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From: TURFeffect

Subject: List of proposed indicators

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Since our meeting two weeks ago, we have been working on a list of proposed indicators to measure the effectiveness of marine reserves. These represent a subset of indicators from Afflerbach et al., 2014, Basurto & Nenadovic, 2012; Pomeroy et al., 2004, and are aligned with the list provided by Stuart Fulton. Indicators were selected based on ease of collection, analysis, and interpretation.

The present document contains our first draft of the list, divided into three main sections: biophysical, socioeconomic, and governance indicators. Biophysical indicators include those that can be extracted from COBI's yearly ecological monitoring program for reserve and control sites. Socioeconomic indicators are those that can be compiled by addressing the fishers, or fisher organizations, the community, or directly from COBI's staff. Governance indicators can be identified through the legal framework under which each community operate, expertise of COBI staff, or directly from fishers and their organizations. We must highlight that this list is based on the data description that we received, and that having access to the databases will enable us to look for different options, gaps, and solutions for said gaps.

Type of indicator	Indicator	Definition/Description	Data type
Biophysical	Species richness	Relative change in number of species across years within reserve and compared to control zone	Discrete
	Size structure	Comparison of size of species inside/outside the reserve as well as before and after reserve implementation	Discrete
	Density	Comparison of density of surveyed species inside / outside the reserve	Discrete
	Natural Disturbance	Information on whether that year happened a major natural disturbance and its severity	Categorical/Continuous (scale)
	Trophic niches	Calculate mean trophic level before and after reserve implementation and between reserve and control site	Continuous
Socioeconomic	Total landings	Have landings increased since the implementation of the reserves? And compared to control sites?	Continuous
	Managed species landings	Have landings for managed species increased since the implementation of the reserves? And compared to control sites?	Continuous
	Cost of implementation and monitoring	Initial cost of implementation (including time spent/distance traveled) and cost of monitoring and management in terms of present value	Discrete
	Alternative economic opportunities	Opportunity for implementation of alternative economic activities to make up for closed/restricted fishing	Categorical
	Community knowledge and understanding	Has the community's understanding of environmental and social sustainability improved since implementation of the reserve?	Categorical
Governance	Access to the fishery	Describes the type of access to the fishery used (TURF, Permits, Open access)	Categorical
	Actors of management	Who is involved in management, monitoring and enforcement	Descriptive
	Number of fishers	Number of fishers with legal access to the area	Discrete
	Legal recognition of reserve	Does the reserve have a legal recognition?	Binary
	Type of reserve	Description of the reserve based on time (partial, permanent) and / or protection (all species, or some species).	Categorical
	Who set up the reserve	The parties involved in setting up the reserve	Categorical
	Decision-making body composition	Who is part of the decision-making body?	Categorical/Continuous (scale)
	Community engagement in monitoring	Are users of near-by areas (fishers) and the community engaged in the monitoring?	Binary
	Illegal harvesting	Degree of illegal harvesting	Categorical
	Adaptive management plan	Does the reserve have an adaptive management plan	Binary
	Reserve enforcement	Description of how the reserve is enforced	Categorical
	Closed areas (for TURF-reserves only)	Percent of fishing grounds closed (for TURF-reserves only)	Continuous
	Size of network	Whether there is a single reserve or a network of multiple reserves within or nearby.	Discrete
	Reasoning for reserve location	Short explanation for why the reserve location was chosen.	Descriptive
	Are fishers organized?	Yes or No?	Binary
	How fishers are organized?	Whether the fishers are organized either in a coop, association, union or fisher organization. There may be multiple organizations of fishers for one reserve.	Categorical
	Number of species managed	Number of species managed under the management tool.	Discrete
	Type of species managed under the managed area	Group (fish, crustacea, mollusc,…) and category (pelagic, benthic, …)	Categorical