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IUU FISHING RISK PROFILE FOR SOUTH CHINA SEA

USAID SUSTAINABLE FISH ASIA TECHNICAL SUPPORT ACTIVITY

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COVER IMAGE: ADOBE/DACO

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AIS	Automatic Information Systems
AN-IUU	ASEAN Network IUU
ASEAN	Association of Southeast Asian Nations
BFAR	Bureau of Fisheries and Aquatic Resources (Philippines)
CANTS	Conservation and Anti-Trawling Structures
CFis	Coastal Community Fisheries (Cambodia)
CORVI	Climate and Ocean Resilience Vulnerability Index
CSO	Civil Society Organization
CTI-CFF	Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security
DoF	Department of Fisheries (Malaysia)
EC	European Commission
EEZ	Exclusive Economic Zone
EJF	Environmental Justice Foundation
ETP	Endangered, threatened, and protected species
FiA	Fisheries Administration (Cambodia)
FMA	Fisheries Management Area
GT	Gross tonnage
IEZ	Inshore Exclusion Zone
IDR	Indonesian Rupiah
IUU	Illegal, Unreported, and Unregulated (fishing)
KI	Key Informants
LGU	Local Governance Units (Philippines)
MAFF	Ministry of Agriculture, Forests, and Fisheries (Cambodia)
MCC	Marine Command Center
MCC	Marine Conservation Cambodia
MCS	Monitoring, Control, and Surveillance
MFMA	Marine Fisheries Management Area (Cambodia)
MMAF	Ministry of Marine Affairs and Fisheries (Indonesia)
MMEA	Malaysia Maritime Enforcement Agency
MoU	Memorandum of Understanding
MPA	Marine Protected Area
NAP	National Adaptation Plan (Thailand)
NFAT	National Fishers Association of Thailand
NFMP	National Fisheries Management Plan
NGO	Non-Government Organization
NGPC	New Generation Patrol Craft
NPOA	National Plan of Action
PFDA	Philippines Fisheries Development Authority
Php	Philippine Peso
PiPo	Port In-Port Out
PNK	Malaysian National Fishermen Association
PRC	People's Republic of China
PSMA	Agreement on Port State Measures
RETT	SuFiA TS Regional Experts Technical Team
RFMO	Regional Fisheries Management Organization
RM	Malaysian Ringgit
Rp	Indonesian Rupiah
RPOA	Regional Plan of Action
SCS	South China Seascape
SEAFDEC	Southeast Asian Fisheries Development Center
SEJ	Structured Expert Judgement
SFI	Seaweed Farm Inputs
SOP	Standard Operating Procedure
SSS	Sulu-Sulawesi Seascape
SuFiA-TS	USAID Sustainable Fish Asia Technical Support
U.S.	United States of America
UNCLOS	UN Convention on the Law of the Sea
USD	US Dollar
VMS	Vessel Monitoring Systems

INTRODUCTION

The purpose of this report is to identify pathways to sustainable fisheries management and marine biodiversity conservation in the Indo-Pacific by offering a robust overview of the key drivers and impacts of illegal, unreported, and unregulated (IUU) fishing in the South China Sea (SCS). This quantitative and qualitative risk assessment profiles the vulnerability of five countries that border the South China Sea—Cambodia, Indonesia, Malaysia, Philippines, Thailand, and Vietnam—to IUU fishing.

The risk assessment process which derives the results detailed in this report adapts the Stimson Center's Climate and Ocean Risk Vulnerability Initiative (CORVI) survey methods to assess the specific economic, environmental, and governance risk factors that drive IUU fishing in the SCS and surrounding region. The process began with 50 semi-structured interviews with expert key informants (KIs) and extensive desk research to determine risk categories (economic, environmental, and governance) and develop five indicators per category. Then an online risk survey was sent to KIs and other identified government, academic researchers, fisheries industry members, NGO staff, and independent experts.

In the online survey, respondents select a country of focus and answer five questions about risk and vulnerabilities for each of the fifteen indicators in the selected country. Questions assess current and future perceptions of issues related to the indicator. Respondents are also asked to compare risk across countries and across different seascapes. To learn more about who took the survey and how respondent's scores are weighted and calculated into mean scores per indicator and category, please see the methods section at the end of this report.

A high risk score for an indicator denotes a higher level of perceived risk associated with that indicator (see Figure 1). This report lays out findings from the analysis of surveys, interviews, and desk research. While it is not within the scope of this report to produce policy and planning recommendations, it is logical to assume that the issues and needs with the highest risk scores are those which require the most policy and programmatic attention.

