

**Marine Recreational Fisheries  
Development in the Caribbean:  
Why and How**

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ABSTRACT

This paper explores the two critical issues involved in the development of marine recreational fisheries (MRF) by providing insights as to why development should be considered and how it can be accomplished. Recognizing that sport fisheries development will not occur until the benefits of development are understood, the paper discusses the growing demand for quality sport fishing, the role MRF can play in creating a marine conservation ethic, the contribution of MRF to physical and mental health and the tremendous economic growth that can be stimulated through MRF development. Following this discussion, the paper presents several precepts to help guide development efforts and outlines specific strategies, tools and methods for systematically enhancing fishery resources on which MRF depends, understanding and providing for anglers' needs, and assisting the MRF industry to grow and stabilize. Finally, based on experience in the southeastern United States, the paper recommends a series of actions to help initiate MRF development in the Caribbean Basin.

INTRODUCTION

In the United States, many persons have questioned the value or desirability of developing marine recreational fisheries (MRF). This attitude has stemmed from a near absence of information concerning the nature and extent of marine recreational fishing as well as from the presumption that saltwater angling was a frivolous and insignificant activity. Further, MRF research, management and development issues were most frequently ignored or given low priority because of the much higher level of importance ascribed to commercial fisheries and freshwater sport fishing. In a very real sense, marine recreational fishing has been the "ugly duckling" of the United States fisheries family.

Attitudes are changing in the United States, as we learn more about MRF. In fact, our increasing knowledge is bringing about a major transformation in our image of marine recreational fishing - the ugly duckling is beginning to look more and more like the goose that lays golden eggs.

This image change has triggered a number of significant events in the United States. In a piece of landmark legislation, the U.S. Congress, in 1976, passed the Magnuson Fishery Conservation

and Management Act which, for the first time, recognizes that both commercial and recreational marine fisheries constitute major sources of employment and contribute significantly to the economy, food supply, enjoyment and health of the U.S. In passing this Act, the Congress set in motion a national program to promote, manage and develop marine fisheries of the U.S. In April 1984, the first national forum exploring problems, opportunities, and priorities for the development of U.S. marine recreational fisheries was held with great success. Further, in October 1985, under an expanded national Sport Fish Restoration Program, the U.S. government dramatically increased financial aid to help states develop and manage freshwater and saltwater sport fisheries. Over \$80 million will be available for fiscal year 1986 to carry out this program.

The purpose of this paper is to take advantage of the opportunity presented by this Gulf and Caribbean Fisheries Institute meeting to share experiences we are gaining in the U.S. concerning the development of MRF. Specifically, this paper presents some ideas as to why MRF should be considered for development in the Caribbean and provides insights as to the various tools and methods that can be used to accomplish this important goal.

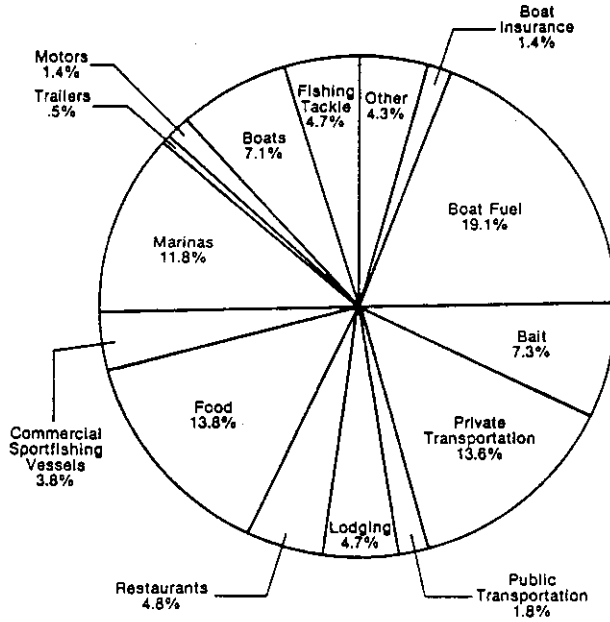
#### WHY DEVELOP MARINE RECREATIONAL FISHERIES?

Our growing national commitment to develop MRF in the U.S. revolves around the nature and magnitude of the benefits or "golden eggs" produced by healthy MRF. Understanding these benefits provides ample justification for serious consideration of a MRF development initiative in the Caribbean Basin.

