

Integrating Habitat Conservation and Fishery Management in the South China Sea and Gulf of Thailand through Fisheries *Refugia*

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The integration of habitat and biodiversity conservation into fishery management and practices in the South China Sea and the Gulf of Thailand has been improved through the efforts of concerned communities and governments. This approach was made possible under the project “Establishment and Operation of a Regional System of Fisheries *Refugia* in the South China Sea and the Gulf of Thailand” supported by the Global Environment Facility (GEF) and United Nations Environment Programme (UNEP). The Project was implemented by the Southeast Asian Fisheries Development Center (SEAFDEC) in partnership with the fisheries agencies of the riparian countries bordering the South China Sea, namely: Cambodia, Indonesia, Malaysia, Philippines, Thailand, and Viet Nam. The main focus of the Project was establishing a regional system of fisheries *refugia*, which are fisheries management areas, in the South China Sea and Gulf of Thailand. Initially planned for 48 months from January 2017 until December 2020, the Project duration was extended until December 2022 due to the COVID-19 pandemic. Nevertheless, as of June 2022, the communities in the fisheries *refugia* sites of the participating countries have been working towards enhancing the integration of habitat and biodiversity conservation into fishery management and practices for the economically important aquatic species.

By 2022, the effective management of critical threats to 15 fisheries *refugia* sites with a total area of about 1.36 million ha is expected to be adopted. This is more than five times of the proposed *refugia* areas (269,500 ha) adopted by the GEF/CEO. Among these, five fisheries *refugia* were agreed upon among stakeholders and approved by the governments, including three in Cambodia at Kep Province for blue swimming crab, Preah Sihanouk for blood cockle, and Koh Kong Province for Indo-Pacific mackerel; and two in Thailand at Surat Thani Province for blue swimming crab and Trat Province for Indo-Pacific mackerel. In addition, seven fisheries *refugia* sites were recognized by the stakeholders and will be adopted by the responsible agencies. These include one in Cambodia at Kampong Speu Province for the juvenile grouper; two in Malaysia at Tanjung Leman, Johor State for spiny lobster and at Miri, Sarawak State for tiger prawn; three in the Philippines at Bolinao for siganids, at Masinloc for one-stripe fusilier, and Coron for redbelly yellowtail fusilier; and two in Indonesia at West Kalimantan for white prawn, and at Bangka Regency for squid. Moreover, although the activities in Viet Nam were delayed, the country have identified two *refugia* sites, one at the Eastern coastal area of Phu Quoc - Kien Giang for blue swimming crab, and another at the coastal area of Lagi, Binh Thuan for subcrenata ark clam.

As a regional system of management areas that focuses on essential links between fish stocks and their habitats, fisheries *refugia* have been considered an important approach for the conservation and management of major critical coastal habitats, e.g. mangroves, coral reefs, seagrass beds. In the Regional Guidelines on the Use of Fisheries *Refugia* for Capture Fisheries Management in Southeast Asia adopted in 2006, promoting the concept of fisheries *refugia* is essential to enhance the existing conservation and management measures, especially in the integration of fisheries with habitats management (SEAFDEC, 2006).

Many Southeast Asian countries have established their respective fisheries *refugia*, but there is a need to enhance the operations of such *refugia* systems in order for these to also support the concept of other effective area-based conservation measures or OECM that has been promoted by the Convention on Biological Diversity (CBD) framework and included in the target of the post-2020 global biodiversity framework (CBD, 2021). The fisheries *refugia* approach is meant to manage intense levels of small-scale fishing pressures that exert unsustainable pressure on the fisheries and the environment, especially in the South China Sea and Gulf of Thailand areas, which is a global center of marine biological diversity that

supports significant fisheries that are important to the food security and economic stability of Southeast Asian countries. Among the most productive fishing grounds in the South China Sea area include the Gulf of Thailand which features a large amount of small-scale and coastal fishing operations and is shared by Cambodia, Malaysia, Thailand, and Viet Nam; and the Eastern and Southern South China Sea that host large amount of small-scale and coastal fishing, small-scale vessels, and bordered by Indonesia, Malaysia, Philippines, and Viet Nam (Ekmaharaj *et al.*, 2009)

Nevertheless, high levels of fishing effort from the small-scale sector have been recorded in the South China Sea area while inshore waters were also subjected to intense fishing pressure that led to the adoption of unsustainable fishing methods and practices to maintain catch and increase incomes in short term. Such practices include the use of destructive fishing gear and explosives; operation of demersal trawls and push nets in seagrass beds, and use of chemicals that poison not only the target fishes but also the corals in reef areas. The vigorous fishing pressure exerted by small-scale fisheries has therefore been identified as a significant cause of the degradation and loss of coastal habitats in the South China Sea.