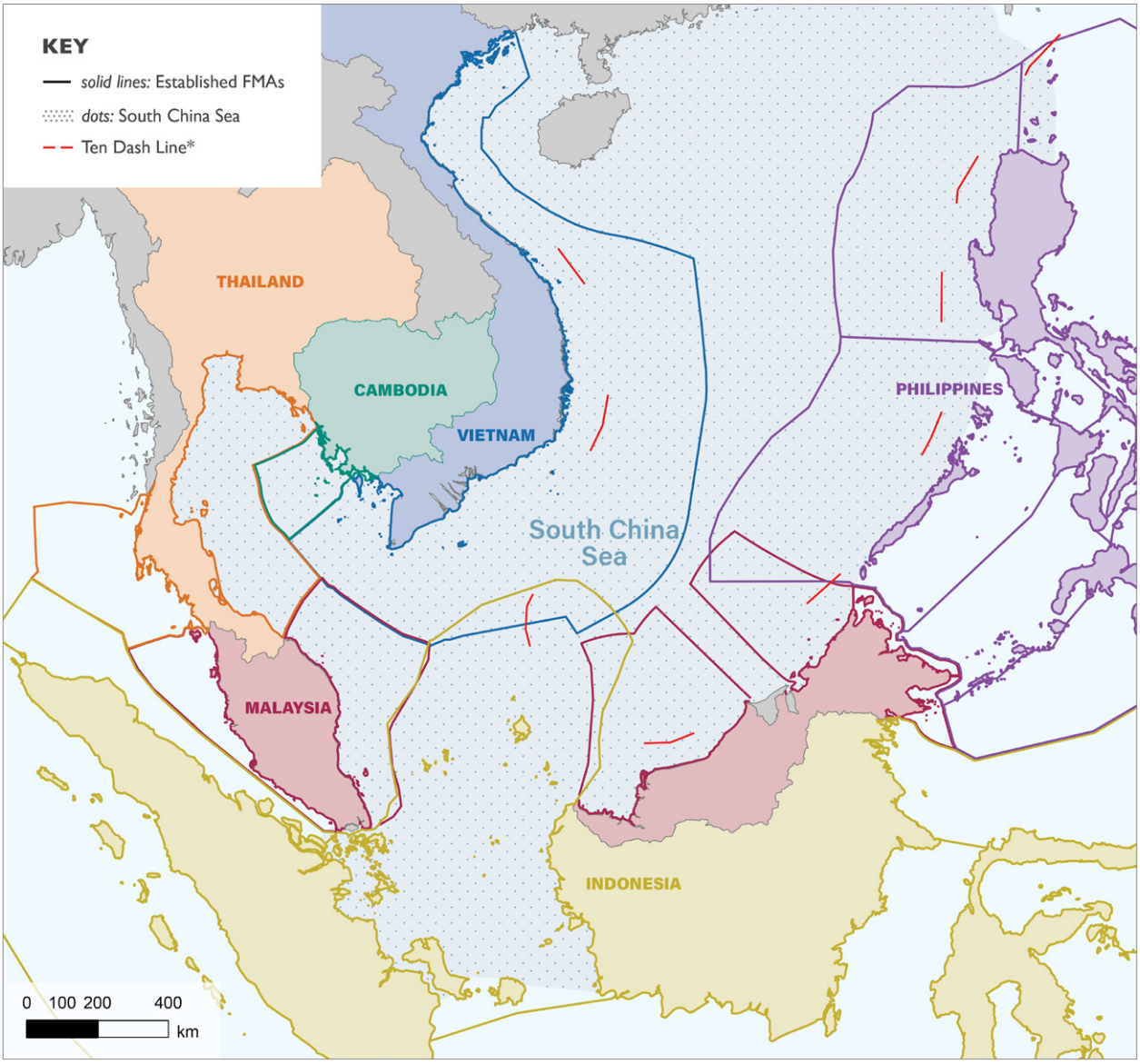
Figure 1: Risk Score Continuum

This report begins with a results summary and comparative analysis of the survey analysis. This section offers an overview of rankings for governance, environmental, and economic categorical indicators. This section also details high-level key risks and trends applicable to the region and observations on potential drivers of IUU fishing between the analyzed countries. The section entitled "Challenges and Opportunities for Regional Action" explores how regional organizations such as the Southeast Asian Fisheries Development Center (SEAFDEC) can address IUU fishing in the SCS. Profiles for each country take a deeper dive into the drivers of risk for specific indicators across the three categories and detail unique threats and best practices found in SCS countries. The report conclusion summarizes the findings and describes opportunities for future collaboration on this topic in the region.

IUU fishing encompasses a range of fisheries offenses. *Illegal fishing* refers to fishing activities by a national or foreign vessels in the waters of a country, or by flag state vessels that are party to a regional fisheries management organization (RFMO), in contravention of conservation and management measures.

Unreported fishing refers to fishing activities that have either not been reported or have been misreported to authorities. Unreported fishing is not only fraudulent, but it also undermines fisheries management by skewing the accuracy of fish stock assessments on which fisheries conservation and management regulations are based. *Unregulated fishing* refers to fishing activities in areas without any fisheries management or conservation measures, including the high seas and areas not management by a RFMO.[1]

Figure 2: South China Sea Map



The SCS covers over 3.36 million square kilometers of water, stretching from Taiwan to the Straits of Malacca. The seascape is characterized by issues of territorial integrity, fishing and energy access rights, and declining fish stocks. Tensions also exist around the political and economic sensitivities related to artisanal and small-scale fisheries. The SCS is a rich fishing ground for small pelagic species, tuna, squid,

*The ten dash line represents PRC's SCS claim and is not internationally accepted by the international community and are evidence of PRC disinformation within the maritime domain, inclusive of fishing claims.

and other commercially important species. More than half of the world's fishing vessels – over 1.77 million – operate in the SCS.[2] Overcapacity and contested maritime boundaries exacerbate unsustainable fishing practices, both by artisanal and industrial fleets. The governments of Indonesia, Malaysia, Philippines, and Vietnam have all experienced contentious interactions with the People's Republic of China (PRC) over access to fishing grounds. Tensions are further influenced by the Vietnamese maritime militia and fishing fleets who patrol and fish in contested waters. Overfishing, declining fish stocks and concerns regarding the effects of climate change have pushed some fishers to encroach on the territorial waters of neighboring states. In addition, artisanal fleets are widely unregulated due to structural capacity challenges and political sensitivities. These factors, coupled with additional political, environmental, and economic risk factors, contribute to rampant IUU fishing in the seascape.

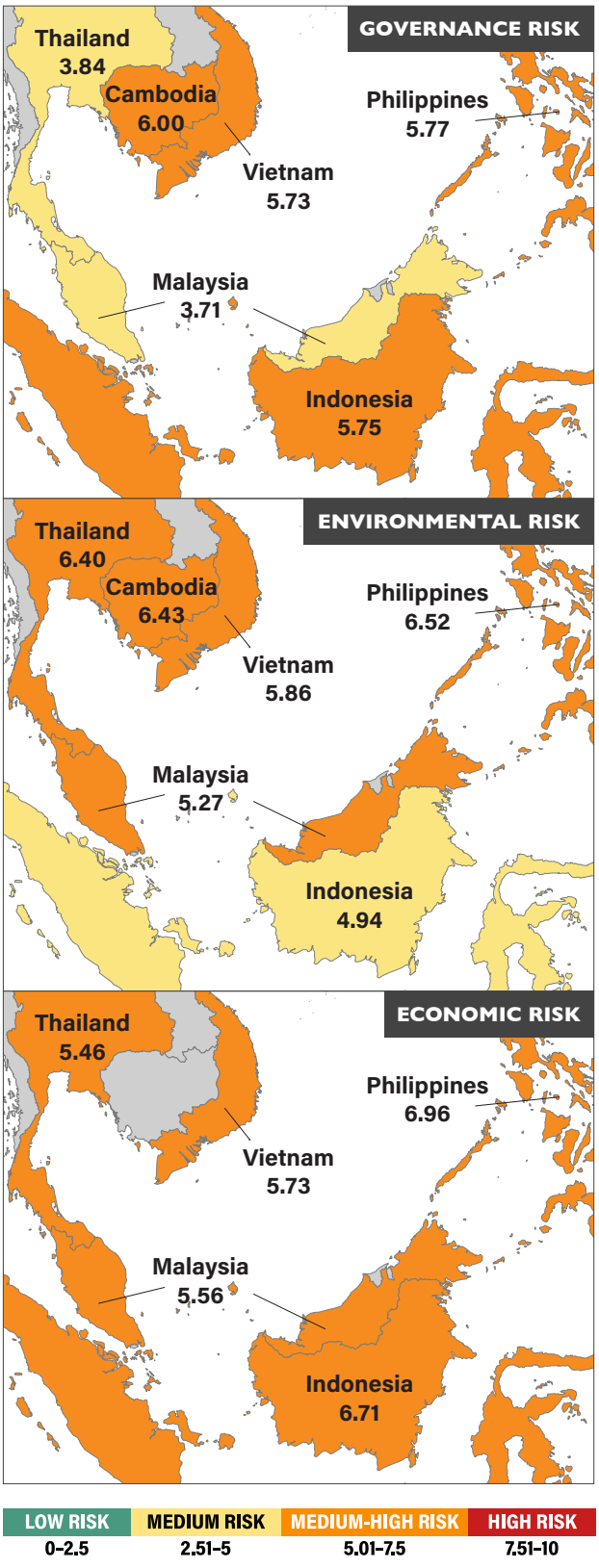
Overall IUU fishing in the SCS region is the result of neighboring countries encroaching on another countries fishing grounds and not reporting the fish catch to authorities. Complicating this dynamic is a lack of clarity among nations on their country's maritime boundaries, which has caused disputes ranging from threats, the sinking of vessels, legal actions and the militarization of fishing vessels and coastguards.