First, and most importantly, MRF can positively affect the economic stability and growth of coastal communities and, on a larger scale, the Caribbean Basin. In the U.S., we are just beginning to understand and appreciate the emerging role of marine recreational fishing as an important coastal component of the rapidly expanding travel and tourism industry - an industry that produced \$191 billion in sales and was the second largest retail industry in the U.S. in 1981 (U.S. Travel Data Center, 1982). In fact, a study conducted by the Sport Fishing Institute (U.S.) estimated the total economic impact of marine recreational fishing in the U.S. to be \$7.5 billion in 1980 - a figure considered conservative by many (SFI, 1983). Notably, this tremendous economic benefit begins with innumerable purchases made by sport fishermen in pursuit of their sport. As Figure 1 indicates, marine recreational fishermen make expenditures across numerous business sectors. Sales, jobs, capital investments and economic multipliers are the stuff of which economic stability and growth are made; herein lies the goose that lays golden eggs.

Tourism is already a tremendously important and expanding industry in the Caribbean. In fact, according to the Caribbean Tourism Research and Development Center, tourism accounts for approximately 40% of the gross domestic products (GDP's) of Caribbean Island nations. The "island atmosphere," warm sunny

Figure 1. Breakdown of expenditures for marine recreational fishing by sector, 1980.



\* SPORT FISHING INSTITUTE, 1983

climate, and marine resources of the region, proved irresistible to over 7.7 million overnight tourists (exclusive of 3.7 million cruise ship passengers) who spent US\$4.645 billion in the Caribbean in 1984 (Caribbean Tourism Research and Development Center, 1985). However, as Table 1 indicates, in spite of aggressive tourism expansion efforts in many island nations, marine recreational fishing has not been developed to any appreciable extent as a tourist attraction in most Caribbean areas even though in the author's opinion, considerable expansion potential exists. Further, with some exceptions, most Caribbean nations actively working to develop, expand, and/or modernize their fishing industry, are focusing on artisanal commercial fisheries with little or no consideration given to the potential for developing MRF as an integral part of tourism and fisheries development strategies.

Recognizing the importance of seafood as a main source of animal protein in the Caribbean, the limited fishery resource base of the region, the current importance of tourism and the need for further economic development, MRF could be the Caribbean's proverbial goose that lays golden eggs. Development of MRF could attract additional tourists to the region who would gladly spend their money for the chance to catch marine fish. Some of these gamefish would be released to help conserve the resource base, some would be kept as trophy mounts which would inject additional dollars into the local economy, and some could be kept and eaten by anglers, perhaps after being prepared by hotel staffs. The majority of fish caught would probably enter local seafood markets since most tourists would not be able to take home their catches. The net economic benefit to the local economy from recreational harvest of marine finfish would likely exceed, by several orders of magnitude, the benefit from commercial harvest for local consumption - without depriving the area of a food source. This conclusion is based on the observation that, in the Caribbean most locally consumed fish is purchased directly from the fishermen in "the round" (unprocessed). Consequently, limited additional value is gained through processing and/or marketing of commercially landed seafood.

Second, development of MRF in the Caribbean would be a natural and logical tourism development strategy to maintain or increase the region's appeal to U.S. travelers who accounted for 65% of the 7.7 million overnight visitors to the Caribbean in 1984 (Caribbean Tourism Research and Development Institute, 1985). According to the Third United States Outdoor Recreation Plan (U.S. Department of the Interior, 1979), sport fishing was the ninth most popular outdoor recreation activity in 1977 with nearly 50 million Americans participating at least once during the year. Further, while freshwater anglers still outnumber saltwater anglers in the U.S. by a factor of 2.8:1, the number of saltwater anglers tripled between 1955 and 1980 while the number of freshwater anglers only doubled (U.S. Department of the Interior, 1982). Clearly, development of marine recreational fishing as a tourist attraction could further enhance the appeal of the Caribbean to U.S. citizens and other travelers.

Table 1. A tourism and Marine Recreational Fisheries (MRF) profile of Caribbean Island countries

