

Fisheries Refugia

LME: LEARN
POLICY BRIEF

Spatially-managed fisheries enhancement and environmental protection at a regional level

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Context and importance of the problem

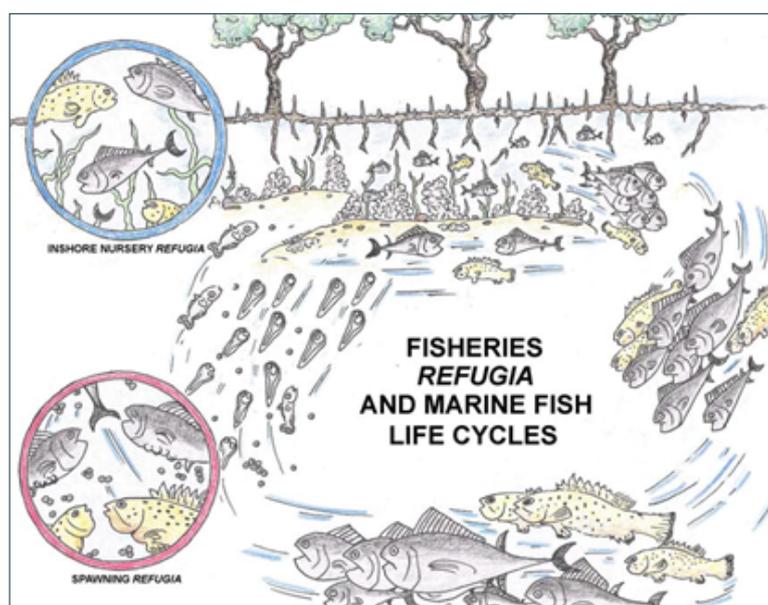


Figure 1: Critical habitat components for fish stocks vary according to life cycle stage and fish species.

Aquatic life is diverse and complex and many of the world's targeted fisheries species utilise different parts of the marine environment at different stages of their lifecycle (Figure 1). Unsustainable fishing pressures are reducing food security and negatively affecting livelihoods in many coastal areas worldwide. This is being exacerbated where environmentally destructive fishing techniques degrade habitat. In many cases the environmental damage is to the very ecosystems that support various stages of lifecycle that result in the productive, healthy fishing grounds. The sheer scale of global fisheries means that if these pressures continue, the collapse of regionally important fisheries and interconnected ecosystems is a very real risk, resulting in a collapse of fishing community livelihoods and industries. Strict no-take

exclusion protection, as are often the purpose of Marine Protected Areas (MPAs) set in place to address this, are not necessarily effective or suitable management approaches in all cases, setting fisheries and environmental policy on a collision course and causing resentment in negatively-impacted local fishing communities. Fisheries Refugia offers an opportunity to protect ecosystem components without blanket exclusion policies. This offers particular benefit where the livelihoods of coastal communities are reliant on accessing their traditional fishing grounds. In these cases, closing waters to some kinds of fishing gear and restricting the catch of named species can offer much more protection than cordoning off even 30% of an area (Hilborn 2016).

