



# THE PEMBA CHANNEL CONSERVATION AREA

ASSESSMENT & MARINE COMPLIANCE REPORT



## ASSESSMENT METHODOLOGY

This report represents the work of a multi-national team that was completed in October 2019. Research methods were developed and applied by WildAid in cooperation with Mwambao Coastal Community Network. Interviews were carried out with the following actors: Department of Fisheries Development (DFD) staff in Unguja and Pemba, Pemba Channel Conservation Area (PECCA) Rangers, District Fisheries Officers from Micheweni, Wete, Chake, Mkoani, Deep Sea Fishing Authority (DSFA), SWIOFish, ZAFICO, Kukuu, Makongwe and Fundo Island SFCs, the Manta Resort, Fundu Lagoon Hotel and Swahili Divers. The 2010 PECCA management plan and the 2016 Zanzibar Fisheries Frame Survey served as vital source documents for maps, baseline data and biodiversity statistics. This report was carried out jointly by WildAid and Mwambao with USAID funding for DFD.

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## ABOUT

### DEPARTMENT OF FISHERIES DEVELOPMENT

The key fishery responsibilities in Zanzibar fall under Zanzibar's Ministry of Livestock and Fisheries. The mandate of the fisheries administration covers a large spectrum of fisheries governance and management functions including fisheries planning, the licensing of vessels & fishers, fisheries monitoring & research, promotion of Marine Protected Areas (MPAs), capacity-building of stakeholders among other functions.

[KILIMOZNZ.GO.TZ](http://KILIMOZNZ.GO.TZ)

### WILDAID

WildAid's mission is to end the illegal wildlife trade in our lifetimes by reducing demand through public awareness campaigns and providing comprehensive marine protection. We have successfully developed a comprehensive marine enforcement model that strengthens the key elements of the law enforcement chain: surveillance, interdiction, prosecution, and sanctions in several MPAs throughout the developing world.

[WILDAID.ORG](http://WILDAID.ORG)

## MWAMBAO COASTAL COMMUNITY NETWORK

Mwambao Coastal Community Network was established in 2010 to help communities in Tanzania's coastal areas develop strong and effective local resource management systems that support livelihoods and sustain marine ecosystems. Mwambao works to empower local communities and enable them to learn from each other through a community-based network spanning different coastal areas and communities. This network structure fosters learning as well as collective action on shared interests such as influencing policy. MWAMBAO focuses on building the capacity of coastal community institutions for engaging in sustainable marine resource management.

[MWAMBAO.OR.TZ](http://MWAMBAO.OR.TZ)

## ACRONYMS

AG	Attorney General
AIS	Automatic Identification System
CAPEX	Capital Expenses
C&V	Control and Vigilance
DFD	Department of Fisheries Development
EMS	Electronic Monitoring Systems
EEZ	Economic Exclusive Zone
FFI	Fauna & Flora International
GMP	General Management Plan
GT	Gross Ton
HP	Horse Power
IMO	International Maritime Organization
IUCN	International Union for Conservation of Nature
KMKM	Kikosi Maalum cha Kuzuia Magendo (Zanzibar Navy)
KPI	Key Performance Indicator
LE	Law Enforcement
MCA	Marine Conservation Area
MACEMP	Marine Coastal Management Project
MCU	Marine Conservation Unit
MCS	Monitoring, control and surveillance
MOU	Memorandum of Understanding
MPA	Marine Protected Area
NM	Nautical Miles
NGO	Non Governmental Organization
NTZ	No-take Zone
IMO	International Maritime Organization
OBM	Outboard Motor
OEM	Original Equipment Manufacturer
OPEX	Operating Expenses
PECCA	Pemba Channel Conservation Area
SFC	Shehia Fisher Committee
SOP	Standard Operating Protocols
SWIOFish	Southwest Indian Ocean Fisheries Governance and Shared Growth Program
URT	United Republic of Tanzania
VHF	Very High Frequency
VMS	Vessel Monitoring System
WOT	Wide Open Throttle
ZAFICO	Zanzibar Fisheries Company



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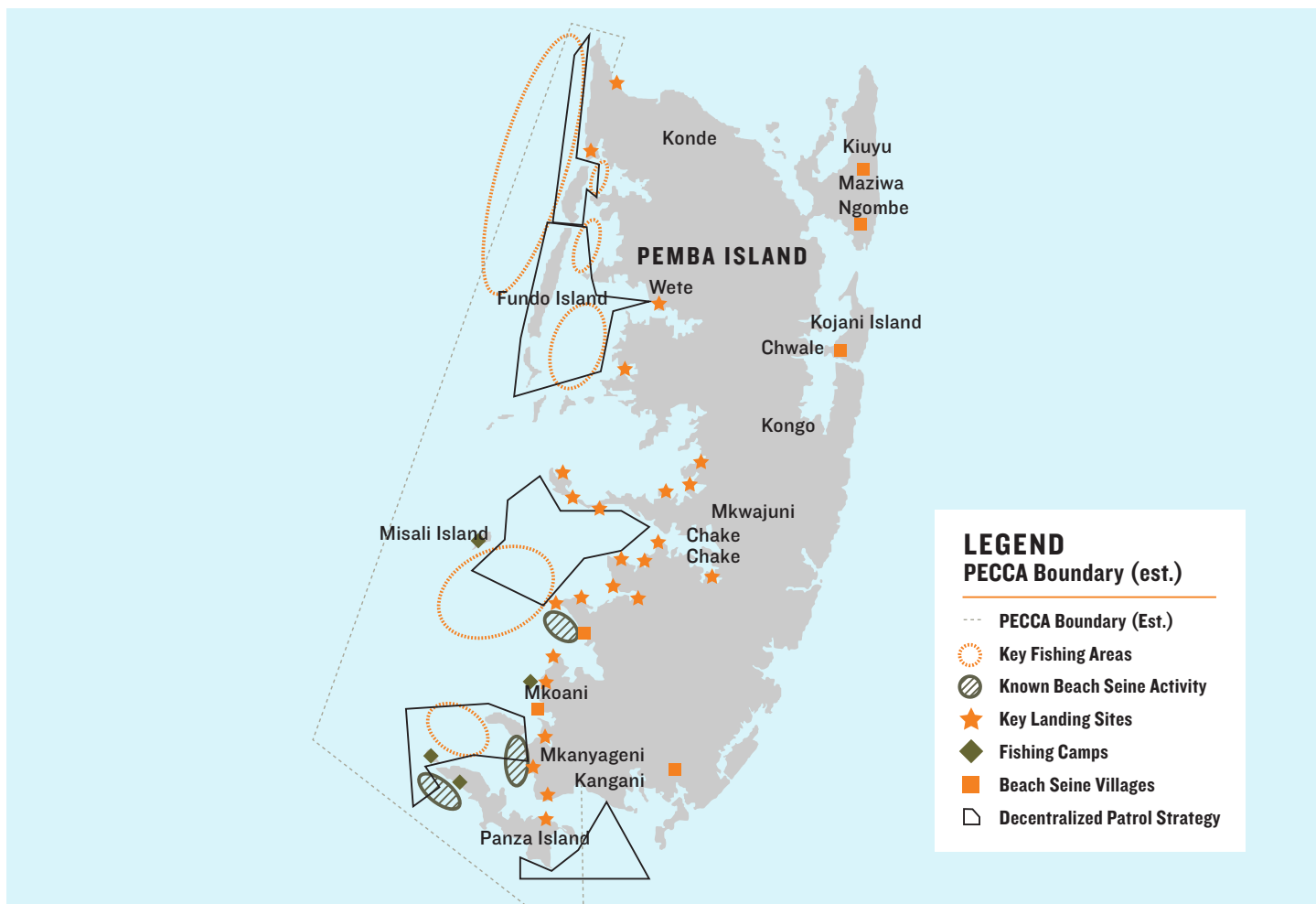
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# EXECUTIVE SUMMARY

Zanzibar's extensive and resource-rich coastal and marine environment supports the livelihoods of thousands in the country and is the mainstay of the artisanal fishing industry and coastal tourism. The Pemba Channel Conservation Area (PECCA) is home to the deepest and most diverse coral reefs of East Africa. In addition to the high level of biodiversity, the area is home to IUCN red-listed species, including four species of sea turtles, Indian Ocean humpback dolphins, humphead wrasse, bumphead parrotfish, and blacktip reef sharks. Of note, PECCA serves as a nesting site for the critically endangered hawksbill and endangered Green turtles. Yet, management and governance are challenged by geographical location, a growing population, a changing climate, improved and changing fishing gears, and increasing demands for coastal resources are pushing the environment to its limits.

In this report, we analyze the legal framework, competencies and jurisdictions of all marine enforcement agencies and stakeholders in order to design a compliance system for the PECCA that is practical, affordable and feasible to implement over a five-year time-frame. As the lead agency of PECCA, DFD must focus on

strengthening its capacity and make critical investments in staff, infrastructure and training to dramatically improve communication with Shehia Fisher Committees (SFCs) and ensure a presence throughout the PECCA. A strong authority is a respected authority and a continuous presence serves as a deterrent in the long run. Our key recommendations include the decentralization of patrolling and compliance efforts to the District level and the strengthening of ties to the SFCs. The SFC community management models should be incorporated into the overall enforcement and compliance strategy. Select communities have already demonstrated their commitment to the vision of PECCA and must be carefully inserted into the compliance framework. As no agency can do it alone, we also recommend the negotiation of a bilateral agreement with KMKM in order to strengthen and better coordinate surveillance and patrol efforts. All CAPEX and OPEX decisions were made in consideration of a highly limited budget. More importantly, we have defined a blueprint of critical steps for the capacity building and professionalization of the DFD personnel, who truly are the core component of the PECCA marine compliance program.





# OBJECTIVES

The primary objectives of this report are to document assessment findings of current compliance efforts in PECCA and to develop a comprehensive marine protection system.

## MARINE PROTECTION SYSTEM

An effective compliance program should dissuade potential law-breakers from committing illegal activities as the consequences (punitive or societal pressure) associated with apprehension outweigh the economic gain. Compliance entails two different facets: the hard and soft approach. The hard approach achieves compliance by increasing monitoring, control and surveillance (MCS) investment and creating strong penalties that are uniformly enforced. The soft approach achieves compliance through education and outreach and by generating incentives through management that benefit the community as a whole. We advocate for a combination of the two.

There are five components necessary for a complete and successful Marine Protection System that will discourage illegal activity and encourage law-abiding behavior.



Figure. 1: Five Key Components of a Marine Protection System

- **Surveillance and Enforcement.** Poachers will be found and caught. Sites need surveillance systems (such as cameras and radar) patrol resources (such as boats) to find and apprehend poachers. We tailor each system design, based on local needs.
- **Policies and Consequences.** Poaching has consequences. We work with lawyers, judges and governments to strengthen laws and ensure meaningful penalties for illegal activities.
- **Training and Mentorship.** Comprehensive Training is essential. Staff and local fisher committees must understand the system, their responsibilities within it, and how to operate and maintain tools. We provide training, mentorship, and professional development.
- **Community Engagement:** Poaching hurts the whole community. We integrate fishers, tourism operators, and local people in the protection of marine resources. We train rangers to educate their communities, design awareness campaigns to foster understanding and buy-in, and support community-based management strategies.
- **Consistent Funding.** Protection requires consistent funding. We develop long-term budgets that streamline operating costs, and create new revenue streams to ensure the protection system has long-term funding.

Protected area management cannot succeed without effective law enforcement and compliance efforts. In the absence of enforcement and a governance framework, open access and marine resource conflicts will only continue to promote unsustainable resource use and jeopardize the future of the PECCA. Protected area management strategies such as establishing Marine Conservation Areas (MCAs), setting measureable quotas, limiting access via licenses, closing fishing areas or using specific seasons, often requires establishing a framework where authorities, the private sector, local communities, NGOs, academic institutions, and other stakeholders agree to collective action. Establishing such a framework, enforcement, and respect for the rule of law are the cornerstones of a good governance program and mandatory for the success of PECCA.

# CHARACTERISTICS OF THE AREA

## OBJECTIVE

As codified in the 2010 PECCA General Management Plan (GMP), the mission of PECCA is “to conserve the biological diversity and other natural and cultural values of the area in the long term, while providing recreational, social and economic benefits for the present and future generation.” To achieve this statement the GMP outlines five objectives:

1. Conserving biodiversity to retain the conservation importance and value of the area;
2. Maximizing long-term socio-economic benefits from the area;
3. Improving research and monitoring;
4. Increase public awareness of the conservation importance, economic value and management requirements of the area;
5. Promoting ecotourism.