Country	Relative Importance of Tourism	MRF Development Status	Tourism Contact
1. Bahamas	No. 1 industry. Accounted for 46% of GDP** in 1983.	MRF important attraction. Excellent development potential.	Bahamas Ministry of Tourism P.O. Box N 3071 Nassau, Bahamas
2. Turks/Caicos Islands	Not well developed but expansion is underway. Accounted for 20% of GDP in 1983.	Marine Fishery resources plentiful but fisheries not well organized or developed. Gaining recognition as excellent MRF area.	Turks/Caicos Tourist Board P.O. Box 592617 Miami, FL 33159
3. Cuba	Important but not well developed.	Unknown.	Instituto Nacional de la Industria Turística G. y Malecon Yegado, Havana, Cuba
4. Cayman Islands	No. 1 industry. Not fully developed.	MRF is important. Excellent development potential.	Dept. of Tourism Gov't Administration Bldg. George Town, Grand Cayman British West Indies
5. Jamaica	2nd largest foreign exchange earner. Accounted for 11% of GDP in 1983.	MRF is important. Gov't is actively developing MRF with good potential for expansion.	Jamaica Tourist Board Sheraton Complex 77-83 Knutsford Blvd. P.O. Box 284 Kingston 5, Jamaica
6. Haiti	3rd largest industry.	Not well developed. Limited expansion potential due to poor resource base.	National du Tourisme et Dept. of Tourism Place de l'Exposition Port-au-Prince, Haiti
7. Dominican Republic	Not developed but excellent potential.	MRF not well developed - weak resource base. Limited MRF development potential.	Direccion de Turismo Cesar Nicolas Penson 21 Santo Domingo, D.R.
8. Puerto Rico	Important and under development.	MRF important but not developed to potential.	Puerto Rico Tourism Company P.O. Box 3072 Old San Juan, P.R. 00903
9. U.S. Virgin Islands	No. 1 industry. Rapidly developing.	MRF important and developing with good expansion potential in some fisheries.	Department of Commerce Visitors Bureau Charlotte Amalie St. Thomas, U.S.V.I.
10. British Virgin Islands	No. 1 industry. Considerable growth potential.	MRF is important with moderate development potential. Somewhat resource limited.	BVI Tourist Board Road Town Tortola, B.V.I.
11. Anguilla	Some importance. Under development.	Unknown importance. Some development potential.	Dept. of Tourism The Valley Anguilla

Table 1. (contd). A tourism and Marine Recreational Fisheries (MRF) profile of Caribbean Island countries

<u>Country</u>	<u>Relative Importance of Tourism</u>	<u>MRF Development Status</u>	<u>Tourism Contact</u>
12. Netherland Antilles Saba St. Eustatius Sint Maarten Aruba Bonaire Curacao	Very important and growing rapidly with some strong government incentives.	Limited importance. Good development potential on Aruba, Bonaire, St. Maarten.	Aruba Information Centre 1210 Ave. of the Americas New York, N.Y. 10020  Bonaire Tourist Office 685 Fifth Avenue New York, N.Y. 10022  Curacao Tourist Bureau 30 Rockefeller Plaza Mazzanine Floor, Rm. 50 New York, N.Y. 10022  St. Maarten Tourist Office 455 Park Avenue Suite 903 New York, N.Y. 10022
13. St. Kitts/Nevis	Very important. Accounted for 24% of GDP in 1983. Aggressive expansion efforts.	Limited importance. Development potential being explored.	St. Kitts-Nevis Tourist Board P.O. Box 186 Basseterre, St. Kitts
14. Antigua & Barbuda	No. 1 industry. Accounted for 39% of GDP in 1983. Active expansion efforts.	Important as tourist attraction. Good expansion potential but not receiving such attention in fisheries development efforts.	Antigua Dept. of Tourism P.O. Box 363 St. Johns, Antigua West Indies or Suite 311 610 Fifth Avenue New York, N.Y. 10020
15. Montserrat	Very important and expanding slowly. Accounted for 21% of GDP in 1983.	Important tourist attraction. Unknown expansion potential.	Eastern Caribbean Tourism Association 200 Buckingham Place Road London, SW1
16. Guadeloupe & Dependencies St. Martin Marie Galante La Desirade Les Saintes Saint Barthelemy	Important and developing.	Somewhat important. Some potential related to offshore pelagic fisheries.	Office du tourisme du Departement de la Guadeloupe Sous Prefecture Place de la Victoire Pointe-a-Pitre.
17. Dominica	Important but not a mainstay of the economy - 6% of GDP in 1983. Some tourism expansion underway.	Marine fisheries are important. Government actively developing commercial fishery. Importance of MRF unknown.	Dominica Tourist Board P.O. Box 73 Roseau, Dominica
18. Martinique	Very important - Perhaps No. 1.	Marine Fisheries are important and under expansion. MRF is tourist attraction having good development potential.	Office Departemental Du Tourisme Boulevard Alfassa Fort-de-France Martinique
19. St. Lucia	No. 2 industry which is being actively expanded. Accounted for 29% of GDP in 1983.	Marine Fisheries being expanded and modernized. MRF importance unknown.	St. Lucia Tourist Board P.O. Box 221 Castries, St. Lucia

Third, marine recreational fishing could help increase the supply of nutritious seafood in the Caribbean. Recent studies, including one released this year by the American Heart, Lung and Blood Institute, are providing strong evidence that the marine lipid complex found in seafood may be the answer to reducing the buildup of fatty deposits in human arteries - the major contributing factor to arteriosclerosis and other heart disorders which are the leading causes of death in the U.S. (Pigott and Marconi, 1983; Castelli, 1984). In the U.S., recreationally caught fish account for an estimated 30% of total U.S. edible finfish landings (U.S. Department of Commerce, 1984), and approximately 90% of all recreationally landed fish are eaten (KCA Research, Inc., 1983). Assuming that most recreationally caught and landed fish would end up in local seafood markets, development of MRF in the Caribbean would translate into an improved supply of healthful seafood for Caribbean residents.

