

Evaluating Approaches for Improving Data-Limited Stock Assessments Across Caribbean Jurisdictions

Evaluar Métodos para Mejorar Evaluaciones de las Poblaciones de Fatos Limitados entre Jurisdicciones del Caribe

L' Jurisdicciones del Caribe Audit des Méthodes de Suivi des Populations de la Région Caraïbe, en Vue de Leur Optimisation

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EXTENDED ABSTRACT

The Gulf of Mexico and Caribbean basins are surrounded by 41 territories comprising parts or all of 28 independent nations. The fisheries management regimes in place across those jurisdictions are highly variable and are supported by variable data streams, with varying degrees of efficacy in implementation and enforcement, and with varying degrees of coordination within and between those jurisdictions (Singh 2008, Salas et al 2011). Recommended strategies for improving data-poor stock assessments are generally predicated on limited entry and rights-based management, conditions that provide incentives for engagement of the fishing community in collaborative research (CFMC/Fisheries Forum 2011). These conditions do not exist uniformly across the Gulf and Caribbean regions, suggesting that the implementation of these recommended strategies will meet with mixed results. One recommended strategy is to maximize the utility of existing fishing community information or academic information for background on fisheries. Another is to evaluate current management actions such as seasonal closures, spawning aggregation closures, or marine protected areas (MPAs). Other recommended strategies involve collection and augmentation of data from, and leveraging resources between, existing or ongoing fisheries dependent and fisheries independent sampling (e.g., size- and length-based studies representative of specific fisheries; data collection techniques that account for 100% of mortality of the species being assessed; biological data and sample collection from as high a percentage of the catch as possible; improvements to fisher reporting forms to be specific to locations, gear, effort, catch and bycatch species, etc.; and incorporation of fisher sampling using consistent areas and gears into fishery independent data sets). A final category of recommended strategies involves localized development and application of management tools to determine appropriate harvest control and sustainability targets, such as iterative annual catch limits that develop from precautionary levels to science-based levels as better or more data is collected over time, the spawning potential ratio (SPR) approach, decision trees to determine sustainable yields, surplus production models, and Ecological Risk Assessments for the Effects of Fishing (ERAEF) (CFMC/Fisheries Forum, 2011). Applying these strategies requires access to a range of data and/or management tools, and the present analysis comparatively evaluates the potential to implement recommended strategies for improving data-limited stock assessments by identifying the availabilities of those data and management tools across the various jurisdictions in the Caribbean region.

This evaluation applies and extends inventories of management approaches and data and assessment methods employed or available in each jurisdiction that were first developed in a report by the Food and Agriculture Organization (FAO) of the United Nations (Salas et al. 2011), to determine if the necessary information or management tools exist to implement recommended strategies for improving data-poor stock assessments. Academics and fisheries managers with relevant expertise contributed information to extend those inventories to nine Caribbean jurisdictions not analyzed in the FAO report (Tables 1 & 2). The geographic extent (Exclusive Economic Zones) of jurisdictions to which these inventories apply is depicted in Figure 1, with a “red/orange/yellow/green” color coding used to characterize the relative difficulty or ease, respectively, with which various jurisdictions might implement the recommended strategies (i.e., the potential that recommended strategies will be viable given extant management approaches and data and assessment methods). Available information allowed for an inventory and evaluation of 18 of the 41 jurisdictions in the Gulf and Caribbean region, and in only two of those jurisdictions (Cuba and Mexico) are existing management approaches and data and assessment methods likely to be adequate to allow for implementation of most or all of the recommended strategies identified above. Additional effort is required to refine these evaluations and to further extend the inventories of existing data and management tools to allow for evaluation of recommended strategies across the remaining 23 jurisdictions in the region. Finally, new technologies have been recommended to enhance stock assessments in the context of the relatively data-rich Gulf of Mexico region, and these technologies may allow assessments of data-poor stocks across the Caribbean region to “leapfrog” to “data-rich” conditions. These technologies include tools for improved environmental characterization and remote sensing survey enhancements; enhanced biological sample processing; improvements to fishery-dependent sampling; remote sensing survey enhancements, and refinement of current fishery-independent surveys based on the information gained through the techniques described above.