However, regional states have developed mechanisms for collaboration on key issues related to fisheries management and marine conservation. The Association of Southeast Asian Nations (ASEAN), a political and economic union of ten states in the region, vowed to increase investment in the development of technological management systems for fisheries in their 2021-2025 workplan to promote green growth and conservation. In May of 2023, the ASEAN Regional Forum on Maritime Security met to discuss opportunities for collaboration in environmental management and conservation, and ways forward to contribute to sustainable development.[3] The 2024 South China Sea Regional Exchange (REX), brought together the ASEAN Secretariat Working Group on Fisheries (ASWGFi), CTI-CFF, and the Regional Plan of Action to Combat IUU Fishing (RPOA-IUU) to highlight key projects that are working to bring the region closer to ecosystem-based management including the role of sub-regional intergovernmental and nongovernmental groups in fostering collaboration and capacity-building of fisheries data/information. Next steps highlighted included collaborating to create a regional network of fisheries infrastructure comprising government fisheries, fisheries managers, scientists, and other stakeholders. Country-level profiles will discuss initiatives spearheaded at the domestic level more in-depth.

Figure 3: South China Sea Comparative Fact Table

	Per Capita Fish Consumption, kg	Annual Fish Catch, MMT	Annual Loss to IUU Fishing, billion USD	Country Allows Foreign-Flagged Vessels in TTY waters	Total Registered Maritime Employment	Portion of Vessels Small-Scale
Cambodia	37.5 (2021)	0.122 (2021)	$0.074-90 (2021)	Yes	10,000 (2021)	89% (2019)
Indonesia	35.26 (2021)	6.8 (2021)	$0.074 (2022)	No	719,000 (2024)	97% (2020)
Malaysia	34.08 (2021)	1.79 (2021)	$1.4 (2019)	No	116,000 (2022)	70% (2022)
Philippines	34.28 (2021)	4.3 (2021)	$1.3 (2021)	Yes	1,354,000 (2020)	80% (2022)
Thailand	27.2 (2021)	2.39 (2021)	$0.230 (2015)	Yes	535,210 (2019)	82% (2016)
Vietnam	39.5 (2021)	3.7 (2021)	$1.3 (2022)	Yes	1,800,000 (2019)	85% (2022)

Figure 4: South China Sea Risk Profile



Source: SuFiA TS Adapted CORVI Risk Survey for IUU Fishing.

RESULTS SUMMARY AND COMPARATIVE ANALYSIS

Risk survey scores (see Figure 4) show the SCS at medium to medium-high risk levels across the governance, environmental, and economic risk categories. On average, risks in the environmental and economic categories are higher than those of the governance category. It is important to note, however, that governance risks are medium-high for four of the six countries bordering the SCS, and is highest in Indonesia and Cambodia.

GOVERNANCE RISKS

The average score of risk indicators related to governance (Figure 5) suggests medium-high risk in Cambodia *(6.00),* Philippines *(5.77),* Indonesia *(5.75),* and Vietnam *(5.73)* and medium risk in Thailand *(3.84)* and Malaysia *(3.71)*. When considering these two groupings, there is a negative correlation between per capita gross domestic product (GDP) and governance risk. The countries with higher per capita GDPs have lower governance risk. The contested maritime boundary indicator is the highest risk indicator. Maritime boundaries in the SCS are highly contested and overlapping territorial claims can lead to unintentional incidents of IUU fishing. The Philippines and Indonesia rank *contested maritime boundaries* at high risk, with scores of *8.25* and *8.73*, respectively (see Figure 5). Both countries have ongoing border disputes with the PRC and with Vietnam. PRC and Vietnamese vessels both fish and patrol contested waters surrounding the Spratly Islands and Natuna Islands and harass Indonesian and Philippines-flagged fishing vessels.[4]

Additionally, *Vietnam (7.07)* and Malaysia *(6.13)* rate *the contested maritime boundaries* indicator as medium-high risk and face similar issues of PRC harassment. Contested territorial claims incentivize unsustainable fishing practices and can result in the securitization of the local fishing industry. As such, the PRC and Vietnam maintain active maritime fishing militias which escort fishing fleets, enforce against IUU fishing in territorial waters, and support territorial

Figure 5: Governance: Contested Maritime Boundaries and Enforcement Capacity

Low Risk 1 - 2.5 | Medium Risk 2.51 - 5 | Medium-High Risk 5.01 - 7.5 | High Risk 7.51 - 10

Indicators	Cambodia	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Governance	**6.00**	**5.75**	**3.71**	**5.77**	**3.84**	**5.73**
% of Territorial Waters Protected	7.50	4.51	2.53	4.65	4.56	6.49
Capacity of Fisheries Enforcement	6.30	4.74	3.27	5.60	3.66	6.01
% of Artisanal/Small-scale Vessels Licensed or Registered	6.20	6.73	3.47	4.50	3.54	4.46
Contested Maritime Boundaries	3.60	8.73	6.13	8.25	4.40	7.07
Government Initiatives to Counter IUU Fishing and Promote Sustainable Fisheries Management	6.25	4.73	3.73	5.45	3.37	5.13

Table: Stimson Center. Created with Datawrapper.

Indicator	Context
% of territorial waters documented as protected	This indicator measures the amount of a country's territorial waters designated with some level of government protection, such as marine protected areas, fisheries management areas, or others. It does not measure the capacity of government institutions or others to enforce these protections. Protected territorial waters indicate that the government is making commitments to support the health and sustainable management of marine ecosystems and resources.
Capacity of fisheries enforcement	This indicator assesses the capability of government institutions to enforce anti-IUU fishing laws and regulations in their territorial waters against national and foreign vessels. Individuals engaging in IUU fishing may seek out areas with poor enforcement, heightening the risk that IUU fishing occurs in these waters.
% of artisanal/small-scale vessels licensed or registered	This indicator measures the ability and will of a government to regulate their artisanal and small-scale fisheries, previously identified by experts as the largest perpetrators of IUU fishing in the region. As discussed earlier, IUU fishing violations perpetrated by artisanal fisherfolk are largely unregulated or unreported, rather than illegal.
Contested maritime boundaries	This indicator assesses the stability of the maritime security environment, level of tension with other regional states, and extent of a state's law enforcement mechanisms. Contested maritime boundaries were identified by interviewees as hubs of IUU fishing, such as those between Cambodia and Vietnam, and those between China and the Philippines.
Government initiatives to counter IUU fishing and promote sustainable fisheries management	This indicator assesses the level of government effort and action to address IUU fishing and/or improve sustainable fisheries management. This indicator includes plans, policies, programs led or funded by the government as well as investments to the fishing industry.