Fourth, development of MRF can create additional public and private support for the effective management and enhancement of marine resources. Experience in the field of natural resource management has demonstrated that direct exposure to, or dependence on, natural resources expands an individual's understanding and appreciation of those resources and helps develop an environmental conservation ethic. In the U.S., commercial and recreational fishermen and businesses involved in the fishing industry (recreational and commercial) are becoming important, and influential allies in the fight to conserve, manage and enhance marine fishery resources and associated habitat. To paraphrase a recent statement made by Mr. Peter Foley, President of the American Fishing Tackle Manufacturers Association (AFTMA) at the 1985 AFTMA Trade Show, the U.S. tackle industry is recognizing more and more that good fishing means good business and that the industry has a vested interest and obligation to help provide for the wise conservation, management and development of U.S. fishery resources.

Indeed, the beautiful beaches, marine waters and fisheries of the Caribbean are perhaps the region's most valuable asset. Development of MRF will help generate additional public and private support for conservation of the region's marine resources.

#### TOOLS AND METHODS FOR FISHERIES DEVELOPMENT

Having provided some insights as to why development of MRF should be considered by Caribbean Basin nations, it is important to now consider a more difficult proposition: how does one actually go about developing MRF? While there is no simple answer to this question, the balance of this paper describes several tools and methods which can be used in this challenging process. However, effective use of these tools and methods requires that several precepts regarding MRF be understood (Schmied, 1984).

## PRECEPTS FOR DEVELOPMENT

1. MRF must be viewed in a broader context than the simple act of fishing.

MRF involve a complex interweaving of three equally important elements: the resource base, the fishermen and the industry. The resource base includes stocks of finfish, mollusks and crustaceans, that can be treated as a unit for conservation, management and development purposes.

Recreational fishermen include all those for whom pleasure, amusement, relaxation and/or home consumption are the primary motivations for their fishing activity.

The marine recreational fishing industry includes all private businesses which provide the numerous goods and services required by fishermen for participation in their sport.

2. Development of MRF requires coordinated cooperative efforts among numerous parties, particularly those involved in fisheries management, outdoor recreation and tourism.

Fishery management agencies and other entities entrusted with fishery research, management and development responsibilities are becoming increasingly effective in addressing resource abundance and use issues which can thwart or preclude fisheries development. More often than not, however, fishery management agencies do not have the authority, responsibility or capability to unilaterally deal with other development constraints such as inadequate fishing/ocean access facilities, tourism support infrastructure, or access to investment capital. Consequently, resolution of these issues requires effective working linkages with other agencies, organizations and individuals.

3. Those involved in MRF development must focus on issues in addition to growth.

Expansion of MRF may be an appropriate development objective, but so are improved quality of the recreational fishing experience, reduced waste of sport-caught species, and increased economic stability for support industries.

4. Fisheries development is a form of "troubleshooting" and as such requires an understanding of how the "MRF system" functions.

To be successful, fishery development programs must consider and address the requirements for each of the major elements of MRF (the resource, users and industry) as well as their interrelationships. Once this "system" is understood, development constraints can be effectively isolated and appropriate remedial action(s) taken.



## KEEPING THE FISHING GOOD

A good potential for catching fish is the primary attraction to marine recreational fishing. Therefore, development of MRF requires protection of fishery resources from overfishing as well as maintenance of water quality and habitats upon which the stocks depend. This section focuses on requirements and methods for management and enhancement of fishery resources and essential habitat.

### The Habitat Connection

Productive estuarine and marine fishery habitats are finite, and, in some Caribbean areas, are decreasing in supply and quality due to man's activities. Growing populations place increasing demands on estuarine and marine resources through dredging, filling, construction, energy development, waste disposal and other human activities. Not only do these activities adversely affect fishery habitat, they also affect the "human fishing environment." Polluted and smelly waters do not attract sport fishermen or other recreational users. Therefore, development of MRF requires effective efforts to minimize loss and pollution of fish habitat and, where possible, to restore and enhance it.

Impacts on water quality and fishery habitat often result from activities which marine fishery managers have little or no authority to control. In fact, U.S. conservation of essential fisheries habitat requires coordination among numerous local, state, regional and federal agencies involved with land use planning and management; air and water quality management; coastal zone management and toxic chemical control. It also requires relations with private corporations interested in developing coastal resources. Fishery managers are often hard pressed to monitor activities, let alone effectively represent fisheries concerns, in all these areas. Original approaches are needed to overcome coordination and management obstacles.

