 1986 GCFI Annual meeting. Among other topics, the planning group put out the call for someone to conduct a more comprehensive assessment of the status of marine recreational fishing and related development efforts in the Caribbean. This paper responds to that call by providing an overview of MRF in the Caribbean for use in formulating future MRF development initiatives by GCFI member nations.

### METHODS

On behalf of the *ad hoc* planning group, a brief questionnaire was developed and mailed to 40 countries requesting that the questionnaire be completed and returned. After a second mailing and follow-up telephone calls, 28 responses were obtained representing a 70% response rate. These responses included questionnaires which were completed and returned via mail and those which were completed via telephone. A copy of the questionnaire is included as Appendix 1 and results are summarized in Table 1.

### RESULTS

For the purposes of this paper, marine recreational fishing in the Caribbean is considered to encompass all fishing for which pleasure, amusement, relaxation and/or home consumption (subsistence) are the primary motivations. Typically, recreational fishing in its pure form does not involve sale of the catch but it is recognized that sport-caught fish are frequently sold or bartered in the Caribbean. Further, it must be recognized that among resident "recreational" fishermen in the Caribbean, subsistence probably plays a larger motivational role than pure sport or relaxation. Sport, amusement and relaxation are much more important motivations for tourist anglers and resident recreational fishermen earning above average incomes and owning private recreational boats.

Extremely limited information and statistical data exist in the literature regarding the nature and extent of marine recreational fisheries in the Caribbean. In part, this situation is reflected in the fact that only 10 of the 28 countries responding to the questionnaire indicated they were collecting any marine recreational fisheries catch/effort statistics. Further, only 8 countries required saltwater sport fishing licenses of tourists and only 6 had instituted marine angling licenses for residents (see item 2, Table 1).

Olsen and Wood (1983) provide one of the few characterizations of Caribbean marine recreational fisheries. While acknowledging the scarcity of data, they contend that recreational fishing in the U.S. Virgin Islands is generally representative of sport fishing in other Caribbean Island nations. Olsen and Wood conclude that marine recreational fishing is composed of sub-activities which account for the following general percentages of total sport fishing effort: trolling (18.3%), bottom fishing (4.9%), spear fishing (12.7%), lobster diving (17.3%), conch diving (7.3%), whelk diving (7.3%), fish/marine life observation via snorkeling (23.5%), fish/marine life photography (6.4%), and other miscellaneous activities (2.3%). They also reported that total recreational landings are generally comprised of the following fishery resource groups: oceanic pelagics (12.2%), coastal pelagics (15.9%), shallow water reef

# Gulf and Caribbean Fisheries Institute

TABLE 1 - SUMMARY OF RESPONSES TO THE MARINE RECREATIONAL FISHERIES QUESTIONNAIRE

	ARIZONA	ARIZONA & PACIFIC	BALMORA	BALMORA	BALISE	BERMUDA	BRITISH VIRGIN ISLANDS	CAYMAN ISLANDS	COLUMBIA	COSTA RICA
1. NMF Survey Being Conducted?	NO		YES	NO	NA	YES	NO	NO	NO	NO
2. NMF License Required?										
a. Resident	NO		NO	NO	NO	YES	NO	NO		YES
b. Visitor	NO		YES	NO	NO	YES	NO	NO		NO
3. Number Marine Anglers (Annual)										
a. Residents	INA		INA	INA	INA	15-20	INA	INA		INA
b. Visitors	INA		1-2K	INA	INA	12-5k	INA	INA		INA
4. Number Private Recreational Fishing Boats										
a. Resident	INA		INA	INA	500	~5K	120	200		0
b. Visitor	INA		INA	INA	20	0	110	20		0
5. Number Resident Paying Passenger Recreational Fishing Vessels Operation Year-Long										
a. Charter Boats	INA		INA	INA	10	25	2	10		10-15
b. Headboats	INA		INA	INA	0	2	0	1		0
c. Diveboats	1		75	INA	0	10	19	24		INA
6. Number Visitor Paying Passenger Recreational Fishing Vessels Operating Seasonally										
a. Charterboats	INA		0	INA	0	0	4-10	0		0
b. Headboats	INA		0	INA	0	0	0	0		0
c. Diveboats	INA		1-2	INA	0	0	0	0		0
7. Percent Total Fishing Trips Made:										
a. Within 3 miles of shore	INA		25	0	40	0	40	14		100
b. Greater than 3 miles of shore	INA		0	100	60	60	20	0		0
8. Number Saltwater Tournaments Held Yearly	1		25	INA	0	0	0	0		0
9. Principal Species Targeted in Tournaments										
	SM		SM		SM	SM	SM	SM		SM
	SM		SM		SM	SM	SM	SM		SM
	SM		YFT		SM	YFT	SM	SM		SM
	SM		SM		SM	SM	SM	SM		SM
	DEF		DEF		DEF	DEF	DEF	DEF		DEF
10. Top Five Species Caught by Anglers by Number Caught	INA		SM		SM	SM	SM	SM		SM
	SM		SM		SM	SM	SM	SM		SM
	SM		SM		SM	SM	SM	SM		SM
	SM		SM		SM	SM	SM	SM		SM
	SM		SM		SM	SM	SM	SM		SM
11. Is NMF Being Actively Developed as										
a. Tourist Attraction	NO		YES	NO	YES	YES	YES	YES		YES
b. Resident Recreational Activity	NO		YES	NO	YES	YES	NO	NO		NO
12. Major Source of NMF Development Funds										
a. General Revenues	N/A		X	NA	X	X				
b. Sales Tax										
c. Tourist Tax										
d. Private Funds			X		X	X	X	X		X
13. Estimated Total Annual NMF Expenditures by (\$U.S.)										
a. Residents	INA		INA		INA	20-50	INA	INA		INA
b. Tourists	100		50-1M	INA	INA	0-5M	INA	100		100