sovereignty claims in contested areas.[5] Since 2017, approximately 300 PRC maritime militia vessels have been stationed in the Spratly Islands. These vessels do not actively fish but receive fuel subsidies to loiter at sea in contested waters. These vessels frequently gather around Vietnamese- and Philippines-claimed reefs and islands and have been involved in tense standoffs with Malaysian and Vietnamese armed forces over PRC oil and gas exploration activities in the Indonesian, Malaysian, and Vietnamese exclusive economic zones (EEZs).[6,7]

ENVIRONMENTAL RISKS

The average score of risk indicators (see Figure 6) related to environmental risks reports medium-high risk in Philippines *(6.52),* Cambodia *(6.43),* Thailand *(6.40),* Vietnam *(5.86),* Malaysia *(5.27)* and medium risk in Indonesia *(4.94). Climate change impacts on habitat health and fish stocks* indicator were noted as a medium-high risk, with all countries rating it as the leading environmental risk. Similarly, *the nearshore fish stocks* indicator ranked medium to medium-high risk associated with reported overcapacity in artisanal fleets, poor management, and unsustainable harvesting practices. The Philippines *(6.60)* is experiencing

Figure 6: Environment: Climate Change and Nearshore Fish Stocks

Low Risk 1 - 2.5 | Medium Risk 2.51 - 5 | Medium-High Risk 5.01 - 7.5 | High Risk 7.51 - 10

Indicators	Cambodia	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Environmental	**6.43**	**4.94**	**5.27**	**6.52**	**6.40**	**5.86**
Nearshore Fish Stocks	6.25	4.27	5.24	6.60	5.70	5.99
Offshore Fish Stocks	6.32	4.71	4.66	5.95	5.60	5.13
Marine Habitat Health	6.33	4.56	4.23	6.80	6.50	6.09
Climate Change Impacts on Marine Habitat Health and Fish Stocks	6.92	6.30	7.64	7.55	8.70	6.48
Climate Change Resilience	6.36	4.79	4.02	5.55	5.80	5.72

Table: Stimson Center. Created with Datawrapper.

Indicator	Context
Nearshore fish stock status	This indicator assesses the health of nearshore fish stocks which are primarily targeted by artisanal and small-scale fisherfolk for household consumption or sale at the local market. It also assesses the effectiveness of the management of inshore fish stocks. Nearshore is defined in this indicator as from the shoreline to 10 nautical miles.
Offshore fish stock status	This indicator assesses the health of offshore fish stocks which are primarily targeted by commercial fisherfolk. It also assesses the effectiveness of the management of offshore fish stocks. Offshore is defined in this indicator as 10 nautical miles to 200 nautical miles.
Marine Habitat health	This indicator assesses the health of marine ecosystem-based services, such as those provided by mangroves, coral reefs, and seagrass beds. This indicator includes a question with an open-ended response for survey respondents to indicate the marine ecosystems they deem most important in their country.
Climate change impacts on habitat health and fish stocks	This indicator measures the vulnerability of each country's marine habitats and fish stocks to climate change, as well as the projected impacts of climate change on IUU fishing.
Climate change resilience	This indicator measures the level of effort and action the government has taken to implement coastal resiliency planning measures.

increased pressure to exploit *nearshore stocks* due to the PRC's occupation of traditional Filipino fishing grounds near Scarborough Shoal and the PRC's island-building activities in the Spratly Islands that destroy spawning grounds. In Vietnam *(5.99)* declining *nearshore stocks* are driving fishers to encroach on other countries' waters. Finally, KIs noted the *climate change impacts on marine habitat health and fish stocks* indicator as a major area of concern, with Thailand *(8.70),* Malaysia *(7.64),* and the Philippines *(7.55)* scoring high risk and Cambodia *(6.92),* Vietnam *(6.48),* and Indonesia *(6.30)* scoring medium-high risk, reflecting declines in habitat suitability caused by climate change. For example, rising sea temperatures are causing coral reefs in the SCS to decline by 16 percent per decade.[8] Climatic changes have caused stronger and more frequent typhoons. These storms damage infrastructure in coastal communities, vessels, and mariculture cages throughout the region. The specific climate change impacts related to fisheries in the region are further analyzed in the country profiles.

ECONOMIC RISK

The average score of risk indicators related to economic risks (Figure 7) suggests medium-high risk in Philippines *(6.96),* Indonesia *(6.71),* Vietnam *(5.73),* Malaysia *(5.56),* and Thailand *(5.46).* An average score for Cambodia could not be calculated due to low sample size. Countries bordering the SCS have large, poorly regulated artisanal fishing fleets. Across countries, KIs reported that government attempts to reduce IUU fishing by local artisanal and small-scale fleets are a sensitive political issue. This reflects the regional risk analysis that rates risk associated with the *percent of population employed by fisheries* indicator at medium-high risk across available data on economic indicators for Philippines *(7.80),* Indonesia *(7.00),* Vietnam *(6.40),* and Thailand *(5.80).* These rankings track closely to the *portion of national*

population employed in the fishing sector with the Philippines at the highest portion in this ranking and Thailand at the lowest. Additionally, *the percentage of national fisheries that are artisanal* indicator ranks as medium-high risk in all five countries. For example, artisanal fishers make up as much as 90 percent of the fishing fleet in Indonesia.

Figure 7: Economic: Fisheries Employment and Artisanal Fleet

Low Risk 1 - 2.5 | Medium Risk 2.51 - 5 | Medium-High Risk 5.01 - 7.5 | High Risk 7.51 - 10

Indicators	Cambodia	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Economic	**N/A**	**6.71**	**5.56**	**6.96**	**5.46**	**5.73**
% of Population Employed in Fisheries	N/A	7.00	5.40	7.80	5.80	6.40
Household Economic Dependence on Fishing in Coastal Communities	N/A	7.60	6.07	8.40	5.60	6.40
% of National Fisheries that are Artisanal	N/A	6.87	6.13	7.30	5.93	6.30
Coastal Poverty Rate	N/A	6.40	5.60	7.10	5.13	4.86
Fisheries Infrastructure	N/A	5.20	4.20	4.20	4.67	5.03

Table: Stimson Center. Created with Datawrapper.

