

# OSPESCA/CLME Pilot for the Shared Stocks of the Central American Lobster Fisheries – Governance Assessment

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*Sustainable Management of the Shared  
Living Marine Resources of the  
Caribbean Large Marine Ecosystem  
(CLME) and Adjacent Regions*

# OSPESCA/CLME Pilot for the Shared Stocks of the Central American Lobster Fisheries – Governance Assessment

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## Acronyms

### ACRONYMS AND ABBREVIATIONS

ACS	Association of Caribbean States
ANAM	Autoridad Nacional del Ambiente (Panamá)
AP	Área Protegida
APESCA	Asociación Pesquera del Caribe (Honduras)
APICA	Asociación Pescadores Industriales (Honduras)
ARAP	Autoridad de Recursos Acuáticos de Panamá
CAPENIC	Cámara de Pesca de Nicaragua
CARICOM	Caribbean Community and Common Market
CATHALAC	Water Center for The Humid Tropics of Latin America and the Caribbean
CBMAP	Corredor Biológico Mesoamericano del Atlántico Panameño
CCAD	Central American Environment and Development Commission
CENDAH	Centro de Desarrollo Ambiental y Humano (Panamá)
CENDEPESCA	Centro de Desarrollo de la Pesca y la Acuicultura (El Salvador)
CEP	Caribbean Environment Programme
CERMES	Centre for Resource Management and Environmental Studies
CLME	Caribbean Large Marine Ecosystem
CONAGEGIO y SNAP	Comisión Nacional para la Gestión de la Biodiversidad y Sistema Nacional de Areas Protegidas (Costa Rica)
CPUE	Catch per unit effort
CRFM	CARICOM Regional Fisheries Mechanism
CRI	Coral Reef Initiative
CSC	Caribbean Sea Commission
CSI	Caribbean Sea Initiative
DAPVS	Departamento de Areas Protegidas y Vida Silvestre (Panamá)
DAPVSICF	Instituto Nacional de Conservación y Desarrollo Forestal, Areas Protegidas y Vida Silvestre (Honduras)
DIGEPESCA	Dirección General de Pesca y Acuicultura (Honduras)
DIPESCA	Dirección de Pesca y Acuicultura (Guatemala)
DIPRONA	División de Protección de la Naturaleza (Guatemala)
DOF	Department of Fisheries (Belize)
DPN	Departamento Nacional de Planeación (Nicaragua)
DPNDIBIO	Departamento Nacional de Planeación / Dirección General de Biodiversidad (Nicaragua)
DSQDSMARENA	Dirección Seguridad Química Dirección Superior Ministerio del Ambiente y los Recursos Naturales
EA	Ecosystem Approach
EAF	Ecosystem Approach to Fisheries
EBM	Ecosystem-based Management
FAB (BEL)	Fisheries Advisory Board (Belize)
GCFI	Gulf and Caribbean Fisheries Institute
GEF	Global Environmental Fund
INCOPESCA	Instituto Costarricense de Pesca y Acuicultura (Costa Rica)
INPESCA	Instituto Nicaragüense de la Pesca
IOCARIBE	Inter-governmental Oceanographic Commission – Caribbean Subcommission
IUU	Illegal, Unregulated and Unreported (fishing)
LME	Large Marine Ecosystem

LMR	Living Marine Resources
MAF	Ministry of Agriculture and Fisheries (Belize)
MAGA	Ministerio Agricultura y Ganadería y Alimentación (Guatemala)
MAREA	Management of Aquatic Resources and Economic Alternatives Project
MARN	Ministerio de Ambiente y Recursos Naturales (Guatemala)
MASPLESCA	Manejo Subregional de las Pesquerías de Langosta Espinosa del Caribe
M&E	Monitoring and Evaluation
MCS	Monitoring, Control and Surveillance
MINAET	Ministerio del Ambiente, Energía y Telecomunicaciones (Costa Rica)
MINRE	Ministry of Natural Resources and the Environment (Belize)
NOAA	National Oceanic and Atmospheric Administration
NGO	Non-Governmental Organization
OLDEPESCA	Fishing Development Latin American Organization
OSPESCA	Organization of the Fishing and Aquaculture Sector of the Central American Isthmus
SAG	Secretaría de Agricultura y Pesca
SAP	Strategic Action Programme
SEMARNAT	Environment and Natural Resources Secretariat
SERNA	Secretaria de Recursos Naturales y Ambiente (Honduras)
SERNACESCO	Secretaria de Recursos Naturales y Ambiente/Centro de estudio y control de contaminantes (Honduras)
SERNA DIBIO	Secretaria de Recursos Naturales y Ambiente / Dirección General de Biodiversidad (Honduras)
SICA	Central American Integration System General Secretariat
STRI	Smithsonian Tropical Research Institute (Panamá)
TDA	Transboundary Diagnostic Analysis
TNC	The Nature Conservancy
TWAP	GEF Transboundary Waters Assessment Project
WCR	Wider Caribbean Region
WECAFCC	Western Central Atlantic Fishery Commission
WSSD	World Summit on Sustainable Development
WWF	World Wildlife Fund

## Summary

Detailed assessments of governance architecture such as the one carried out in this study for the shared stocks of the Central American lobster fisheries are few. Technical assessments of resources and their habitats are far more common. The purpose of the assessment carried out here is to dissect and display the suite of governance arrangements for the six major issues identified for the Central American lobster fisheries in the Caribbean, in order to facilitate discussion among stakeholders. This discussion can lead to shared perceptions of what should be in place, what principles should be prominent and how the system should be structured. The assessment is not intended to lead to a prescriptive output regarding what should be in place. Nonetheless, some broad observations can be made on aspects of the system that need attention if arrangements are to be structured in a way that is likely to lead to effective governance, including the promotion of inter-sectoral and inter-issue integration that is needed for an ecosystem approach.

The assessment was carried out at two levels:

- Level 1 examined the governance arrangements or architecture
- Level 2 made a preliminary assessment of functionality according to several basic principles.

The area for the assessment was the Caribbean waters off the coasts of Belize, Guatemala, Honduras, Nicaragua, Costa Rica and Panama with special attention paid to the fishing grounds harvested by the fishers of Caye Caulker (Belize), Roatan (Honduras) and Guna Yala (Panama). The assessment focuses on living marine resources and the requirement for an ecosystem approach to ensure their sustainable use.

Six key living marine resource issues were identified for governance on the Caribbean waters of the Central American lobster fisheries:

- Overfishing
- Illegal fishing
- Monitoring, Control and Surveillance (MCS)
- Habitat degradation and biodiversity loss
- Land based pollution of marine pollution
- Marine-based pollution.

It should be noted that the rationale provided for considering habitat degradation and biodiversity loss as a single issue was based on the strength of the cause-effect relationship between these two variables. Additionally, there are social issues on the three country level sites relating to human health (particularly from diver-induced illnesses in Honduras and Nicaragua), drug use, alcoholism, crime and safety that are considered to be beyond the scope of this assessment.

Due to time and financial constraints, individual arrangements for these six issues were examined with input from technical experts involved in the CLME lobster pilot from the Organization of the Fishing and Aquaculture Sector of the Central American Isthmus (OSPESCA), including the consultant responsible for conducting the principal stakeholder assessment. These experts worked over a two-day period with the CERMES governance consultant to provide the input used to complete this preliminary governance assessment. The extent of interaction among these arrangements, such as would be needed for an ecosystem approach, was also examined. With regards to the three country-level sites, it is expected that feedback from local level stakeholders on the governance arrangements will be solicited by the

OSPESCA stakeholder consultant, using the methodology described in this report at the three country-level sites.

Three major observations are highlighted in this assessment.

The first is that there is a significant disconnect, both vertically and horizontally, between the arrangements for issues relating to fisheries (i.e. overfishing, illegal fishing and MCS) and those that relate to habitat degradation, biodiversity protection and land-based and marine-based pollution. This is not a surprising finding given the bureaucratic structures in place for most modern nation states but it does present a significant challenge in shifting from a sectoral approach to management to one that is ecosystem based.

The second observation specific for the Central American lobster fisheries system is the relatively well developed meta-level policy advice and policy decision making that is provided for by SICA/OSPESCA. The ability for SICA/OSPESCA to formulate and make decisions on a sub-regional level that would be implementable by all member countries provides the opportunity for a common suite of principles and policy objectives to be achieved for the fisheries system, thereby contributing to an effective governance regime. Areas for improvement include the lack of involvement in issues not directly fisheries related but which could have a significant impact on the fisheries, such as habitat degradation, biodiversity protection and pollution of the marine environment, whether the source be land-based or marine-based. There is an opportunity for SICA to ensure greater connectivity between its two sub-units, OSPESCA and CCAD.

The third observation that could potentially have the most significant impact on the likelihood of implementing an effective governance regime for the lobster fisheries within the Central American sub-region is the variation in the attention being given to the identified issues by the different countries. Given the shared nature of the resource, this pattern could serve to undermine the efforts made by some countries to enhance governance arrangements and performance for the lobster fisheries in the sub-region.

With regard to the Level 2 assessment, based on the extent to which experts perceived certain principles as being observed in the arrangements, the general picture is that experts did not consider the processes as being highly functional with regard to the principles. Improvement of these perceptions and scores could be a governance objective. This general conclusion provides the opportunity to reflect on what might be done differently in order to improve the arrangements with respect to the principles.

It is thought that dissecting the living marine resource governance issues as has been done in this assessment will provide insights and a framework for developing a robust governance architecture and principled processes for the marine ecosystem of the Caribbean waters off the coasts of the six Central American countries of Belize, Guatemala, Honduras, Nicaragua, Costa Rica and Panama.

# 1 Introduction

## 1.1 The CLME Project and LME Governance Framework

The Caribbean Large Marine Ecosystem and Adjacent Areas (CLME) Project ([www.clmeproject.org](http://www.clmeproject.org)) aims to improve management of shared living marine resources (LMRs) within the Wider Caribbean Region (WCR). The Transboundary Diagnostic Analyses (TDAs) have identified weak governance as a root cause of the problems facing these social ecological systems (Mahon et al, 2011a). Therefore, the CLME Project has a strong emphasis on assessing LMR governance systems and on proposing ways of strengthening them. The background to the way that governance is treated in the CLME Project, including the development of the LME Governance Framework, is discussed in Mahon et al (2011a).

The CLME Project is designed to begin the process of building the framework for the WCR through a series of targeted activities aimed at specific parts of the framework and at testing the effectiveness of the LME Governance Framework concept (Fanning et al, 2009a; Mahon et al, 2010a). This is expected to be a long term process of conceptualising, operationalising, testing, learning and adapting that involves the over two dozen countries in the WCR and its various ecosystems (e.g. continental shelf, pelagic and reef). This is no simple undertaking. It requires a systematic and incremental approach.

The purpose of the CLME pilot projects and case studies, such as this one, is to examine and understand key parts of the governance framework through 'learning by doing'. The pilots and cases explore, by means of practical examples, how developing functional policy cycles and linkages may lead to improved transboundary LMR governance in the WCR. These projects have been designed to encompass the full range of transboundary LMR situations, each with emphasis on a different level of the LME governance framework and a different geographical region of the WCR.

## 1.2 About this report

The governance assessment of these pilots and case studies uses a common methodology (Mahon et al, 2011b) that is summarised in section 2.1 below. Following this, we use the methodology to assess governance of the Central American lobster fisheries ecosystem and to frame what we can learn and improve as a result. This report is mainly for discussion amongst the governmental and non-governmental case study participants and interested parties. By illustrating strengths and weaknesses in the assessed governance of the system, it contributes to the elaboration of the regional governance framework and formulation of the Strategic Action Programme (SAP) which is the next major stage of the CLME project.