TABLE 1 - SUMMARY OF RESPONSES TO THE MARINE RECREATIONAL FISHERIES QUESTIONNAIRE

	FRENCH ANTILLES										
	JAMAICA	AMERICAN REPUBLIC	EL SALVADOR	GUADALUPE	HAWAII	MARTINIQUE	GUERNSEY	GUATEMALA	HAWAII	HONGKONG	
1. <u>MRP Survey Being Conducted?</u>	NO	NO	NR	NO	NO	NR	YES	Y	NR	Y	
2. <u>MRP License Required?</u>											
a. resident	NO	NO		NO	NO	NA	NA	NA	NA	NA	
b. visitor	NO	NO		NO	NO	NO	NO	NO	NO	NO	
3. <u>Number Marine Anglers (Annual)</u>											
a. Residents	INA	100		15	INA	20	INA	INA	15	15	
b. visitors	INA	200		INA	INA	200	INA	INA	500	500	
4. <u>Number Private Recreational Fishing Boats</u>											
a. Resident	INA	294		150	INA	10	INA	INA	INA	INA	
b. Visitor	INA	INA		INA	INA	0	INA	INA	INA	INA	
5. <u>Number Resident Paying Passenger Recreational Fishing Vessels Operation Year-Long</u>											
a. Charterboats	7-10	0		0	0	18	INA		INA	INA	
b. Headboats	0	0		0	0	1	INA		INA	INA	
c. Diveboats	7-10	15		0	0	2	INA		INA	INA	
6. <u>Number Visitor Paying Passenger Recreational Fishing Vessels Operating Seasonally</u>											
a. Charterboats	0	0		0	0	25	INA		INA	INA	
b. Headboats	0	0		0	0	0	INA		INA	INA	
c. Diveboats	0	0		0	0	2	INA		INA	INA	
7. <u>Percent Total Fishing Trips Made:</u>											
a. Within 3 miles of shore	40	80		80	1	82	INA		INA	INA	
b. Greater than 3 miles of shore	10	20		10	0	12	INA		INA	INA	
8. <u>Number Saltwater Tournaments Held Yearly</u>	0	10		INA	0	1	INA		INA	1	
9. <u>Principal Species Targeted in Tournaments</u>	N/A	BF		INA	N/A	BF	INA		INA	INA	
		EM				EM					
		EM									
		EM									
10. <u>Top Five Species Caught by Anglers by Number Caught</u>	INA	BF		INA	INA	BF	INA		INA	INA	
		EM				EM					
		EM				EM					
		EM				EM					
		EM				EM					
11. <u>Is MRP Being Actively Developed as</u>											
a. Tourist Attraction	NO	YES		NO	NO	NO	NO		NO	NO	
b. Resident Recreational Activity	NO	YES		NO	NO	NO	NO		NO	NO	
12. <u>Major Source of MRP Development Funds</u>											
a. General Revenue	N/A			N/A	N/A	N/A	N/A		N/A	N/A	
b. Sales Tax											
c. Tourist Tax											
d. Private Funds		Y									
13. <u>Estimated Total Annual MRP Expenditures by (\$U.S.)</u>											
a. Residents	INA	INA		INA	0	150K	INA		INA	INA	
b. Tourists	INA	INA		INA	0	850K	INA		INA	INA	