Creation of marine habitat protection committees and advisory panels is a novel approach being used to improve habitat protection efforts in the U.S. Comprised of key commercial and recreational fishing and environmental leaders, these committees are being established as arms of federally constituted Regional Fishery Management Councils. The committees monitor activities that affect marine fisheries and related habitat, and when appropriate, take action through governmental and political avenues to prevent or minimize adverse fisheries impacts from coastal development activities. In the Caribbean, these committees could be expanded to include local tourism board representatives, hotel and restaurant associations and other key private and government organizations. Whether quasi-governmental or purely advisory, habitat protection committees can help guard the integrity of the Caribbean's greatest asset - its marine environment.

Once habitat protection programs are strengthened to the extent necessary, numerous methods and techniques can be used to

enhance or restore fisheries habitat. Examples include streambed clearing and graveling; construction of fish ladders; noxious weed control; shoreline regrades to produce shallow-water fish habitat; marsh, mangrove, seagrass and kelp plantings; ditching, dyking and weir construction to enhance or restore tidal and sheet water flows to wetlands; and artificial reef construction.

### What's Fishing Without Fish?

While the potential for catching marine gamefish may be sufficient motivation for anglers to travel to the Caribbean, the catching of fish keeps them satisfied and will bring them back another day. Consequently, conservation and management of marine resources will be the controlling factor in developing MRF as a tourist attraction. Caribbean fishery managers must deal with several important issues.

First, MRF development in the Caribbean must begin with an assessment of the local fishery resource base. This assessment must determine the status of various fish stocks that could be targeted by sportsmen, assess existing harvest pressure exerted on those resources by artisanal commercial fishermen and ascertain the ability of the fish stocks to support additional fishing pressure. The potential for user conflicts must be assessed and strategies developed to accommodate commercial and recreational fishing users. In some Caribbean areas, inshore reef fish resources are either overfished or are being harvested at or near their sustainable yields by commercial fishermen. Luckily, pelagic fishery resources that are most attractive to sportsmen (billfish, tuna, wahoo, mackerel, dolphin, etc.) are relatively underexploited in most Caribbean areas and should provide an adequate resource base to support development of MRF. In any event, fishery managers will need to develop and implement fishery management measures to prevent overfishing and rebuild overfished stocks so as to produce attractive and satisfying recreational fishing opportunities.

Second, fishery managers must seek to create a positive fishing environment for all users by anticipating, avoiding, and/or resolving user conflicts between commercial and recreational fishermen and between types of recreational users (e.g., SCUBA divers and fishermen).

Third, fishery managers must be careful to consider and minimize the social and economic impacts of management measures on anglers and the recreational fishery industry. As more management measures become necessary, their cumulative effects must also be evaluated. Frankly speaking, fishery managers must strive to make sport fishing as "hassle free" as possible to maximize the area's appeal to tourist anglers.

Beyond addressing these three basic recreational fisheries development needs in the fisheries management process, there are several techniques that may be explored to maintain and enhance the availability of fishery resources for saltwater sport fishermen.

## Fish Hatchery and Stocking Programs

While initially developed and used to enhance freshwater and anadromous fisheries, recent progress in applying hatchery and stocking technology to marine/estuarine systems is generating growing interest in its use as a marine fisheries management tool. Examples of ongoing efforts include projects to re-establish striped bass (Morone saxatilis) fisheries in the Chesapeake Bay and northern Gulf of Mexico as well as those designed to rebuild snook (Centropomus undecimalis) populations in south Florida.

A particularly interesting effort involves red drum (Sciaenops ocellata) hatching and stocking activities in the state of Texas. The John Wilson Hatchery, near Corpus Christi, Texas, was built by the Gulf Coast Conservation Association, a 15,000 member recreational fishing organization, on land provided by the Central Power and Light Company and is operated by the Texas Parks and Wildlife Department. This hatchery is unique in that it is the first saltwater facility of its kind geared strictly to mass produce finfish for stocking into coastal bays. In June 1983, 2.3 million 1.5-2 inch fingerlings were stocked into Espiritu Santo Bay. Texas biologists are monitoring the bay to determine the impact of stocking on the bay's red drum fishery (Teague, 1983).

The future of hatchery and stocking technology as a marine fishery enhancement tool will depend on the ability of researchers to demonstrate positive biological effects on the stocks as well as positive benefit-to-cost ratios. The author's limited knowledge of Caribbean Basin fisheries precludes any specific recommendations for hatchery and/or stocking applications in the area, but the concept is worthy of consideration by more knowledgeable fishery scientists as circumstances warrant.