There is an abundance of literature related to the spiny lobster in the Wider Caribbean, as is evidenced by the over 200 references which have been collected and inputted into an ACCESS database by the OSPESCA stakeholder consultant for this CLME pilot (Diaz, pers.comm.) It is expected that the database will soon be available on the CLME Project website for use by interested stakeholders, managers and decision-makers in the WCR. Since the target audience for this report comprises primarily fisheries stakeholders, we assume familiarity with or access via internet to this literature. Kindly consult the resources mentioned later if you require background on the fishery. In addition, the 2007 CLME thematic report of the Central/South American Sub-region (Martinez, 2007) and the 2011 CLME Reef and Pelagic Ecosystems Transboundary TDA (Heileman, 2011) are available at [www.clmeproject.org/](http://www.clmeproject.org/) for downloading.



## 2 Overview of LMR governance assessment

### 2.1 General approach to assessment

The approach to doing the LMR governance assessment for the CLME project builds on the methodology developed by Mahon and others (2011b, 2011c) for the Transboundary Waters Assessment Programme (TWAP). TWAP is a GEF project to develop indicators for monitoring all aspects of the projects in the GEF's International Waters (IW) portfolio. The discussion and methodology paper by Mahon et al (2011d) addresses the monitoring of governance. While the focus is on the LME component of the IW Programme, the assessment approach and methodology were developed for the entire GEF IW programme. To a large extent they were based on experience gained in developing the CLME Project and is therefore considered appropriate for adaptation to the CLME pilots and case studies.

The TWAP approach to be adopted and adapted here is two-level. It is described in detail by Mahon et al (2011b). It has been adapted to the CLME pilots and case studies in a working paper (Mahon et al 2011c). Level 1 assesses governance architecture or structural arrangements, and a methodology has been developed for this. Level 2 assesses the performance, or actual operational functioning, of the governance arrangements or architecture identified in Level 1 (Figure 1). As an analogy, Level 1 is like the structure of a house. It should be well-designed to function with all the key components (e.g. has windows and doors). Level 2 is the functionality such as how well the ventilation and security actually work (e.g. windows are not opened enough for air flow or doors are not closed securely) despite good design.

### 2.2 The Central American Lobster Fisheries Pilot

OSPESCA is the implementing agency for the Central American lobster (*Panulirus argus*) pilot. It serves as the organization within the Central American Integration System (SICA) that promotes the coordinated development and management of regional activities of fisheries and aquaculture, contributing to strengthening the Central American integration process. Its organizational structure has a Council of Ministers responsible for fisheries and aquaculture, which is the highest authority representing the political level of the member states.

While Belize, Guatemala, Honduras, Nicaragua, Costa Rica and Panama are members of the CLME Project and are included in the pilot, this CLME sub-project also identifies three national sites for in-depth analysis: Caye Caulker (Belize); Roatan (Honduras); and Guna Yala (Panama). A thorough description of the case study is provided by OSPESCA (SICA/OSPESCA, 2010).

The overall project objective as provided by OSPECA (2010) is:

- to demonstrate the best practices of effective management and governance for the lobster fishery at local and national levels that are linked to a strong sub-regional management and governance framework. By strengthening governance and management at lower levels and increasing awareness of regional interdependence, the project seeks to establish the basis for more effective compliance with sub-regional and regional agreements.

The specific objectives of the pilot are to:

- Identify and test models of management and governance at local community levels that can be replicated and improved to support the national levels and allow for the development of self-governance and ownership of the fishery;
- Promote strong links between the local, national and sub-regional levels of governance, promoting communication networks and information transfer.

- Agree on a sub-regional management plan for the spiny lobster fishery that has been tested and validated at local and national levels.

To achieve the above objectives, four components have been developed:

- **Component 1.** Identification of key management problems in the lobster fishery, from the standpoint of biological, ecological, economic, social and governance issues.
- **Component 2.** Prioritization of key issues and validation of models of management and governance of the region.
- **Component 3.** Development of a management plan for the Central American sub-region.
- **Component 4:** Adaptive management and learning, including transferability of lessons learned to other areas within the WCR.

The need for understanding the management and governance of the shared Central American lobster fisheries ecosystem arises from the significance of this species to the region (Martinez et al, 2007). Its sustainable management is very important for the attainment of national economic and social development goals, as well as for the human well-being and livelihoods of individuals and families dependent on these fisheries. The documented decline and in some cases overexploitation of the resource is considered to be a great threat both from the biological as from the socio-economic standpoint (Ehrhardt et al, 2011). This decline may be in part due to the lack of a governance regime in which all actors in the fish chain, from production and distribution to consumption, have input to decisions affecting the resource.

Problems facing the sustainable management of the fishery include: open-access nature of the fishery and failure to control fishing effort; large-scale landings of juvenile lobster and berried females; diving accidents of lobster divers; large-scale illegal, unregulated and unreported (IUU) fishing; lack of control and surveillance; lack of harmonization amongst fisheries regulations of the countries involved; insufficient financial resources and human capacity in government institutions; and lack of capacity (organizational, human, financial and technical) among fishers and others involved in the fishery to engage meaningfully in its management (SICA/OSPESCA, 2010).

The lack of information throughout the region on landings, effort, IUU fishing, juvenile and berried females has also led to inadequate fishery management policies. The importance of the lobster fisheries and their management in the Caribbean has been widely recognized by institutions such as the Gulf and Caribbean Fishery Institution (GCFI), FAO – Western Central Atlantic Fisheries Commission (WECAFCC), Caribbean Regional Fisheries Mechanism (CRFM), Caribbean Fishery Management Council (CFMC), and the National Oceanic and Atmospheric Administration (NOAA). Furthermore, the lobster fishery is significant throughout the Wider Caribbean in that it is regional and transboundary by virtue of planktonic dispersal, whilst local and national in terms of its governance. The fact that it is traded extensively within the region and beyond also calls for a regional approach to management.

In 1980, FAO WECAFCC initiated a Working Party on spiny lobster management at its Commission meeting in San José Costa Rica, which included most of the countries in the region with a lobster fishery (WECAFCC, 1982). In 1997, the Working Party was replaced by a WECAFCC *Ad Hoc* Working Group which has conducted five more workshops on the management of this resource: Belize (1997), Merida, Yucatán (1998 and 2000), Cuba (2002), and Mérida (2006). These meetings included major lobster fishing countries with the support of experts to facilitate the analysis of the information.

At the 2006 FAO Workshop (FAO, 2007), one of the major decisions taken was to divide the stocks in the Western Central Atlantic – FAO Fishing Area 31 -, into four groups, based on the biogeography and knowledge of the prevailing currents in the region:

- **Group I - Northern Stock:** Bahamas, Bermuda, Cuba (North), Turks and Caicos Islands and United States of America (Florida).
- **Group II - North Central Stock:** Belize, Cuba (Southwestern) and Mexico.
- **Group III - South Central Stock:** Colombia, Costa Rica, Dominican Republic, France (Guadeloupe and Martinique), Haiti, Honduras, Jamaica, Nicaragua and United States of America (United States Virgin Islands and Puerto Rico).
- **Group IV - Southern Stock:** Antigua and Barbuda, Brazil, Netherlands Antilles, Saint Lucia and Venezuela.

There has been considerable effort in the region to assess and address the problems of the lobster fishery by organizations at different jurisdictional levels and at different stages in the policy cycle. Lack of monitoring, control and surveillance (MCS) is a common problem amongst the countries in the region, resulting in increased fishing effort and large-scale IUU fishing (SICA/OSPESCA 2010). The large-scale illegal sized lobster catches, which can contribute between 25-50% of the total catch in some countries, are not reported to the national fisheries agencies and can lead to significant bias in estimates of the biomass and the age structure of the stocks (Ehrhardt et al, 2011). Many governments lack information on the state of exploitation such as the catch per unit of effort (CPUE), the catchability coefficient ( $q$ ); and, due to the lack of local-level information related to the applied effort, many of the countries cannot estimate maximum sustainable yield (MSY), assess biomass or correctly set annual catch quotas. Failure of adequate control, combined with the high unit value of the species at the global market, has resulted in many conflicts between fishing groups (e.g. small-scale vs. industrial, trappers vs. divers and national vs. international fleets).

In January 2005, OSPESCA held a meeting in Managua, Nicaragua entitled the “Regional Alternatives for the Harmonized Administration of the Lobster Fishery in the Caribbean, on the basis of coordinated actions”. As an outcome of this effort, Nicaragua and Honduras signed an agreement on the harmonization of the closed season, minimum size, a ban on lobster meat exports, the dimension of the escape gap in lobsters’ traps, and other management measures, with the support of delegates from Belize, Costa Rica, Guatemala, Panama, and in the presence of delegates of Bahamas, Colombia and México, and the Latin America Fishing and Aquaculture Organization (OLDEPESCA). Since that time, a harmonized closed season regulation (with some minor variations in the time of closures for Belize) has been signed by the member states in the Dominican Republic in May 2009 (SICA/OSPESCA 2009).

It is worth noting that in addition to the sub-regional efforts undertaken by OSPESCA, the Caribbean Regional Fisheries Mechanism (CRFM) has undertaken an *Assessment of the spiny lobster of Belize based on fishery dependent data*, with support from the United Nations University-Fisheries Training Program (UNU-FTP). The aim of the partnership is to strengthen fisheries institutional capacity in the Caribbean. Based on the analysis conducted, the results showed that declines over a ten year period (1999-2009) in catches and abundance of lobster have occurred and it is believed that the resource is overfished. However, the results of the study were uncertain due to limited data. The management recommendations from this study were a reduction in fishing effort and an increase in the minimum size of harvested lobster (CRFM, 2011).

This problem of overfishing continues to be a perennial one in the region as one of the conclusions of the Cuba 2002 workshop was: “we recognize that while some progress has been made in addressing

these recommendations and conclusions, much still remains to be done and that in much of the region, problems in the fisheries and their management continue to threaten the sustainable utilization of the resource” (FAO 2003). Similarly, in Merida in September 2006, the FAO workshop report noted that “despite good management and control, the populations in these important lobster areas – referring to Cuba, Mexico and USA – are showing signs of declining”. The stocks were also found to be declining in the South and North Central Region, as well, where the report highlighted “the unacceptable high levels of capture of undersize and juvenile lobster that was being reported by the countries” (FAO 2007).

Key issues with respect to the fishery that have been highlighted in a number of technical reports and scientific peer-reviewed articles (Ehrhardt, 2011), can be summarized as follows:

- The spiny lobster is a transboundary species, which spends a year drifting in the ocean waters while in larval stage, indicating that some countries are supplying larvae to their neighbors or even farther, and that the harvest of one country affects the potential harvest of the neighbouring countries;
- In most of the countries, there is a lack of information on the fishing effort applied in industrial and small-scale fisheries; that is the number of fishermen, small-scale boats, number of traps, scuba tanks, compressors, hookahs and other means that are used in the different countries for capturing this resource;
- In most countries, there is little input from the local level into the policy cycles at higher levels resulting in fractured vertical linkages and dysfunctional policy cycles at multiple levels;
- Despite the fact the Caribbean spiny lobster is a single species and the concept of a regional population has been usually accepted, the legal size for harvest varies from one country to another, mostly due to market-driven factors. This results in growth overfishing, as has been recognized by scientist at different workshops, including FAO 2006. In most countries, markets for undersized lobster exist, hence the imperative to include actors throughout the fish chain in the sustainable management of the resource.
- Closed seasons are one of the most restrictive management measures taken in fisheries, severely affecting the lives of fishermen. Yet, they are necessary when other measures fail. However, closed seasons are often implemented without input to the decision from the local level. There are many examples of neighbouring countries making decisions that result in differing periods of the year marked as the closed season without having adequate information, analysis and advice on the spawning or the recruitment season.

Even as the pilot proceeds, other events are unfolding in the region. For example, the prohibition of commercial divers in the harvesting of lobster in Honduras and Nicaragua is creating considerable social conflict as divers and commercial operators explore alternative means of making a living. Given the lucrative nature of the fishery, this loss in income could have a considerable impact on the socio-economic aspects of the fishery with the potential for increasing conflict and non-compliance of the prohibition in areas where monitoring is lacking.