Figure 1. Geographic extent (Exclusive Economic Zones) of Caribbean jurisdictions for which inventories of existing data and management tools were compiled. Color coding indicates an evaluation of the viability of recommended strategies to improve data-poor stock assessments (e.g., green indicates viability of recommended strategies; yellow and orange indicate progressively lower potential viability; and red indicates recommended strategies are not likely viable given existing data and management tools). Only partial inventory information has been compiled to date for jurisdictions indicated by hatched color coding.

LITERATURE CITED

- Singh, A. 2008. Governance in the Caribbean Sea: Implications for Sustainable Development. Research Paper, United Nations - Nippon Foundation Fellowship Programme. 122 pp.
- Salas, S., R. Chuenpagdee, A. Charles, and J.C. Seijo (eds.). 2011. *Coastal Fisheries of Latin America and the Caribbean*. FAO Fisheries and Aquaculture Technical Paper. No. 544. Rome, Italy. 430 pp.
- Caribbean Fisheries Management Council/Fisheries Leadership & Sustainability Forum. 2011. Exploring Tools for Managing Data-Poor Stocks: CFMC Workshop Summary Report. San Juan, Puerto Rico. 43 pp.

Table 1. Fishery management approaches employed in 9 Caribbean territories inventoried by Salas et al, 2011 (black text), and preliminary inventory for 7 additional territories compiled with input from academics and fisheries managers with expertise relevant to those jurisdictions (red text).

	Barbados	Colombia	Costa Rica	Cuba	Dominican Republic	France	Grenada	Honduras	Mexico	Trinidad & Tobago	UK	USA	
					Collectivity of Saint-Martin	Guadeloupe, Les Saintes, Marie-Galante, & La Desirade	Martinique			Anguilla	British Virgin Islands	Puerto Rico	United States Virgin Islands
MANAGEMENT SYSTEM													
Institutional Management Bodies	P			D				P, B	P, D	D, P			D, B, P
State Management	D, B, P	D, B, P	D, P	D, P	X	X	X		D, B, P	D, P	X	D, B, P	D, B, P
Co-Management	B, D				X	X	D		D, B	X			
Sea Tenure									D				
ACCESS RIGHTS & REGULATIONS (who, when, & where have access to the resources)													
Open Access	X(*)				D(*)	X*	X*	D, B, P		X			
Restricted Access	B, P	D, B, P	D	D	B*	B*	P	D, B, P	D, B, P	D	B	P	D, B, P
Exclusive Fishing Area (TURFs)	B	X	D		X*	X*	X*		D			B	
Fishing Permits	B	D, B, P	D, B, P	D	B	B	B	D, B, P	D, B, P	D, P	X	X	D, B, P
Closed Areas	B, P		D	D	X	X	X	D, B, P	D			D	D, B, P
Seasonal Closure	B	X	D	D	B*	B*	B*	D, B, P	D, B, P	D		D	D, B, P
Marine Protected Areas	X	X			X	X	X	D, B, P		X	X		D, B, P
FISHERY POLICY INSTRUMENTS													
Restrictions on Gear & Fishing Effort	D, P				X	X	X	B	D, P	D, P	D, P, B	X	D, B
Minimum Legal Size	B, D, P	D	D	D	X	X	P	P, B	D, B, P	D, P	B	D	D, B, P
Total Allowable Catch (Total Quota)		D, P	D	D				B	D				
Community Quotas		D, P	D						D			D	
Protection of Berried Females				D	B*	B*	B*	B	D	B	B	D	D, B
Fishing Restricted During Spawning Season					D	B*	B*	B, D	D		D, B		D, B, P
Individual Quotas (Fisher or Boat)	B	D	D					B	B, P				D, B, P
Species Excluding Devices		D	D		B*	B*	B*	B	D	D			D, B
Use of Explosives or Pollutants Forbidden	B, P	D	D		X	X	X	D, B, P		X	D, B, X	D, B, P	D, B, P

Notes: D=Demersal; P=Pelagic; B=Benthic; X=Not Specified by Resource; * = Applicable to Some Species or for Subsistence Fisheries

