

Guidelines for Assessing Fish Conservation Zones

Measuring the Effectiveness of Community-Based Fish Conservation Efforts

Project Lead
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Overview

Community-managed fish conservation zones (FCZs) are a common approach to freshwater fisheries management across the Lower Mekong Basin, and provide a means for local people to directly manage their aquatic resources. FCZs are a type of freshwater protected area that often limit or prohibit fishing activities within their borders to protect fish populations or other aquatic species. Typically, more effort has been invested in establishing FCZs than in monitoring their performance. Effectiveness evaluations are a process for investigating whether FCZs are successfully meeting their objectives, and are a key step of the fisheries management cycle (Figure 1). However, in contrast to the abundance of monitoring that has taken place in marine protected areas, there have been few evaluations of freshwater protected areas such as FCZs, and few resources were available until recently.

To address this need, FISHBIO published a guidebook for assessing FCZs in 2019. This resource was developed in the context of the Lao People's Democratic Republic, but is also applicable to other countries in the Lower Mekong Basin. The FCZ guidebook includes methods for measuring 21 indicators of the biological, social, and governance effectiveness of FCZs. Indicators are specific qualitative or quantitative variables directly related to management goals that are used to measure management effectiveness (see Table 1). The results of an FCZ assessment can provide valuable information on the strengths and weaknesses of current management activities, and can offer insights on how these practices could be adapted. This can ensure that the significant time and resources invested in FCZ establishment and management are used most effectively.



Community interview about the perception of local fish catch.

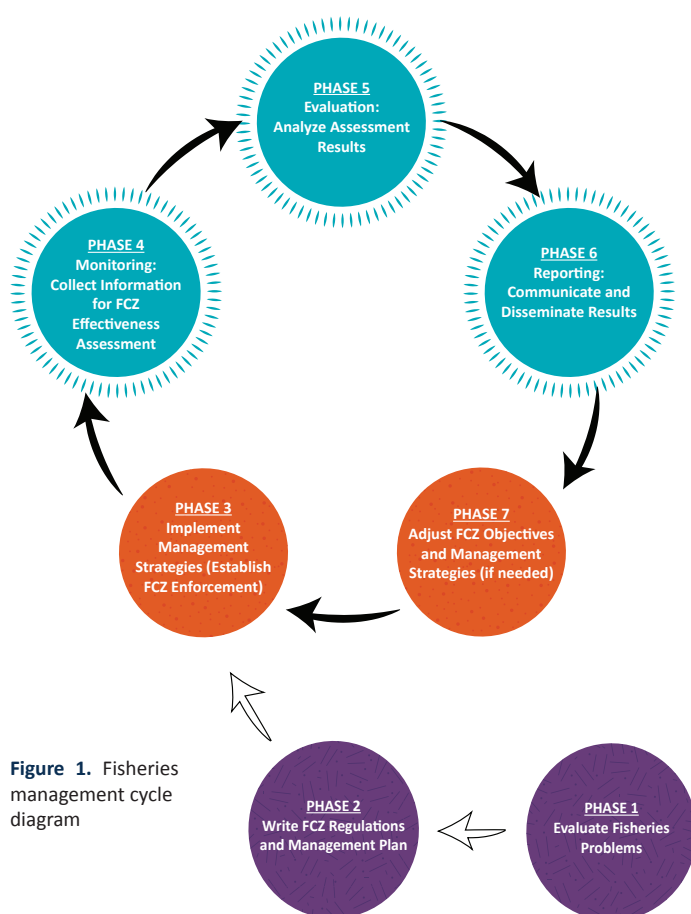



Figure 1. Fisheries management cycle diagram

A literature review conducted by FISHBIO found that studies of both marine and freshwater protected areas have measured indicators of biological effectiveness more frequently than socioeconomic and governance effectiveness (Loury and Ainsley 2020). However, the human dimensions of protected areas are just as important as environmental ones, especially in the Lower Mekong Basin where people depend heavily on aquatic resources – therefore, increased effort to measure socioeconomic and governance indicators of FCZs is warranted. While the FCZ guidebook was developed primarily for use by technical advisors, community participation in the FCZ assessment process is recommended to ensure that assessment results are integrated into future community management of an FCZ.

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Table 1. List of performance indicators linked to common FCZ objectives.