## Artificial Reefs

Properly designed, sited and constructed artificial reefs can be used to maintain, and in some cases, enhance production of marine fishery resources and recreational fishing opportunities. Experience has shown that benthic artificial reefs can be used to effectively increase production of bottom-dwelling reef fish assemblages and that fish aggregating devices (FADs) can be used to develop and more efficiently harvest pelagic species. However, more research and site planning is needed to capitalize on these artificial reef functions, particularly in the Caribbean where nearshore reef fishes are subjected to tremendous harvesting pressures and where little is known about the pelagic resources. To address these issues, the Southeast Regional Office of the National Marine Fisheries Service is working with Old Dominion University and Puerto Rico (CODREMAR) to study the feasibility of using artificial reefs to develop commercial and recreational fisheries and to prepare an artificial reef siting plan for Puerto Rico. This plan will identify preferred sites for reef construction offshore of major

fishing centers. When implemented, the plan will help guide future artificial reef siting decisions, thereby reducing user conflicts and increasing marine fisheries benefits. Similar programs could be appropriately conducted in other Caribbean islands using the Puerto Rico project as a guide.

#### ATTRACTING FISHERMEN

Attracting recreational fishermen is the second most critical task in developing MRF. To attract anglers, it is important that information on their nature, motivations and preferences be used to develop, package and promote fishing opportunities. This approach, as described in the following sections, will help provide quality fishing for the greatest number of anglers and generate maximum economic and social benefits for the region.

#### Understanding Angler Diversity

Research is revealing that marine recreational fishermen are as diverse as the fish they seek. In fact, saltwater anglers can be separated into sub-groups based on differences in fishing motivations, attitudes, species preferences, skill levels, avidity, fishing methods and other traditional social and economic characteristics such as age, race, sex and income levels.

In 1981, the National Marine Fisheries Service contracted with KCA Research, Inc., to conduct a National Socioeconomic Survey of Marine Recreational Fishing. The survey obtained information about fishermen, the nature of their marine recreational fishing experiences, fishing costs, species preferences, disposition of catch and trip satisfaction levels. Results of the survey were most interesting and provided useful background market information for Caribbean nations considering MRF development, particularly considering the importance of U.S. tourists in the region.

While "market" information on marine recreational fishermen is critical to successful development efforts, care should be taken in the use of information generated by national studies or by studies performed in areas other than the particular one in question. These data may not accurately reflect the characteristics and preferences of local anglers. Therefore, local fisheries development interests should make an attempt to supplement existing data with local angler studies. For example, visitor entrance and exit surveys frequently conducted by chambers of commerce or tourism boards may obtain information regarding visitor participation in marine angling. Similarly, periodic tourism demand and market studies, such as those conducted by the Caribbean Tourism Research and Development Center, can be expanded to obtain needed MRF market information.

#### Designing "Best Match Packages"

Armed with accurate information, recreational fishing development packages can be designed which constitute the "best

match" between local fishery resources, support industries, characteristics/preferences of recreational fishermen, and other attributes of the area. These packages can be as broad and diverse as fishery resources, support services or angler preferences permit.

Accenting the positive is essential. Areas with limited tourism infrastructure could promote a type of "backwoods" fishing experience for anglers preferring primitive settings. In other areas, specialized fishing opportunities may be developed for those seeking specific gamefish (e.g., billfish) or for those preferring certain types of fishing such as spear fishing. Popular family vacation spots should market family fishing packages. Clearly, fishing packages can be developed to attract anglers of nearly every description.

### Fishing Information

Quite often, the greatest overall constraint to development of MRF is a lack of fishing information that is comprehensive in scope, effectively packaged and readily available to fishermen.

Instead of only providing "negative" regulatory information, a broader approach is needed which provides useful answers to questions about the characteristics and availability of target species, fishing methods, bait and tackle recommendations, popular fishing areas, available facilities and services, applicable fishing regulations, handling, storing and cooking techniques and sources of additional information.

Recreational fishing information should be packaged with at least three specific goods in mind. First, the presentation of brief, attractive promotional materials highlighting recreational fishing opportunities is needed. These materials should include the names of contacts for further information and should be available in large quantities for wide distribution.

Second, to respond to requests for further information, comprehensive angling guides that provide detailed "what, when, how and where information" should be available. Guides serve as a basic reference and can be geared to various geographical areas - city, county, state, region, etc.

Third, durable and appropriately-sized field guides should be included to serve as quick references on fishing regulations, safety rules and other essential topics. It is critical that all of these materials be brief in format.