# Gulf and Caribbean Fisheries Institute

TABLE 1 - SUMMARY OF RESPONSES TO THE MARINE RECREATIONAL FISHERIES QUESTIONNAIRE

	NETHERLAND ANTILLES										
	JANAILA	MELICH	POINSEBANT	ARIBA	BAWALU	DUNALAI	SABA	ST. EUSTATIUS	ST. MAARTEN	WICOBAGUA	
1. NMF Survey Being Conducted?	YES	YES	NO	YES	NR	NR	YES	NR	NR	NR	
2. NMF Licenses Required?											
a. resident	YES	YES	YES	NO			NO				
b. visitor	YES	YES	YES	NO			NO				
3. Number Marine Anglers (Annual)											
a. residents	200	4K	1NA	200			1NA				
b. visitors	1.7K	4.5K	1NA	40.5K			1NA				
4. Number Private Recreational Fishing Boats											
a. Residents	100	2.4K	1NA	15			1				
b. Visitor	10	12K	1NA	200			0				
5. Number Resident Paying Passenger Recreational Fishing Vessels Operation Year-Long											
a. Charter Boats	20	1.5K	0	Fish 10			1				
b. Headboats	0	0	0	0			0				
c. Diveboats	100	100	2	2			2				
6. Number Visitor Paying Passenger Recreational Fishing Vessels Operating Seasonally											
a. Charterboats	3	40	0	0			1NA				
b. Headboats	0	0	0	0			0				
c. Diveboats	3	2	0	0			3				
7. Percent Total Fishing Trips Made:											
a. Within 3 miles of shore	5	60	100	25			67				
b. Greater than 3 miles of shore	5	40	0	75			30				
8. Number Saltwater Tournaments Held Yearly	5	100	0	2			0				
9. Principal Species Targeted in Tournaments	GH	N	N/A	SP			N/A				
	BO	BO		YPT							
	GH	SP		SM							
		TAR		JM							
10. Top Five Species Caught by Anglers by Number Caught	GH	YES	BARR	RC			BARH				
	JM	N	JM	JR			JM				
	J	N		J			YPT				
	J			JM			JM				
	BARR			YPT							
11. Is NMF Being Actively Developed as											
a. Tourist Attraction	YES	YES	NO	YES			YES				
b. Resident Recreational Activity	YES	YES	NO	YES			NO				
12. Major Source of NMF Development Funds											
a. General Revenue		X	N/A				X				
b. Sales Tax		X									
c. Tourist Tax											
d. Private Funds	X	X		X							
13. Estimated Total Annual NMF Expenditures by (SU. \$.)											
a. Residents	1-5M	5-10M	1NA	1NA			1NA				
b. Tourists	5M	1-2.5M	1NA	5M			2M				

TABLE 1 - SUMMARY OF RESPONSES TO THE MARINE RECREATIONAL FISHERIES QUESTIONNAIRE

	PANAMA	PUEBLO RICO	ST. KITTS NEVIS	ST. LUCIA	ST. VINCENT & GRENADINES	SURINAME	TRINIDAD & TOBAGO	TURKS & CAICOS	U.S. VIRGIN ISLANDS	VENEZUELA
1. MRF Survey Being Conducted?	NR	YES	NO	NO	NO	NO	NO	NO	YES	NO
2. MRF License Required?										
a. Resident		NO	NO	NO	NO		NO	NO	NO	
b. Visitor		NO	NO	NO	NO		NO	YES	NO	
3. Number Marine Anglers (Annual)										
a. Residents		41K	INA	10K	INA		INA	2	10K	
b. Visitors		10K	INA	1.5K	INA		INA	10K	1.5K	
4. Number Private Recreational Fishing Boats										
a. Resident		1.1K	3	38	INA		INA	11	1.1K	
b. Visitor		INA	0	2	INA		INA	20	INA	
5. Number Resident Paying Passenger Recreational Fishing Vessels Operation Year-Long										
a. Charter Boats		7	0	10	1		2-5	60	7	
b. Headboats		0	3	10	3		3	3	1	
c. Diveboats		INA	1	12	2		INA	2	INA	
6. Number Visitor Paying Passenger Recreational Fishing Vessels Operating Seasonally										
a. Charterboats		INA	0	0	3		0	0	INA	
b. Headboats		INA	3	3	3		3	0	INA	
c. Diveboats		INA	2	2	3		3	0	INA	
7. Percent Total Fishing Trips Made:										
a. Within 3 miles of shore		65	0	60	100		60	100	7	
b. Greater than 3 miles of shore		35	100	40	0		40	0	93	
8. Number Saltwater Tournaments Held Yearly		20	1	3	0		2	1	6	
9. Principal Species Targeted in Tournaments		SM 3F W D	BARR D	D BARR	N/A		2M 2M	SM SM	SM 3F	
10. Top Five Species Caught by Anglers by Number Caught		SM KM GR SS 3B	E KM SM BARR U	SMR D SM KM 2M	W W BFT BARR		2M 2M W W	SM SM BFT SM KM	SM BFT SM SM SM	
11. Is MRF Being Actively Developed as										
a. Tourist Attraction		YES	NO	YES	YES		YES	YES	YES	
b. Resident Recreational Activity		YES	NO	YES	NO		NO	NO	YES	
12. Major Source of MRF Development Funds										
a. General Revenue		X	N/A						X	
b. Sales Tax		X							X	
c. Tourist Tax										
d. Private Funds		X		X	X		X	X	X	
13. Estimated Total Annual MRF Expenditures by (\$U.S.)										
a. Residents		INA	INA	100K	INA		INA	INA	INA	
b. Tourists		INA	INA	20K	INA		INA	INA	INA	