Box. Definition of fisheries *refugia*

Fisheries *refugia* refers to “Spatially and geographically defined, marine or coastal areas in which specific management measures are applied to sustain important species [fisheries resources] during critical stages of their life cycle, for their sustainable use.”

Thus, fisheries *refugia* should:

- not be simply ‘no take zones’;
- have the objective of sustainable use for the benefit of present and future generations;
- provide for some areas within *refugia* to be closed due to their critical importance [essential contribution] to the life cycle of a species or group of species;
- focus on 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;
- have different characteristics according to their purposes and the species or species groups for which they are established and within which different management measures will apply; and
- have management plans.

Management measures that may be applied within fisheries *refugia* may be drawn from the following [non-exhaustive] list of classical fisheries management actions:

- exclusion of a fishing method (e.g. light luring, purse seine fishing);
- restricted gears (e.g. mesh size);
- prohibited gears (e.g. push nets, demersal trawls);
- vessel size/engine capacity;
- seasonal closures during critical periods of fish life cycles;
- seasonal restrictions (e.g. use of specific gear that may trap larvae); and
- limited access and use of rights-based approaches in small-scale fisheries.

The riparian countries of the South China Sea have been exerting efforts to reduce the rate of loss of coastal habitats, e.g. adoption of conventional fisheries management measures such as regulating the mesh size of nets and imposition of closed areas and closed seasons. Nonetheless, the rate of loss of such habitats remained high due to difficulties in the enforcement of such measures resulting in the impossibility of increasing or maintaining production levels (Siriraksophon, 2010). The continued decline of habitats critical to the life cycles of most aquatic species has raised serious concerns for the long-term sustainability of small-scale fisheries in the South China Sea. With fish production intrinsically linked to the quality and area of habitats and the heightened dependence of coastal communities on fish, the need to improve the integration of fish habitat considerations and fisheries management has become essential. Such a situation, therefore, called for the establishment of the fisheries *refugia*, where fisheries *refugia* as defined by the UNEP/GEF/SCS are the “spatially and geographically defined, marine or coastal areas in which specific management measures are applied to sustain important species (fisheries resources) during the critical stages of their life cycle, for their sustainable use” (Pernetta *et al.*, 2010).

As an initial attempt to address the concerns related to the widespread overexploitation of fish stocks in the Gulf of Thailand and South China Sea, the UNEP/GEF Project “Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand” through its Regional Working Group on Fisheries (RWG-F) developed the initial concept





Supplementary Guidelines on Co-management Using Group User Rights, Fishery Statistics, Indicators and Fisheries *Refugia*

of fisheries *refugia* (Pernetta *et al.*, 2010). Moreover, from 2002 to 2008, the Project collaborated with SEAFDEC and its Member Countries to refine this concept and develop a framework for the establishment and operation of a regional system of fisheries *refugia*, targeting priority transboundary, demersal fish, and non-fish resources (UNEP, 2007). Considering that specific habitats and areas are critically important to different stages of the life cycle of each species, these areas have to be managed by adopting the fisheries *refugia* concept. During the implementation of the Project, efforts were made to address the key barriers to effective fisheries habitat management in the South China Sea and Gulf of Thailand. These barriers include limited information regarding fish life cycle and critical habitat linkages and the role that the marine habitats play in sustaining fisheries; low-level of understanding among stakeholders including fishers, scientists, policymakers, and fisheries and habitat managers of the linkages between fish stocks and habitats; limited community acceptance of “protected” area-based approaches to marine management in Southeast Asia; and limited experience of national fisheries and environment agencies with respect to the implementation of integrated fisheries and habitat management approaches (Siriraksophon, 2010). Despite such limitations, 52 known fisheries *refugia* had been identified and characterized, and the experiences and lessons learned had been used to develop the Regional Guidelines on the Use of Fisheries *Refugia* for Capture Fisheries Management in Southeast Asia that formed part of the ASEAN-SEAFDEC Regional Guidelines for Responsible Fisheries in Southeast Asia published by SEAFDEC in 2006 (Pernetta *et al.*, 2010).