Indicator	Context
% of population employed by fisheries	This indicator measures the workforce of the fishing industry, throughout the seafood supply chain, relative to total population in each country, inclusive of artisanal, small-scale, and industrial fisherfolk. Foreign fisherfolk living in each country are included in this indicator.
Household economic dependence on fishing in coastal communities	This indicator measures the economic dependence on fishing in coastal communities. Shocks to the community through regulation, the economy, or environment can have varying degrees of impact on driving coastal communities to engage in IUU fishing activities. If a large percentage of household income is derived from fishing, individuals will be more likely to engage in IUU fishing activities.
% of national fisheries that are artisanal	This indicator measures the relative size of artisanal fisherfolk to the national fisheries workforce. Several interviewees stressed that artisanal fisherfolk are the greatest perpetrators of IUU fishing in their respective countries. IUU fishing perpetrated by artisanal fisherfolk is generally unregulated and unreported, rather than illegal. Artisanal fisherfolk are also the most vulnerable to stock collapses, which may further drive them to engage in IUU fishing.
Coastal poverty rate	This indicator measures the proportion of the coastal population without the economic means to acquire basic goods and services. Coastal poverty drives fisherfolk to engage in IUU fishing to feed their families and communities, while IUU fishing in turn exacerbates coastal poverty. Coastal poverty rates were also identified by government interviewees as a roadblock to policy reform to combat IUU fishing, as they were reluctant to reduce a food and revenue source for people in poverty if they could not provide an alternative.
Fisheries infrastructure	This indicator measures the risks of IUU fishing from the level of investment into fisheries infrastructure, such as implementation of the Port State Measures Agreement (PSMA). This indicator also measures the level of community-based fisheries infrastructure, such as community-based fisheries surveillance and co-management.

CHALLENGES AND OPPORTUNITIES FOR REGIONAL ACTION

Regional IUU fishing risks can be mitigated in part through relevant regional actions. Two recommended regional actions to mitigate IUU fishing risk were identified during the assessment and are briefly discussed below.

According to some KIs, science and fisheries management are utilized by the PRC to assert false territorial claims. PRC survey vessels routinely transit through the territorial waters of other states escorted by the PRC Coast Guard in operations that KIs associate with naval surveillance activity.[9] KIs

in Indonesia and Malaysia reported that their national governments spend minimal effort to publicize these intrusions. Since 1999, the PRC has implemented closed season fishing from May to August in waters north of the 12th parallel within the Philippines' and Vietnam's claimed EEZs.[10] The closures are implemented without the consent of Manila or Hanoi and are enforced by the PRC Coast Guard. In the face of aggressive action to subvert sustainable fisheries management and the rules-based maritime order, it is imperative for regional states to work together to uphold legitimate science-based fisheries management efforts through relevant regional bodies, such as the Regional Plan of Action to Promote Responsible Fishing Practices including Combatting Illegal, Unregulated, and Unreported Fishing (RPOA-IUU) and the Southeast Asian Fisheries Development Center (SEAFDEC).

Unlike other regional bodies of water with shared fisheries resources, the SCS is not managed by an RFMO. In the absence of an RFMO, regional organizations work to promote cooperation on sustainable fisheries management among states bordering the SCS. The RPOA-IUU is a ministerial level initiative that includes 11 countries in the region: Australia, Brunei Darussalam, Cambodia, Indonesia, Malaysia, Papua New Guinea, Philippines, Singapore, Thailand, Timor-Leste, and Vietnam. The RPOA-IUU serves as a convening body for voluntary cooperation on sustainable fisheries management and information sharing on IUU fishing activities in the SCS, Sulu-Sulawesi Seascape (SSS), and Arafura-Timor Seas.

SEAFDEC is an autonomous intergovernmental body made up of 11 member countries, including Brunei Darussalam, Cambodia, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam. SEAFDEC's goal is to promote and facilitate actions amongst member countries to ensure the sustainability of fisheries in Southeast Asia.[11] The Center operates through five technical departments: the Training Department, the Marine Fisheries Research Department, the Aquaculture Department, the Marine Fishery Resources Development and Management Department, and the Inland Fishery Resources Development and Management Department.

Data and information on the health of fish stocks, fleet size, fishing capacity, and harvest locations are sensitive, and national governments are unwilling to share them with others in the region. Creating formal regional data sharing mechanisms within relevant regional partner organizations such as the RPOA-IUU and SEAFDEC and their technical departments will help to share information to reduce IUU fishing levels in a collaborative but sensitive manner. In 2022, ASEAN launched the ASEAN Network-IUU (AN-IUU), a platform for fisheries enforcement agencies to report incidents of IUU fishing.[12] In July 2024, representatives from ASWGFi and the EU convened to discuss the implementation of best practices for information sharing and strategies to improve enforcement procedures. Establishing formal regional mechanisms for sharing data on reported IUU incidents, as well as information on fish stock health, marine ecosystems, fleet size, and harvest locations among relevant regional organizations like RPOA-IUU and SEAFDEC, can facilitate collaboration and reduce IUU fishing levels by improving trust between nations.

KIs noted that labor and human rights abuses occur on board vessels that operate in the SCS and throughout the nodes of the seafood supply chain in the region, including at processing facilities. Migrant women work as day laborers in the post-harvest processing sector.[13] Many vessels rely on workers rather than technology for productivity, so the controllable cost for owners is narrowed down to wages and living conditions. Large industrial vessels hire migrant workers from other regional states. Workers on board foreign distant water fishing vessels experience severe human rights and labor abuses.[14] These vessels are at sea for months to years at a time with very few trips to shore, if any, essentially trapping victims on board. Victims of human trafficking often do not report their experiences to the authorities for fear of being deported.

Local and international NGOs have investigated and uncovered egregious labor and human rights abuses on vessels and in factories and have cooperated with law enforcement agencies on rescues and repatriation. Several national governments have made human trafficking and labor abuse priority

areas for regional policy. After receiving a 'yellow card' from the European Commission in 2015, the Thai government instituted a series of reforms, including legalizing the status of migrant workers and implementing labor inspections in port.[15] Malaysia maintains Memorandums of Understanding (MoUs) with Indonesia and the Philippines to prevent smuggling and trafficking in persons. Other states in the region could benefit from enhanced coordination and the sharing of best practices to combat IUU fishing-associated labor and human rights abuses between civil society and regional states, potentially facilitated by regional organizations.