## Gulf and Caribbean Fisheries Institute

---

### \*CODES AND ABBREVIATIONS USED IN THE TABLE ARE AS FOLLOWS:

INA = Information is Not Available  
N/A = Not Applicable  
NR = No Response received  
K = 1,000  
M = 1,000,000 (1 Million)  
\$ = Dollars U.S.  
D = Dolphin (*Coryphaena hippurus*)  
KM = King Mackerel (*Scomberomrus cavalla*)  
BF = Bonefish (*Albula vulpes*)  
BM = Blue Marlin (*Makaira nigricans*)  
WM = White Marlin (*Tetrapturus allicidus*)  
SF = Sailfish (*Istiophrus platypterus*)  
BFT = Bluefin Tuna (*Thunnus thynnus*)  
SN = Snappers (*Lutjanus sp.*)  
SB = Sea Basses (*Serranidae*)  
GR = Grunts (*Haemulon sp.*)  
JK = Jacks (*Caranx sp.*)  
YTS = Yellowtail Snapper (*Ocyurus chrysurus*)  
W = Wahoo (*Acanthocybium solanderi*)  
BARR = Barracuda (*Sphyraena barracuda*)  
AJ = Alamco Jack (*Seriola rivoliana*)  
AMB = Amberjack (*Seriola dumerilii*)  
T = Tunas (*Thunnus sp.*)  
SJT = Skipjack Tuna (*Euthynnus pelamis*)  
BO = Bonito (*Euthynnus alletteratus*)  
M = Marlins (*Istiophoridae*)  
TAR = Tarpon (*Megalops atlantica*)  
RH = Red Hind (*Epinephelus guttatus*)  
SS = Silk Snapper (*Lutjanus vivanus*)  
SW = Swordfish (*Xiphias gladius*)  
CG = Coney Grouper (*Cephalopholis fulva*)  
CM = Cero Mackerel (*Scomberomorus regalis*)  
MT = Mackerel/Tunas (*Scombridae/Thunnus*)  
RS = Red Snapper (*Lutjanus campechanus*)

---

fish (67.3%), lobster (2%), conch (1.3%) and whelk (1.3%). Clearly, these percentages do not apply to other areas, but they do provide some insight as to the relative importance of various activities and target species groups.

At present, recreational fishing is not a major component of marine fisheries in the Caribbean and it has not been developed any where near the extent it could be as an integral part of the region's vitally important tourism industry. Marine recreational fishing is, however, growing in popularity and importance in some areas, particularly the Bahamas, the Cayman Islands, Turks and Caicos Islands, Jamaica, Puerto Rico, the U.S. and British Virgin Islands, Mexico, Belize and Venezuela. With some exceptions, the magnitude and importance of marine recreational fishing declines dramatically as you move southward

through the Lesser Antilles. Notably, Caribbean nations with higher per capita incomes, broader continental shelf areas and/or more highly developed tourism industries tend also to have more highly developed recreational fisheries. With these general comments in mind, the following sections provide a more detailed discussion of information generated by the questionnaire.

### Participation

Marine recreational fishing in the Caribbean is a recreational activity that is biased strongly toward participation by visitors as opposed to residents. Of the 27 participating countries, 1 reported that no marine recreational fishing occurred (Suriname), and only 13 of the remaining 27 provided estimates of resident and visiting anglers. A total of 132,254 resident anglers were reported with Grenada accounting for the lowest estimate of 20 and Puerto Rico having the highest number of resident anglers (81,000). Mexico, with an estimated 450,000 visiting sports fishermen, accounted for the largest share of the 623,960 total estimated number of visiting anglers reported by the 13 countries.

Based on information provided, it appears that very little sport fishing is conducted from shore, most occurs from private recreational boats or paying passenger sport fishing vessels (guideboats, charterboats and headboats). A total of 35,929 private boats were reported to be operating in the 16 countries that provided estimates. The number of boats reported ranged from 3 in St. Kitts-Nevis to over 23,000 in Puerto Rico. The majority of resident vessels reported were twenty feet and less in length. While an additional 14,408 private sport fishing boats are estimated to visit to fish annually in waters of the 13 reporting countries. Only the British Virgin Islands, Mexico, Turks and Caicos Islands, and Aruba indicated they had more visiting than resident private boats fishing in their waters annually. All 4 of these countries are geographically located so as to be able to attract fishing boats from nearby populous areas (Puerto Rico, Continental U.S., and Venezuela) that travel to fish in locally sponsored tournaments.