## LOCATION & SIZE

Zanzibar is a semi-autonomous part of the United Republic of Tanzania (URT) consisting of two major islands, Unguja and Pemba. The Pemba Channel Conservation Area (PECCA) resides on the west side of Pemba Island from the northern tip of Ras Kigomasha to the southern tip of the Ngazi Islet. The area extends from the shoreline out to approximately 3km along the 68km coastline encompassing nearly 1,000km<sup>2</sup>, making it double the size of any other conservation areas in Zanzibar.

## BIODIVERSITY INFORMATION AND IUCN CATEGORY

PECCA is notable for its numerous bays, tidally exposed sandbanks, deep channels, mangrove forest, islands, and deep and shallow water coral reefs. Further, as an oceanic island, Pemba is surrounded by deep waters that descend to nearly 1,000 meters between PECCA's western boundary and mainland Tanzania; it also has high levels of endemism. According to the GMP, the majority of the area's islands are “protected by fringing coral reefs and are covered mostly by coral rag bush and surrounded by extensive seagrass beds.” Further the GMP states, “coral reefs have been predominantly recorded to the west of Misali Island with some coral outcrops to the east and small reef areas to the north and south. Studies recorded that coral cover within the reef areas was intermittent and ranged from small outcrops and patchy reefs to physically complex coral walls.” In addition to the high level of

biodiversity, the area is home to IUCN red-listed species, including four species of sea turtles, Indian Ocean humpback dolphins, humphead wrasse, bumphead parrotfish, and blacktip reef sharks. Of note, PECCA serves as a nesting site for the critically endangered hawksbill and endangered Green turtles.

## KEY MANAGEMENT AUTHORITY AND PLANNING

The declaration of PECCA is provided for under section 7(1) of the Fisheries Act No. 8 of 1988. As of the 23rd September 2005, the marine waters of Pemba Channel became part of the Pemba Channel Conservation Area (PECCA). PECCA is administered and managed by the Department of Fisheries and Marine Resources within the Ministry of Agriculture, Livestock and Environment. The Department of Fisheries Development (DFD) and its Marine Conservation Unit (MCU) carry out the mandate on a day-to-day basis.

## ZONING MAP

Figure 2 shows the extent of PECCA and the delineation of the Districts. In addition, Shehia (ward) Fisher Committees possess the authority to generate by-laws, with approval of DFD, to control the fishing activity within their area of responsibility. These areas are usually in nearshore or tidal zones and are of a range of sizes depending on the Shehia involved.

## COMMUNITY

As of 2016, the overall population of Pemba is 406,000. According to the 2016 Marine Fisheries Frame Survey<sup>1</sup>, “(s)mall-scale fisheries is one of the most important coastal activities in Zanzibar. This small-scale fishery is vital for the livelihoods, food security and well-being of coastal communities in Zanzibar. The artisanal fisheries supply not less than 95% of the marine catch in Zanzibar and are the principle income generating activity for a large number of coastal households. Fish is the principal source of animal protein among the local population and the tourism industry of Zanzibar. Currently, total fish production is around 34,000 tonnes and the per capita consumption is around 22kg/person annually.”

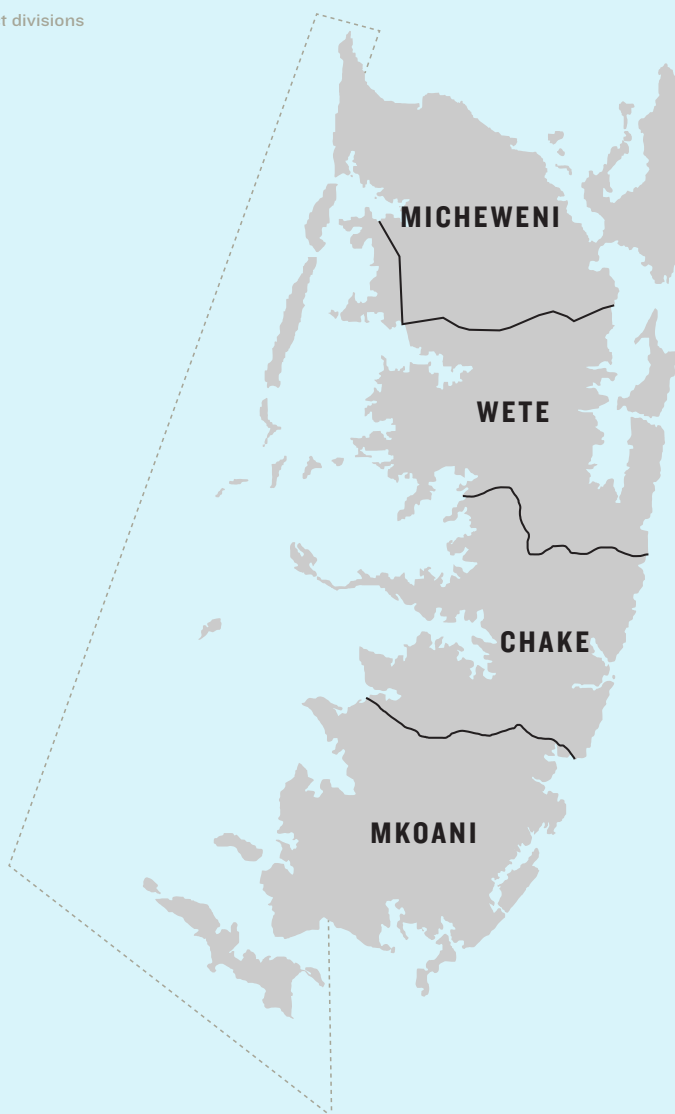
1. Department of Fisheries Development (DFD) 2018. Marine Fisheries Frame Survey 2016, Zanzibar. Ministry of Agriculture, Natural resources, Livestock and Fisheries, Zanzibar. SWIOFish project/ World Bank.pp55



## NATURE OF THREATS AND MANAGEMENT CONCERNS

<b>ILLEGAL FISHING</b>	<ul style="list-style-type: none"> <li>• Overfishing</li> <li>• Non-selective fishing gear: beach seines, small mesh size nets, and drag nets</li> <li>• Fish bombing and cyanide</li> <li>• Spear guns, mask and SCUBA</li> <li>• Limited enforcement of fishing regulations</li> <li>• Fishing camps</li> </ul>	<b>CLIMATE CHANGE</b>	<ul style="list-style-type: none"> <li>• Shoreline erosion</li> <li>• Seasonal extremes</li> <li>• Coral bleaching</li> </ul>
<b>TOURISM</b>	<ul style="list-style-type: none"> <li>• Limited enforcement of regulations</li> </ul>	<b>DEVELOPMENT</b>	<ul style="list-style-type: none"> <li>• Sand mining / dredging</li> <li>• Back filling of coast and mangrove eradication</li> </ul>
<b>SHIPPING</b>	<ul style="list-style-type: none"> <li>• Collision, noise pollution and propeller damage associated with vessel traffic</li> </ul>	<b>POLLUTION/CONTAMINATION:</b>	<ul style="list-style-type: none"> <li>• Pesticides and fertilizers from agriculture</li> <li>• Municipal discharge</li> </ul>

Figure. 2: Map of PECCA with district divisions





## INFRASTRUCTURE

Figure 3 depicts the location of District offices, Beach Recorders, the Ranger station, and KMKM camps within PECCA. Additionally, the map highlights the SFCs currently working with Mwambao to build community resilience and improved sustainable coastal resource management. The Frame Survey identified 72 landing sites within PECCA. Overall, the number of landing sites in Pemba has increased by 34% from 68 to 104 between 2007-2016. Most major landing sites offer gear and boat repair services; however, cold storage and fish processing services are very limited. With respect to communication, the fishers and law enforcement agencies rely on cell phones since they do not have an operational VHF radio system.

## FISHING CHARACTERISTICS

- There are 18,047 fishers in Pemba: a 15% increase from 2007 to 2016. 11,328 of those operate within PECCA: 6,933 use vessels and are all male while 4,395 are foot fishers (46% male and 54% female.)
- The artisanal fishery uses traditional vessels and gears. The fishing gears used include traps, hook-and-line, nets and spears. The fishing vessels are dugout canoes, outrigger canoes, boats and dhows. The means of propulsion for most of these vessels are mainly by sails, but some vessels use outboard engines of which the number has now increased.
- “Fishing is practiced throughout the year and peak seasons depend on the sites, but are related to the monsoon winds. There are Northeast (Kaskazi) and Southeast (Kusi) monsoon

seasons in Zanzibar. Subsequently, these two monsoons are separated by very calm periods. The Kusi winds start to blow around mid/end of March and continue through late October, the strongest winds encountered during the Kusi are during July/August. Kaskazi start to blow from November until mid-December and continue to early March, the strongest winds blow during the January with rough seas and strong winds. Usually, from mid-February onward the wind becoming lighter and the seas calmer.”

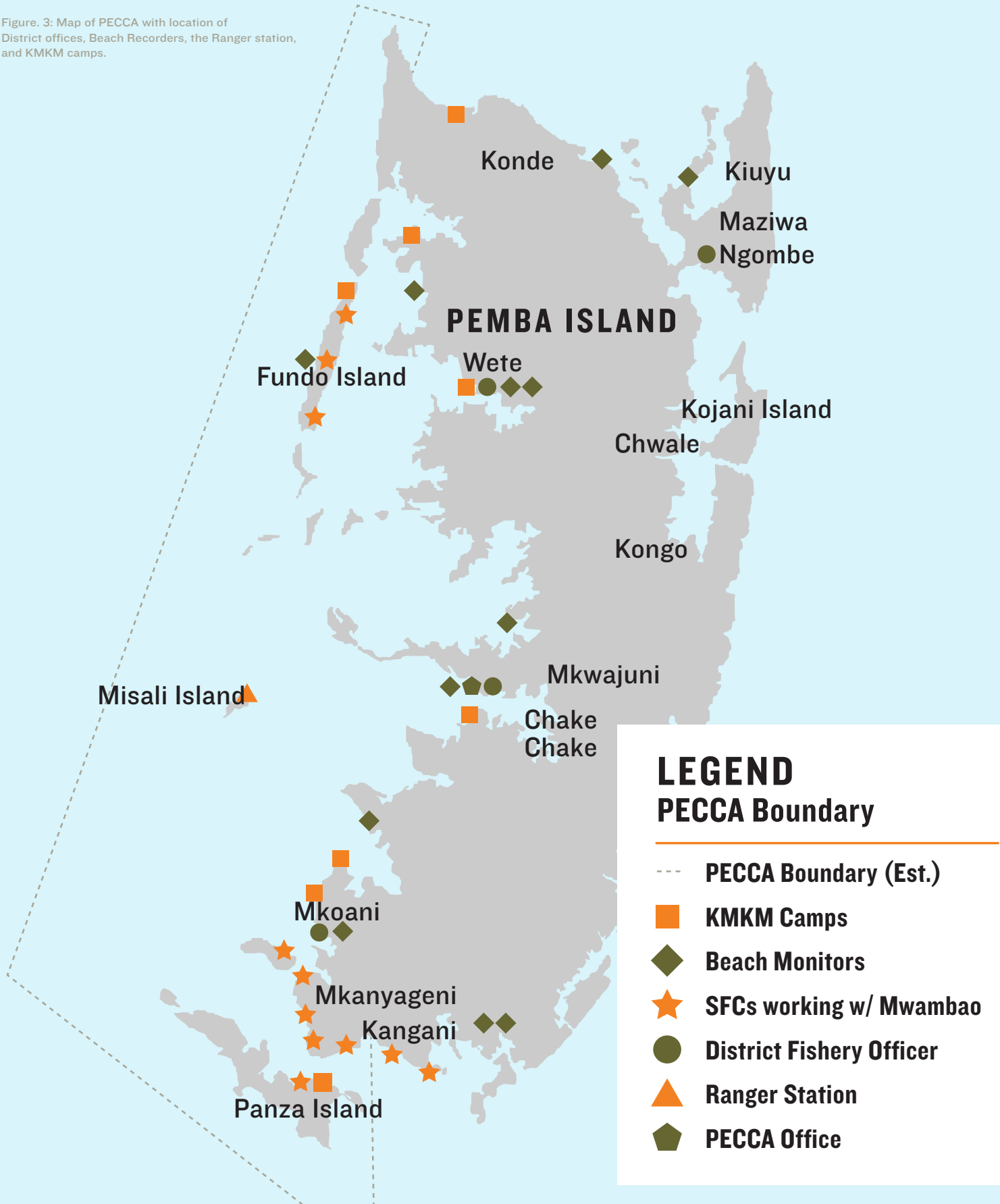
- The vast majority of fishing activity in PECCA is comprised of short trips (<3 hours) during daylight hour low tides, although nighttime fishing activity also takes place and is on the increase.