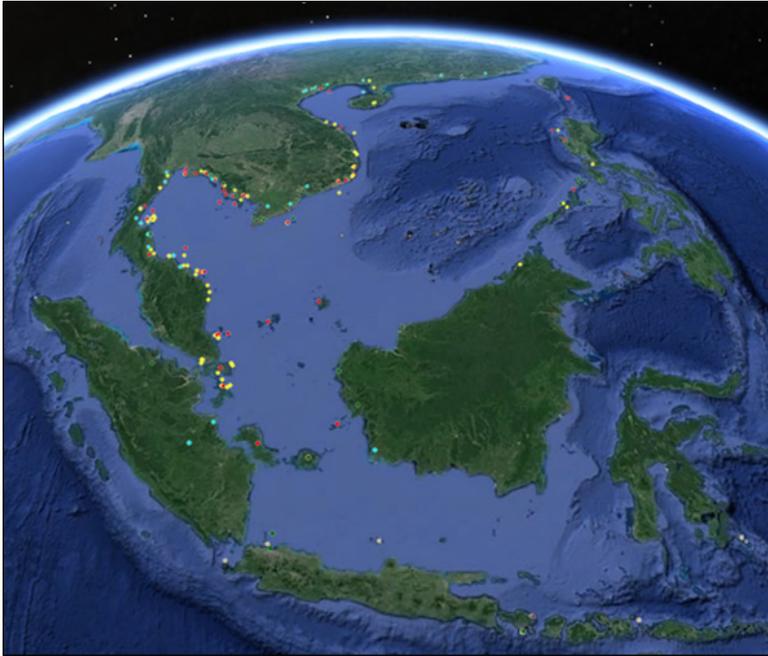


Figure 2: Management of a regional assemblage of key ecosystems coral reefs (red), sea grass meadows (yellow), mangrove forests (green, hard to distinguish) and wetlands (blue) mapped in the South China Sea and Gulf of Thailand to plan a coordinated management for Fisheries Refugia sites (SEAFDEC). For a full interactive view visit <https://scssap.org/googlemaps/>

To cohesively protect key ecosystem components that support the lifecycle of targeted fishery species, the Large Marine Ecosystem (LME) offers a comprehensive and internationally recognised region. The ecosystem components, such as coastal mangroves for egg laying and coral reefs or seagrass meadows to support juveniles before migrating to deeper waters, when protected in a coordinated approach that is cognisant of the lifecycle requirements of targeted species are called Fisheries Refugia. Importantly, these refugia are managed in both time and space to allow sustainable fishing livelihoods and industries. To effectively implement a system of Fisheries Refugia protection a regional approach is needed and, in many cases, this requires engagement of local community knowledge and fishing practices under a coordinated transnational partnership.

A Fisheries Refugia approach is a regional system of management areas that is focused on essential links between fish stocks and their habitats. It is designed to manage intense levels of small-scale fishing pressures that exert unsustainable pressure on the fisheries and the environment. It is designed to work with fishing communities to develop resilient and sustainable fisheries at a regional level. This management approach offers a powerful intervention to improve livelihoods, food security and the marine environment in productive coastal fisheries. A regional scale using an LME as a management framework (Figure 2) supports the integration of all essential ecosystem components into the management approach. Communication and policy development on Fisheries Refugia facilitate interactions between the government institutions responsible for the traditionally separate management of the environment and fisheries. With fishing communities and industries being key benefactors and partners in developing a network of Fisheries Refugia, local knowledge of fishing grounds, fish life cycles and fishing practices play a central role in management design and implementation. The Global Environment Facility International Waters (GEF IW) Portfolio's experience demonstrates how this can be successfully designed, developed and implemented in LMEs across national borders.

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Critique of Policy Options

When considering a Fisheries Refugia approach it is important to understand how it differs from the traditional MPAs and the focus on small-scale fishing communities. By understanding the shortcomings of an MPA approach in areas essential for small-scale and sustenance fisheries, the case for a refugia-based management system can be understood. Fisheries Refugia approach offers a more community-embraced form of management to the more restrictive, whether perceived or actual, implementation of MPAs on the use of marine resources. MPAs are frequently proposed as fisheries management instruments and, while MPAs can have varying levels of legislated and/or enforced rules and regulations on fishing activities, they are widely understood by fisheries stakeholders to be areas that are closed to fishing (UNEP 2007). As such, with MPAs (and similar protected area instruments, see Box 1) the key challenge lies in achieving their acceptance amongst communities at the local level.

Box 1: Understanding Fisheries Refugia alongside Protected Area Terminology

The term 'Marine Protected Area' (MPA) and 'Marine and Coastal Protected Area' (MCPA) are widely used around the world but its meaning in any one country or region may be quite different from that in others. There are many terms related to MPA. These include SPA (Specially Protected Area), SCA (Special Conservation Area), MCZ (Marine Conservation Zone sea type of MPA in English waters), MR (Marine Reserve), MP (Marine Park), NTZ (No Take Zone, or closed area in fisheries management) and ASCC (Area of Special Conservation Concern). Each of these terms has specific types of restriction associated with them as defined by the laws of the countries concerned (Paterson *et al.* 2013).