In addition to private recreational boats, it is clear from the questionnaire that a growing number of charterboats, headboats and diveboats are available in the Caribbean to cater to the growing demand for marine recreational fishing and diving opportunities by residents and tourists. An estimated 1748 charterboats, 67 headboats and 399 dive boats were reported to be operating by respondent countries. Charterboats vary in size but typically carry six or less anglers for hire who pay a single fee to charter the vessel and the services of its crew. Depending on their size, these boats either fish the flats and shallows for bonefish, tarpon and other nearshore species or venture further offshore in search of pelagic species. Headboats, which are less common in the Caribbean, are usually larger vessels that take anywhere from 6 to 40 anglers fishing. Anglers are charged on a "per-person" or "head" basis and are usually restricted to bottom fishing for snappers, groupers, grunts, hinds and other demersal marine fish. Mexico accounted for 50 of the 67 headboats and 1500 of the 1748 charter/guideboats reported. In every case, countries reporting the greatest number of visiting anglers also reported the greatest number of charterboats, headboats and diveboats.

Based on discussions with the various fishery officers, it appears that one of the greatest opportunities in the paying passenger recreational fishing vessel business in the Caribbean is for entrepreneurs who can obtain, skillfully operate



and effectively market the services of a for hire vessel that can cater to both the sport fishing and sport diving tourist market. This could enable the captain to overcome the lulls in the sport fishing season resulting from seasonal fluctuations in the availability of some preferred target species by also catering to sport diving clientele.

No responding country reported a significant number of visiting charterboats, headboats or diveboats that operated seasonally in their waters. In addition to the fact that geography is a barrier to this practice, many countries strictly prohibit such practices except for short visits for fishing tournaments. Some countries like Mexico only allow paying passenger sport fishing vessels to fish in their waters under special permit.

Sport fishing patterns in the Caribbean are clearly established by responses received from 24 of 28 responding countries. Overall, 67 percent of the fishing effort occurs within three miles of shore with the remaining 33 percent expanded further offshore. The relatively narrow continental shelves and nearby deep water surrounding most Caribbean islands and countries and the predominance of smaller-sized (less than 20 feet) fishing vessels contribute greatly to this fishing pattern.

### Recreational Catches

Based on reports from 20 countries it is clear that sport catches in the Caribbean are dominated by coastal and oceanic pelagic species with a relatively low incidence of demersal fish. The pelagic species most consistently reported in sport catches include king mackerel (*Scomberomorus cavalla*); barracuda (*Sphyraena barracuda*); dolphin (*Coryphaena hippurus*); sailfish (*Istiophorus platypterus*); wahoo (*Acanthocybium solanderi*); yellowfin tuna (*Thunnus albacares*); blue marlin (*Makaira nigricans*); and white marlin (*Tetrapturus albidus*). With few exceptions these species are equally attractive to resident and visiting sports fishermen and are also the principal target species in most Caribbean fishing tournaments.

Sport catches which included demersal species were most frequently reported by countries having comparatively larger continental/insular shelves and greater populations of resident sport fishermen. Examples include Puerto Rico, Bahamas, Bermuda, Belize, U.S. Virgin Islands, and Aruba. Demersal species appearing most frequently include red snapper (*Lutjanus campechanus*); grunts (*Haemulon sp.*); groupers (*Epinephelus sp.*); yellowtail snapper (*Ocyurus chrysurus*); silk snapper (*Lutjanus vivanus*); and red hind (*Epinephelus guttatus*).

Relative to commercial fishing landings, recreational harvests are, for the most part, insignificant in most countries. In the British Virgin Islands (B.V.I.) for example, recreationally caught fish (205,300 lbs) only accounted for an estimated 12% of total marine fish landings in 1982 (Dalhousie, 1985)- Notably, B.V.I. recreational fishing landings had increased by a factor of four between 1975 and 1982. As in most Caribbean areas, this growth can be largely attributed to expansion of B.V.I.'s charter fishing fleet, an increasing number and popularity of sport fishing tournaments, increasing popularity of sport diving (snorkeling and scuba) and general growth in the tourism industry. Interestingly, B.V.I.'s sport fisheries are still relatively unorganized,

unregulated, and have received minimal active promotion outside of tournament promotions (Dalhousie, 1985).

In some areas, conflicts between commercial and recreational fishermen are emerging due to competition for harvest of reef fish. However, pelagic species (e.g., billfish, tuna, wahoo, mackerel and dolphin) which are most highly prized by sportsmen are presently of little commercial importance in most Caribbean areas and if effectively managed, they could provide a sufficient resource base for further development of marine recreational fisheries.