CAMBODIA

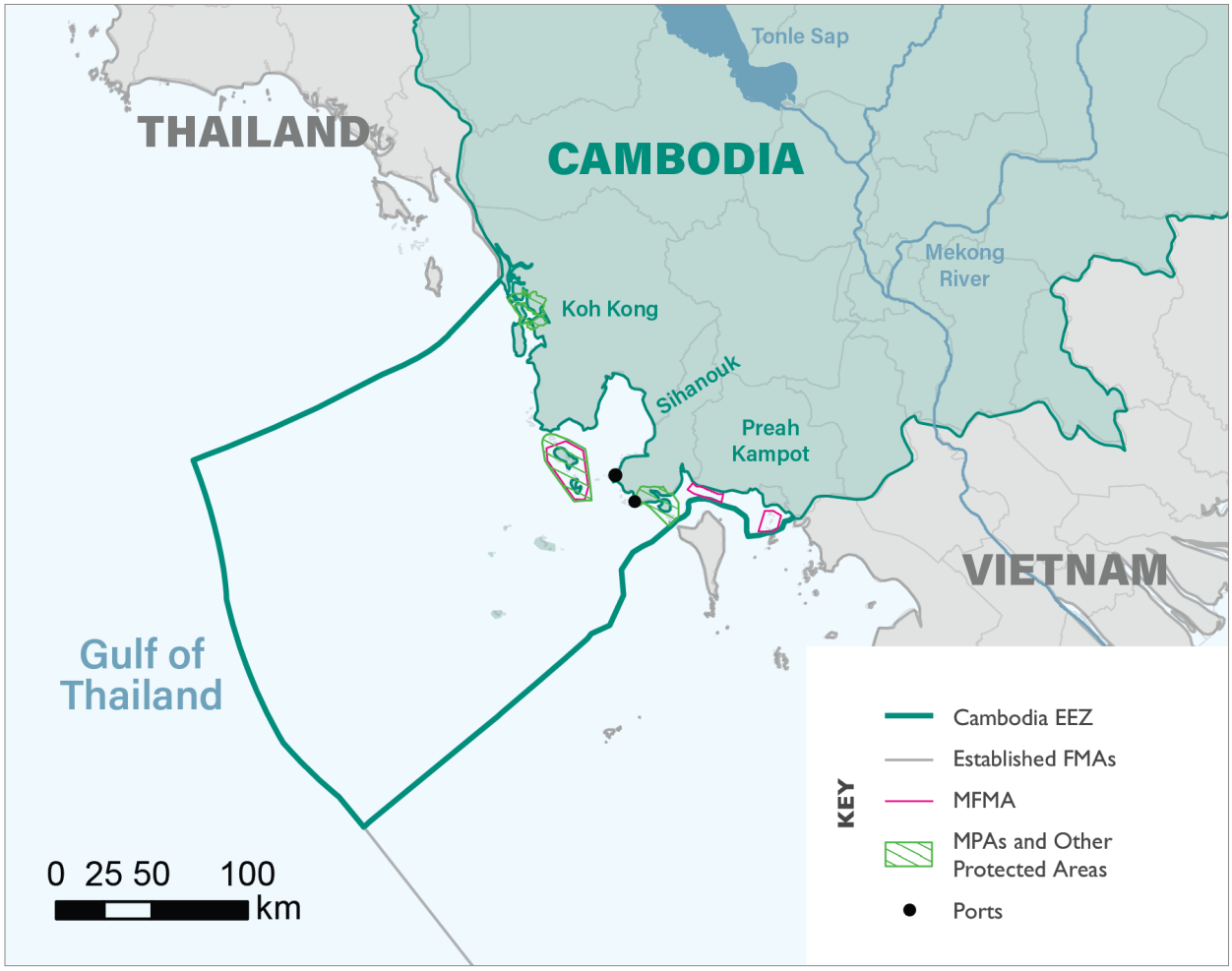
OVERVIEW

Summary categorical risk scores for Cambodia in governance (6.00) and environment (6.43) are reported as medium-high risk. The survey process could not generate a risk score for the economic category due to low response rates.

Cambodia loses an estimated USD 4-90 million (KHR 16-365 billion) annually to IUU fishing, amounting to approximately 37,500 metric tons of fisheries products each year.[16] In Cambodia, the fishing sector is dominated by inland freshwater fishers. In 2019 inland capture fisheries produced a reported catch of 524,465 metric tons, whereas the reported catch for marine capture fisheries was only about 137,225 metric tons.[17] Cambodia's marine fishing area is located off the coast of the provinces Kampot, Kep, Koh Kong, and Preah Sihanouk. Cambodia's exclusive economic zone (EEZ) accounts for 16 percent of the Gulf of Thailand and totals 48,488 square kilometers. According to KIs, the primary fish products caught in Cambodia's SCS are shrimp, crab, and squid, but is primarily comprised of trash fish sold to Vietnam as fishmeal. Cambodia's domestic fleet comprises 5,000-7,000 boats and 1,000 trawlers. However, in Cambodia's maritime domain, Thailand and Vietnam are responsible for approximately 50 percent of the total catch, according to KIs. In 2013, the European Commission issued Cambodia a 'red card' via the EU's IUU regulation. The red card was issued due to Cambodia's lack of a legal framework to combat IUU fishing and its failure to comply with its flag state obligations. As a result, Cambodian fisheries products were prohibited from being imported into the EU marketplace. Despite attempts at reform, Cambodia's 'red card' remains in place today. This reflects persistent challenges with enforcement of proposed regulations.

Fisheries management in Cambodia is divided between local and national governments. The Ministry of Agriculture, Forests, and Fisheries (MAFF) oversees the fisheries sectors, and the Fisheries Administration (FiA) leads enforcement. FiA devotes most of its efforts to supporting freshwater fisheries regulations. Cambodia has an established marine fisheries management area (MFMA) in each of its four coastal provinces. MFMAs are managed by the Ministry of the Environment. MFMAs are zoned for fisheries conservation and ecotourism. Small-scale fisherfolk are permitted to fish in MFMAs using small-scale gear, in waters up to 20 meters. KIs report that nearshore fisheries are frequently breached by industrial trawlers that exploit fish stocks and damage marine ecosystems. MAFF and FiA lack capacity and resources to conduct enforcement activities within Cambodia's MFMAs, however, conservation areas within the MFMAs managed by the Ministry to the Environment were reported by KIs to be well protected and frequently patrolled. In addition to MFMAs, Cambodia has four marine protected areas (MPAs) that allow for small-scale fishing.[18] which amounts to approximately 1.4 percent of its territorial waters (691.5 square kilometers).[19] KIs report that industrial vessels frequently encroach on MPAs to illegally trawl, damaging

Figure 8: Map of Cambodia's Maritime Domain in the SCS



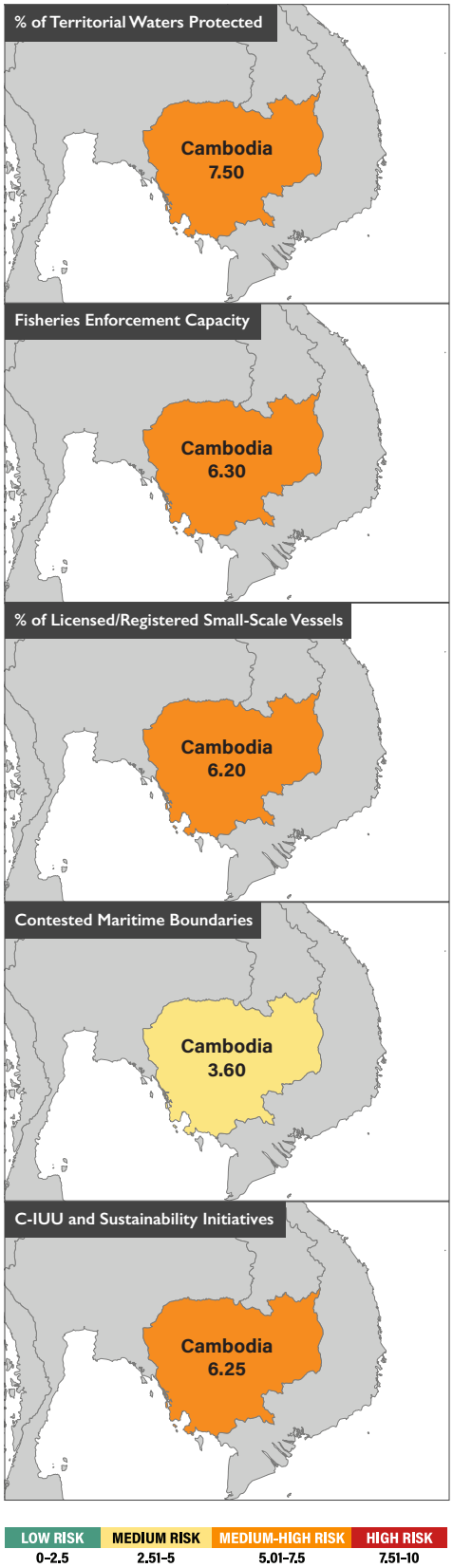
Note: Labeled features on the map above are specific features mentioned in this country profile.