Since all the information in the world will not help if it is not made available to anglers, distribution methods should be selected that will reach specific target audiences. For example, if surveys show that most tourist anglers reside in the U.S. coastal states, advertising should focus on cities within that geographic range. Information distribution costs can be reduced by using key tourism contact points such as hotels, airports, travel agents, chambers of commerce and visitor centers or by advertising the availability of angler information in key travel, tourism and sport fishing publications distributed in target geographical areas.

## PROVIDING THE MEANS TO FISH

Providing essential facilities, goods and services is the third major requirement for developing MRF. Saltwater anglers require numerous goods and services to participate in their sport and, as Figure 1 shows, their expenditures cut across many business sectors. Frequently, these needs are not appreciated or it is incorrectly assumed that reasonably good supplies of fish and fishermen will ensure an automatic response by the public and private sectors to provide necessary goods and services. Typically, this approach results in less than optimum participation levels and lost economic benefits.

In view of the importance of facilities, goods and services to the development of MRF, it is critical to assess their availability at the outset. One approach is to consider the angler needs associated with each major segment of a fishing trip (Table 2): trip preparation, fishing excursion and post trip adjustments (Schmied, 1983). Using Table 1 and other screening criteria as guides (e.g., relative importance of visitors and various fishing modes), weak links in an area's recreational fishing support facilities and services may be identified. While local conditions will dictate the "best approach," the following sections describe several methods that can be used to enhance or expand angling facilities and services.

### Improving Fishing Access

In some areas, there are not enough fishing piers, boat ramps, marinas, or shore fishing areas. In others, facilities are either poorly designed and maintained or are not located where they are most needed. In resolving access problems, the following approaches are worthy of consideration.

#### Carefully weigh public and private roles

While the public sector (government) constructs and maintains the majority of shoreline access/fishing facilities in the U.S., the role of the private sector needs to be carefully assessed both with respect to existing facilities and future expansion. For example, fishing piers can be profitable enterprises, especially if artificial reefs are used to maintain and enhance angler catches and if pier operations are diversified to include snack bars, restrooms, fish cleaning services, fishing instruction and facilities for spectators (which may outnumber fishermen in many tourist areas). Joint ventures in which publicly owned facilities are leased to private entities for operation and maintenance are also worthy of investigation.

#### Take advantage of the full-range of public funding sources

Those interested in improving recreational fishing access should look beyond traditional sources of government funds for

Table 2. Major stages in a recreational trip and related requirements for goods and services

<u>TRIP STAGE</u>	<u>GOODS AND SERVICES REQUIRED</u>
1. Pre-Trip Planning and Preparation	0 Fishing Equipment
	0 Fishing Information (Nautical Charts, Facilities, Target Species, Hotels, Restaurants, Charter/Headboat and Guide Services, Etc.)
	0 Fishing Licenses
	0 Fishing clothes and accessories
	0 Boat repair and maintenance
	0 Boat accessories
	0 Car repairs and maintenance
	Travel Arrangements (Passport/Visa, Airline Tickets, Local Transportation, Hotel Reservations, etc.)
	0 Diving Equipment
	0 Car, Boat & Travel Insurance
	2. Fishing Excursion
0 Gas and oil (Boat and Car)	
0 Fishing Access for Facilities & Services (Boat Ramps, Marina Services, Piers, Charter/headboat/Guide/Dive/Boat Services, etc.)	
0 Bait, Tackle, Ice, Accessories	
0 Food and Lodging	
0 Boat Repairs and Supplies	
3. Post Trip	0 Supplies and/or Services for catch Handling, Preparation, Storage, Shipping, and Trophy Mounts
	0 Boat/Car Maintenance and Repair
	0 Fishing Equipment Replacement
	0 Transportation Home

fishing access facility construction. For example, recreational shoreline access has been substantially improved in numerous U.S. cities (e.g., Norfolk, Virginia; Baltimore, Maryland; Washington, D.C. and Boston, Massachusetts) through innovative thinking by tourism interests who joined forces with government and private community developers seeking to rebuild older, run-down urban waterfronts (e.g., ports and harbors). These efforts have resulted in waterfront developments, like the "Inner Harbor" in Baltimore, which features a magnificent aquarium, "international" shopping plazas, historic ship displays, a recreational marina and a waterfront promenade featuring paddleboat rentals and other recreation attractions. This area has become a major tourist attraction in Baltimore and has put residents and tourists alike back in touch with the area's maritime heritage.

On a similar note, Pinellas County, on the west Florida coast, has instituted a county-wide solid waste disposal program that features a waste recovery plant that converts garbage into electricity, recovers usable metals, and recycles other solid wastes, such as automobile tires and rock rubble for use in construction of offshore artificial fishing reefs. Numerous other unique opportunities for supporting MRF access development exist and can be exploited through innovative thinking.