With the results of the 2002–2008 UNEP/GEF Project at the backdrop, and in order to improve the integration of fish habitat considerations and fisheries management in the South China Sea, the 2017–2022 Project “Establishment and Operation of a Regional System of Fisheries *Refugia* in the South China Sea and Gulf of Thailand” was implemented to meet this need via implementation of the fisheries component of the Strategic Action Programme for the South China Sea. The Project had the objectives of contributing to improved integration of

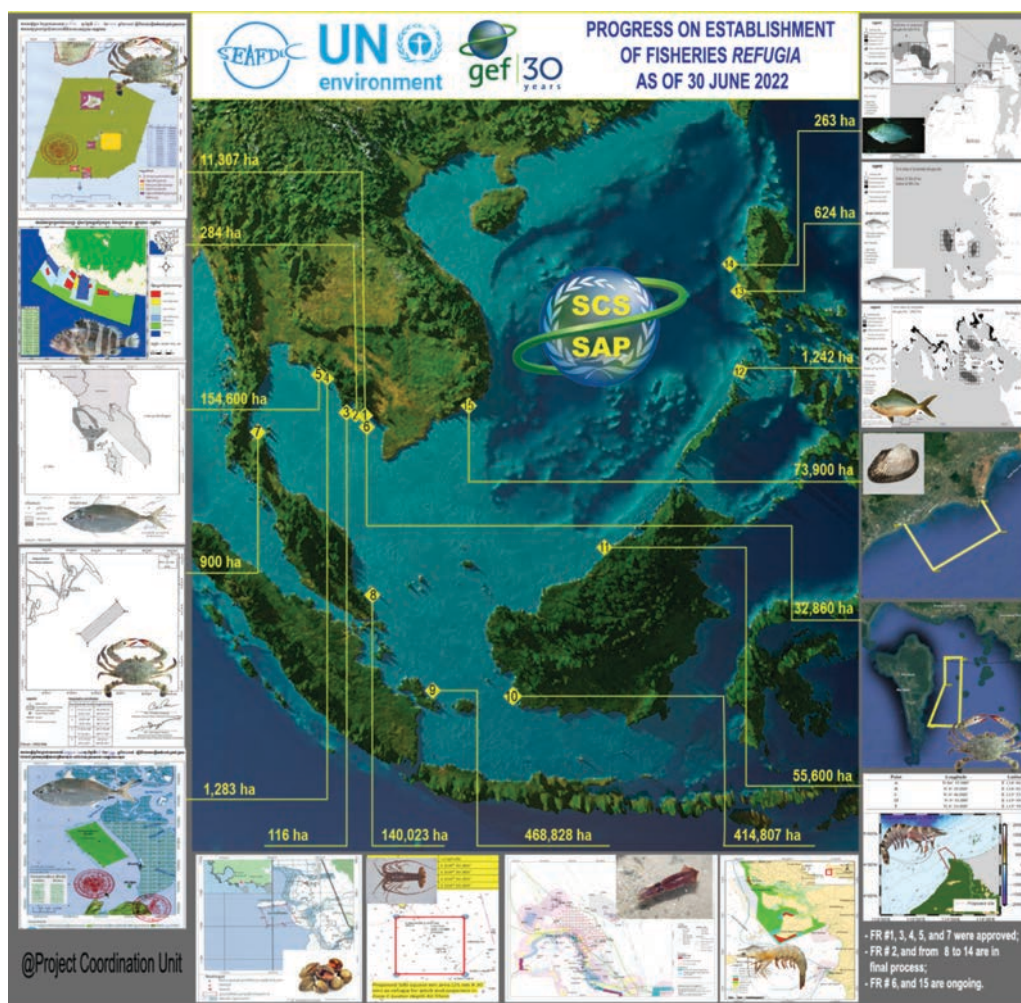
habitat and biodiversity conservation considerations in the management of fisheries in the South China Sea and Gulf of Thailand; improving national management of the threats to fish stock and critical habitat linkages within fisheries *refugia*; and enhancing the uptake of good practice in integrating fisheries management and biodiversity conservation in the design and implementation of regional and national fisheries management systems. The four components of the Project were 1) establishing operational management at 15 priority fisheries *refugia* with community-based *refugia* management plans as key outputs; 2) strengthening the enabling environment for the formal designation and operational management of fisheries *refugia*; (3) strengthening information management and dissemination for enhancing the national uptake of best practices in integrating fisheries management and biodiversity conservation, and in improving community acceptance of area-based approaches to fisheries and coastal environmental management; and at the national level, (4) strengthening the cross-sectorial coordination for integrated fisheries and environmental management while harnessing national scientific and technical expertise, and knowledge required to promote policy, legal, and institutional reforms for fisheries *refugia* management in the participating countries.