### Fishing Tournaments

Fishing tournaments are quite popular in the Caribbean and are being used as the primary sport fisheries development tool. Of 28 countries responding to the questionnaire, 19 reported that fishing tournaments were held in their country. Mexico accounted for 100 of the 232 tournaments reported with the Bahamas, Bermuda and Puerto Rico accounting for 35, 25 and 20 tournaments, respectively. As mentioned previously, white marlin, blue marlin, sailfish, yellowfin tuna, bluefin tuna, king mackerel, wahoo and dolphin dominate as the principal target species. Tournaments targeting inshore species like tarpon (*Megalops atlantica*) and bonefish (*Albula vulpes*) are also frequently held, especially in Mexico, the Bahamas and the Turks and Caicos Islands.

Interesting and unique approaches to using tournaments as a sport fishing development tool abound in the Caribbean. In 1984, the Cayman Islands joined hands with Cayman Airways and several other sponsors to promote June as Million Dollar Billfish Month. Any person catching a world record Atlantic blue marlin in June will win \$1 million (U.S.) in cash, a beach condo, a 38 foot Hatteras yacht and a lifetime pass on Cayman Airways (Keefer, 1985). You can bet this tournament draws a few interested sports fishermen to the Caymans. Further, considerable work is being done in the U.S. to use tournaments as a tool to develop fisheries for species that have been historically not targeted and underutilized. Dr. Jeffrey Johnson provides a report on this project in Tuesday's session on "Social and Cultural Issues in Fisheries Management and Development."

### Economic Evaluations

Based on the questionnaire results reported on item 13 of Table 1, it is obvious that most countries have no estimate of the annual expenditures made by resident and tourist sport fishermen in their countries. Of the seven countries that provided estimates of annual MRF expenditures, Mexico clearly appears to have the highest MRF expenditures estimates--\$150 million for residents and \$450 million for tourists. Other expenditure estimates ranged from \$5,000 (Grenada) to \$9.5 million (Bermuda) for residents and from \$50,000 (Grenada) to \$81 million (Bahamas) for visitors. Assuming the Bahamian estimate is accurate, MRF expenditures represented 10% of all tourist spending in the Bahamas in 1984. According to statistics generated by the Caribbean Tourism Research and Development Center (Miller, 1986), Bahamas' MRF-related expenditures exceeded the total tourist expenditures made in 14 Caribbean island countries in 1984. Clearly, marine recreational fishing, if managed effectively and developed as a tourist attraction, can have potentially enormous positive economic impact on Caribbean countries.

### **MRF Development Efforts and Problems**

At the very heart of this paper remains the question--to what extent are Caribbean countries attempting to develop marine recreational fisheries as a tourist attraction or resident recreation activity and what problems are being encountered? When asked whether MRF was being developed, a surprising 17 out of 28 responding countries indicated they were attempting to develop marine recreational fisheries as a tourist attraction. Ten countries were also trying to develop saltwater sport fishing as a recreational pursuit for residents.

Clearly, private funds contributed by businesses, tournaments, and in one case, the Organization of American States, are the largest single source of development funds and are carrying the programs in 10 countries. Six countries were using a combination of funds emanating from private and general revenue sources. In most cases, tourism departments or offices were the major sources of general revenue. Only in the case of Saba was general revenue the sole source of development funds.

While there is considerable optimism and effort in some Caribbean countries, fishery officers identified several key issues that must be resolved to secure the orderly and successful development of the region's marine recreational fisheries. The more frequently cited impediments include:

1. Increasing operating (fuel, tackle, ice, insurance, etc.) and labor costs are pricing some charterfishing and diving operations out of the market.
2. Increasing levels of competition and conflict between commercial and recreational fishing interests is slowing MRF development progress.
3. Growing fishing pressure on pelagic fish resources calls into question the need for improved fisheries management and conservation efforts and stimulation of catch and release practices.
4. Deteriorating water quality and marine habitats are causing fishery resource declines in some areas and are reducing the attractiveness of the Caribbean to tourists.
5. Marina and harbor facilities are inadequate in some areas as is the quantity and quality of sport fishing tackle and related supplies.
6. The SABA Bank is receiving tremendous fishing pressure and must be protected from overexploitation.
7. Inadequate information exists on the biology and harvest limitations of important recreational target species.
8. Poaching and infraction of fishery regulations by sport and commercial fishermen from neighboring countries/islands is creating "ill-will" and impacting fisheries management and development efforts of affected countries.
9. Inadequate funding and technical assistance programs exist to help local fishermen purchase sport fishing boats, to educate them on sport fishing techniques, marketing/promotion skills and business management practices.
10. There is inadequate tourism infrastructure (hotels, services, goods, etc.) and cooperation between tourism and fisheries officers in some areas.
11. Seasonal fluctuations in the availability of some target species creates peaks and valleys in fishing activity and tourist arrivals.
12. There is a lack of recognition and promotion of marine recreational fishing as a potentially viable and lucrative business enterprise.
13. There is a shortage of qualified boat captains, mates and skilled vessel maintenance personnel.