## TOURISM

Tourism is limited within PECCA when compared to neighboring Unguja, although substantial potential does exist. There are three luxury hotels on the island, one dive resort and a number of budget to mid-range hotels. Most tourists arrive to Pemba to visit Misali island, the Tangawizi Spice Farm, the Ngezi forest, and to dive the coral walls of Fundo Island. DFD receives roughly TSh 34,470,000 from entrance fees and vessel mooring at the Misali Island annually. Two of the larger hotels serve as a source of employment for locals and are working directly with local communities and SFCs to protect reefs in exchange for social project funding. Collectively, the sector supports conservation, but is also frustrated with the lack of DFD enforcement of PECCA regulations.



Figure. 3: Map of PECCA with location of District offices, Beach Recorders, the Ranger station, and KMKM camps.



# ANALYSIS OF EXISTING COMPLIANCE CAPACITY

In the following section, we aim to gauge the capacity of the current enforcement actors to enforce PECCA regulations.

## PUBLIC SECTOR

GOVERNMENT AGENCY	COMPETENCY	PHYSICAL PRESENCE	SCOPE OF ACTIVITIES	
Ministry of Agriculture, Natural Resources, Livestock and Fisheries (MANRLF) of Zanzibar - Department of Fisheries Development (DFD)	Management of territorial waters of Zanzibar and Pemba	Zanzibar and Pemba: Jurisdiction 12NM to coastline	Vessel and fisher licensing, enforcement	
DFD Pemba & The Pemba Channel Conservation Area (PECCA)	Management of fisheries island wide and the Pemba Channel Conservation Area	Pemba	Conservation, enforcement, education, eradication of invasives, collects tourism fees from tourists (TSh 11,490), vessel mooring (TSh 45,960/day), and from hotels (The Manta Resort, Aiyana Emerald Bay Resort, Fundu Lagoon & Pemba Misali Sunset Beach).	
Micheweni District Office	Management of district waters	Micheweni	Licensing, outreach, inspection and compliance	
Wete District Office	Management of district waters	Wete	Licensing, outreach, inspection and compliance	
Chake Chake District Office	Management of district waters	Chake Chake	Licensing, outreach, inspection and compliance	
Mkoani District Office	Management of district waters	Mkoani	Licensing, outreach, inspection and compliance	
Deep Sea Fishing Authority (DSFA)	Established by MALF & MANRLF and located in Zanzibar, manages fisheries within the EEZ including access by foreign vessels. Apparently MANRLF has not signed DSFA into existence.	Zanzibar	Licensing of commercial vessels/ inspection and compliance of fisheries.	
World Bank - South West Indian Ocean Fisheries Governance and Shared Growth Program (SWIOFish)	Improve management effectiveness of MCAs.	Mainland Tanzania, Zanzibar & Pemba	Project goals: 1) strengthen governance capacity to manage fisheries, including reducing illicit fishing activities and strengthening co-management of small-scale fisheries; 2) increase the profitability and sustainability of fisheries and value chains; 3) improve the sharing of benefits derived from sustainable use of marine living resources; and 4) build robust and cost-effective regional cooperation on fisheries.	
Zanzibar Maritime Authority (ZMA)	Maritime security, safety, environment, training and certification and vessel registration.	Unguja and Pemba	Established under Act No. 3 of 2009 and charged with the responsibility of monitoring, regulating and coordinating activities in the maritime industry.	



BUDGET, PERSONNEL & INFRASTRUCTURE	OBSERVATIONS
<p>Large office in Zanzibar. 20 inspectors with power of arrest but do not bear firearms. Total of 12 vessels: three in Pemba &amp; nine in Unguja ranging from 3M with 15 -250HP. VHF radio system donated by WWF in 1996 is not operative and no plans to replace. Officers use SMS for comms. No official training program, but "on the job training." SOPs crafted in 2003 in English were never adopted by staff. There is also no training component; SOPs for SFCs are under development.</p>	<p>Director mentioned there are 50,000 fishers, up from 34,000 in 2007. Also 70% of fishers are aged 10-20. Head of MCS states that his department carries out day patrols and longer 60-80 hour patrols with Navy. Crew size 3-4 Fisheries inspectors and 3 armed Naval officers. Inspectors do not have fixed 9-5 schedule. Currently, 3 MCAs and gazetted 2 more. He estimated that only 34% of sector is licensed to fish. Cost of license: TSh 250-15K and vessel TSh 4.5-10K depending on size. The fine for fishing without license is 100K TSh. Three primary infractions: North - small mesh nets, South - spear guns &amp; generally speaking limited compliance with respect to licenses. Fishers should register vessel and obtain fishing license annually. Current plans include establishing fisheries information system for small pelagics, octopus, reef fisheries and tuna. Number of 2018 violations not known.</p>
<p>DFD Pemba - 4 District Fisheries Officers and 10 Beach recorders. No patrol vessel, but 2 motorcycles. Pemba Channel Conservation Area - Office in Chake Chake, small outpost on Misali, 2 patrol vessels - 6 meter with 2-stroke 200HP Yamaha and one 4 meter vessel with 2-stroke 60HP Yamaha, VHF radio network not operational since 2010, former 6-story vigilance post for surveillance of western no-take area (nesting of Hawksbill &amp; Green turtles), no uniforms, no basic safety gear only life vests, no office for record keeping, no consistent electricity on Misali). Annual budget TSh 89,622,000: TSh 59,748,000 for 10 staff (4 rangers) paid by DFD &amp; TSh 29,874,000 from tourism. Tourism fees are divided: 70% for fuel, food, and incentives &amp; 30% for social purposes. 3 Rangers on for 2 weeks, off 1 week - patrols carried out by 2 rangers, 500 liters per quarter, 1 patrol per month. All rangers are dive SCUBA certified. KMKM officers were stationed on Misali until 2014 when funding lapsed.</p>	<p>There is a long history of international assistance to Misali beginning in 1996 via EU funding of the Environmental Defense Group. Misali was the jewel of Pemba and held cultural and spiritual importance. The original management committee comprised of 15 members including outsiders. From 2001-2005, CARE implemented cultural ethics conservation program to garner local support and provided VHF radio network, surveillance post, among other equipment, then funded by MacArthur Foundation &amp; the Ford Foundation. In 2005, PECCA was born via the World Bank thereby creating a large MCA and new 30 member board comprised of only locals. The WB MACEMP project ran from 2005-2010 including: 1) outreach to schools, communities and executive committee; 2) provision of vessels and up to 4,000 liters of fuel/month for patrols; and 3) provision of cellular phones to SFCs for co-management. Upon MACEMP project closure, PECCA ran short of funds and most has fallen into disrepair. There are 31 landing sites, but monitoring only 12. Seven core zones have been identified in the 2010 management plan, but not implemented. According to DFD staff, SFCs and the four districts meet monthly &amp; all the SFCs meet once a quarter. There are a total of 18,047 fishers. According to DFD, there are three port authorities in Pemba, which began to register fishing vessels in 2018. DFD Pemba estimates hundreds of violations committed in 2018, yet could not verify exact number. Districts produce monthly LE activity reports, but they weren't available for review.</p>
<p>One District Fishery Officer (DFO) of 20 years and 3 Beach Recorders (BRs) responsible for 18 SFCs. The SFCs meet once a quarter. The DFO does not possess a boat nor vehicle for outreach.</p>	<p>Micheweni district said to have most landings of Pemba, yet only two violations in the past year: no license and beach seine and Kenyan fishers illegally fishing in Pemba waters. The DFO would prioritize confiscating beach seines and would prefer better organized SFCs vs. additional officer. Training interests include fisheries management. The DFO noted that the Makangale SFC is operating well; however, other SFCs have issues with communication as SFC Chairs do not disseminate all necessary information to their fishers as they do not understand their responsibilities.</p>
<p>One DFO (18 yrs.), one assistant and four BRs responsible for nine SFCs with an average of 300 fishers per SFC. The DFO possesses a SWIOfish funded motorcycle with no monthly fuel allowance. No patrol vessel. Seven of the SFCs working well.</p>	<p>11 major fish landing sites of which only three have BRs. Beach seines and spear guns are a serious threat as well as "kigumi" whereby large nets are set around corals and skin divers use large poles to poke at the reef to scare fish into the nets meanwhile damaging the reef. Occasional patrols carried out with Rangers. The FO received recent MCS training from the Mbegani Fisheries Institute and stated that further training was needed in conservation and legal issues. Four violations recorded in 2018 by the Fundo SFC. Coordination with KMKM exists for joint patrol, but requires subsistence allowance for officers.</p>
<p>One FO (20 yrs.) and two BRs responsible for nine SFCs. The SFCs meet once a quarter. The FO does not possess a boat, but does have a SWIOFish motorcycle.</p>	<p>DFD plans patrols and FOs with BRs join Misali Rangers for patrols. Out of nine SFCs, two are active. Ndagoni replicated Mwambao model for six month closure (octopus &amp; fish). Periods of six months without patrols. Fishing license compliance estimated at 40% by Q1. Grace period extended through July then leverages the Police to fine and force registration. Fines collected are sent to general account. Priorities: 1) Awareness raising; 2) Beach seines; 3) Monitoring and surveillance; and 4) Evaluation.</p>
<p>One DFO (6 yrs.) and 4 BRs responsible for 18 SFCs. The SFCs meet once a quarter. The DFO possesses a SWIOfish funded motorcycle with 20 liter monthly allowance. No patrol vessel.</p>	<p>Three violations in the past year: encroachment in seasonal closure areas. The DFO would prioritize beach seines, then snorkel masks/SCUBA and would prefer additional BR vs. better organized SFCs. Training interests included fisher outreach strategies. DFO stated that he had received no names from most recent 3-day Ranger patrol through his district despite the observation of several license and illegal fishing gear violations.</p>
<p>Large office located in FUMBA. No fish landing sites. 20 staff (10 inspectors), no patrol vessel nor agency wide comms system. They possess VMS (CLS) yet limited use of features.</p>	<p>Mr. Marwa, new Director as of April 2018, comes from 15 years of fresh water enforcement at Lake Victoria. No central government funding and runs on revenues generated by licensing. Currently, No foreign vessels in EEZ after Jodari campaign, 24 vessels in 2017 and 96 in 2016. 19 vessels fled country without signing out and outstanding fines of TSh 1.149B per vessel. No operational link among DSFA, Zanzibar nor mainland maritime authority, port authority among others. Regs include: report country entry/exit, report daily catch, 10% crew must be Tanzanian, an observer, and unloading of bycatch at Zanzibar prior departure.</p>
<p>HQ office in DFD in Unguja. 2 staff and multiple consultants. Project ends September 2021.</p>	<p>Three implementing Agencies: MALF Mainland, MANRLF Zanzibar and DSFA. There are currently a number of consultancies slated for 2019-2021 period that include: master fisheries plan, specific fishery management plans, MCA management plans, octopus closure, MCS and co-management strategies. SWIOFish provides operating funds for patrols on a quarterly basis and will soon deliver a new 7.5M patrol vessel with 200HP OB motor to PECCA (3 in total for Zanzibar.) Demarcation buoys will also be designed and installed throughout PECCA. They fund official joint patrols twice monthly (Police, KMKM, Fisheries and SFCs.) Also SFCs can apply for fuel for patrols. KPIs for quarterly reports include license and illegal gear violations.</p>
<p>Three offices in Pemba.</p>	<p>ZMA suspended in January 2018 following arrests of Tanzanian-flagged vessels involved in the smuggling of drugs and explosive materials. Unable to hold a meeting with officials yet DFD reports that the ZMA began registering vessels in Pemba in late 2018 and possesses three offices in Pemba.</p>

The management and operation of PECCA is primarily the responsibility of the Department of Fisheries Development (DFD) through the Marine Conservation Unit (MCU). While the 30-member Fishers Executive Committee (FEC) is the organ responsible for the management of the conservation area, it is the Manager supported by Rangers, Fisheries Officers and Beach Recorders who are involved in the day-to-day operation of PECCA. On Pemba Island, DFD has a central office in Wete and a PECCA specific office in Weshia, but relies heavily upon the District Offices in Chake Chake, Micheweni, Mkoani, and Wete to administer program objectives. DFD's regulations authorize a community-based, co-management Shehia level institution – Shehia Fisher Committees (SFC) – to develop and enforce bylaws governing the utilization of community fishing grounds. On Pemba as a whole, there are 72 SFCs operating at various levels of effectiveness to achieve local management and monitoring, control, and surveillance (MCS) of fishing activity. Within PECCA itself there are 33 SFCs. The DFD and SFCs also draw on enforcement support from the Kikosi Maalum cha Kuzuia Magendo (KMKM) and police forces when necessary given their power of arrest and firearms; however, no formal inter-institutional agreements exist among the three agencies.