Specifically, the Project was also aimed at aligning with the fisheries component of the Strategic Action Programme for the South China Sea, *viz*: build the resilience of Southeast Asian fisheries to the effects of high and increasing levels of fishing effort; improve the understanding among stakeholders, including fishers, scientists, policymakers, and fisheries managers, of the ecosystem and fishery linkages as a basis for integrated fisheries and ecosystem/habitat management; and build the capacity of fisheries agencies to engage in meaningful dialogue with the environment sector regarding the improvement of fisheries and management of interactions between fisheries and critical marine habitats. As of June 2022, the participating countries have made progress in their respective fishery *refugia*, where fisheries *refugia* management is being effectively implemented and promoted for certain economically important commodities prioritized by the countries. All 15 fisheries *refugia* sites with a total area of about 1.36 million ha are expected to be adopted by 2022. This is more than five times of the proposed *refugia* areas (269,500 ha) adopted by the GEF/CEO. As of June 2022, five *refugia* sites were approved, while the others were in the ongoing and final approval process.

Way Forward

Although the fisheries *refugia* establishment in Viet Nam has been delayed, fisheries management systems in the identified priority fisheries *refugia* were developed in the participating countries consistent with the ASEAN-SEAFDEC Regional Guidelines for Responsible Fisheries in Southeast Asia. Moreover, the draft Regional Guidelines on Indicators for

No. in map	Fisheries <i>refugia</i> site	Target species	Area (ha)	Status
1	Marine Fisheries Management including Refugia at Koh Po & Koh Tonsay Archipelago, Kep, Cambodia	Blue swimming crab (<i>Portunus pelagicus</i>)	11,307	Approved
2	Prek Thnaot, Kampot, Cambodia	Groupers	284	Final process
3	Prek Sangke, Village, Tek Thlar Commune, Prey Nub District, Preah Sihanouk, Cambodia	Blood cockle (<i>Anadara granosa</i>)	116	Approved
4	Peam Krasob, Koh Kong, Cambodia	Indo-Pacific mackerel (<i>Rastrelliger brachysoma</i>)	1,283	Approved
5	Off Trat, Thailand	Indo-Pacific mackerel (<i>Rastrelliger brachysoma</i>)	154,600	Approved
6	Eastern coastal area of Phu Quoc - Kien Giang, Viet Nam	Blue swimming crab (<i>Portunus pelagicus</i>)	32,860	Ongoing
7	Around Koh Sed, Surat Thani, Thailand	Blue swimming crab (<i>Portunus pelagicus</i>)	900	Approved
8	Tanjung Leman, Johor, Malaysia	Spiny lobster (<i>Panulirus polyphagus</i>)	140,023	Final process
9	Off Tuing Village, Bangka Regency, Indonesia	Squid (<i>Uroteuthis chinensis</i>)	468,828	Final process
10	Kubu Raya (Padang Tikar), Ketapang (Delta Pawan and North Kayong (Dusun Besar)/West Kalimantan, Indonesia	Penaeid shrimp (<i>Penaeus merguensis</i>)	414,807	Final process
11	Kuala Balam, Miri, Sarawak, Malaysia	Black tiger prawn (<i>Penaeus monodon</i>)	55,600	Final process
12	Off Coron Islands, Palawan, Philippines	Redbelly yellowtail fusilier	1,242	Final process
		White-tipped scad (Option)	-	Ongoing
		One-stripe fusilier	624	Final process
13	Masinloc coastal area, Zambales, Philippines	Frigate tuna (Option)	-	Ongoing
		Fringe scale sardine (Option)	-	Ongoing
14	Bolinao coastal area, Pangasinan, Philippines	Siganids	263	Final process
15	Coastal area of Lagi - Binh Thuan, Viet Nam	Subcrenata ark clam (<i>Anadara subcrenata</i>)	73,900	Ongoing
TOTAL AREA (ha)			1,356,637	



Fisheries *refugia* establishment (as of June 2022)

Sustainable Management of Fisheries *Refugia* is being prepared. The structural framework together with criteria and indicators to enhance the effective management of fisheries *refugia* have been defined by the participating countries. It is expected that the experience gained from this Project in the South China Sea area could be adopted in other marine areas of the world where overfishing and the use of inappropriate fishing gears and practices are significant impediments to the sustainable exploitation of fishery resources and utilization of coastal habitats.

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