Quite understandably, these issues do not apply equally to all areas of the Caribbean but many are shared problems and will require cooperative and concentrated effort to resolve.

### SUMMARY

The most obvious conclusions that can be drawn from this assessment is that a significant but unquantifiable amount of saltwater sport fishing currently occurs in the Caribbean and that a number of countries are proceeding to develop marine recreational fisheries as a tourist attraction. Clearly, most countries interested in MRF development are facing a number of challenging issues, not the least of which is the formulation of a development strategy that recognizes the natural, social and cultural resource limitations and assets of the region.

Perhaps the most appropriate strategy for development of marine recreational fisheries and tourism in the Caribbean is an "eco-tourism" approach (Dalhousie, 1982). This strategy calls for maximum use of an area's natural and human resources in a way that captures and highlights the very essence or unique qualities of the area. This approach calls for greater emphasis and linkage with locally owned hotels, local cuisine, locally popular entertainment and recreation, and local small-scale business enterprises. This strategy would naturally emphasize the tropical island atmosphere and marine resources in the region. Carrying this into the fisheries arena, sport fisheries development should feature fishing opportunities for locally abundant species (e.g., billfish, bonefish, shark, dolphin, mackerel, etc.) and would include popular local fishing styles (e.g., spearfishing, lobster and conch diving, etc.).

Initiation of a more intensive recreational fisheries development program in the Caribbean will require a number of prerequisite steps. First, in view of the extremely limited data base, more thorough assessments are needed to determine the present character, extent and status of sport fisheries in each interested country. The study should evaluate the nature and scope of sport fishing, the condition of the fishery resource base, availability of essential goods and services, and opportunities for and limitations to further development. Data collection and research programs should be continued to monitor progress and identify emerging problems requiring special attention.

Second, as recommended by some researchers (Schmied, 1987), a marine recreational fisheries development plan should be formulated which provides a prioritized, time bound list of recommended actions needed to resolve development impediments and achieve program objectives. Throughout this process, close coordination between tourism, fisheries development, and private business sector representatives would be required. In this way effective integration of fisheries and tourism development programs can be accomplished.

Third, given the importance of maintaining the limited marine fishery resource base in the Caribbean, and the likelihood that visiting marine recreational fishermen will continue to be highly attracted to migratory pelagic species (e.g., billfish, tunas, mackerel, shark, etc.), Caribbean Basin nations need give serious thought to development of cooperative interjurisdictional management programs for these species. At a minimum, this cooperative program should also involve the United States, France, England and other affected or interested nations. Perhaps as a starting point, the Gulf and

Caribbean Fisheries Institute should institute a series of meetings to begin formulation of cooperative fishery management programs.

Last, given the frequency with which the need for training was mentioned, it may be appropriate for the Gulf and Caribbean Fisheries Institute to consider organizing and conducting training seminars to help interested Caribbean residents become gainfully employed in marine recreational fishing related businesses such as charter and diveboat operations, and bait/tackle sales and service, marina operation, and sport fisheries promotion/marketing skills. Clearly, opportunities exist to involve representative of the tourism industry private sport fishing businesses and academic institutions in these endeavors.

In conclusion, the status of marine recreational fishing in the Caribbean is not unlike a precious diamond that has just been unearthed. It needs to be carefully examined and skillfully developed and polished to emphasize its most valuable attributes and to maximize the value of sport fisheries to the owner--the people of the Caribbean.

### ACKNOWLEDGEMENTS

I wish to acknowledge Dr. Grant Beardsley of the National Marine Fisheries Service Southeast Fisheries Center in Miami, Florida for his assistance in developing the questionnaire and to the innumerable fishery officers and other representatives of the various Caribbean countries who so graciously gave of their time and talents in completing the questionnaires.

### LITERATURE CITED

- Dalhousie Ocean Studies Program. 1982. Integration of marine space in national development strategies of small island states--Case of Caribbean States of Grenada and St. Lucia. Nova Scotia, Canada.
- , 1984a. Ocean use and resource development and management in the eastern Caribbean. Basseterre, St. Kitts.
- , 1984b. Development and ocean management in the eastern Caribbean--The case of Leeward Islands. Nova Scotia, Canada.
- , 1985. Management and utilization of marine resources of the British Virgin Islands. Nova Scotia, Canada.
- Food and Agriculture Organization. 1983. Report of the fourth session of the Western Central Atlantic Fishery Commission. Managua, Nicaragua.
- Keefer, B. 1985. Big time fishing. In: *St. Petersburg Times*. June 4, 1985. St. Petersburg, Florida.
- Miller, L.G. 1986. *The Impact of Tourism on Caribbean Economies and Societies*. Caribbean Tourism Research and Development Center. Barbados, West Indies.
- Olsen, D.A. and R.S. Wood. 1983. The marine resource base for marine recreational fisheries in the Caribbean. *Proc. Gulf Carib. Fish. Inst.* 35: 152-160.
- Schmied, R.L. 1987. Marine recreational fisheries development in the Caribbean: Why and how. *Proc. Gulf Carib. Fish. Inst.* 38: 688-706.
- Woods Hole Oceanographic InstitutE. 1984. Management of ocean and coastal resources in Columbia--An Assessment. Woods Hole, Massachusetts.