The DFD is able to achieve minimal presence throughout PECCA with limited staff and vessels. Our interviews revealed that there were no formal institutional training courses nor standard operating procedures (SOPs) for Fishery Officers (FOs), Rangers, nor Beach Recorders (BRs). There are draft SFC SOPs, but their role in MCS is only mentioned cursorily. Staff do not wear uniforms neither do they possess binoculars, cameras, flashlights, first aid kits, VHF radios, nor official log books, though the patrol vessel did have life vests. It appears that dissemination of PECCA regulations by DFD has been minimal since the closure of the Marine Coastal Management Project (MACEMP) in 2010 resulting in lack of awareness and general disrespect of regulations. The 25 DFD field staff is distributed throughout PECCA in the following manner:

LOCATION	STAFF	ASSETS
WESHA	1 Manager, 1 Assistant Manager and Accountant	1 large office with conference room
MISALI	4 Rangers	6 meter with 2-stroke 200HP Yamaha and one 4 meter vessel with 2-stroke 60HP Yamaha
MICHEWENI	1 FO and 3 BRs	None
WETE	1 FO, 1 Assistant and 4 BRs	None
CHAKE	1 FO and 2 BRs	1 motorcycle
MKOANI	1 FO and 4 BRs	1 motorcycle
TOTAL	25	2 vessels and 2 motorcycles

The DFD currently carries out a centralized patrol strategy whereby two of the four rangers on Misali island carry out periodic patrols of PECCA using the 7-meter 200HP patrol boat. The Misali-based patrol receives a quarterly allocation of 500 liters of fuel and coordinates patrols with District FOs and BRs when entering their respective district. A 46 NM round-trip from Misali to Ras Kigomasha in the North and a 41 NM round-trip from Misali to Panza Island to the South consume 140 liters and 120 liters, respectively. Roughly 50% of the quarterly fuel allocation is used in just two trips. As the FOs and BCs do not possess vessels, they do not patrol their jurisdictional waters without support from the Rangers. Our interviews revealed that the Misali-based patrols occur once a month and FOs reported that they could sometimes go six months without a single patrol in their jurisdictional waters.

Currently, most illegal activities either go undetected due to lack of presence of law enforcement officers or simply because local laws are not enforced. Key violations include: lack of fishing licenses, encroachment into closure areas and the use of illegal fishing gear (beach seines, snorkel masks, SCUBA, and spearfishing.) On a one-day patrol with Rangers, we inspected seven vessels and encountered the following violations: six vessels and crew did not possess licenses and three vessels were observed to have scuba tanks and/or spear guns. No citations were issued nor confiscation of illegal gear carried out.

It is important to note that some SFCs are well organized and carry out 3 month octopus and general fishery spatial closures. The SFCs finance patrols with the occasional support of the local NGO Mwambao and via the levy of a TSh 1,000 on catch derived from the opening of their local management area. Even with limited resources, SFC members patrol by foot, hire patrol vessels and coordinate with KMKM posts to provide the institutional support needed to ensure that surrounding communities comply with their local closure. It does appear that SFC have a limited scope to primarily enforce closures and do not enforce any other regulations outside of those specific areas; they do however, using their bylaws, have the power to fine and confiscate illegal gear.

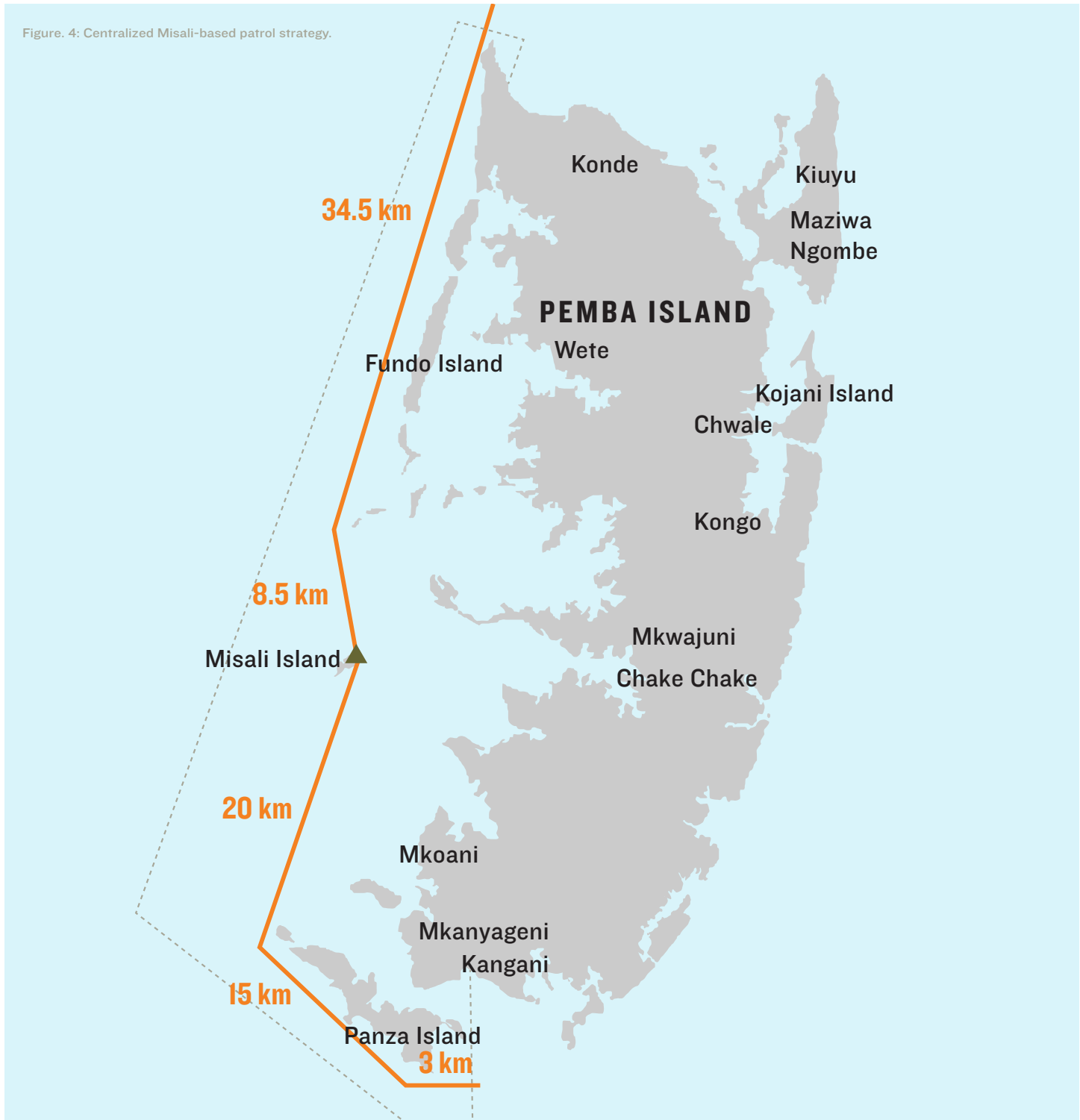
According to the Fisheries Act of 2010, “DFD authorized officers possess the power to stop and board any vessels in jurisdictional waters, stop and inspect any vehicle and enter any premise where there is thought to be any fish, fish product, aquatic flora, or product of aquatic flora, fishing gear, or other article used in the commission of the offence or in respect of which the offence has been committed is kept; and it also assigns power of arrest.” It is evident that regulations are not being enforced despite this positive enabling framework. The DFD MCU Regulation of 2014 also delegates the power of enforcement to SFC members within their controlled area. Interviews revealed some SFCs had been effective in stopping illegal fishers from entering their closures by directly interdicting themselves or coordinating with KMKM and/or the Police. More than 50 illegal fishers were detained among three SFCs in the past three months alone. When fines were not paid, the case would be elevated to a relevant authority.



There are two primary means whereby illegal fishing is penalized: the DFD administrative/criminal process and via the SFCs. According to our interviews, few violations were successfully processed via the courts, as there is more of a culture of warning infractors rather than hard enforcement. We understand that Mwambao partner Fauna and Flora International (FFI) will be looking to strengthen this area: DFD, lawyers, District office, Rangers District Police and SFCs. Some SFCs possess very clear

bylaws over the management of their controlled area. When apprehended, the local SFC will issue a fine ranging from TSh 50–100K, which must be paid within seven days. We learned of several cases where matters were resolved within the stipulated time at the village level; however, when the infractors disagreed with the fine, the case is reported to the relevant authority – usually involving DFD and the Police.

Figure. 4: Centralized Misali-based patrol strategy.





## PRIVATE SECTOR

Private sector organizations include hotels, dive operators, nonprofit organizations and SFCs. Each of these supports the authorities to varying degrees.

ACTOR	PHYSICAL PRESENCE IN THE MPA. MEANS, INFRASTRUCTURE, PERSONNEL	ACTIVITY WITHIN THE MPA	OBSERVATIONS
Zanzibar Fisheries Company (ZAFICO)	Zanzibar and Pemba. Started in October 2017. Business plan and feasibility studies are under construction. Three components: 1) Commercial fishing targeting tuna/pelagics (procuring two large 40 ton vessels; 2) aquaculture (7 cages in Pemba and 4 in Fumba- species TBD by Norwegians); and 3) artisanal fisheries - ZAFICO will provide fiberglass vessels & ice via loans and double price of catch as well as provide collateral for loans - Number of fishers TBD.	Fisheries production within marine coastal area and EEZ.	The Director explained that the Tanzanian government is trying to spur investment/ domestic fisheries production via ZAFICO and TAFICO on the mainland. The Director also explained that Tanzania had recently extended trawling permits to a number of Chinese companies.
Fundo Island Shehia Fishing Committee (SFCs)	Fundo Island - 10 representatives in SFC, 500 fishers, no patrol vessel also provide fuel to KMKM for closures. They have no binoculars, but do possess a camera for case building. They occasionally rent a small vessel with 15HP to patrol area.	Fishing, enforcement and conservation	The SFC has led a couple of successful octopus closures and has coordinated with KMKM for enforcement. 1,739 kilos of octopus were harvested on March 23 opening day: TSh 5,500 per kilo with 1,000 of that collected to support SFC activities. The SFC had successfully arrested 27 skin divers attempting to dive in their closed zone. The case was resolved by the local Shehia and they were fined TSh 675,000. Had the fine not been paid, the fishers would have been turned over to the Police.
Makongwe Shehia Fishing Committee (SFCs)	Makongwe Island - 10 representatives in SFC, 550 fishers (300 women/250 men - meet 2-3 times per month. Patrol of closure area carried out on foot. No patrol vessel though they had received a canoe from MACEMP in 2009. They have no binoculars nor camera for case building.	Fishing, enforcement and conservation	The SFC had a poor experience with a closure back in 2009 due to miscommunication by DFD leading to premature invasion into the closed area. After nearly 10 years, they recently enacted a closure beginning in February 2019. Already there have been two illegal fishing incidence - one by a young community skin diver and the other by a group of 8 using nets. Both were fined TSh 100,000 and the former case required involvement of Police. The SFC recommended the use of radio and television for dissemination of the closure. All internal comms done via cellular.
Mwambao Coastal Community Network	Founded in 2010 to facilitate a network linking coastal communities and other stakeholders that builds community resilience and improved sustainable coastal resource management and livelihoods. Projects in Unguja, Pemba and Tanga.	1) Reef ball - coral recovery project in Jambiani (8 communities), Unguja as part of Menai Bay Conservation Area; 2) Blast fishing monitoring network in Tanga/Pemba; and 3) Octopus & Co-Management projects in Pemba in 8 shehias.	Shehia Fishing Committees (SFCs): Kukuu Panza Stahabu, Makongwe, Shidi, Michinzani, Fundo. 12 members in each, communities of 2,000 to 4,000. Closure of near shore areas for octopus recruitment has resulted in larger landings. Patrols by foot daily and 3 vessel patrols a month. Limited DFD presence in area. Mwambao has provided one 15HP Yamaha OB and another pending though on hold until Panza governance structure is worked out. Kukuu has built school with community revenue. Revenue breakdown from octopus harvest of close areas is the following: 50% community, 25% SFC and 25% for fishers.
FFI	No in-country staff, but do have two in Kenya. Directly partner with Mwambao to implement Mwambao projects in Pemba.	Fisheries management - season closures, working with middlemen/ markets and community level savings and loan.	Positive results with the closing of octopus fishery. (3 months temporary no-take zones.)
The Manta Resort	16 room hotel located in northern Pemba - 40 full occupancy, 1 km protected area established in 2014. Patrol team includes three from SFC and two private security - 1 vessel - no arrests.	Ecotourism, conservation and education.	The hotel has a 52% occupancy rate, highlight is underwater room @ TSh 3.4M /night, 95% of employees are locals (78 of 82), experience illegal fishing from local community, charges TSh 34,470 for fishing committees for clients that snorkel local reef and TSh 11,490 to PECCA. SFC bylaws have been signed for protected area. 3 buoys - demarcated area. 30 meters below. The communities receive TSh 16M per year.
Fundu Lagoon Hotel	17 room hotel located in southern Pemba - 34 full occupancy, 200 meter no-take area. One private security officer from KK - 1 vessel - no arrests.	Ecotourism, conservation and education.	The hotel employs 69 staff - 60% of which are local. The hotel pays a total of TSh 28M in fees to PECCA for use of Misali; however, notes that the site has deteriorated in recent years due to excessive fishing. They are confused by the zonification - fishing so near a conservation site. Divers note less rainbow runners and Napoleon wrasse. 4 others dive sites used to South near Panza including Emeralds. Three communities benefit from services and some social investment from Fundu.
Swahili Divers	Dive operator located in North Western Pemba with four deluxe and four standard bungalows and one dormitory with three bunk beds and offering a range of diving and ecotourism packages.	Ecotourism, conservation and education.	The manager noted healthy state of corals along Fundo Island yet serious problem with crown of thorns, which they will attempt to eradicate. Limited interaction with fishers and no coordination with DFD besides monthly fee payment.
Greenfi System LTD	Working in Kuku in partnership with Mwambao, so far they have established 5 Mkuba groups with 131 members with equal numbers of men and women. 151 loans have been issued and 32 borrowers are on the second loan. There have been no defaults on repayments.	MKUBA stands for MFuko wa KUTunza BAhari (in English 'Fund to Care for the Sea') and is a revolving loan fund that provides 'eco credit' to coastal communities on condition that they protect and sustainably manage their marine resources.	The Shehia Fisheries Committee estimates a 3 fold increase in patrol effort in protecting the communities closed fishing zones and over 7000 mangrove seeds have planted through communal planting days and with an estimated 75% survival rate.
Aiyana Hotel	30 villa luxury resort including all inclusive packages located on the Ras Kigomasha peninsula, northern Pemba	Ecotourism.	We were unable to meet with management during our site visit. Marketing materials make no mention of support for community or conservation efforts. Aiyana appears to be under change of management at the time of writing this report.