#### Economic Strength Through Collective Action

Collective, cooperative effort by businesses comprising the marine recreational fishing industry could substantially contribute to industry stability and growth. However, these businesses often do not recognize or exploit their interrelationships as components of the marine recreational fishing industry.

Fishing management and tourism agencies working in conjunction with chambers of commerce could promote a "systems approach" through establishment of local or regional MRF development boards or foundations. Comprised of representatives of hotel and restaurant associations, bait and tackle shops, charter and headboat fishing services, marine trades, fishing pier and marina operators, tourism interests, recreation and park agencies and fishery management agencies, these boards could design, support and/or promote projects needed to develop MRF in ways that produce economic benefits across many business sectors. An interesting example of this type of cooperative project occurred in the Cayman Islands in 1984, when the Cayman government 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 during June will win \$1 million (U.S.) in cash, and several other fringe benefits such as a beach condo, a 38 foot Hatteras yacht and a lifetime pass on Cayman Airways (Keefer, 1985). You can bet this single event draws a few interested fishermen to the Cayman Islands. Imagine what several other MRF events spaced throughout the year could do for the Cayman Island economy!



## SUMMARY AND RECOMMENDATIONS

The purpose of this paper has been to respond to the question - "Marine Recreational Fisheries Development in the Caribbean - Why and How?" In doing so, examples of the social and economic impacts of marine recreational fishing in the United States were woven into a rationale for development of saltwater sport fisheries in the Caribbean. Several precepts were offered to help guide development efforts. Specific techniques were discussed that can be used to maintain and enhance fishery resources, attract anglers and promote the stability and growth of the marine recreational fishing industry. Based on this discussion and experience gained in the U.S., the following recommendations are offered to help initiate a MRF development program in the Caribbean.

First, like many complex chemical reactions, MRF development often requires a catalytic agent to start the process. Since so many diverse government and private entities must necessarily be involved in the process, it is recommended that each participating Caribbean nation establish a MRF Development Board and that each "national" board be represented on a Caribbean Basin MRF Development Board. National Boards could serve to coalesce the diverse MRF-related government, private and business sector organizations into a coordinated working group that would plan and guide the implementation of local MRF development program activities. The Caribbean Basin MRF board, which possibly could be organized as part of the Caribbean Tourism Research and Development Center or Western Central Atlantic Fisheries Commission, could consist of representatives of the "national" boards, the Caribbean Hotel Association, Caribbean Tourism Association and the other appropriate governmental and private organizations. This board could develop and implement Basin-wide programs needed to address problems of universal concern to member nations. Examples might include problems regarding the management or conservation of shared fishery resources (e.g., billfish, tunas and other migratory species) or procurement of funds to support regional MRF-related market research, data collection, or tourism promotions.

Second, it is recommended that each participating nation prepare a MRF Development Plan. Each plan should contain an assessment and description of the current status of MRF in the area, an identification and discussion of limiting factors (problems) that need to be resolved, and a prioritized, time-bound list of recommended actions (activities) needed to resolve identified problems. In developing this program plan, specific attention needs to be given to each major MRF component - the resource base, the users (sport fishermen) and the industry. It is conceivable that the Caribbean Basin MRF Board could seek and obtain funding from the Caribbean Development Bank, U.S. AID, U.S. Trade and Development Program (State Department) or other sources to help national MRF Boards conduct their initial MRF assessments and feasibility studies. In fact, these studies could be expanded to include other marine recreational activities.

Third, given the importance of maintaining the limited marine fishery resource base in the Caribbean, and the likelihood that visiting marine recreational fishermen would be highly attracted to migratory pelagic species (e.g., billfish, tunas, mackerel, shark, etc.), it is recommended that Caribbean Basin nations give serious thought to development of cooperative interjurisdictional management programs for these species. At a minimum, this cooperative program should involve the United States and Mexico. Perhaps as a starting point, the U.S. could institute a series of meetings to inform Mexican and Caribbean fishery management agencies of progress being made in the U.S. to develop a fishery management plan for billfishes in the Atlantic, Gulf of Mexico and Caribbean area. Opportunities for cooperative research and data collection could also be explored.

In conclusion, the development of MRF in the Caribbean would be a challenging but rewarding effort that could easily translate into economic stability and growth for Caribbean nations, jobs for area citizens, and overall improvements in the quality of life in the region. The success of development efforts, however, will depend on each nation's ability to initiate a multidisciplinary development effort. This effort should recognize the limitations of the fishery resource base, respond to the nature, motivations and preferences of anglers visiting the region, and provide sufficient economic incentives and assistance to support the establishment of necessary MRF related support businesses and services. Those of us in the National Marine Fisheries Service, Southeast Regional Office and Fisheries Center stand ready to help you in any way possible.

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