APPENDIX 1

Marine Recreational Fisheries Questionnaire

Please answer the following questions as accurately as possible and forward the completed questionnaire to:

Ronald L. Schmied  
National Marine Fisheries Service  
9450 Koger Boulevard  
St. Petersburg, Florida 33702

1. Country covered by this questionnaire?  
\_\_\_\_\_

2. Are you currently conducting any marine recreational fishing participation, catch, and/or effort survey? Yes \_\_\_\_\_ No \_\_\_\_\_

If not, do you plan to initiate such a survey within the next several years?  
Yes \_\_\_\_\_ No \_\_\_\_\_

3. Is a marine recreational fishing license required of:

- a) residents (citizens) - Yes \_\_\_\_\_ No \_\_\_\_\_  
b) visitors - Yes \_\_\_\_\_ No \_\_\_\_\_

4. How many marine recreational fishermen fish annually in waters subject to your country's jurisdiction?

- a) residents \_\_\_\_\_  
b) visitors \_\_\_\_\_

5. How many private recreational boats capable of participating in marine recreational fishing are owned and operated in national waters by:

- a) residents: boats less than 20 feet in length \_\_\_\_\_  
boats between 20 and 30 feet in length \_\_\_\_\_  
boats greater than 30 feet in length \_\_\_\_\_  
total number of boats (size data not available) \_\_\_\_\_  
b) visitors: boats less than 20 feet in length \_\_\_\_\_  
boats between 20 and 30 feet in length \_\_\_\_\_  
boats greater than 30 feet in length \_\_\_\_\_  
total number of boats (size data not available) \_\_\_\_\_

6. What percent of the marine recreational fishing trips are made within three miles of shore and what percent made more than three miles from shore?

- a) Percent within three miles of shore: \_\_\_\_\_  
b) Percent more than three miles of shore: \_\_\_\_\_

7. How many recreational fishing craft of the following types operate in your country all year?

- a) Recreational fishing boats for hire carrying less than six fishermen (e.g., charterboats & guideboats) \_\_\_\_\_

b) Recreational fishing boats for hire carrying more than six fishermen  
(e.g., headboats) \_\_\_\_\_

c) Recreational diving boats \_\_\_\_\_

8. How many recreational fishing craft of the following types travel to and operate seasonally in your country?

a) Recreational fishing boats for hire carrying less than six fishermen  
(e.g., charterboats & guideboats) \_\_\_\_\_

b) Recreational fishing boats for hire carrying more than six fishermen  
(e.g., headboats) \_\_\_\_\_

c) Recreational diving boats \_\_\_\_\_

9. How many saltwater sportfishing tournaments are held annually in your country? \_\_\_\_\_

What are the principal fish species targeted in these tournaments?  
(scientific names, please)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

10. Please list the top ten species caught by saltwater water sport fishermen in your country (Please use scientific names and list in descending order in terms of number caught).

- |          |           |
|----------|-----------|
| 1. _____ | 6. _____  |
| 2. _____ | 7. _____  |
| 3. _____ | 8. _____  |
| 4. _____ | 9. _____  |
| 5. _____ | 10. _____ |

11. Is your country actively developing marine recreational fishing as:

- a) a major tourist attraction? Yes \_\_\_\_\_ No \_\_\_\_\_  
b) a resident recreation activity? Yes \_\_\_\_\_ No \_\_\_\_\_

12. What is the major source of funds used to develop marine recreational fishing?

- a) general revenue \_\_\_\_\_  
b) sales taxes \_\_\_\_\_  
c) tourist taxes \_\_\_\_\_  
d) other (please specify) \_\_\_\_\_

13. How much money (estimate U.S. dollars) spent by marine recreational fishermen annually in your country by:

- a) residents? \_\_\_\_\_  
b) visitors? \_\_\_\_\_

14. What are the major problems you feel must be resolved to develop marine recreational fishing in your country? (Please list (describe) problems briefly)

15. Please provide name, address, and telephone number of person who can be contacted for further information:

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_  
Telephone: \_\_\_\_\_  
\_\_\_\_\_

THANK YOU FOR YOUR HELP!