Category	FCZ Objective	Example Indicators	Example relationship between indicator and objective
 Biophysical	Increase the abundance of a focal species	Species abundance	Is the abundance of the focal species increasing over time inside the FCZ?
		Focal species population structure	What proportion of the focal species population inside the FCZ is of reproductive age?
	Increase total abundance of all fishes	Taxon abundance	Is the abundance of all fishes (or a group of fishes) increasing over time inside the FCZ?
	Protect or increase the biodiversity of aquatic species	Composition and structure of the community	Are various measures of biodiversity, such as richness, evenness and dominance, changing over time inside the FCZ?
	Protect critical habitats (e.g., spawning or rearing habitat)	Habitat distribution and complexity	Does the distribution of habitats include the critical habitat of interest? What is the quality of that habitat?
		Water quality	Is the water in the FCZ of sufficient quality for aquatic species to survive?
		Composition and structure of the community	How are species distributed among habitats in the FCZ?
		Focal species population structure	Are reproductive adults found in spawning habitats? Are juveniles found in rearing habitats?





Socio-economic

Category	FCZ Objective	Example Indicators	Example relationship between indicator and objective
Socio-economic	Increase community fish catches near FCZ through spillover	Fishery spillover: Species abundance	Is the abundance of the targeted fish species increasing over time inside the FCZ?
		Fishery spillover: Type, level, and return on fishing effort	Are members of the local community catching the targeted fish species outside of the FCZ? Is their return on effort increasing over time, indicative of spillover?
		Local aquatic resource use patterns	Have fishing patterns of the local community shifted closer to the FCZ boundary, indicative of spillover?
		Perceptions of local resource harvest or abundance	Do people perceive that fish catches have increased in the community, indicative of spillover? (indirect measurement)
		Perceptions of benefits derived from an FCZ	Do people perceive that fish catches have increased in the community as a result of the FCZ, indicative of spillover? (indirect measurement)
	Increase community food security	Level of household fish consumption	Are people eating more locally caught wild fish following the establishment of the FCZ?
		Local aquatic resource use patterns	Do people have more access to fish to eat as a result of increased fish catch?
		Perceptions of benefits derived from an FCZ	Do people believe that fish and other aquatic foods are more available as a result of the FCZ? (indirect measurement)
	Support community livelihoods	Household income/effort distribution by source	How many households are engaged in activities affected by the FCZ? How important are these activities to their income?
		Local aquatic resource use patterns	Are fishing livelihoods in the community affected by the FCZ?
		Perceptions of benefits derived from an FCZ	Do people perceive that their income has increased as a result of the FCZ? (indirect measurement)



Fish catch from local fisher.



Governance

Category	FCZ Objective	Example Indicators	Example relationship between indicator and objective
Governance	The FCZ has sufficient management inputs to achieve its goals	Existence and adoption of a management plan	Are there clear guidelines to guide management of the FCZ?
		Existence of a decision-making and management body	Is a designated group actively engaging in FCZ management?
		Availability and allocation of FCZ administrative resources	Are funding, equipment, and personnel sufficient and effectively distributed to achieve management goals?
	Community members support FCZ management	Local understanding of FCZ rules and regulations	Do people understand and agree with FCZ rules?
		Level of stakeholder participation and satisfaction in management	Do community members play an active role in FCZ decision making or management activities? Do they agree with or support FCZ management decisions or activities?
		Level of resource conflict	Have conflicts arisen among community members or between community members and managers related to dissatisfaction with FCZ management?
		Perceptions of benefits derived from an FCZ (socioeconomic indicator)	Is community support of the FCZ influenced by whether they think they have benefited from the FCZ?
	Good compliance with FCZ regulations	Local understanding of FCZ rules and regulations	Are community members aware of and do they understand FCZ regulations to ensure they are not violating rules unintentionally?
		Level of stakeholder participation and satisfaction in management	Do community members think FCZ regulations and decisions are fair, which may make them more likely to abide by the rules?
		Compliance with regulations	How many people are violating the rules, how often, and in what ways?
		Level of resource conflict	Are conflicts between resource users and managers leading to low compliance?



Community FCZ meeting.

Want more information?

The full FCZ Assessment Guidebook can be downloaded at <https://fishbio.com/fcz-guidebook/>

For additional details, please refer to the following open-access publication:

Loury E.K. and S.M. Ainsley. 2020. Identifying Indicators to Evaluate Community-Managed Freshwater Protected Areas in the Lower Mekong Basin: A Review of Marine and Freshwater Examples. *Water*; 12(12):3530. <https://doi.org/10.3390/w12123530>