When considering the most suited fisheries management approach there are largely two opposing views on the effectiveness of MPAs and strict no-take reserves. First is that many conservationists and conservation-focused organisations traditionally proposed such areas as what is needed to sustain fisheries. This effectively closes these areas off through regulation and relies on the protected area to generate sufficient biota that then leaves to areas where they can be caught. While MPAs may be suited to some near-pristine and remote marine areas, the second view considers areas that are important for fisheries and supporting livelihoods to require a more engaged form of management to meet both environmental protection and fisheries goals. Otherwise, the exclusion of local fishing communities can cause resentment towards the protected area and those managing it, increase unreported and destructive fishing activities, or force small fishing boats to travel further to new fishing grounds. Excluding commercial fisheries can simply shift the fishing pressures elsewhere and underscores the need for regional cooperation.

This second view is embodied in the Fisheries Refugia approach to managing fisheries. This approach draws on fisheries management concepts that are designed to be embraced by the fishing community. Emphasis on the sustainable use of fisheries resources and their habitats rather than the prohibition of fishing addresses the resentment that exclusion or no-take reserves can foster. Central to a refugia initiative is building fishing community support for area-based approaches to fisheries and habitat management, through which fisheries management and biodiversity conservation objectives can be achieved simultaneously (UNEP 2007).

Importantly, the Fisheries Refugia approach can be implemented on a regional level, such as at the LME scale, to incorporate existing or planned MPAs. This integration of fisheries management with conservation efforts through spatially-planned development of Fisheries Refugia offers benefits for income, generation

and the environment where an MPA-only would be a non-starter due to the reliance on the marine resources by multiple countries. Importantly, Fisheries Refugia will strengthen MPAs in the region and should not be considered as competing classifications but a network of regionally managed fisheries and environment protection areas.

A Fisheries Refugia initiative should effectively integrate both fisheries and habitat management. In order to develop and implement the initiative at a scale to support regional fish stocks, the LME offers the strategic benefit of international recognition and clearly identified stakeholders. In many cases the departments and ministries responsible for fisheries and environment will not have a history of working together. The LME approach to developing a Fisheries Refugia therefore needs to facilitate a meaningful dialogue on multiple use planning.

Essential to a successful Fisheries Refugia design is knowledge of critical habitat type and location for the various life-cycle stages of fish stock species. This knowledge is rarely well understood and the lack of knowledge is exacerbated when fish life cycles cross national borders or include a pelagic stage in the open ocean. A collaborative compilation of existing datasets by experts is required to compile what is known about critical habitat for fish stocks. Gaps in knowledge can be identified and targeted efforts to prioritise refugia sites at the regional level made. Existing MPAs should be included as should essential ecosystems needed according to fish species type. For example mangrove habitat is required for mullet, snapper, sea bass and tilapia species (FAO 1994).



Figure 3: Local fisherman involved in identifying species-specific spawning and nursery areas (Phu Phoc Archipelago, Viet Nam) ©SEAFDEC.

The role of coordinated and shared use of marine LME resources as part of a refugia initiative should be communicated and developed in partnership with local communities and the private sector (Figure 3). This is essential to counter the failings of MPA acceptance by in regions with that are heavily reliant on small-scale fishing. Consultations undertaken with fishing communities, fish traders, and women involved in inshore fisheries activities have revealed that the emphasis on sustainable use rather than the no-take approach adopted as part of conventional MPA systems avoided adverse reactions at the community level in the GEF IW South China Sea and Gulf of Thailand Fisheries project (Paterson *et al.* 2013). Clear messaging that fisheries habitat management and ecosystem conservation measures will improve fish stocks and livelihoods should be made. A focus on sustainable use rather than the prohibition of fishing is the key message of a successful Fisheries Refugia approach. Coordination of these efforts at the regional scale is essential and using the LME as a tangible ecosystem to maintain aids in the messaging and sense of regional community.

Fisheries Refugia habitats in the South China Sea and Gulf of Thailand were coral reefs, mangroves, seagrass meadows, estuaries, brackish water lagoons, and inter-tidal mud flats.