As the PECCA promotes collaborative management and local community involvement, we interviewed select non-profit organizations and SFCs to understand their role and activities as well as gauge capacity that can be incorporated into the compliance plan. It is clear that the Mwambao community-led marine management efforts have had positive results, which bode well for scaling and replication throughout the PECCA. Several communities have been able to change their fishing practices, enforce their own nearby marine areas and create awareness among others to stop destructive practices. This bottom up strategy will be a critical component to the success of the PECCA over the long term. The

comanagement framework holds great potential in fostering compliance and expanding the sphere of influence of DFD especially given its limited budget. There are currently 54 SFCs of which ten are operating well. Last, but not least, Mwambao has done a tremendous job within PECCA over the past four years working with the local communities and helping drive change. Mwambao has provided critical organization support, equipment, training, materials and guidance to eight SFCs and continues to work hand in hand with both DFD and the community in the development and implementation of the local fishery management plans.

## FINDINGS/ RECOMMENDATIONS

1. Currently, DFD personnel are not in a position to achieve the mission of the PECCA “to conserve the biological biodiversity and other natural and cultural values of the area in the long term, while providing recreational, social and economic benefits for the present and future generations.” Staff does not possess uniforms, outreach is limited, patrols are sporadic, regulations are not uniformly enforced and there are no SOPs to guarantee the consistent performance of agency functions. Misali Rangers and district level fisheries staff require additional training, professionalization and the elaboration of basic SOPs for patrolling, vessel boarding, case building, coordination and information sharing among DFD personnel and outreach with SFCs.
2. A centralized Misali-based patrol strategy is both ineffective and inefficient. The Rangers must travel great distances using a 200HP OB motor while burning scarce fuel to provide sporadic enforcement of both Northern and Southern regions of Pemba. A decentralized strategy based on the deployment of smaller vessels using 15-40HP OB motors at the district level would increase the frequency and duration of operations needed to establish a more consistent presence and complement SFC efforts.
3. The co-management strategy is currently underutilized by DFD. Given limited resources and personnel, we recommend the elaboration of a compliance strategy whereby DFD MCS staff and district authorities focus on strengthening ties with the SFCs and providing more structured support so they can better organize and actively patrol their respective territories.
4. Fishers demonstrate a general lack of awareness and respect for PECCA and fishery regulations as evidenced by the ubiquitous use of illegal gear throughout the PECCA – spear guns, SCUBA tanks, beach seines, and fishing masks. It appears that since the MACEMP project very little formal outreach or enforcement has been carried out. We highly recommend the design and launch of a Pemba wide awareness campaign highlighting the mission of PECCA and basic fisheries regulations. As we do not expect DFD to begin enforcing all regulations at once, we

- recommend a phased approach beginning with one priority regulation e.g. no use of beach seines, where no exceptions are made nor limited warning is allowed for compliance.
5. Currently fishing is pervasive throughout the PECCA regardless of the 2010 management plan and zonation. There is limited signage, which contributes to infractions. A signaling plan for the regulations is required, including demarcation of priority areas where possible. As PECCA and DFD embark on a new management plan for PECCA in 2019, we recommend a review of the core zones as less than 0.05% of PECCA is within the core zones. Ultimately, a law or regulation for a marine area cannot have its fully intended effect if the boundary description is vague, inaccurate, or incorrectly represented on a map. A zone demarcation plan must be defined which includes the demarcation of priority areas including currently demarcated areas of community reef closures.



# BLUEPRINT FOR COMPLIANCE

A law enforcement system is designed to monitor all activities within a given area ranging from tourism, research, and transportation to fisheries. Protected area enforcement requires a holistic approach that accounts for surveillance, interdiction, systematic training, education and outreach and lastly, meaningful sanctions. Generally speaking, a compliance system should possess the following core components:

1. An operations planning and coordination lead;
2. A communication network to ensure constant coordination of personnel and community members;
3. Surveillance sensors and patrol assets that are strategically located to monitor key fishing grounds and to perform timely interdiction;
4. Clear and concise standard operating protocols (SOPs) to optimize operations, govern the use and maintenance of all assets and ensure patrol crew safety; and
5. Systematic training programs should be carried out for agencies and communities to foster effective joint patrols.



Figure. 5: Core Components of a Monitoring, Control and Surveillance System for Protected Areas

We recommend employing the following general guidelines for the design of the DFD compliance program:

1. Limit Capital Expenditures (CAPEX) by leveraging existing infrastructure e.g. KMKM posts and District offices. All asset acquisitions must be performance driven, account for lifecycle maintenance and operations and not be dictated by donors.
2. Minimize Operating Expenditures (OPEX) by decentralizing patrols to the District level, using appropriately sized and fuel-efficient O/B motors, and adopting low resource intensive patrol strategies.
3. Incorporate SFCs and tourism operators into the compliance strategy in order to reduce operating expenditures and leverage their support.

COMPONENT	RECOMMENDATIONS
<b>SURVEILLANCE AND INTERDICTION</b>	<ol style="list-style-type: none"> <li>1. Institutional strengthening of DFD Pemba &amp; PECCA via systematic training and the elaboration of Standard Operating Protocols (SOPs)               <ol style="list-style-type: none"> <li>a. Basic IMO safety courses and Boat Captain's course</li> <li>b. Marine coastal enforcement operations</li> <li>c. Yamaha basic O/B service training</li> <li>d. Elaboration of control center, patrolling and boarding SOPs</li> <li>e. Establish reporting formats, job aids and checklists</li> </ol> </li> <li>2. Decentralize compliance strategy and optimize patrol strategies</li> <li>3. Recommended patrol assets, surveillance and safety equipment</li> <li>4. Negotiate and craft inter-institutional agreement and SOPs</li> </ol>
<b>EDUCATION AND OUTREACH</b>	<ol style="list-style-type: none"> <li>1. Rules, Regulations &amp; Communication Plan:               <ol style="list-style-type: none"> <li>a. Develop an outreach and education component for all stakeholders. Messaging must be clear as people fear what they do not know.</li> <li>b. Protected area demarcation should be a priority and a key component of the outreach and education program.</li> </ol> </li> </ol>
<b>PENALTIES</b>	<ol style="list-style-type: none"> <li>1. Strengthen Penalties</li> <li>2. Establish a practical database that allows for case monitoring and the recording of repeat offenders.</li> </ol>





# SURVEILLANCE AND INTERDICTION

## I. INSTITUTIONAL STRENGTHENING OF DFD PEMBA & PECCA

As a starting point, we recommend the elaboration of an institutional manual or guiding document to orientate all staff. The management plan and regulations are useful documents; however, personnel must be given clear guidelines and support for their implementation. First and foremost, it is key that MCS staff understands they are the Police of Sea; and as such, must lead by example in the completion of their duties. Institutional standards must be established and followed to ensure consistency in the application of regulations and establishment of best practices. A few simple actions are listed below that can immediately help strengthen PECCA at minimal cost. These include:

- The crafting of a DFD personnel manual with the definition of roles and responsibilities including the District level, the establishment of a code of conduct, communication protocols, Key Performance Indicators (KPI) to measure effectiveness of operations and best practices;
- The procurement and use of uniforms for all DFD personnel when on duty unless part of covert operations;
- The realization of a refresher course to ensure that all personnel possess thorough knowledge and understanding of the mission of DFD and its respective legislation and regulations. As public servants, all personnel must have a firm grasp of the regulations and uphold the rule of law and promote the public interest; and
- A regular update of all active management areas within PECCA including permanent No Take Zones (NTZs) and temporary NTZs created by SFCs along with the attendant bylaws.

### TRAINING

With respect to training, we highly recommend the following three courses to ensure DFD personnel possess the fundamentals to plan and safely execute effective maritime enforcement.

COURSE TOPIC	COURSE DESCRIPTION
BASIC IMO TRAINING	<ul style="list-style-type: none"> <li>• First aid</li> <li>• Survival at sea</li> <li>• Fire fighting</li> </ul>
MARINE COASTAL ENFORCEMENT OPERATIONS	<ul style="list-style-type: none"> <li>• Operations planning and preparation including risk assessment, asset use, reporting, communication procedures, surveillance strategies, and documentation.</li> <li>• Personal safety issues for patrolling and boarding</li> <li>• Use of visual sensors in marine patrolling</li> <li>• Boarding procedures: Performing inspections, documentation to request, what to look for, and documenting your inspection.</li> <li>• Conflict resolution</li> <li>• Crime scene key practices. Evidence collection and handling.</li> <li>• Operations/Felony Reports. Information and items that are typically in a "good" report.</li> <li>• Search and rescue</li> </ul>
YAMAHA BASIC O/B SERVICE TRAINING COURSE	<ul style="list-style-type: none"> <li>• All FOs and Rangers should participate in an OEM basic outboard motor maintenance certification course. (As there are no facilities for the servicing of four stroke OB motors on Pemba, we recommend the procurement of two-stroke OB motors.)</li> </ul>

Systematic training and SOPs are designed to create routines that increase awareness and reduce risk. We highly recommend a combination of theory and practical exercises for improved retention of information and swift adoption of newly developed skills.

Refresher courses should be delivered at a minimum once a year and be no less than 40 hours.