In view of the fishery situation not being static, this governance assessment is necessarily a snapshot. We expect monitoring and evaluation, which results in learning and adaptation, to be integrated into ongoing efforts for improving fishery governance. In this spirit, the Level 1 and Level 2 assessments offered below are intended primarily to provoke thought and discussion rather than be a thorough diagnosis or offer any remedial prescriptions. Constructive criticism and alternatives are encouraged.

### 3 Level 1 assessment - architecture

The steps required for the Level 1 assessment are outlined in Figure 1 and the outputs of the assessment will be described step-by-step in this section.

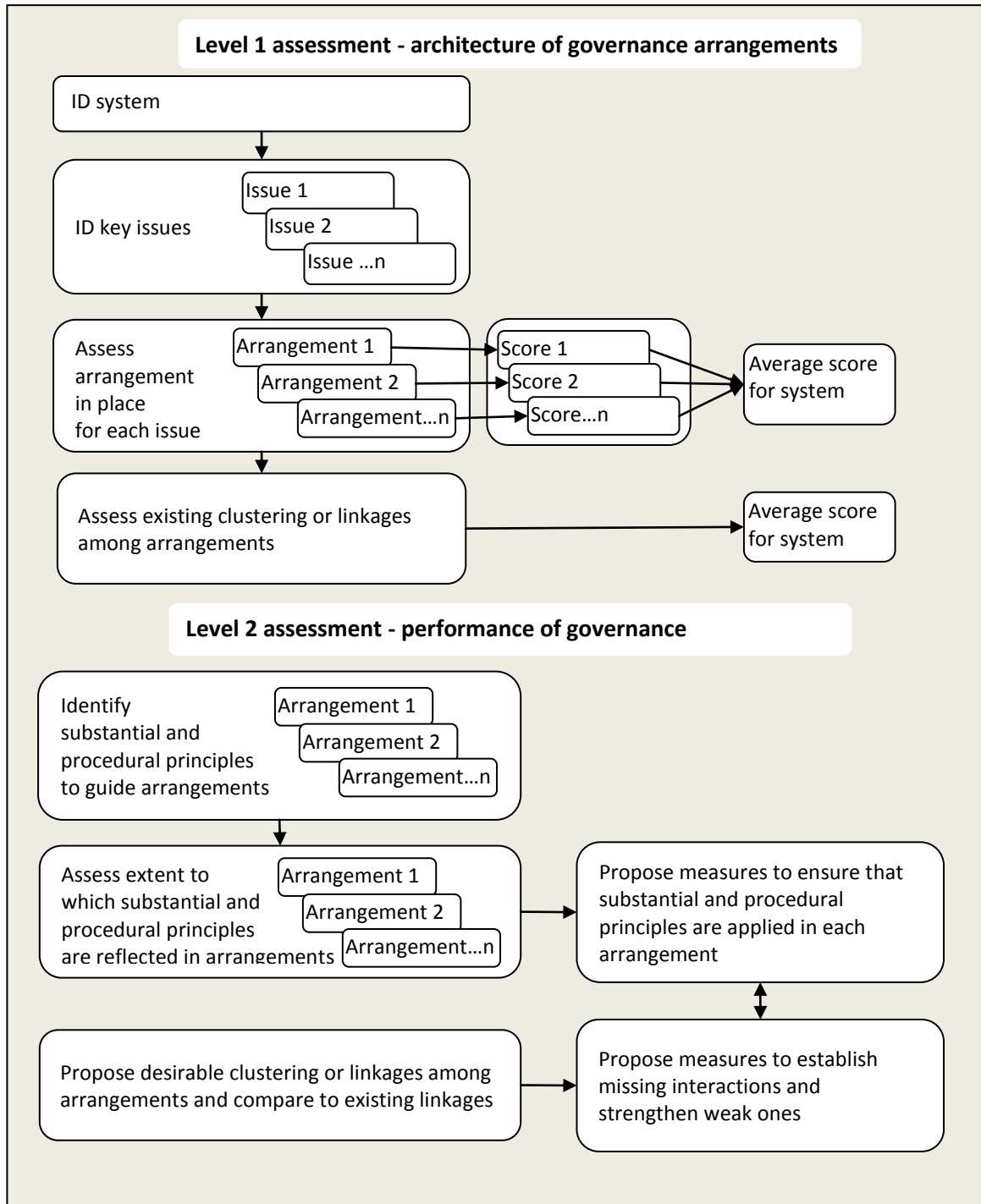


Figure 1. Level 1 and Level 2 processes used for assessing governance for CLME fishery social ecological systems

First we identify the social-ecological system that is Central American lobster fisheries and then the main transboundary and shared issues related to it. Next we investigate what, if any, governance arrangements exist to address the issues, paying attention to the policy cycle model. Where an arrangement addresses several issues or an issue is addressed by several arrangements, we look to see if or how arrangements can be clustered for a more complete picture of the structure, taking the principles of ecosystem-based management into account as well. In Level 2 we use a suite of governance principles to evaluate the actual performance of arrangements.

### 3.1 System to be governed

Governance of LMR must be place-based (Crowder et al, 2006; Young et al, 2007). Coastal states have marine jurisdictions even if these are not always formally agreed upon through negotiation and delimitation. The geographical boundaries of the system, and the countries involved in the particular fishery social-ecological system, must be clearly identified as a basis for determining the issues and arrangements.

In this CLME lobster pilot, the area of the fisheries' social-ecological system to be governed is determined by the Caribbean waters of six of the member countries of OSPESCA. These are Belize, Guatemala, Honduras, Nicaragua, Costa Rica and Panama. The area of combined possible marine jurisdictions is roughly sketched in Figure 2 with the red line while the local sites are indicated by the red dots. Yellow lines show the boundaries of LMEs in the region.

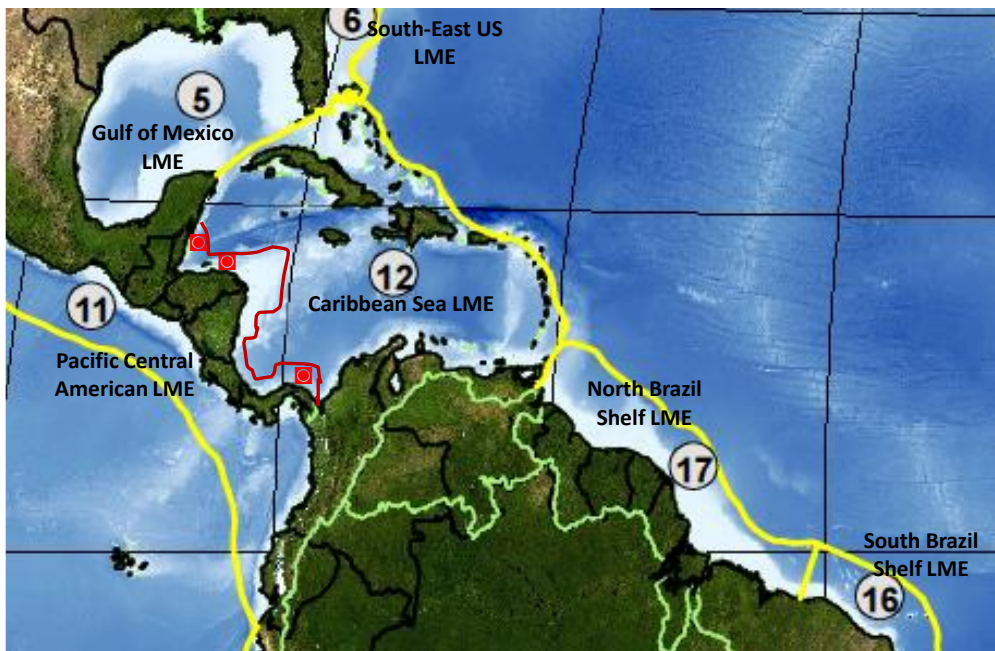


Figure 2. Sketch Map of Central American Lobster Fisheries System and Country Level Lobster Pilot Sites at Caye Caulker Belize; Roatan Honduras and Guna Yala, Panama

## 3.2 Issues to be governed

The desired approach to governance of the Central American lobster fisheries socio-ecological system in the Western Caribbean, (focusing on both the entire system (six countries) and including the three national level sites) is an integrated one that is consistent with ecosystem based management or the ecosystem approach to fisheries (EAF) of FAO. This requires that the full range of issues that may be relevant to sustainable use of living marine resources be considered.

The key issues identified for governance are:

- Overfishing throughout the entire area
- Illegal fishing throughout the entire area
- Lack of monitoring, control and surveillance (MCS)
- Habitat degradation and biodiversity loss
- Land based pollution of the marine ecosystem
- Marine-based pollution (include fishing vessels, ships, rigs (future))

Clearly these issues are linked or interacting. Yet, they should be sufficiently distinct to elicit differences in the policy cycles, degree of importance and other metrics of how structurally complete the governance arrangements are. The overlaps among issues will help to turn our attention to whether or not the governance arrangements, if any, can reasonably be clustered. As mentioned above, we acknowledge that there are also broader social issues relating to human health, drugs, alcoholism, crime and safety that have been associated with the lobster fisheries, especially in areas using commercial divers but these are considered to be beyond the scope of this assessment.

**What is missing?** According to our criteria, there should be little else of major importance. All three of the transboundary issues of overfishing, habitat degradation and pollution highlighted in the report by Martinez (2007) for the Central American sub-region and in the Reef and Pelagic Ecosystems TDA (Heileman, 2011) were identified by the experts. Given the marine spatial range for the lobster fisheries, it is no surprise that for countries such as Belize and Panama that harvest the resource close to shore, land-based sources of pollution are a significant transboundary issue. Additionally, the high degree of agricultural activity in Honduras is identified as a source of contamination. For all of the countries, habitat degradation and biodiversity loss were viewed as significant transboundary issues to be addressed, arising from a variety of sources but especially coastal development and tourism-related activities on land and at sea. It is important to note that the experts involved in the identification of the issues component of the assessment concluded that the strong causal relationship between these two issues were such as to treat them as a single issue. Illegal fishing and overfishing were common to all parts of the system although it was noted that MCS was particularly a problem for the industrial fisheries practised further offshore in Nicaragua and Honduras.

### 3.2.1 Identify arrangements for each issue

The assessment of completeness of an arrangement for an issue (Table 1) is based upon whether there are organizations with responsibility for the various stages of the policy cycle for that issue. The columns showing responsible agency or body in Tables 2-7 (one for each issue), were populated in consultation with experts from OSPESCA and CERMES over a two day period and checked for accuracy with the findings of technical reports and the peer-reviewed literature.

It is important to note that this expert judgment is only a first step in the assessment of incompleteness. With a greater number and type of stakeholders providing feedback, the opportunity for capturing a

wider cross-section of stakeholders' views would lead to greater confidence in the research findings as the possibility would exist for both divergent and convergent views to be expressed. These tables can all be reviewed and revised by the fishery stakeholders via several consultative modes, the most interactive but costly of which is face-to-face meeting. For example, as was noted previously, one of the experts who participated in the identification of arrangements for this report was the OSPESCA consultant responsible for conducting the stakeholder analysis in the six countries and at the three sites in Caye Caulker, Roatan and Guna Yala. Having been exposed to the methodology, the possibility of conducting the assessment at these sites was raised and should this occur, an updating of the calculated level of incompleteness should take place. Other alternatives for obtaining input into the assessment are through internet communication or 'round robin' edits.

The assessment of completeness of an arrangement for an issue (Tables 2-7) is based upon whether there are organizations with responsibility for the various stages of the policy cycle for that issue. For this assessment, a basic policy cycle is used (Figure 3). However, the assessment process recognises that the policy cycle must have functionality at two levels: (1) Policy setting, and (2) Management planning and decision making. These are sometimes the responsibility of different organisations (Fanning et al in prep). Thus Tables 2-7 allow for both levels in terms of advice and decision making.

Where an organisation or body exists that has the potential to perform a function, but has not demonstrated any evidence of achieving that potential, the completeness receives a zero in order to reflect the current structure. This differs from evaluating the performance of arrangements as done in Level 2 of the governance assessment. It says that structurally the body is basically invisible.