Policy Recommendations

A successful Fisheries Refugia system managed at a regional level requires both fisheries and the environment to be considered together. This means that fisheries management strategies need to incorporate fish life-cycle and critical habitat linkages. Consequently, cross-sectoral consultation between fisheries and environment departments must be facilitated in both the design and implementation stages. The cross-sectoral consultation must include coordinated community-consultation and engagement with local and provincial agencies and stakeholders. The Fisheries Refugia approach has shown to be successful in addressing a significant barrier to the integration of fisheries and habitat management - the adverse reaction to the MPA concept that is elicited from fishing communities and fisheries officers at the local and provincial levels. The key to this success is the adjustment in language and approach when engaging to develop a network of Fisheries Refugia. This is a key strength for establishing new protection sites with the support and buy-in of adjacent communities. Finally, this cross-sectoral coordination needs to occur at the national level and facilitated transnationally at the regional level.

It is important to reiterate that planning a Fisheries Refugia approach does not need to start from a blank canvas. Existing protected areas (in all forms), or the potential designation of other categories of MPAs (Box 1) should be included. This is required to ensure that areas designated for protection by environment ministries are whenever possible aligned with the critically important habitat areas for fish stocks. Policy recommendations that will help develop a regional Fisheries Refugia initiative are:

- Identify and bring together the departments and research institutes responsible for both fisheries and marine / coastal protection in countries sharing the LME.
- Collate information for initial review. This should include national reports, international reports and mapping of local knowledge, agencies and stakeholders.
- Work to identify areas of critical importance in the life cycle of fished species, including spawning, and nursery grounds, or areas of habitat required for the maintenance of brood stock.
- Develop management plans for each species of importance and their critical habitats that are then overlain at the regional level. Management measures should be developed in consultation with those that are reliant and/or using the fish stocks and marine resources, namely small-scale fisherfolk and private industries. Management measures should be focussed on the sustainable use of the resources and may include restrictions according to season, size, fishing gear, fishing method, vessel size (UNEP 2007)
- Hold annual regional meetings between all partner countries with attendance from local, provincial and national representatives of fisheries and environmental protection.
- Use the knowledge and partnership to develop policy jointly between fishery and environmental protection agencies at a coordinated, regional level.

Case Study: South China Sea and Gulf of Thailand

An example of the successful design and deployment of a regional Fisheries Refugia is the South China Sea and Gulf of Thailand where communities and governments are working to implement the fisheries component of the GEF South China Sea Strategic Action Programme. Efforts to reduce the loss of coastal and marine ecosystems in the South China Sea (SCS) have not been effective with declining trends of critical habitat recorded. Seagrass meadows had declined by 30%, mangroves by 16 % and coral reefs by 16% when the UNEP / GEF International Waters project "Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand" was proposed. The project was developed to meet the need to balance fisheries and environmental management in the region. The declining trend in the total area of these habitats, critical to the life cycles of many marine species, combined with the high levels of coastal community dependence on fish, raised serious concerns for the long-term sustainability of small-scale fisheries in the region. Fish production was known to be intrinsically linked to the quality and area of seagrass, mangrove and coral reef habitats. This meant that in order to protect fisheries a combination of fisheries and environmental objectives were needed to be aligned in the region.

Box 2: Fisheries Refugia, a win for the community and for government

The Fisheries Refugia concept was well received by the Kien Provincial Department of Science and Technology (DoST) and Department of Fisheries (DoF), as well as representatives of the Ham Ninh commune. It aligned closely with local knowledge on fish migrations and patterns of availability, seasons of reproduction and areas in which fish are caught. It was noted in several community consultations at that site that the refugia concept and its focus on life cycle and habitat linkages was more relevant to local stakeholders than scientific concepts such as representativeness, comprehensiveness, and uniqueness that community members had previously been introduced to in discussions on MPA planning (Patterson *et al.* 2013).