### SOPS

As a complement to formal training courses, we recommend establishing a set of policies that can guide personnel in their actions and defend them from criticism when they do their assigned job. We firmly find value in such documents as they contribute to making good and consistent decisions. The elaboration of Standard Operating Protocols (SOPs) for key processes and activities will help institutionalize processes and prevent informal interpretation of rules and regulations. SOPs also help new personnel learn appropriate actions, responses and methods more quickly by providing a consistent and objective source for operations. SOPs are living documents designed to ensure the best, up-to-date practices for enforcement. For this reason, they should be reviewed and updated regularly in accordance with the input and experience of the officers. As a minimum, SOPs should be developed for the following core enforcement components:

#### I. DFD Planning and Communication:

As the lead agency, DFD must draft a master compliance plan and provide overall guidance to all DFD staff including PECCA staff in the coordination and execution of patrols. As Pemba is divided into four districts, it is vital that all staff adopt agency wide standards, formats and procedures for the enforcement of laws. DFD planning and communications SOPs should include:

- Direction of communication between DFD district level staff, Rangers, and BRs.
- Coordination of active operations and interdictions, as well as send backup as needed.
- Provision of formats, job aids and checklists to district level offices.
- Development and maintenance of all archives including user manuals and SOPs.
- Communication with external agencies and managing confidential information.

#### 2. Patrol:

The SOPs for patrols should include:

- Pre-departure requirements (verify that all the gauges are operating, test the speed control and guiding system, prepare underway logs, personal equipment, etc.)
- Submit pre-departure report to the operational manager.
- Determine patrol and operation area and establish patrol strategies: multiple boat patrol, barrier patrol, and patrol with SFCs, among other strategies.
- Reporting requirement for PECCA and District offices.

#### 3. Boarding:

Boarding inspections are subject to maritime control and interdiction procedures and must account for a range of potential activities from fishing violations to greater crimes such as drug

trafficking, piracy, contraband, among others. Boarding inspections may be met with an armed and hostile response from a suspected crewmember. All boarding plans must consider these real and legitimate threats. Boarding inspections should take the highest level of precaution for personnel and the vessels. The minimum requirements of a boarding SOP include:

- Determine the distance and speed of vessels to be intercepted and detained.
- Minimum training requirements for personnel in the inspection of different types of vessels and their associated risks.
- Protocols for the chain of command, control, and abnormal situation assessment (Ex: the escalation of a detected crime).
- Communications protocols to keep constant communication with the control center (Ex: perform periodic checks every 15 minutes).

### ESTABLISH REPORTING FORMATS, JOB AIDS AND CHECKLISTS

Job aids and checklists enable a user to perform a job even if they do not recall all of the specifics, actions, or steps associated with that job. We recommend crafting job aids and checklists that are concise, focused, and written in Swahili at the reading level of the typical user. Incorporate pictures, diagrams and other visual elements when they can make a point faster or clearer than a written text section. Prior to implementation, one must ensure that each job aid and checklist is thoroughly tested and reviewed. Ideally, develop job aids and checklists on water resistant paper and make them small enough to easily fit into a pocket or clipboard. The following table highlights the types of activities, functions and benefits associated with job aids and checklists.

ACTIVITY / TASK	JOB AID / CHECKLIST FUNCTION AND BENEFITS
RECALL PROCEDURES AND STEPS	<ul style="list-style-type: none"> <li>• Guide the user through each step in sequence from the first time</li> <li>• Task performance is standardized, reliable, and repeatable</li> <li>• Training uses the job aids that are in turn used in the field to build competency with a minimum of required training time</li> </ul>
INSTITUTIONALIZE OEM CONTENT	<ul style="list-style-type: none"> <li>• Capture content from OEM turn over training in a job aid or checklist to avoid "losing" those skills during warranty or initial operational time periods</li> <li>• Use still pictures and diagrams to show specific actions, parts, and results</li> </ul>
MAKE EFFECTIVE CHOICES	<ul style="list-style-type: none"> <li>• Job Aids that use "if –then" patterns can help users make correct choices and decisions for standard situations and issues</li> </ul>
REPORT / DOCUMENT ACTIONS	<ul style="list-style-type: none"> <li>• Provide clear reporting and documenting requirements and direction coupled with key operational tasks and functions</li> <li>• Guides the user on what and when they need to report, as well as who gets the report.</li> </ul>

## 2. DECENTRALIZE COMPLIANCE STRATEGY

In order to improve compliance throughout PECCA, we recommend the elaboration of a decentralized compliance strategy. This strategy shift would have far reaching implications in how DFD plans its patrols, coordinates with district level staff, the distribution of its patrol assets, communication strategy, patrol strategy with SFCs among others facets. In this section, we will highlight these changes and discuss their implications and advantages.

The decentralization of the compliance strategy essentially entails two fundamental changes for DFD: the assignment of greater patrolling responsibility and resources to each district and strengthening of ties with the SFCs by providing more targeted and structured support so they can better organize and actively patrol their respective territories. It is evident that DFD possesses a very limited operating budget; and as such, must repurpose the highly inefficient Misali-based patrol for one that is more cost effective and congruent with the co-management framework.

### DISTRIBUTION OF PATROL ASSETS

The decentralized patrol strategy requires the procurement of one small patrol vessel and quarterly fuel allocation of 100 liters for each district level post. Currently, no district possess a patrol vessel and are dependent on a Ranger patrol from Misali. This would give greater autonomy to district level staff as they would be able to carry out more frequent and cost-effective patrols as they cover shorter distances. In addition, district level staff could spend more time on the water where they could inspect vessels, serve as a deterrent and allow for more frequent coordination with local SFCs.

In order to illustrate the strategy, we've included two hypothetical patrol strategies for the Mkoani District in Figure 6. As one can observe, total patrol distances are much shorter than the Misali-based patrol and sum between 26 – 31km. If SFCs were to report a violation to DFD in this scenario, district level staff could realistically be able to respond to a situation. A District level patrol offers the advantage of increasing routine interaction with fishers and local SFCs thereby reinforcing compliance efforts and culture. A continuous presence of a fishery authority is imperative to improved compliance. We recommend a phased approach to program rollout by beginning with one District e.g. Mkoani and then incrementally adding vessels to other Districts as resources become available. Figure 7 illustrates the hypothetical patrol strategies for the four Pemba Districts. It is clear that the distribution of smaller vessels to each District would allow DFD to increase patrol time dramatically with the same amount of resources. Additionally, the decentralized approach could also allow for increased community participation in patrols and coordination among communities to create collaborative fishery management groups.



Figure 6: Hypothetical decentralized patrol strategy for Makongwe and Kuuu SFCs, Mkoani district.



Figure 7: Hypothetical decentralized patrol strategy for the four PECCA districts.

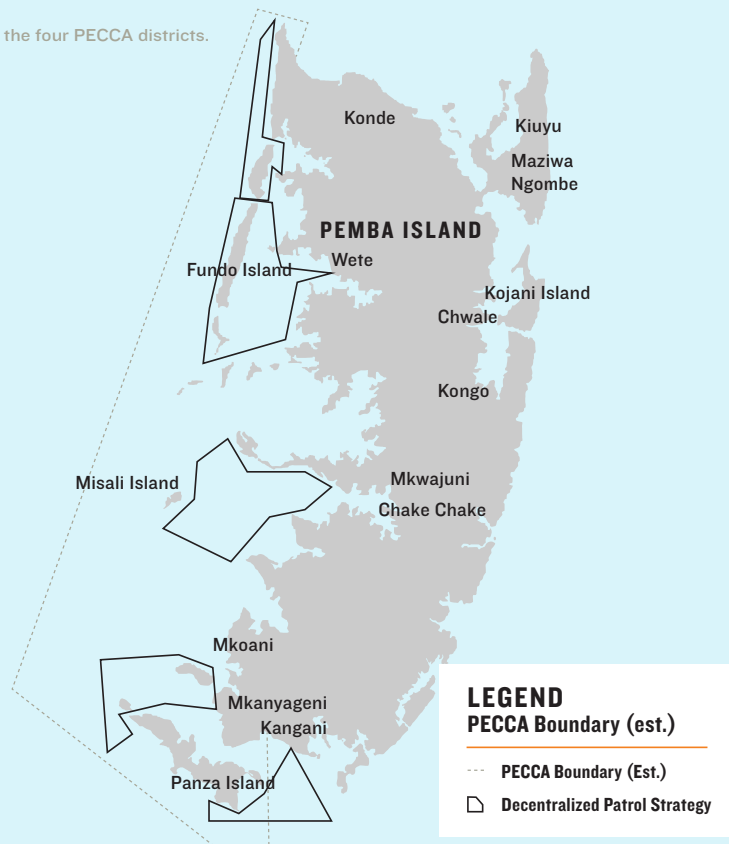
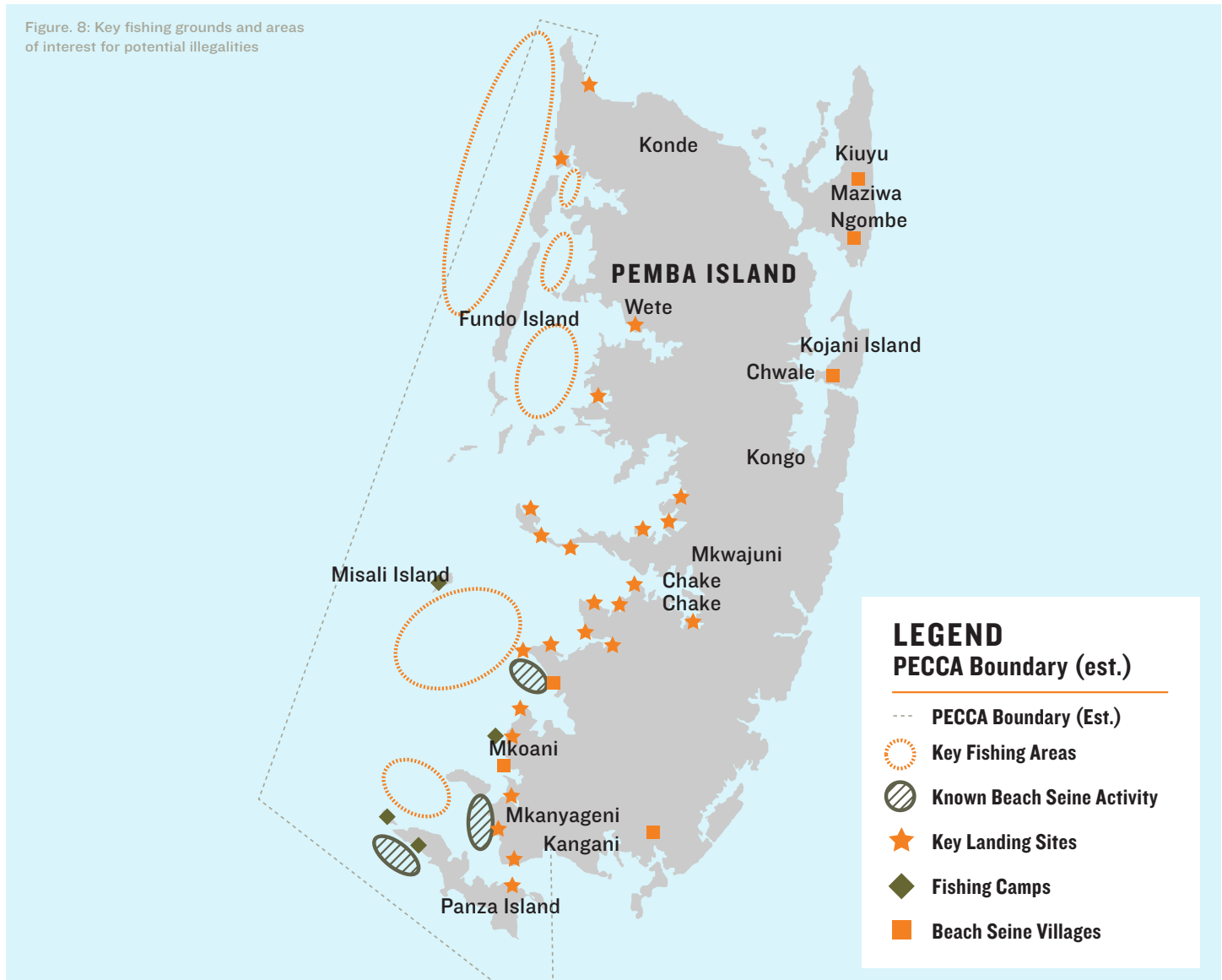




Figure 8: Key fishing grounds and areas of interest for potential illegalities



## PATROL STRATEGIES

A decentralized compliance plan requires a fundamental shift in patrolling strategies. Compliance strategies that involve patrol can be on foot, on a motorcycle and in a boat: the important thing is to maintain a presence in known areas of high incidence of violations to deter activities. Not all patrol strategies require high levels of funding as evidenced by foot patrols - 39% of all fishers in Pemba are foot fishers. Even boat patrols do not require large amounts of fuel or constant motion – boats can moor or anchor near sanctuaries, key access ways, and areas of high incidence of illegal fishing. With smaller OB motors and the mooring of vessels in critical areas, the district level staff can significantly increase the frequency of patrols in their district. Using existing intelligence, DFD can already determine areas for both foot and vessel patrols as illustrated in Figure 8. Also critical is community outreach. District level staff must constantly perform outreach with fishers, communities and to schools. The more frequently stakeholders are reminded of rules, the more difficult it is for them to ignore them. Penalties are also critical.