We present the tables in sequence below, but note that while the left half of Table 1 is filled out initially, the right half can only be filled in after Tables 2-7 are done and the data are available for insertion in the columns for completeness and priority. The table notes describe the contents in more detail. After Table 7 there is a summary discussion of the findings.

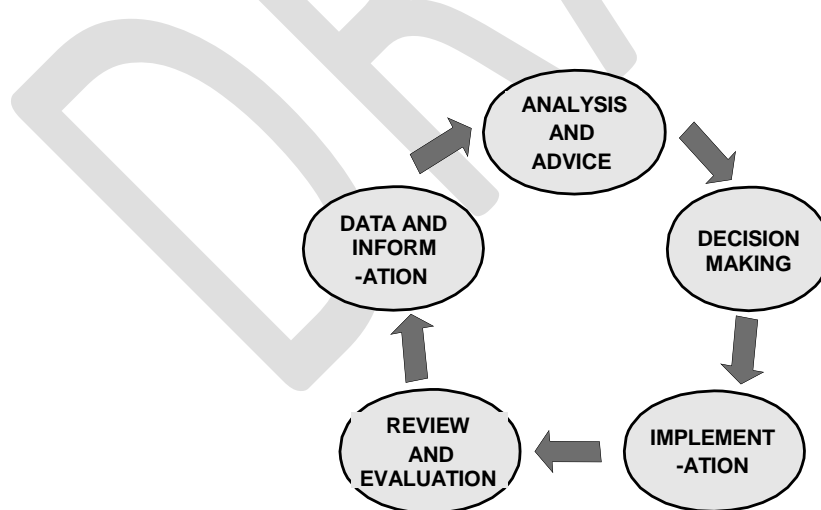


Figure 3. Components of a basic policy cycle to be used for the proposed governance assessment methodology.



**Table 2: CLME fishery ecosystem governance architecture for CA Lobster Fisheries - System summary<sup>1</sup>**

IW category: LME	Countries: Six (Belize, Guatemala, Honduras, Nicaragua, Costa Rica, Panama)		System name: Central American Lobster Fisheries Socio-Ecological System	Region: Latin America and the Caribbean	
<i>Complete these columns then assess issues using the arrangements tables (Tables 2-7)</i>			<i>After completing the arrangements tables, complete these columns</i>		
Trans-boundary issue <sup>2</sup>	Number of countries involved <sup>3</sup>	Collective importance for countries involved <sup>4</sup>	Completeness of governance arrangement <sup>5</sup> % (category)	Priority for intervention to improve governance <sup>6</sup>	Observations <sup>7</sup>
Overfishing	6	3	61% (2)	6	Significant problem both in reports and in practice, (especially in Honduras and Guatemala)
Illegal fishing	6	3	48% (2)	6	Claims of being important, but little action yet in some countries; Of the six countries, Belize and Nicaragua most active in addressing this problem. Also a very sensitive topic often avoided
Monitoring, Control and Surveillance (MCS)	6	3	33% (2)	6	Claims of being important, but little action yet in most countries. Also a very sensitive topic with limited hard data and often avoided
Habitat degradation and biodiversity loss	6	2	33% (2)	4	Little linkage between lobster fisheries arrangements and Ministries responsible for habitat degradation and biodiversity protection
Land-based sources of marine pollution (LBS)	6	1	38% (2)	2	Little linkage between lobster fisheries arrangements and Ministries responsible for LBS.
Marine-based sources of pollution (MBS)	6	2	43% (2)	4	Little attention given to this within the fishing arrangement for lobster and little linkage between lobster fisheries arrangements and ministries responsible for MBS
	System architecture completeness index <sup>8</sup> >>		43%	4.7	<< System priority for intervention <sup>8</sup>

Table notes:

<sup>1</sup> This page provides an overview of all the arrangements in the system and their status.

<sup>2</sup> There is the question of how far down in detail these should go. This can be a matter of choice, and part of the flexibility of the system, but it should ideally be to the level where the transboundary issue requires a separate arrangement for management. To use a fishery example, individual species or groups of species may each require their own assessment and measures, but may all be handled in one institutional arrangement. However, for geopolitical reasons, some species or groups of species may require separate processes and should be treated as separate issues needing separate

arrangements. Ideally, these issues should be identified and quantified in a TDA. If not, experts knowledgeable about the system may have to identify them.

<sup>3</sup> Indicates how many of the total number of countries are involved in the particular issue.

<sup>4</sup> This should be based on the TDA but may have to be based on expert judgement, or other sources of regional information. It is to be scored from 0-3.

<sup>5</sup> The percentage given in this column is derived from the completeness scores allocated on the arrangement specific page (Tables 2-7). This score will then be reallocated into a category where none = 3, low = 2, medium = 1 and high = 0) for input into the Priority for intervention column. The reason for reversing the score is that the higher the completeness, the less the need for intervention.

<sup>6</sup> This priority would be calculated as the product of the 'collective priority for countries involved for the issue' and completeness category. It can range from 0-9.

<sup>7</sup> This provides the opportunity for brief comments that may help the user interpret the information provided on the summary page, but is not intended to be a substitute for annotation.

<sup>8</sup> Average.

For filling in Tables 2-7, it does not matter at which stage in the policy cycle the assessment starts. Some may find it more intuitive to start with 'data and analysis' as the first row to be filled in while others may prefer another starting point.

**Arrangements by issue table notes (applies to the following Tables 2-7)**

<sup>1</sup> This column lists the governance functions that are considered to be necessary at two levels: (1) the meta-level of policy preparation and setting; and (2) the policy cycle level as per Figure 3.

<sup>2</sup> The organisation or organisations responsible for the function should be listed here

<sup>3</sup> These are the level or levels on the jurisdictional scale at which the function is performed. There are five levels on the scale of jurisdiction: local, national, sub-regional, regional, and extra-regional.

<sup>4</sup> Rate on a scale of 0 = absent, 1 = low (ad hoc, irregular, unsupported by formal documentation or little known by stakeholders) , 2 = medium, 3 = high (clearly identifiable, regular, documented or supported by policy and legislation and widely known among stakeholders)

<sup>5</sup> This provides the opportunity for brief comments that may help the user interpret the information provided, but is not intended to be a substitute for annotation.

<sup>6</sup> Assume each step is equally important and receives equal weighting for the completeness overall.

**Table 2: CLME fishery ecosystem governance architecture for CA Lobster Fisheries – Summary for Overfishing Issue**

Arrangement: Central American Lobster Fisheries		Issue: Overfishing		
Policy cycle stage (governance function) <sup>1</sup>	Responsible organisation or body <sup>2</sup>	Scale level or levels <sup>3</sup>	Completeness <sup>4</sup>	Observations <sup>5</sup>
Meta level - preparation of policy advice	SICA/OSPESCA; CARICOM/CRFM; FAO-WECAFC	Regional, sub-regional,	2	Mainly OSPESCA and CRFM (for Belize) While WECAFCC used to be active, it does not provide much guidance now.
Meta level - Policy setting or decision-making	SICA/OSPESCA; CARICOM/CRFM; FAO-WECAFC	Regional	2	While WECAFCC used to be active, it does not provide much guidance now.
Provision of data and information	GCFI, MAREA, OSPECA, STRI (PAN); cooperatives (BEL); NGOs (TNC, WWF, IDF); Fisheries Associations - APESCA (HON); CAPENIC (NIC); Univ. of Costa Rica	Regional, sub-regional	2	Fishing associations have lots of information but do not necessarily share all of it
Analysis and advice	OSPESCA; CARICOM/CRFM; FAO-WECAFC FAB (BEL); CAPENIC (NIC); FISHERIES DEP; ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC); DIPESCA (GUAT); INCOPECA (CR)	Regional, sub-regional, national	1	OSPESCA cycle Complete, Some countries, (e.g Honduras) have less ability to contribute than others. For example Nicaragua considered the best country for providing management advice, followed by Belize
Management decision-making	MIN OF AG&FISH(BEL); ARAP (PAN); SAG (HON); INPESCA (NIC); MA&GANADERIA (GUAT); INCOPECA (CR) Local govts or autonomous govts (NIC & PAN)	National, local	2	Nicaragua and Panama have district level and sub-national and municipal governments who make decisions
Implementation	FISHERIES DEP(BEL); ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC); DIPESCA (GUAT); INCOPECA (CR); local govts or autonomous govts(NIC & PAN)	National, local	2	
Monitoring and Evaluation	OSPESCA; FISHERIES DEP (BEL); ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC); DIPESCA (GUAT); INCOPECA (CR); Cooperatives (BEL)	Sub-regional; National, local	2	Review of decisions also by local governments and cooperatives
Overall Total <sup>6</sup> and % completeness >>			13/21 or 61%	

**Table 3: CLME fishery ecosystem governance architecture for CA Lobster Fisheries – Summary for Illegal Fishing Issue**

Arrangement: Central American Lobster Fisheries		Issue: Illegal Fishing		
Policy cycle stage (governance function) <sup>1</sup>	Responsible organisation or body <sup>2</sup>	Scale level or levels <sup>3</sup>	Completeness <sup>4</sup>	Observations <sup>5</sup>
Meta level - preparation of policy advice	SICA/OSPESCA; CARICOM/CRFM; FAO-WECAFC	Regional, sub-regional	2	WECAFC no longer appears to be active
Meta level - Policy setting or decision-making	SICA/OSPESCA; CARICOM/CRFM; FAO-WECAFC	Regional, subregional	1	Not sure how active CRFM is here
Provision of data and information	GCFI; CRFM; WCAF; NOAA, OSPESCA, MAREA; Cooperatives (BEL); Fishing Associations (APESCA and APICA (HON); CAPENIC (NIC)	Sub-regional, National, Local	1	WECAFC used to be more active; Fishing associations have lots of information
Analysis and advice	OSPESCA; CRFM; FAO-WECAFC ; FAB (BEL); CAPENIC (NIC); FISHERIES DEP (BEL) ; ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC); DIPESCA (GUAT); INCOPECA (CR)	Regional, sub-regional, National	2	
Management decision-making	MIN OF AG&FISH (BEL); ARAP (PAN); SAG (HON); INPESCA (NIC); MA&GANADERIA (GUAT); INCOPECA (CR)	National	2	Honduras, Panama and Guatemala have low levels of completeness
Implementation	FISHERIES DEP (BEL); ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC); DIPESCA (GUAT); INCOPECA (CR); CENDEPECA (EL SAL)	National	1	El Salvador is important to include as much of the illegal lobster ends up there
Monitoring and Evaluation	OSPESCA, FISHERIES DEP (BEL); ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC); DIPESCA (GUAT); INCOPECA (CR); Cooperatives (BEL) CENDAH (PAN) Processing plants (NIC and HON) Navy/coastguards; Fisheries enforcement officers.	Sub-regional, National, Local	1	Nicaragua has better monitoring than Honduras as it is closer to the banks used by fishers.
Overall Total <sup>6</sup> and % completeness >>			10/21 or 48%	

**Table 4: CLME fishery ecosystem governance architecture for CA Lobster Fisheries – Summary for MCS Issue**

Arrangement: Central American Lobster Fisheries		Issue: Monitoring, Control and Surveillance		
Policy cycle stage (governance function) <sup>1</sup>	Responsible organisation or body <sup>2</sup>	Scale level or levels <sup>3</sup>	Completeness <sup>4</sup>	Observations <sup>5</sup>
Meta level - preparation of policy advice	SICA/OSPESCA; CARICOM/CRFM; FAO-WECAFC; NOAA	Regional; subregional	1	WECAFCC used to be active
Meta level - Policy setting or decision-making	SICA/OSPESCA; CARICOM/CRFM	Subregional	1	
Provision of data and information	GCFI; CRFM; NOAA, OSPESCA; Cooperatives (BEL); fishing association (APESCA & APICA (HON) and CAPENIC (NIC)	Regional, subregional, local	1	WECAFCC used to be active; Fishing associations have lots of information but not necessarily shared
Analysis and advice	OSPESCA; CRFM; NOAA FAB (BEL); FISHERIES DEP (BEL) ; ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC); CAPENIC (NIC); DIPESCA (GUAT); INCOPECA (CR)	Regional, subregional. National	1	
Management decision-making	MIN OF AG&FISH(BEL); ARAP (PAN); SAG (HON); INPESCA (NIC); MA&GANADERIA (GUAT); INCOPECA (CR) Local govts or autonomous govts (NIC & PAN); Navy/coastguards; Fisheries enforcement	National, Local	1	Panama and Honduras have no active process in place for MCS decision-making
Implementation	FISHERIES DEP (BEL) ; ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC); DIPESCA (GUAT); INCOPECA (CR) Navy/coastguards; Fisheries Enforcement	National,	1	
Monitoring and Evaluation	OSPESCA, NOAA, FISHERIES DEP (BEL) ; ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC); CAPENIC (NIC); DIPESCA (GUAT); INCOPECA (CR); Cooperatives (BEL) Navy/coastguards; Fisheries Enforcement CENDAH	National, local	1	Nicaragua appears to be the best in region
Overall Total <sup>6</sup> and % completeness >>			7/21 or 33%	