nearshore ecosystems. Recent analysis notes that less than one percent of Cambodia's protected areas have passed management effectiveness evaluations.[20] Cambodia is not a signatory of the Port State Measures Agreement (PSMA) and has not ratified the UN Convention on the Law of the Sea (UNCLOS).

GOVERNANCE RISK

The risk analysis highlights the medium-high risk *(6.00)* in the governance category when averaged across five risk indicators. In Cambodia, fisheries governance is made particularly difficult by a low governmental capacity to create and enforce counter-IUU fishing laws and a high occurrence of foreign vessel incursions. The leading risk indicator is the *percent of territorial waters documented as protected (7.5)* which is reported as high risk, reflecting the country's small number of MPAs (4) and its limitations with respect to enforcement within those MPAs. According to KIs, small-scale and commercial fisherfolk are aware that fisheries management is very limited in Cambodia. As a result, these fishers take advantage of this by fishing in incorrect zones and underreporting their catch. This is reflected in the medium-high risk indicators *capacity of fisheries enforcement (6.30)* and *percent of licensed/registered small-scale vessels (6.20)*. Government agencies lack sufficient resources to patrol at sea; the FiA Inspectorate has only two 18-meter (59-foot) patrol boats carrying minimal surveillance equipment.[21] In addition, KIs note that

Figure 9: Cambodia Governance Scores by Indicator



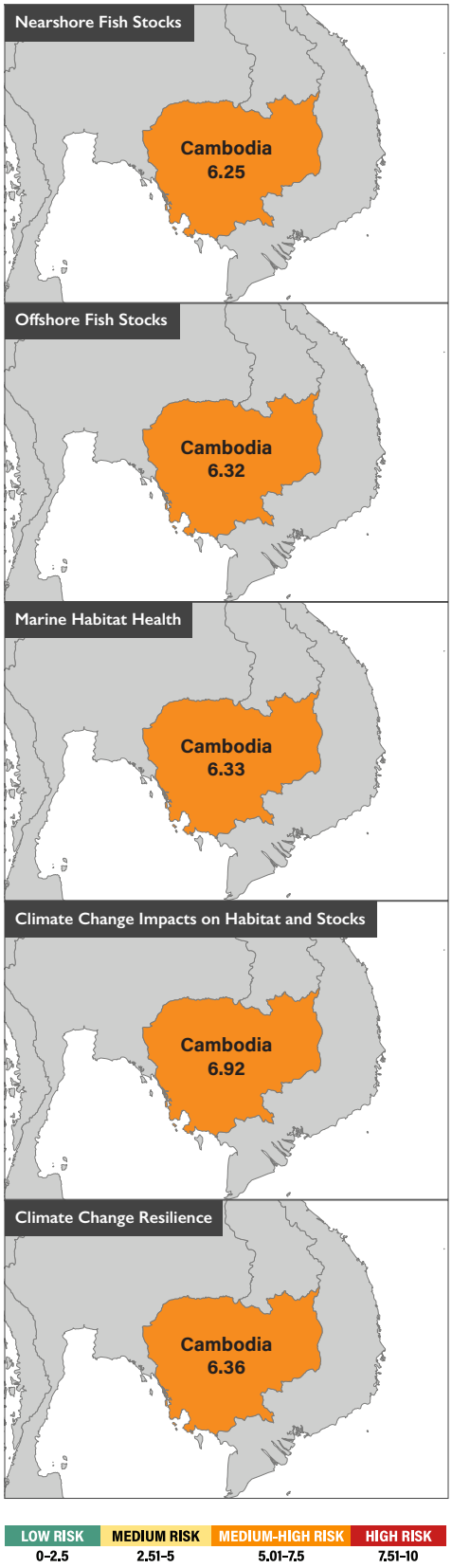
FiA enforcement teams are frequently threatened by armed foreign vessels and take bribes to allow for transboundary IUU fishing by trawlers in Cambodia's EEZ. KIs describe Cambodian fisheries as a "pay-to-play" system; bigger boats can afford to pay penalties or bribe law enforcement, while small-scale fisherfolk cannot. Among small-scale fishers, fishing without a license and underreporting catch are the most common offenses. In 2023 the government implemented discounts for boat registration as part of a national plan to register all vessels, however, by the end of 2023 just 42 percent (3,225) of the total estimated vessels (7,552) were registered.[22]

In Cambodia's EEZ, foreign vessels illegally fish and small-scale fisheries operate at an increasing capacity. *Contested maritime boundaries (3.6)* is the lowest risk indicator at medium risk. Cambodia and Vietnam have established "shared historical waters" along their maritime boundary, which allows artisanal fishers from both states to access traditional fishing grounds across the border, reducing illegal encroachments by vessels from both countries.[23] However, Thai- and Vietnamese-flagged trawlers exploit poor monitoring, control, and surveillance (MCS) capacity and coverage and corrupt officials to fish illegally in Cambodian waters, while Cambodian artisanal fishers encroach on adjacent Vietnamese waters. KIs expressed that there is minimal political will within the government to address IUU fishing, which is reflected in the medium-high risk indicator *government initiatives to counter-IUU fishing and promote sustainable fisheries (6.25)*. For instance, Cambodia's Fisheries Law of 2006, a legal framework to counter IUU fishing, has been under revision since 2018. In 2023, the government of Cambodia announced it will begin developing the legal infrastructure to accede to the PSMA, as well as prepare a National Plan of Action (NPOA) on IUU Fishing, and a National Fisheries Management Plan (NFMP).