## IMPLICATIONS FOR RANGERS

The Misali Rangers are positively impacted by the decentralized strategy. Without the need to carry out long distance patrols, the Rangers can better focus on enforcing Misali regulations, collecting tourism revenue and performing short perimeter patrols using the smaller vessel with 60HP OB motor. In addition, it is possible that the MCS Head Ranger could also support the District level patrols when necessary.

## STRENGTHENING THE ROLE OF THE SFCs

Even in the event that each District office possesses its respective patrol vessel, there are too few DFD personnel to ensure a consistent presence throughout the MCA. Besides, the PECCA co-management framework is an innovative piece of legislation that should be embraced by DFD to compensate for their own resource limitations and because SFCs have demonstrated their effectiveness when they are well trained and receive technical assistance. Therefore, we recommend DFD support SFC local management endeavors, which include efforts to strengthen SFC capacity to organize, administer and manage local fishery closures and other management actions. DFD should craft a manual and SOPs for MCS at the Shehia level, develop and deliver an annual training for the SFCs and consider equipping them with the necessary tools and communication equipment to protect them from potential harm, recognize their legitimate role and maximize their potential as allies in conservation. As stipulated in the legal framework, SFCs will operate independently of DFD, but should coordinate activities with DFD when warranted. Additionally where legitimately requested, and where available, DFD should provide SFCs with fuel for patrol. Mwambao have assisted in the creation of a draft bylaw template for SFCs and is assisting DFD for provision of an SFC training curriculum and other useful tools. Figure 9, outlines the key components of an effective SFC (Mwambao 2018). DFD intends to strengthen the role of SFCs throughout PECCA.

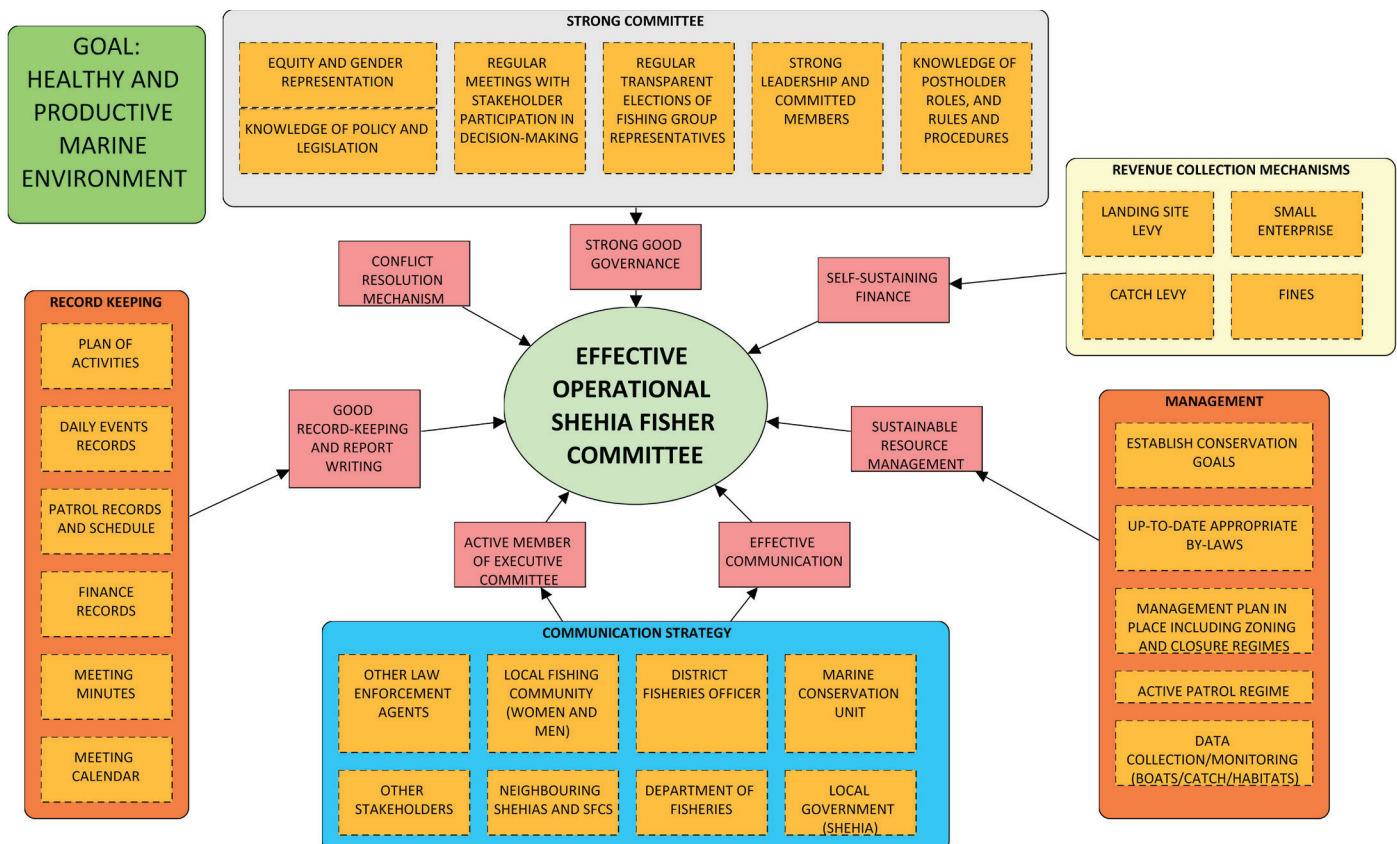


Figure 9: Key components of an effective SFC  
(Source Mwambao 2018)

## PLANNING AND OPERATIONS

There needs to be a center for planning and operations despite the decentralization of compliance. It is important for DFD to serve as the lead and provide structure and guidance for specific methodologies, templates, forms, conformance to governance, and application of PECCA wide policies and practices. In this fashion, DFD would provide a clear service to help district level staff more consistently develop their plans as well as more effectively execute their programs. Decentralization cannot mean independence for each district level post to carry out their compliance plans as they see fit. Engagement and support from DFD's MCS officer, as part of planning a key link in the chain of command over their respective Districts is essential. The advantages of centralized planning are multiple. There are thousands of fishers in Pemba who migrate from district to district, just as fish do and there must be a lead that supervises and coordinates the overall strategy, consolidates reports and provides follow-up to the most problematic fishery cases. The center does not require substantial CAPEX, but as a minimum should include a desktop computer, monitors, digital storage, lock and key filing cabinets, and a safe and other basic office furniture. It is important the center allow the MCS team to carry out their operations and planning with privacy.

## RECOMMENDED PATROL ASSETS, SURVEILLANCE AND SAFETY EQUIPMENT

Due to resource constraints and the fact that 95% of the fishers in Pemba use sailboats or small OB engines, or are foot fishers, we recommend the procurement of the following patrol assets:

QTY	LENGTH	MOTOR	ACCESSORIES
04	5 meter fiber glass boat	01 Yamaha 15HP 2-stroke with remote control helm	<ul style="list-style-type: none"> <li>Fiber glass canopy</li> <li>Fixed to hull fuel tank</li> </ul>

As fuel is extremely scarce, all DFD boat captains must adopt fuel-efficient patrol strategies. While we assume it is common knowledge, it is important to remind personnel that the worst fuel efficiency is due to a larger throttle opening (WOT). As illustrated in figure 10, fuel burn increases exponentially at faster speeds. For example, fuel burn increases nearly six fold from a slow troll of 2.5KTS to a cruising speed of 14.9 KTS and then more than doubles from there to 25 KTS. Given the nature of the threats and type of vessels used by local fishers, there really is no need for high-speed patrols or hot pursuit interdictions. The DFD should develop and adopt fuel-efficient patrol strategies that emphasize slow troll to cruise speeds. This simple measure alone would allow each District to patrol 166 hours covering a total of 420 NMs with 100 liters of fuel. According to our calculations, this would allow each District (4) to carry out a minimum of 21 patrols per quarter with only 100 liters of fuel. Currently, the Misali-based patrol carries out one patrol per quarter per District.

Figure. 10: Fuel burn chart for a single Yamaha 15HP OB motor (Source Yamaha)

RPM	SPEED (KTS)	FUEL BURN (LT/H)	NM/LT
850 (slow troll)	2.5	0.6	4.2
3,500 (plane)	12.5	3.2	3.9
4,000 (cruise)	14.9	3.5	4.2
5,000 (max. cruise)	19.7	4.9	4
6,060 (WOT)	24.9	7.2	3.5

Most mariners lack basic surveillance and safety equipment at sea. In the table below, we've included a list of basic surveillance and safety equipment for each vessel.

QTY	ON BOARD EQUIPMENT	LOCATION
4	Megaphone 25W with rechargeable batteries	All boats
4	Waterproof/Shockproof/Portable GPS	All boats
10	First Aid Kit	Offices and all boats
14	PFDs (lifejackets)	All boats
4	Marine waterproof Binoculars 10X50 up to 12X50	All boats
6	LED Search Lights w/rechargeable batteries	All boats
6	14.1 Megapixel Shockproof/Waterproof Digital Camera with Optical 16x Zoom and built in GPS with extra batteries and flash memory cards	All boats
4	Leatherman Multi Tool	All rangers
6	Solar powered flashlights with battery backup	All boats
12	Inflatable Vinyl Boat Fender (8" x 24", White)	All boats
12	Coastal Locator Flares Kit	All boats (3 on each)
4	Pelican Case 1620	All boats

## NEGOTIATE AND CRAFT INTER-INSTITUTIONAL AGREEMENT AND SOPs

We recommend that DFD negotiate a MOU with KMKM in order to strengthen and better coordinate surveillance and patrol efforts in the PECCA for three primary reasons:

- As KMKM already possesses eight camps throughout PECCA, DFD could potentially leverage their existing infrastructure as part of their compliance plan;
- KMKM officers bear firearms and could be requested to join Rangers and district level staff on patrols to protect them against the more aggressive infractors;
- Station a KMKM officer at Misali again to support Rangers and deter illegal fishing near the island.



## EDUCATION AND OUTREACH

### I. RULES, REGULATIONS AND COMMUNICATION PLAN

DFD must develop a simple education and outreach plan directed towards local fishers and the community alike. A simple fact sheet outlining zonification, regulations, restrictions, and fines should be widely distributed to all stakeholders. DFD should lead outreach activities, however, DFOs, Rangers and BRs are critical to effectively disseminate essential information throughout PECCA. We highly recommend involving both the district offices and SFCs to reinforce understanding and acceptance of the regulations. A phased approach to enforcement of laws and new regulations should be implemented whereby violators are first warned about infractions; however, as widespread knowledge of regulations is achieved, law enforcement agents should be authorized to impose penalties at whatever level is needed to ensure compliance. As we do not expect DFD to begin enforcing all regulations at once, we recommend a phased approach beginning with one priority regulation e.g. no use of beach seines. In order to be effective, the regulations must be enforced otherwise the communications plan will have been a wasted effort.

With respect to methodology, we suggest a communications plan to saturate Pemba with a team of people that would flood the villages to personally communicate the essence and details of the outreach campaign. Planning considerations for this idea would include:

- A. Message content: The full range, from overall objectives, to focus on collaboration to zoning, and new regulations
- B. Means of delivery: There are multiple ways to communicate the new plan:
  - Personal - one or two team members should spend a day in each village talking with SFCs, fishers, community leaders, and as many residents as possible about what the regulations and the PECCA means for them. Such conversation should clearly indicate that a key component is collaboration with them, and how that collaboration will happen. Easy-to-understand maps of various zones, lists of regulations, and maybe a two or three page introduction to the MCA (overall significance, vision for future, etc.) should also be distributed widely. Perhaps some cannot or will not read it; however, it is important to leave something as a reference source for those who will.
  - Radio and TV spots – local contacts indicated that both the radio and TV serve as a good medium for informing island inhabitants. Depending on funding, the communication plan could entail developing content for both mediums.
- C. Timing: In a perfect world the basic components of message decisions, planning, selection of the subject team, training the team, identifying logistical needs and how to meet them, etc.

would be accomplished before the communication plan is approved so that this major undertaking can be initiated as soon as possible following formal approval and implementation.