Table 5: CLME fishery ecosystem governance architecture for CA Lobster Fisheries – Summaries for Habitat Degradation & Biodiversity Loss Issue

Arrangement: Central American Lobster Fisheries		Issue: Habitat Degradation & Biodiversity Protection		
Policy cycle stage (governance function) <sup>1</sup>	Responsible organisation or body <sup>2</sup>	Scale level or levels <sup>3</sup>	Completeness <sup>4</sup>	Observations <sup>5</sup>
Meta level - preparation of policy advice	SICA/OSPESCA; CARICOM/CRFM; CCAD; CEP	Subregional, Regional	1	
Meta level - Policy setting or decision-making	SICA/OSPESCA; CARICOM/CRFM; CEP	Subregional, regional	1	
Provision of data and information	OSPESCA, CRFM, CEP, CRI, CATHALAC, IOCARIBE, MAREA, Healthy Reefs, Min of Env (BEL) ; DAPVS(PAN); SERNADIBIO (hon); DAPVSICF (HON); DPNDIBIO (NIC); AP(NIC); DIPRONA(GUAT); STRI(PAN), CBMAP (PAN) TNC, WWF, IDF, Lobster Initiative; MINAET (CR) Coastal Zone Unit (BEL)	Regional, subregional, national, local	1	
Analysis and advice	OSPESCA; CRFM; CCAD; CEP Min of Env (BEL); DAPVS(PAN); SERNADIBIO (HON); DAPVSICF (HON); DPNDIBIO (NIC); AP(NIC); DIPRONA(GUAT); STRI(PAN) TNC, WWF, IDF, Lobster Initiative; MINAET, CONAGEBIO Y SNAP (CR); Coastal Zone Unit (BEL)	Regional, subregional, National	1	Countries have differing capacities in providing management advice
Management decision-making	Min of Env (BEL); ANAM(PAN); SERNA (HON); MARENA(NIC); MARN(GUAT);MINAET (CR); Coastal Zone Unit (BEL)	National	1	OSPESCA does not have much involvement in decision making or implementation
Implementation	Min of Env 9BELO; DAPVS(PAN); SERNADIBIO; DAPVSICF (HON); DPN(NIC); DIPRONA(GUAT); Navy/coastguards; Fisheries enforcement or Rangers Coastal Zone Unit (BEL); FUNDARI	National, Local	1	
Monitoring and Evaluation	OSPESCA; CRI; CEP; Healthy Reefs Min of Env (BEL); DAPVS(PAN); SERNADIBIO (hon); DAPVSICF (HON); DPNDIBIO (NIC); AP(NIC); DIPRONA(GUAT); STRI(PAN) TNC, WWF, IDF, Lobster initiative; MINAET (CR); Coastal Zone Unit (BEL)	Regional, subregional, local	1	
Overall Total <sup>6</sup> and % completeness >>			7/21 or 33%	

**Table 6: – CLME fishery ecosystem governance architecture for CA Lobster Fisheries - Summaries for Land-based Sources of Pollution Issue**

Arrangement: Central American Lobster Fisheries		Issue: Land-based Sources of Pollution		
Policy cycle stage (governance function) <sup>1</sup>	Responsible organisation or body <sup>2</sup>	Scale level or levels <sup>3</sup>	Completeness <sup>4</sup>	Observations <sup>5</sup>
Meta level - preparation of policy advice	CARICOM/CRFM; CCAD; CEP	Regional, subregional	1	OSPESCA not involved in this issue
Meta level - Policy setting or decision-making	CARICOM/CRFM; CCAD; CEP	Regional, subregional	1	OSPESCA not involved in this issue
Provision of data and information	CEP, CATHALAC, IOCARIBE, Min of Env (BEL); ANAM PAN); CESCOSERNA (HON); DSQDSMARENA (NIC); DGA(GUAT); STRI(PAN), CICA(Univ. of CR); Coastal Zone Unit (BEL); CRI, Healthy Reefs	Regional, national, local	1	NGOs have lots of information that is useful for this stage of the policy cycle
Analysis and advice	CEP, CCAD Min of Env (BEL); ANAM PAN); CESCOSERNA (HON); DSQDSMARENA (NIC); DGA(GUAT); STRI(PAN), CICA(Univ. of CR); Coastal Zone Unit (BEL)	Regional, subregional, National	2	No involvement of Fisheries departments
Management decision-making	CCAD, CARICOM Min of Env.(BEL); ANAM(PAN); SERNA(HON); MARENA(NIC); MARN(GUAT);MINAET (CR); Coastal Zone Unit (BEL)	Regional, National	1	No involvement of Fisheries departments
Implementation	Min of Env (BEL); ANAM PAN); CESCOSERNA (HON); DSQDSMARENA (NIC); DGA(GUAT); MINAET (CR); Coastal Zone Unit (BEL)	National, local	1	No involvement of Fisheries departments
Monitoring and Evaluation	CEP Min of Env (BEL); ANAM PAN); CESCOSERNA (HON); DSQDSMARENA (NIC); DGA(GUAT); (BEL) MINAET (CR); Coastal Zone Unit (BEL)	Regional, National	1	
Overall Total <sup>6</sup> and % completeness >>			8/21 or 38%	

**Table 7: – CLME fishery ecosystem governance architecture for CA Lobster Fisheries - Summaries for Marine-Based Sources of Pollution Issue**

Arrangement: Central American Lobster Fisheries		Issue: Marine-Based Sources of Pollution		
Policy cycle stage (governance function) <sup>1</sup>	Responsible organisation or body <sup>2</sup>	Scale level or levels <sup>3</sup>	Completeness <sup>4</sup>	Observations <sup>5</sup>
Meta level - preparation of policy advice	CARICOM/CRFM; CEP; CCAD; IMO	Regional, international	1	Not sure how active CRFM is here
Meta level - Policy setting or decision-making	CARICOM/CRFM; CEP; CCAD	Regional, subregional	2	Not sure how active CRFM is here
Provision of data and information	CEP, CATHALAC, IOCARIBE Min of Env (BEL); ANAM PAN); CESCOSERNA (HON); DSQDSMARENA (NIC); DGA(GUAT); STRI(PAN), CICA(Univ. of CR); Coastal Zone Unit (BEL); CRI, Healthy Reefs	Regional, national, local	1	NGOs have lots of information
Analysis and advice	CEP, CCAD Min of Env (BEL); ANAM PAN); CESCOSERNA (HON); DSQDSMARENA (NIC); DGA(GUAT); STRI(PAN), CICA(Univ. of CR); Coastal Zone Unit (BEL)	Regional, subregional, National	2	In Spanish countries, Transport Ministry not involved. Not sure about Belize. Fisheries Depts not involved
Management decision-making	CCAD; CARICOM; Min of Env.(BEL); ANAM(PAN); SERNA(HON); MARENA(NIC); MARN(GUAT);MINAET (CR); Coastal Zone Unit (BEL)	Regional, subregional, National	1	
Implementation	Min of Env (BEL); ANAM PAN); CESCOSERNA (HON); DSQDSMARENA (NIC); DGA(GUAT); Coastal Zone Unit (BEL); MINAET (CR); Navy; Coast Guard; Coastal Zone Unit (BEL)	National	1	
Monitoring and Evaluation	CEP; Min of Env (BEL); ANAM PAN); CESCOSERNA (HON); DSQDSMARENA (NIC); DGA(GUAT); Coastal Zone Unit (BEL); MINAET (CR);	Regional, National	1	
Overall Total <sup>6</sup> and % completeness >>			9/21 or 43%	



### 3.3 Summary of findings

Returning to Table 1 we see that there is an overall incompleteness score of 43% for the policy cycles covering the six issues with the level of priority averaging at 4.7 for the fishery system. This suggests that there is still a lot of work to be done to build the policy cycles in order to match the demand for governance. It is worth noting that the easily connected issues of overfishing, illegal fishing and MCS received the highest priority scores while land-based sources of pollution received the lowest level of priority for attention among the six issues. This result should not be interpreted as indicating little need for addressing land-based sources of pollution but rather, take into account the background and affiliation of the experts providing feedback. Since the respondents were expert in fisheries-related matters and affiliated with OSPESCA, either as an employee or contractee on the pilot, it should not be surprising that the priority given to assess the importance of terrestrial, non-direct fisheries matters would be outside the scope of these experts. As noted previously, getting additional feedback from a suite of stakeholders across different sectors would help to give more confidence to the findings. The observations provide good news in the form of the ability of SICA/OSPESCA to serve as a key entity at the meta level providing of advice and decision-making. However, the completeness of the policy cycles at the national levels, a key requirement to implement meta-level decision-making, appears to be inconsistent across the countries (based on the expert opinion provided), with Nicaragua and Belize serving as most advanced, although still needing to address gaps in governance arrangements. A critical demonstration of this gap is the general absence of involvement of SICA/OSPESCA in decisions affecting pollution and to a slightly lesser degree, habitat protection and biodiversity. Given the ecosystem connectivity between these two categories of issues and fisheries, an opportunity exists to strengthen SICA/OSPESCA and other national fisheries departments and ministries involvement in these policy cycles. One venue for enhancing these linkages would seem to be the CLME Project. Additionally, strengthening linkages between OSPESCA and CCAD as well as the agencies responsible for land-based and marine-based sources of pollution and the International Maritime Organisation need to be developed and a structure built that would handle the ecosystem approach to fisheries (EAF).

Another observation noted from the results of the Level 1 assessment of arrangements is the variation in the completeness of the policy cycles across the six countries. This has significant implications for the effective governance of the transboundary lobster socio-ecological system and the 'chain will only be as good as its weakest link'. While lack of 'political will' may be an issue in some countries more than others for a variety of reason, it needs to be remembered that incompleteness in policy cycles is a complex deficiency comprising dysfunctions that range from the truly technical (e.g. information available) to the purely political (e.g. power dynamics).