Establishing Refugia Sites

An example of successful local refugia sites being established under the regional LEM project is at the Phu Quoc Archipelago where coral reef, seagrass and mangrove habitats were identified for integrated fisheries and habitat management. Essential to the success of the site was the creation of an information database on coral reef and seagrass communities which has been used in the zoning of two pilot areas for management, namely the An Thoi coral reef sub-site (400 ha) and the Ham Ninh seagrass sub-site (6,300 ha). Central to the coordinated compilation of information was the effective operation of a cross-sectorial Project Steering Committee and the improved awareness and business practices within the tourism sector.

At the outset of the project the links between fish stocks and habitats at Phu Quoc was scarce. Little or no data on the distribution and abundance of fish eggs and larvae were available for identification of spawning locations or important nursery locations for fish stocks. This problem was largely overcome by a high level of involvement of fishermen from the local commune in all consultations and exercises to identify refugia sites. The level of acceptance by fishermen of the refugia concept was high. This acceptance and engagement resulted in their leading activities to identify specific spawning and nursery areas in consultation with local fisheries and

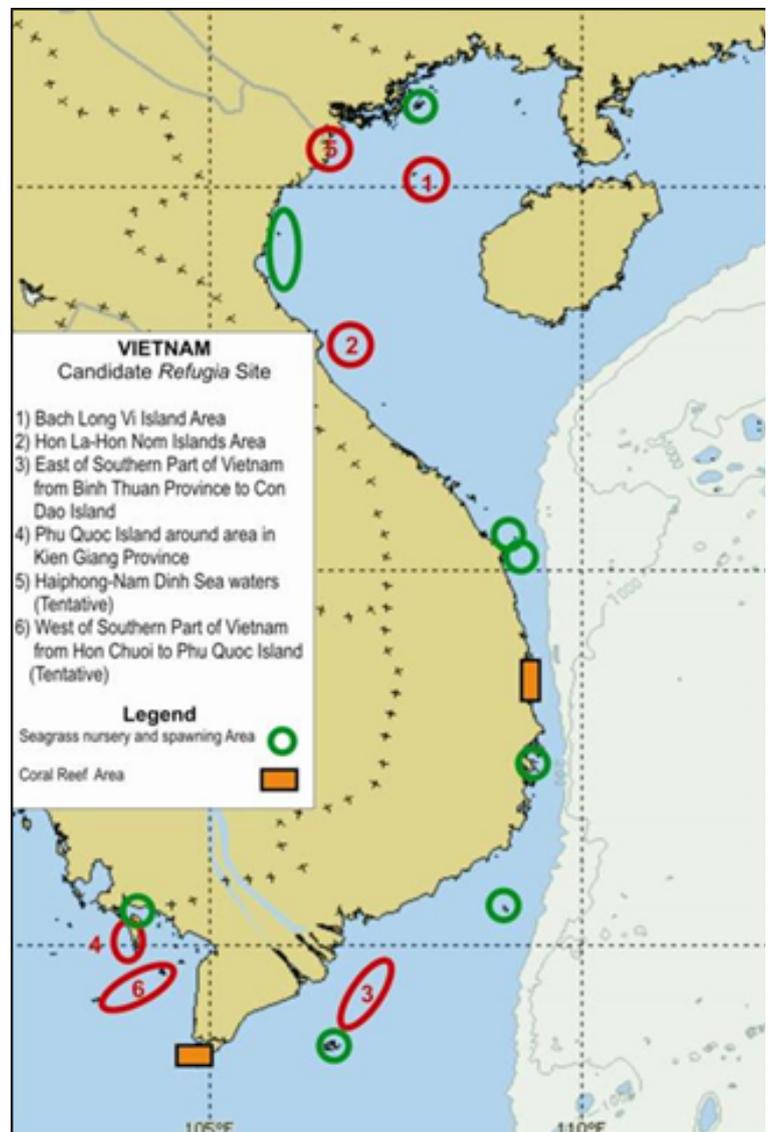


Figure 4: Sites selected in Vietnam for inclusion in an initial system of fisheries refugia, the same mapping was undertaken in all partner countries Cambodia, Indonesia, Malaysia, Philippines, Thailand and Vietnam (SEAFDEC).

environment department staff and border army officials. This provided sufficiently high level of interaction between all sectors that management issues and solutions could often be discussed and agreed at-sea aboard small-scale fishing vessels. Such dialogue was necessary to enable the level of sharing of ideas and perspectives between stakeholders required to identify solutions to problems directly related to the primary source of food and income for the local community. Involvement of scientists from Viet Nam's Institute of Oceanography in the process assisted in the interpretation of local community and fishermen knowledge.