D. Where: Decisions about where presentations should be made are part of the planning process. It's our impression that presentations should be made at the District level (probably more than once) and in most of the coastal villages throughout the islands.

E. Communication Team: Criteria needs to be established for whoever will be selected to serve as part of this team, particularly those who are knowledgeable about the area and have a track record of good communication and diplomatic skills.

F. Roles and Responsibilities: Overall leadership and management of the action should be agreed upon as soon as possible. Personal responsibilities need to be assigned in terms of leadership, decision-making, and operational control.

G. Monitoring and Evaluation: Creation of a system to review ongoing "progress" should be included in the plan, and should set forth a process to make changes when shortcomings are identified and such change is indicated.

### 2. PROTECTED AREA DEMARCATION SHOULD BE A PRIORITY AND A KEY COMPONENT OF THE OUTREACH AND EDUCATION PROGRAM.

According to the 2010 management plan, there is limited zonification and demarcation of PECCA, which contributes to every day infractions. As PECCA and DFD embark on a new management plan in 2019, we highly recommend reviewing the core zones as less than 0.05% of PECCA is currently within the core zones. Ultimately, a law or regulation for a marine area cannot have its fully intended effect if the boundary description is vague, inaccurate, or incorrectly represented on a map. A zone demarcation plan must be defined which includes the demarcation of priority areas including currently demarcated areas of community reef closures.



## PENALTIES

### I. STRENGTHEN PENALTIES

Enforcement systems require effective criminal, civil and/or administrative sanctions. Simply put: if there are no repercussions, illegal fishers will return tomorrow. Lack of penalties will undercut community respect for regulations as well as negatively impact enforcement team morale. Measures must be taken to avoid delays, improve coordination and decentralize the sanction process as impunity ultimately represents a loss for all involved. It's important to note that in the case of PECCA, the administration of justice via the DFD is extremely limited given the fact Rangers and DFOs almost never issue citations to offenders. It is in fact the SFCs, which are vested in the protection of their closed areas, who are quick to detain and fine fishers that encroach into their waters. As part of the culture change required within DFD, Rangers and DFOs must begin to issue citations and they should consider the following types of sanctions in the development of their compliance system:

**Criminal/Civil Sanctions:** The following actions are recommended to improve judicial proceedings:

- Establish a standardized vessel boarding report format with recommendations from the AG.
- Officers should be trained in the completion of this format.
- Formalize official relations between the agency and their counterparts.
- Carry out training workshops for judges, POs and lawyers at a minimum of once a year.

**Administrative Sanctions:** In order to expedite the sanctioning process, where possible administrative sanctions should be carried out at the local level. The severity of measures should correspond to the seriousness of the violation and be determined at the level to prevent re-occurrence of the violation. The following non-economic sanctions should also be implemented as permitted under the law:

- Vessel detention
- Seizure of fishing gear
- Temporary suspension of the permits of boats, crewmembers or the boat-owner
- Revoking the operating licenses of boats, boat-owners, agents, maritime personnel or fishers

### 2. ESTABLISH A PRACTICAL DATABASE THAT ALLOWS FOR CASE MONITORING AND THE RECORDING OF REPEAT OFFENDERS.

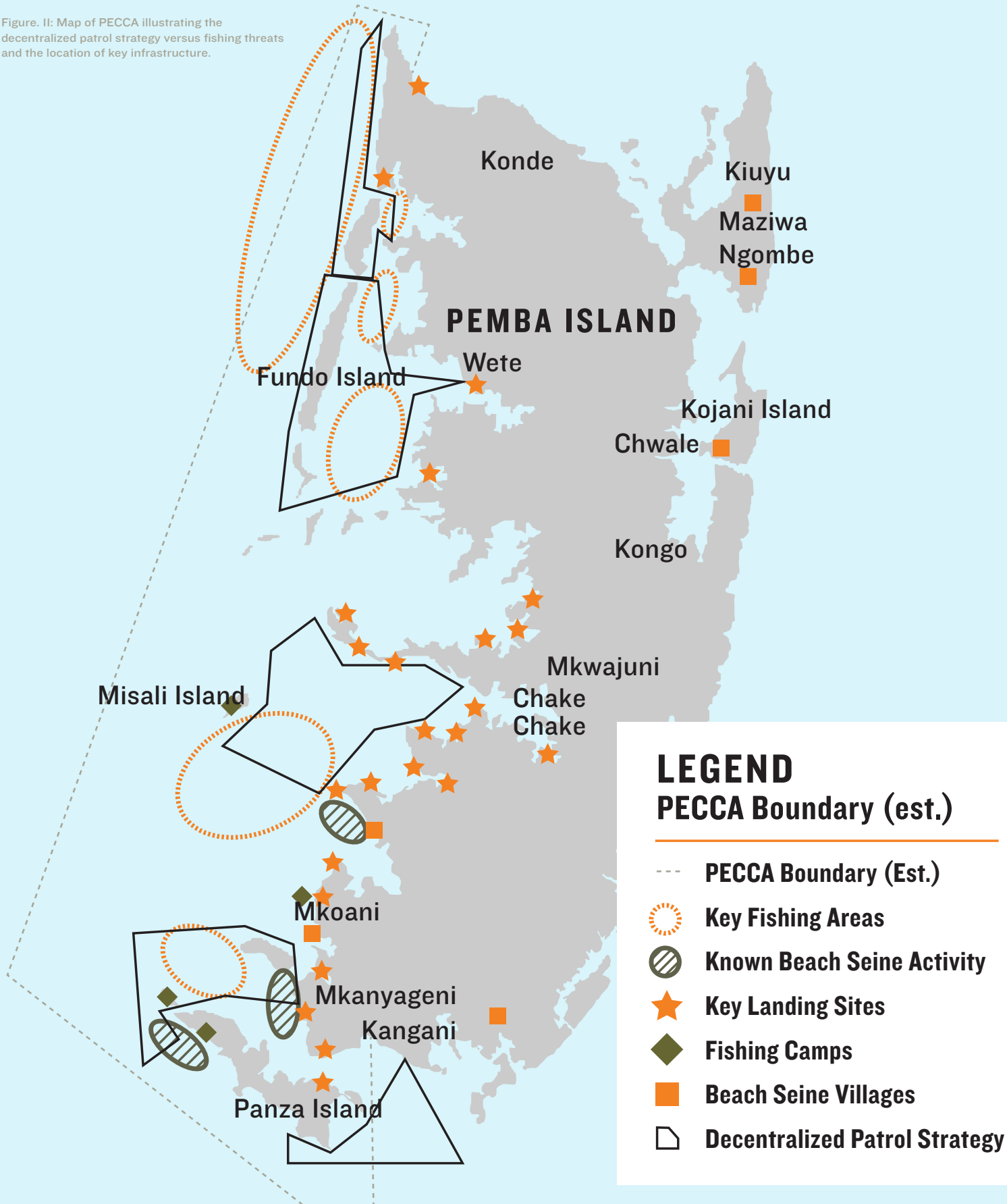
The DFD MCS team should create a simple database for recording and tracking information on violations. Documenting and recording basic background information on past incidents may help with predictive policing. Recording and documenting this basic information on violations can develop a clear profile of the violator. Additionally, the database can provide useful information for managers when scheduling and planning patrols to enable a more effective strategy.

## FINAL PECCA MARINE COMPLIANCE PLAN

In summary, we are confident that the compliance program designed for PECCA is practical, affordable and feasible to implement over a five-year timeframe. As the lead agency of PECCA, DFD must first strengthen its capacity and make critical investments in staff, infrastructure and training to dramatically improve communication with SFCs and ensure a presence throughout the PECCA. A strong authority is a respected authority and a continuous presence serves as a deterrent in the long run. Our key recommendations include the decentralization of patrolling and compliance efforts to the District level and the strengthening of ties to the SFCs. The SFC community management models should be incorporated into the overall enforcement and compliance strategy. Select communities have already demonstrated their commitment to the vision of sustainable fishery management and must be carefully inserted into the compliance framework. As no agency can do it alone, we also recommend the negotiation of a bilateral agreement with KMKM in order to strengthen and better coordinate surveillance and patrol efforts. All CAPEX and OPEX decisions were made in consideration of a highly limited budget. More importantly, we have defined a blueprint of critical steps for the capacity building and professionalization of the DFD personnel, who truly are the core component of the PECCA enforcement program.



Figure. II: Map of PECCA illustrating the decentralized patrol strategy versus fishing threats and the location of key infrastructure.







# BUDGET

ACTIVITY/LINE-ITEM	COST/UNIT/YEAR
<b>I. INSTITUTIONAL STRENGTHENING OF DFD PEMBA &amp; PECCA</b>	<b>188,895,600</b>
a. Uniforms (22 staff x 2 uniforms/pp x TSh 114,900/uniform)	5,055,600
b. Personnel manual	22,980,000
c. Basic IMO safety courses and Boat Captain's course	22,980,000
d. Marine coastal enforcement operations	45,960,000
e. Yamaha Basic O/B service training course	22,980,000
f. Elaboration of control center, patrolling and boarding SOPs	45,960,000
g. Establish reporting formats, job aids and checklists	22,980,000
<b>2. DECENTRALIZE COMPLIANCE STRATEGY AND OPTIMIZE PATROL STRATEGIES</b>	<b>317,583,600</b>
a. Define cost effective patrol strategy	22,980,000
b. PECCA and District Office workshops	22,980,000
c. District Office and SFC workshops	91,920,000
d. Co-management manual, SOPs, training curriculum and templates for bylaws	68,940,000
e. SFC surveillance, communication and safety equipment (Initiate with 10 SFCs: pelican case, binoculars, GPS, waterproof camera and leatherman) (72 SFCs x TSh 1,378,800/SFC over 5 years)	99,273,600
f. Equipment for PECCA control center: computer, monitors, digital storage, filing cabinets and safe	11,490,000
<b>3. RECOMMENDED PATROL ASSETS, SURVEILLANCE AND SAFETY EQUIPMENT</b>	<b>147,700,733</b>
a. 5 meter fiberglass boat with canopy and one Yamaha 15-HP 2-stroke outboard motor ( TSh 17,235,000/vessel x 4 Districts)	68,940,000
b. Spare parts: propeller, spark plugs, filters, batteries, oil, tools and one kit of critical spare parts (TSh 1,723,500 per vessel x 4 Districts)	6,894,000
c. District level annual fuel estimate: 4 Outboard Motors (OBMs) x Wide Open Throttle (WOT) 7.2 Liters Per Hour (LPH) x 60% x 60 hours/month x 12 months x TSh 2,298/liter	28,590,797
d. Surveillance and safety equipment for District patrol vessels: (4) megaphone, (4) GPS, (10) first aid kits, (16) PFDs, (4 ) marine waterproof binoculars 12X50, (6) 14 MP waterproof digital cameras with extra batteries and (6) 32GB flash memory cards, (4) Leatherman, (6) solar powered flashlights, (12) boat fenders, (12) flares, and (4) pelican cases	43,275,936
<b>4. NEGOTIATE AND CRAFT INTER-INSTITUTIONAL AGREEMENT AND SOPS</b>	<b>52,854,000</b>
a. Draft interagency MOU (Lawyer fees)	11,490,000
b. Stipend for KMKM officer TSh 459,600 per month x 12 months x 5 years)	27,576,000
c. Joint operations resources	13,788,000
<b>5. RULES, REGULATIONS AND COMMUNICATIONS PLAN</b>	<b>197,628,000</b>
a. Develop Outreach and Education Campaign to Stakeholders	34,470,000
b. Deploy communication teams (TSh 9,129,000 per District x 4 Districts)	36,768,000
c. Protected area demarcation: workshops TSh 34,470,000 and demarcation materials TSh 91,920,000	126,390,000
<b>6. STRENGTHEN PENALTIES</b>	<b>91,920,000</b>
a. Lawyer fees	22,980,000
b. Training fees (TSh 11,490,000 per District x 4 Districts)	45,960,000
c. Establish a practical database that allows for case monitoring	22,980,000
<b>TOTAL</b>	<b>996,581,933</b>



# WILDAID



THIS DOCUMENT WAS PRODUCED FOR REVIEW BY THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT. IT WAS PREPARED BY INTERNATIONAL RESOURCES GROUP FOR USAID'S PROTECTING TANZANIA'S ENVIRONMENT, CONSERVATION AND TOURISM (PROTECT) PROJECT.