Tables 2-7 mainly identify those bodies with formal responsibility for governance with regard to the issues being considered, the exception being some transboundary initiatives such as Healthy Reefs and non-governmental organizations such as The Nature Conservancy. This provides the formal arena in which the governance process may be played out. However, governance as understood in the CLME Project includes the interactions of all the actors with interests in governance outcomes. This is also reflected in the objectives of the OSPESCA pilot to build the capacity for self-governance and ownership of the fisheries while granting legitimacy to sub-regional agreements through compliance. The engagement of stakeholders, and especially resource users, is identified as necessary for the successful implementation of sustainable fisheries management. In order to understand and assess governance processes the roles of and interactions among these actors must be considered. This requires identification of the actors and their roles with reference to the policy cycles. It also provides the opportunity to identify where partnerships exist and/or can be developed. The full identification of all stakeholders is an objective currently being undertaken in the OSPECA lobster pilot and a preliminary

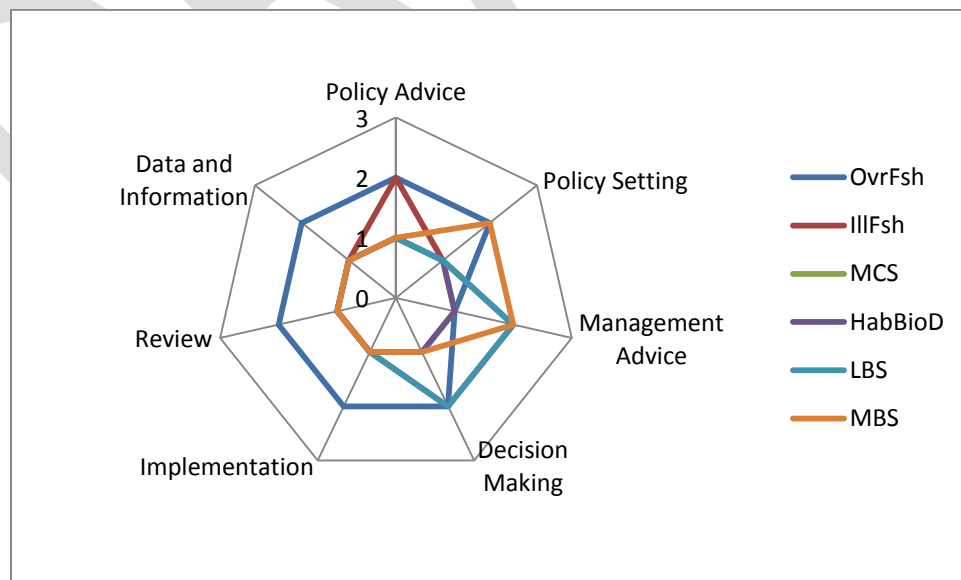
look at the findings by the stakeholder consultant suggests a thorough assessment of stakeholders and their roles with reference to the policy cycle has been undertaken.

The completeness of policy cycle stages in the governance arrangements for the six identified issues in Tables 2-7 is summarized in Table 8 and Figure 4. The latter vividly illustrate low levels of completeness by issue and policy cycle stage.

**Table 8. Summary of completeness scores for all issues**

Issue identified / Policy cycle stage	Overfishing	Illegal Fishing	MCS	Habitat degradation and biodiversity protection	LBS of pollution	MBS of pollution
Meta level - preparation of policy advice	2	2	1	1	1	1
Meta level - Policy setting or decision-making	2	1	1	1	1	2
Provision of data and information	2	1	1	1	1	1
Analysis and advice	1	2	1	1	2	2
Management decision-making	2	2	1	1	1	1
Implementation	2	1	1	1	1	1
Monitoring and Evaluation	2	1	1	1	1	1

Table and figure key: 0=absent; 1=low; 2= medium; 3= high level of policy cycle completeness



**Figure 4. Summary of completeness scores by issue and policy cycle stage**

Figure 4 shows that for all policy cycles for the six issues, the perceived level of completeness is low to medium. However, even if the policy cycle stage is formal and well known to some, it is important that all stakeholders in a process are aware of it and of who is responsible for the various stages of the governance process that they are involved in. Further to this point, in some instances, the experts from SICA/OSPESCA were not entirely sure of the level of involvement of some of the stakeholders in Belize or the mandates of some of the organizations. While this is understandable and a similar finding would no doubt be obtained with CARICOM fisheries experts if asked about SICA/OSPESCA member countries' stakeholders, it could be argued that an effective arrangement should require all stakeholders involved in LMR governance for the Central American lobster fisheries system to be aware of the arrangements for all six of the issues even, if not directly involved. This challenge of integration across the WCR because of the complexity in the region and its implications for regional governance has been discussed in considerable detail (Mahon et al, 2010a). However, it is encouraging to note that efforts are being made for OSPECA and CRFM to interact on a more formal basis, with a joint meeting scheduled to take place in September 2012 in Belize.

Figure 4 shows that that the governance arrangements for overfishing and illegal fishing issues are viewed as best known among stakeholders, although data and information on illegal fishing is ranked lower than for overfishing. The arrangements for MCS is least known, being considered by the experts to be within the low area (a score of 1) of the diagram. The arrangements for LBS and MBS issues are also scored low and are almost identical. Most troubling is the assessment of arrangements for habitat degradation and biodiversity loss. This is scored as low overall (a score of 1) and has significant implications for the implementation of an ecosystem approach to the lobster fisheries as a well-governed and healthy fisheries is intricately linked to these ecological factors.

### 3.4 Clustering and linking arrangements

The assessment of clustering is based on the extent to which issue specific arrangements in a system share a responsible body at various policy cycle levels. The information on responsibility for various stages from Tables 2-7 is summarized in Table 9. The clustering score is either assigned a 'zero', in cases where each arrangement has a totally separate set of responsible bodies, or a 'one', where all arrangements share the same responsible bodies at every stage. It is generally expected that responsibility will lie with one primary agency; however there may be situations where there is more than one agency. In such cases, it must be decided whether to give a score between 0 and 1 based on the number of agencies that are shared or simply to give a 1 if any agency is shared. For a system that is identified as transboundary, as is the case for the Central American lobster fisheries, in instances where the responsibility for the policy cycle stage is at the national level, a zero score is assigned. This is the case even where the responsible agency has a counterpart in each country (e.g. the Ministry of Environment), as this cannot be considered to be a common agency for the shared fisheries.

There is no a priority criterion for the extent of clustering that would be considered optimal. However, one would expect that without considerable attention to linkages and interaction among arrangements, a score of zero would make it difficult to have an integrated approach within a system. At the other end of the scale, in a system with highly diverse issues, one would not normally expect to find them all covered by the same responsible bodies. One could posit that it would be desirable to have arrangements share common responsible organizations at policy setting levels, but that having different responsible organizations at technical and operational policy cycle stages would be more effective and even more flexible. To some extent, this is reflected in the Central American lobster fisheries by OSPECA having responsibilities for the fisheries and CCAD being involved in the issues surrounding habitat loss and land-based sources of pollution, yet both arrangement types share SICA at the policy setting stages.

**Table 9. Agencies with responsibility, or potential responsibility, for the LMR issues of the Central American Lobster Fisheries**

<b>Issue</b>	<b>Overfishing</b>	<b>Illegal Fishing</b>	<b>MCS</b>	<b>Habitat degradation and biodiversity loss</b>	<b>LBS of pollution</b>	<b>MBS of pollution</b>
<b>Stage</b>						
<b>Meta level - preparation of policy advice</b>	SICA/OSPESCA; CARICOM/CRFM; FAO-WECAFC	SICA/OSPESCA; CARICOM/CRFM; FAO-WECAFC	SICA/OSPESCA; CARICOM/CRFM; FAO-WECAFC; NOAA	SICA/OSPESCA; CARICOM/CRFM; CCAD; CEP	CARICOM/CRFM; SICA/CCAD; CEP	CARICOM/CRFM; CEP; SICA/CCAD
<b>Meta level - Policy setting or decision-making</b>	SICA/OSPESCA; CARICOM/CRFM; FAO-WECAFC	SICA/OSPESCA; CARICOM/CRFM; FAO-WECAFC	SICA/OSPESCA; CARICOM/CRFM	SICA/OSPESCA; CARICOM/CRFM; CEP	CARICOM/CRFM; SICA/CCAD; CEP	CARICOM/CRFM; CEP; SICA/CCAD
<b>Provision of data and information</b>	GCFI, MAREA, OSPECA, STRI (PAN); cooperatives (BEL); NGOs (TNC, WWF, IDF); Fisheries Associations - APESCA (HON); CAPENIC (NIC); Univ. of Costa Rica	GCFI; CRFM; WCAF; NOAA, SICA/OSPESCA, MAREA; Cooperatives (BEL); Fishing Associations (APESCA and APICA (HON); CAPENIC (NIC)	GCFI; CRFM; NOAA, SICA/OSPESCA; Cooperatives (BEL); fishing association (APESCA & APICA (HON) and CAPENIC (NIC)	SICA/OSPESCA, CRFM, CEP, CRI, CATHALAC, IOCARIBE, MAREA Healthy Reefs Min of Env (BEL) ; DAPVS(PAN); SERNADIBIO (hon); DAPVSICF (HON); DPNDIBIO (NIC); AP(NIC); DIPRONA(GUAT); STRI(PAN), CBMAP (PAN) TNC, WWF, IDF, Lobster imitative; MINAET (CR) Coastal Zone Unit (BEL)	CEP, CATHALAC, IOCARIBE Min of Env (BEL); ANAM PAN); CESCOSERNA (HON); DSQDSMARENA (NIC); DGA(GUAT); STRI(PAN), CICA(Univ. of CR); Coastal Zone Unit (BEL); CRI, Healthy Reefs	CEP, CATHALAC, IOCARIBE Min of Env (BEL); ANAM PAN); CESCOSERNA (HON); DSQDSMARENA (NIC); DGA(GUAT); STRI(PAN), CICA(Univ. of CR); Coastal Zone Unit (BEL); CRI, Healthy Reefs
<b>Analysis and advice</b>	SICA/OSPESCA; CARICOM/CRFM; FAO-WECAFC FAB (BEL); CAPENIC (NIC); FISHERIES DEP; ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC); DIPESCA (GUAT); INCOPECA (CR)	SICA/OSPESCA; CRFM; FAO-WECAFC ; FAB (BEL); CAPENIC (NIC); FISHERIES DEP (BEL) ; ARAP (PAN); DIGEPESCA (HON); INPESCA	SICA/OSPESCA; CRFM; NOAA FAB (BEL); FISHERIES DEP (BEL) ; ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC); CAPENIC (NIC); DIPESCA (GUAT); INCOPECA (CR)	SICA/OSPESCA; CRFM; SICA/CCAD; CEP Min of Env (BEL); DAPVS(PAN); SERNADIBIO (HON); DAPVSICF (HON); DPNDIBIO (NIC); AP(NIC); DIPRONA(GUAT);	CEP, SICA/CCAD Min of Env (BEL); ANAM PAN); CESCOSERNA (HON); DSQDSMARENA (NIC); DGA(GUAT); STRI(PAN),	CEP, SICA/CCAD Min of Env (BEL); ANAM PAN); CESCOSERNA (HON); DSQDSMARENA (NIC); DGA(GUAT); STRI(PAN),

Issue	Overfishing	Illegal Fishing	MCS	Habitat degradation and biodiversity loss	LBS of pollution	MBS of pollution
<b>Stage</b>		(NIC); DIPESCA (GUAT); INCOPECSA (CR)		STRI(PAN) TNC, WWF, IDF, Lobster Initiative; MINAET, CONAGEBIO Y SNAP (CR); Coastal Zone Unit (BEL)	CICA(Univ. of CR); Coastal Zone Unit (BEL)	CICA(Univ. of CR); Coastal Zone Unit (BEL)
<b>Decision-making</b>	MIN OF AG&FISH(BEL); ARAP (PAN); SAG (HON); INPESCA (NIC); MA&GANADERIA (GUAT); INCOPECSA (CR) Local govts or autonomous govts (NIC & PAN)	MIN OF AG&FISH (BEL); ARAP (PAN); SAG (HON); INPESCA (NIC); MA&GANADERIA (GUAT); INCOPECSA (CR)	MIN OF AG&FISH(BEL); ARAP (PAN); SAG (HON); INPESCA (NIC); MA&GANADERIA (GUAT); INCOPECSA (CR) Local govts or autonomous govts (NIC & PAN); Navy/coastguards; Fisheries enforcement	Min of Env (BEL); ANAM(PAN); SERNA (HON); MARENA(NIC); MARN(GUAT);MINAET (CR); Coastal Zone Unit (BEL)	SICA/CCAD, CARICOM Min of Env.(BEL); ANAM(PAN); SERNA(HON); MARENA(NIC); MARN(GUAT);MINAET (CR); Coastal Zone Unit (BEL)	SICA/CCAD; CARICOM; Min of Env.(BEL); ANAM(PAN); SERNA(HON); MARENA(NIC); MARN(GUAT);MINAET (CR); Coastal Zone Unit (BEL)
<b>Implementation</b>	FISHERIES DEP(BEL); ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC); DIPESCA (GUAT); INCOPECSA (CR); local govts or autonomous govts(NIC & PAN)	FISHERIES DEP (BEL); ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC); DIPESCA (GUAT); INCOPECSA (CR); CENDEPESCA (EL SAL)	FISHERIES DEP (BEL) ; ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC); DIPESCA (GUAT); INCOPECSA (CR) Navy/coastguards; Fisheries Enforcement	Min of Env 9BELO; DAPVS(PAN); SERNADIBIO; DAPVSICF (HON); DPN(NIC); DIPRONA(GUAT); Navy/coastguards; Fisheries enforcement or Rangers Coastal Zone Unit (BEL); FUNDARI	Min of Env (BEL); ANAM PAN); CESCOSERNA (HON); DSQDSMARENA (NIC); DGA(GUAT); MINAET (CR); Coastal Zone Unit (BEL)	Min of Env (BEL); ANAM PAN); CESCOSERNA (HON); DSQDSMARENA (NIC); DGA(GUAT); Coastal Zone Unit (BEL); MINAET (CR); Navy; Coast Guard; Coastal Zone Unit (BEL)
<b>Monitoring and Evaluation</b>	SICA/OSPESCA; FISHERIES DEP (BEL); ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC); DIPESCA (GUAT);	SICA/OSPESCA, FISHERIES DEP (BEL); ARAP (PAN); DIGEPESCA	SICA/OSPESCA, NOAA, FISHERIES DEP (BEL) ; ARAP (PAN); DIGEPESCA (HON); INPESCA (NIC);	SICA/OSPESCA; CRI; CEP; Healthy Reefs Min of Env (BEL); DAPVS(PAN);	CEP Min of Env (BEL); ANAM PAN); CESCOSERNA (HON);	CEP; Min of Env (BEL); ANAM PAN); CESCOSERNA (HON);