More than 50% of fishing vessels in the world are estimated to operate in the South China Sea (Austin 2019) and in 2016, the FAO reported the catch of all ASEAN countries with a coastline on the South China Sea at around 15 million tonnes. This equates to 16% out of a global total of 93 million tonnes. This intensity of fishing in the South China Sea meant that benefits offered through regional coordination and management of Fisheries Refugia were viable where MPAs and regional management of these were not. The GEF IW LME Fisheries Refugia project was the implementation of the fisheries component of the Strategic Action Programme for the South China Sea, executed at a regional level by the Southeast Asian Fisheries Development Center in partnership with the government agencies responsible for fisheries in the six participating countries. The lessons learned in such an intensely utilised region offer insight and guidance for successful replication of Fisheries Refugia in other LMEs and shared waters of the world.

A Regional Partnership

The LME Fisheries Refugia project was a partnership between Cambodia, Indonesia, Malaysia, Philippines, Thailand and Vietnam executed by the Southeast Asian Fisheries Development Centre with GEF IW, UNEP and UNOPS implementation support. The national activities of the project were executed by departments or research institutes of the government ministries responsible for fisheries in each country. Government nominated focal points for fisheries from these countries led the execution of regional activities through the Regional Working Group on Fisheries. The work of this group benefitted from the participation of 5 regional experts on fisheries, and senior advisors and technical staff of the Southeast Asian Fisheries Development Center (SEAFDEC), the Food and Agriculture Organization of the United Nations (FAO), the WorldFish Centre and the International Union for the Conservation of Nature (IUCN). Engagement of the national and regional partners with the local fisheries and environmental agencies who were on-water with local fisherman is essential for effective refugia identification, designation and implementation.



References

1. Austin, G. 2019. "China's assault on South China Sea fisheries: doing the maths." from <https://www.aspistrategist.org.au/chinas-assault-on-south-china-sea-fisheries-doing-the-maths/>.
2. FAO. 1994. Mangrove Forest Management Guidelines. Food and Agriculture Organisation of the United Nations: Rome, Italy.
3. Hilborn, R. 2016. "Policy: Marine biodiversity needs more than protection." Nature News: 535(7611).
4. Paterson, C. J., *et al.* 2013. "Fisheries Refugia: A novel approach to integrating fisheries and habitat management in the context of small-scale fishing pressure." Ocean & Coastal Management. 85: 214-229.
5. SEAFDEC. "Fisheries Refugia Sites." from http://refugia.unepscs.org/Fisheries_Refugia_Information/About_Fisheries_Refugia/Fisheries_Refugia_Sites.html.
6. SEAFDEC. "The South China Sea Fisheries Refugia Initiative." Southeast Asian Fisheries Development Center/Training Department (SEAFDEC/TD). from <http://www.seafdec.or.th/home/other-programs/fisheries-refugia/>.

GEF LME:LEARN

GEF LME: LEARN is a program to improve global ecosystem-based governance of Large Marine Ecosystems and their coasts by generating knowledge, building capacity, harnessing public and private partners and supporting south-to-south learning and north-to-south learning. A key element of this improved governance is main-streaming cooperation between LME, MPA, and ICM projects in overlapping areas, both for GEF projects and for non-GEF projects. This Full-scale project plans to achieve a multiplier effect using demonstrations of learning tools and toolboxes, to aid practitioners and other key stakeholders, in conducting and learning from GEF projects.

This global project is funded by the Global Environmental Facility (GEF), implemented by the United Nations Development Programme (UNDP), and executed by the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization. The GEF LME:LEARN's Project Coordination Unit (PCU) is headquartered at UNESCO-IOC's offices in Paris.

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