Issue Stage	Overfishing	Illegal Fishing	MCS	Habitat degradation and biodiversity loss	LBS of pollution	MBS of pollution
	INCOPESCA (CR); Cooperatives (BEL)	(HON); INPESCA (NIC); DIPESCA (GUAT); INCOPESCA (CR); Cooperatives (BEL) Navy/coastguards; Fisheries Enforcement CENDAH (PAN) Processing plants (NIC and HON) Navy/coastguards; Fisheries enforcement officers.	CAPENIC (NIC); DIPESCA (GUAT); INCOPESCA (CR); Cooperatives (BEL) Navy/coastguards; Fisheries Enforcement CENDAH	SERNADIBIO (hon); DAPVSICF (HON); DPNDIBIO (NIC); AP(NIC); DIPRONA(GUAT); STRI(PAN) TNC, WWF, IDF, Lobster initiative; MINAET (CR); Coastal Zone Unit (BEL)	DSQDSMARENA (NIC); DGA(GUAT); (BEL) MINAET (CR); Coastal Zone Unit (BEL)	DSQDSMARENA (NIC); DGA(GUAT); Coastal Zone Unit (BEL); MINAET (CR);

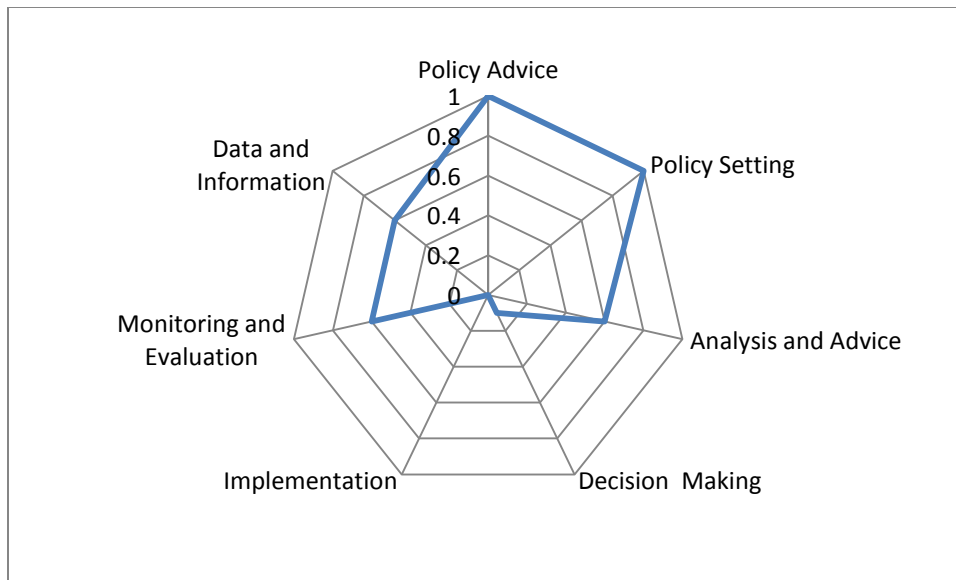
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The degree of overlap of responsibility among the six issues is assessed in Table 10. The outputs of this assessment of clustering can be interpreted in two ways. The right hand column in the table indicates the extent of clustering among pairs of arrangements. The bottom row indicates the average clustering score for a given stage in the policy cycles stages, ranging anywhere from between zero and one. The latter information can be depicted as a kite diagram and for the Central American lobster fisheries, is summarized in Figure 5.

**Table 10. Assessment of clustering of governance arrangements for the six issues of the Central American Lobster Fisheries system**

Common agency between arrangements	Meta-level policy advice	Meta-level policy decision-making	Data and information	Analysis and advice	Decision-making	Implementation	Review and evaluation	Overall average
1 and 2	1	1	1	1	0	0	1	0.7
1 and 3	1	1	1	1	0	0	1	0.7
1 and 4	1	1	1	1	0	0	1	0.7
1 and 5	1	1	0	0	0	0	0	0.3
1 and 6	1	1	0	0	0	0	0	0.3
2 and 3	1	1	1	1	0	0	1	0.7
2 and 4	1	1	1	1	0	0	1	0.7
2 and 5	1	1	0	0	0	0	0	0.3
2 and 6	1	1	0	0	0	0	0	0.3
3 and 4	1	1	1	1	0	0	1	0.7
3 and 5	1	1	0	0	0	0	0	0.3
3 and 6	1	1	0	0	0	0	0	0.3
4 and 5	1	1	1	1	0	0	1	0.7
4 and 6	1	1	1	1	0	0	1	0.7
5 and 6	1	1	1	1	1	0	1	0.9
<b>Average</b>	1.0	1.0	0.6	0.6	0.1	0	0.6	

**Table notes:** Each policy cycle stage is given a score of 0 or 1 for each combination of arrangements depending on whether there is a common agency or not. A score of 1 means that the two arrangements cross-referenced have at least one responsible agency in common. A score of 0 means they have no responsible agency in common.



**Figure 5. The extent of clustering of the governance arrangements for the six issues of the Central American Lobster Fisheries broken out by policy cycle stage (1 = full integration of responsibility for all issues)**

Figure 5 indicates that the degree of clustering and integration among the six issues is considered to be highest at the policy advice and policy setting levels. This is not unexpected as the meta-level advisory and policy setting is primarily done within SICA/OSPESCA for the Central American lobster fishery. In stark contrast, the degree of clustering around the other stages of the policy cycle is assessed as medium to very weak across the six issues, decreasing from 0.6 for data and information sharing across the countries, analysis and advice and monitoring and evaluation through 0.1 for decision-making to no integration across the countries for implementation. In the case of policy decision-making, in the national context, Cabinet is the ultimate policy setting body for action to be taken under laws that have already been enacted. This is well known. However, if the priority assigned for addressing the issues is low, one can expect little attention to be focused on policy decisions, implementation and evaluation. In this case, it would appear that while some effort is being made to have data available for analysis and advice being shared by a number of pertinent organizations, more attention needs to be paid to making appropriate decisions, implementing them and evaluating their success at the national level if governance of the lobster fisheries in Central America is to be more effective. The score in this area was assessed as low.

A striking observation from the assessment was the ‘silo-like’ disconnect between arrangements for the fishing related issues of overfishing, illegal fishing and MCS and those for habitat degradation and biodiversity protection and pollution, land-based and marine-based. This finding seems to be consistent with those of other reef ecosystem governance arrangements assessments and those for the continental shelf ecosystem, highlighting a significant area for improvement across the WCR.

Even if policy integration is achieved through more formal collaboration at the regional level with SICA/OSPESCA, SICA/CCAD and CARICOM/CRFM, it would appear that at the national level, where decisions are made, implemented, and evaluated to determine whether additional information is required for further analysis, there is still the need for an integrating mechanism at the functional, management level for the issues occurring within the lobster fisheries socio-ecological system. Of the six countries assessed for this analysis, Nicaragua and Belize appear to have done a better job in trying to



bridge this gap and as such, lessons can be drawn for these countries to help to build capacity for an enhanced policy cycle in the other countries. One mechanism that can assist in this sharing of lessons learned is the use of national intersectoral committees (NICs) in the CLME project. Additionally, a targeted approach to responding to the information obtained in an earlier study by Mahon and co-authors (2010a) on communication and coordination mechanisms by which states interact with regional organisations and projects could contribute to the sharing of best practices. However, the challenge remains getting the needed level of attention for decision-making at the Cabinet level and dedicating the resources needed for implementation and evaluation to monitor success that is influenced by organizations with responsibilities beyond the national level. Given the authority of SICA/OSPESCA to develop fisheries policies for national level implementation across the Central American sub-region and the involvement of Belize in both SICA/OSPESCA, SICA/CCAD and CARICOM/CRFM, it is hoped that a growing awareness of the importance of an ecosystem approach to fisheries will increase the involvement of these organizations in arrangements dealing with pollution issues and habitat degradation and biodiversity protection.

## **4 Level 2 assessment - performance of governance arrangements**

The Level 2 assessment evaluates the functionality and performance of governance arrangements according to criteria agreed upon by stakeholders. Mahon et al (2010b) provide the conceptual background to a process for examining governance arrangements in transboundary water systems.

### **4.1 Assessment of principles**

The principles that should guide the establishment and the functioning of a governance arrangement, and the extent to which they are being observed in the processes, are an important part of a governance assessment. Assessing them can provide insight into where the systems need the most attention. Key end product principles are: sustainability, efficiency, rationality, inclusiveness, equity, precaution and responsiveness. Process principles are: transparency, accountability, comprehensiveness, participation, representativeness, information and empowerment. Processes and products are linked and overlap.

For the Central American lobster fisheries system assessment, 13 principles were selected. Respondents were asked to score each principle based on the extent to which they agreed or disagreed with the statement associated with the principle (Table 11). Experts were also asked to rank their assessment of how well each principle were actually being reflected in each of the arrangements for each issue (Table 12). The responses provided by SICA/OSPESCA and CERMES experts for the six arrangements are also illustrated in Figure 6. As noted previously, it would be desirable to conduct a similar exercise with a broader suite of stakeholder representatives but this was not currently feasible. As a first draft of the Level 2 assessment, we have instead relied once more on the input from the SICA/OSPESCA experts and the experiences of the authors.

**Table 11. Desirability of principles in governance arrangements for each of the six issues**

Principle	Statement	Issue Ranking <sup>a</sup>					
		Ovr Fsh	Ill Fish	MCS	Hab BioD	LBS	MBS
Accountability	The persons/agencies responsible for the governance processes can be held responsible for their action/inaction	3	3	2	2	3	3
Adaptability	The process has ways of learning from its experiences and changing what it does	3	3	3	3	3	3
Appropriateness	Under normal conditions, this process seems like the right one for what it is trying to achieve	3	3	2	3	2	2
Capability	The human and financial resources needed for the process meet its responsibility are available.	4	4	4	3	3	3
Effectiveness	This process should succeed in leading to sustainable use of ecosystem resources and/or control harmful practices	4	4	4	4	4	4
Efficiency	This process makes good use of the money, time and human resources available and does not waste them.	4	4	4	3	3	3
Equity	Benefits and burdens that arise from this process are shared fairly, but not necessarily equally, among stakeholders	4	4	4	4	4	4
Inclusiveness	All those who will be affected by this process also have a say in how it works and are not excluded for any reason.	4	4	4	3	3	3
Integration	This process is well connected and coordinated with other related processes.	4	4	4	4	4	4
Legitimacy	The majority of people affected by this process see it as correct and support it, including the authority of leaders	4	4	4	4	4	4
Representativeness	The people involved in this process are accepted by all as being able to speak on behalf of the groups they represent	4	4	4	3	3	3
Responsiveness	When circumstances change this process can respond to the changes in what most think is a reasonable period of time	4	4	4	4	4	4
Transparency	The way that this process works and its outcomes are clearly known to stakeholders through information sharing	4	4	4	4	4	4

<sup>a</sup> None = 1, Low = 2, Medium = 3, High = 4

**Table 12. Actual assessment of reflection of principles in governance arrangement for each of the six issues**

Principle	Statement	Issue Ranking <sup>a</sup>					
		Ovr Fsh	III Fish	MCS	Hab BioD	LBS	MBS
Accountability	The persons/agencies responsible for the governance processes can be held responsible for their action/inaction	3	2	2	2	2	2
Adaptability	The process has ways of learning from its experiences and changing what it does	3	3	3	2	2	2
Appropriateness	Under normal conditions, this process seems like the right one for what it is trying to achieve	2	2	2	2	2	2
Capability	The human and financial resources needed for the process meet its responsibility are available.	3	2	2	2	2	2
Effectiveness	This process should succeed in leading to sustainable use of ecosystem resources and/or control harmful practices	3	3	3	2	2	2
Efficiency	This process makes good use of the money, time and human resources available and does not waste them.	2	2	2	2	2	2
Equity	Benefits and burdens that arise from this process are shared fairly, but not necessarily equally, among stakeholders	2	2	2	2	2	2
Inclusiveness	All those who will be affected by this process also have a say in how it works and are not excluded for any reason.	2	2	2	2	2	2
Integration	This process is well connected and coordinated with other related processes.	3	2	2	2	2	2
Legitimacy	The majority of people affected by this process see it as correct and support it, including the authority of leaders	2	2	2	2	2	2
Representativeness	The people involved in this process are accepted by all as being able to speak on behalf of the groups they represent	2	2	2	2	2	2
Responsiveness	When circumstances change this process can respond to the changes in what most think is a reasonable period of time	3	2	2	2	2	2
Transparency	The way that this process works and its outcomes are clearly known to stakeholders through information sharing	2	2	2	2	2	2

<sup>a</sup> Disagree strongly = 1, Disagree =2, Agree = 3, Agree strongly = 4

On average, all principles received high scores for importance from all stakeholders (Figure 6a). At the same time, the results indicated that these principles were not well reflected in the governance arrangement for the six issues (Figure 6b). In fact, for the habitat degradation and biodiversity protections, land-based sources and marine-based sources of pollution arrangements, the experts did not rank any of the principles as being reflected in the current arrangements for these issues. In the case of illegal fishing and MCS, only two principles, accountability and effectiveness, were identified as being present in the current arrangements for these two issues. On the other hand, it appears that there is a sense of governance effectiveness, or at least attention being paid to the issue of overfishing, as the experts ranked six of the 13 principles as being reflected in the current arrangement for this issue, namely accountability, adaptability, capability, effectiveness, integration and responsiveness. However, it is important to note that this ranking is an average for all of the countries and there is considerable variation at the individual country level in how well these principles are reflected.

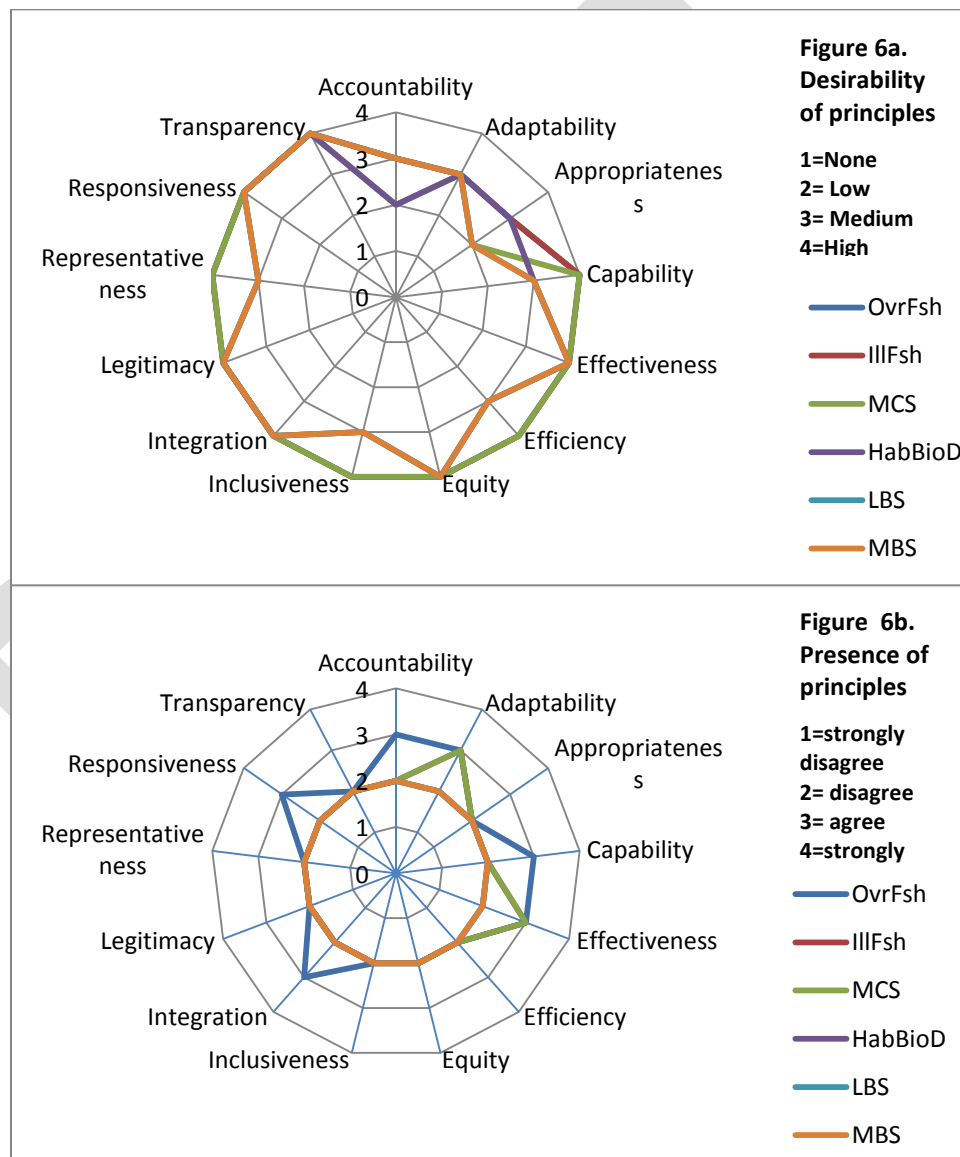


Figure 6. Assessment of the extent to which principles are considered to be (a) desirability and (b) represented, in the governance processes for the six issues identified for the Central American Lobster Fisheries System

## 4.2 Assessment of performance

The general impression that the processes are not highly functional with regard to the principles means that improvement of these perceptions and scores could be a governance objective.

This general conclusion provides the opportunity to reflect on what might be done differently in order to improve the arrangements with respect to the principles. This would probably be best done in consultation with the stakeholders by asking them what they would like to see changed in order for them to feel comfortable that the principle was being observed in the process.

Functional linkages and interaction within governance arrangements as well as between them are a critical component of the governance system. While the clustering analysis found structural (governance architecture) arrangements that reflect integration as being possible or likely, their existence does not mean that integration is actually taking place. This can best be determined by in depth interviews and by examination of the documentation of the functioning arrangements. Sound architecture is seen as a necessary, but not sufficient condition for the integration required for an ecosystem approach to fisheries. An example of this is the example cited earlier of OSPESCA and CCAD being within the same regional organization, potentially suggesting the possibility for coordination if not integration across responsibilities. However, feedback provided by the experts indicated there was little to no interaction between these 'sister' components of SICA.

It should also be noted that integration can take place in the absence of appropriate formal structure on an ad hoc basis, through individual initiative and personal contacts. While this is better than nothing and may in cases be all that is possible given the prevailing architecture, it is not considered to be a sustainable, transparent, accountable approach to addressing the challenge of integration across issues.

## 5 Conclusions and recommendations

Assessments of governance architecture, such as the one carried out for this case study, are few. The purpose of the assessment carried out here is to measure and visualise the governance arrangements for the six issues identified for the Central American lobster fisheries in order to facilitate discussion among stakeholders. This discussion can lead to shared interest in what should be in place, what principles should be prominent and how the system should be structured. The assessment is not intended to lead to a prescriptive output regarding what should be in place. Nonetheless, some broad observations can be made on aspects of the system that need attention if arrangements are to be structured in a way that is likely to lead to good governance, including the promotion of inter-sectoral and inter-issue integration that is needed for an ecosystem approach to fisheries.

Three major observations are highlighted in this assessment.

The first is that there is a significant disconnect, both vertically and horizontally, between the arrangements for issues relating to fisheries (i.e. overfishing, illegal fishing and MCS) and those that relate to habitat degradation, biodiversity protection and land-based and marine-based pollution. This is not a surprising finding given the bureaucratic structures in place for most modern nation States but it does present a significant challenge in shifting from a sectoral approach to management to one that is ecosystem based. Process mechanisms need to be developed whereby arrangements for each issue have the opportunity to be made aware of the policies being developed by each of the arrangements. This is required not only at the sub-regional level with SICA-mandated institutions but between other organizations/stakeholders present at the sub-regional level, such as CARICOM/CRFM, CCCCC,

OLDEPESCA and at the regional level with the Caribbean Sea Initiative (CSI) and the CSC of the ACS as well as sub-regional and regional level NGOs.

The second observation specific for the Central American lobster fisheries system is the relatively developed meta-level policy advice and policy decision making that is provided for by SICA/OSPESCA. The ability for SICA/OSPESCA to formulate and make decisions on a sub-regional level that would be implementable by all member countries provides the opportunity for a common suite of principles and policy objectives to be achieved for the fisheries system, thereby contributing to an effective governance regime. Areas for improvement include the lack of involvement in issues not directly fisheries related but which could have a significant impact on the fisheries, such as habitat degradation, biodiversity protection and pollution of the marine environment, whether the source be land-based or marine-based. It is important to note that the two SICA units, OSPESCA and CCAD have the potential to affect the governance of their respective areas of responsibility based on being within the same sub-regional organization. However, it must be stressed that at this level of the assessment, whether or not these two units actually are aware of or influence each other's decision-making processes is not to be assumed. It is strongly recommended that SICA provides the mechanism whereby the arrangements for identified issues can be linked laterally.

The third observation that could potentially have the most significant impact on the likelihood of implementing an effective governance regime for the lobster fisheries within the Central American sub-regions is the variation in the attention being given to the identified issues by the different countries. On the positive side, it appears that Nicaragua and Belize have relatively good mechanisms in place for addressing the identified issues, which nonetheless can still be strengthened. On the other hand, countries such as Guatemala and Honduras need to improve their policy cycles considerably. As noted earlier, there is no simple fix to address this as solutions include building the capacity to address data and information needs for national level policy advice and having the priority assigned to the issues by policy makers, i.e. having the 'political will', to act and make informed decisions.

Finally, the analysis suggests that there is an urgent need to formalize and/or operationalise the governance arrangements for the six issues (addressing Level 1), and by making them known and more open to all stakeholders to take part in the processes effectively, facilitate improved performance (helps to address Level 2). Although much more can be read into the results, we acknowledge that this first draft of the assessment is fairly crude and has not been participatory. In keeping with good governance principles, we make only conservative broad-scale observations at this time but look forward to deeper and more inclusive analysis as the SAP approaches.

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