ENVIRONMENTAL RISK

Categorical risk for the environment was reported as medium-high risk *(6.43)* when averaged across the five risk indicators. The categorical risk indicator is led by the medium-high risk indicator *climate change impacts on habitat health and fish stocks (6.92)*. Current climate trajectories are expected to reduce expected catch by 25 percent by 2050 and by 90 percent by 2100. Absent intervention, this will devastate coastal residents' food security and livelihoods. By 2050, the cost of adaptation in Cambodia is expected to increase, and it is unclear if Cambodia will have the resources to avoid fisheries stock collapse. Therefore, the risk indicator

Figure 10: Cambodia Environmental Scores by Indicator



climate change resilience (6.36) is the second-highest risk indicator at medium-high risk. Tempering this indicator are perceptions that recent initiatives to install concrete blocks on the seabed to prevent trawling of critical sea grass ecosystems have been successful. KIs report that while climate change has reduced yields, it has also been used as a scapegoat to obscure systemic overfishing and persistent fisheries management issues. Cambodia's last reputable stock assessment was conducted in the 1980s. According to the Asian Development Bank (ADB), small-scale fish catches in Cambodia fell by as much as 60 percent between 2017 and 2022.[24] Additionally, the ADB estimated that 2018 fish stocks amounted to just 10 percent of their levels in 1970. Vietnamese-flagged vessels target sea turtles in Cambodian waters and smuggle them across the border, and other endangered, threatened, and protected species are sold to Chinese tourists at coastal resorts. These challenges are reflected in the risk medium-high risk indicators *nearshore fish stock (6.25)* and *offshore fish stock (6.32)*.

In Cambodia, the government tends to prioritize coastal and urban development over conservation, which can compound harm to fish stocks and habitat. Industrial fishing vessels regularly breach MFMAs where they fish illegally and damage nearshore ecosystems. In the first half of 2024 there were over 544 fisheries crimes committed with 75 percent of those crimes having a confirmed link to trawlers, according to government data.[25] Trawlers use drag nets that damage marine ecosystems by displacing sediment from the seabed and destroying seagrass and reefs. Seagrass beds in Cambodia's territorial waters have declined by an estimated 7-11 percent per year due to bottom trawling.[26] As trawlers encroach on small-scale fishers' historical fishing grounds, fisherfolk are losing access to their coasts due to development projects. Roughly 51 percent of Cambodia's 435-kilometer coastline has been sold to Cambodia's elite class for tourism development much of which has been contracted to Chinese construction companies.[27] KIs report that coastal development has facilitated rampant deforestation of mangroves, with the geographical area of mangrove forests to have declined from 800 square kilometers in 1996 to 440 square kilometers in 2022.[28] These threats to Cambodia's marine ecosystems are reflected in the medium-high risk indicator *marine habitat health (6.33)*.

ECONOMIC RISK

Of the 661,690 metric tons of fisheries produced annually in Cambodia, just 20 percent is caught in the ocean.[29] Naturally, inland fisheries dominate the Government of Cambodia's policy focus. Of the two million people working

in Cambodia's fisheries sector, approximately 10,000 are employed by marine fisheries; the rest fish on the Tonle Sap Lake or along the Mekong River and its tributaries.[30] Household fishing communities have poverty levels of 36 percent, compared to the national average of 18 percent. IUU fishing has had a substantial impact on the livelihoods of coastal Cambodians. First, overexploitation due to lack of fisheries management has decreased overall catch. From 2019 to 2022, 67 percent of all fishing households faced a decrease of 50 percent in fishing incomes. For households that derive more than 50 percent of their income from fisheries products, 72 percent reported lower catch and incomes. Most Cambodians engage in IUU fishing for survival, and declining fish stocks are a threat to food and livelihood security. Second, KIs report that coastal land development is pricing out small-scale fishers, many of whom migrate to work on Thai-flagged fishing vessels, where they are vulnerable to exploitation and labor abuses.

Koh Rong, Cambodia on the Gulf of Thailand. Photo by Communar/Adobe

Cambodia has a significant post-harvest value chain as part of their fisheries industry but has underdeveloped port infrastructure which undermines its economic potential. According to the Asian Development Bank, the marine fisheries sector has 175 registered post-harvest enterprises—of which 80 percent are considered microenterprises.[31] These enterprises are largely operated by women and have come under stress due to a combination of fisheries overexploitation and poor port infrastructure. Increases in the share of small pelagic species, together with declines in the number of fish landings, are making microenterprises vulnerable due to high costs. Poorly developed port and landing sites infrastructure and weak data collection has led to a reliance on transshipment for most of the commercial catch. Additionally, there are no official landing sites for small-scale fishers, which results in underreported catch. The PRC is investing heavily in industrial ports and other relevant infrastructure along Cambodia's coastline as part of the Belt and Road Initiative, yet this infrastructure development will likely mostly facilitate commercial fishing. In 2022, Cambodia ratified the UN Fish Stocks Agreement and is working to develop the legal infrastructure to accede to the PSMA.

BEST PRACTICES: CIVIL SOCIETY ORGANIZATIONS

In the absence of robust government regulation and enforcement in Cambodia, local communities are increasingly turning to civil society organizations (CSO) and non-governmental organizations (NGO) to report IUU fishing and to build community enforcement capacity. Cambodian communities have established coastal community fisheries (CFis) that are managed by the communities or groups of citizens living around the fishery grounds.[32] CFis, though managed by local communities, are a domain of the state and are encouraged by the state and international development partners to partner with CSOs for strategic planning and financial support. Cambodia now has a robust coalition of non-governmental fisheries actors. The Coalition for Cambodian Fisheries comprises 160 CFis, and the Fishery National Platform comprises 172 community fisheries representatives, national NGO representatives, and provincial government representatives. One community-based NGO working to build enforcement capacity and safeguard ecosystems is Marine Conservation Cambodia (MCC). MCC installs Conservation and Anti-Trawling Structures (CANTS) on the sea floor to deter the destructive fishing practice of bottom trawling.[33] Other activities supported by MCC include wildlife monitoring, raising local awareness of the importance of marine ecosystems, and developing conservation legislation with regional partners. These activities are focused on fisheries stock rebuilding and seagrass replenishment, as well as restoring and protecting endangered species threatened by illegal fishing.

Conservation and Anti-Trawling Structure (CANTS) installed by MCC. Cambodia. Photo by: Marine Conservation Cambodia.

INDONESIA

OVERVIEW

Summary scores for Indonesia rank medium-high risk for the government (5.75) risk indicator and medium risk for the environmental (4.94) and economic (5.09) risk indicators.

Between the SCS and the SSS, Indonesia is estimated to lose USD 74 million (IDF 1.149 trillion) annually to IUU fishing.[34] Estimated IUU fishing losses fell from $6.8 billion in 2015 reflecting the offshoring of IUU fishing activities to international waters and more evasive IUU fishing tactics, according to experts. The fishing industry in Indonesia is expansive and is critical to the stability of the Indonesian economy. Indonesia's marine wild capture fisheries employ 2.7 million people.[35] Of this, approximately 719,000 have Marine and Fisheries Business Actors Cards, official identification cards for marine capture fishers in Indonesia.[36] Of those directly employed by the industry, 97 percent are small-scale fishers (boat size under 10GT). Indonesian capture fisheries are the world's second largest fish producer, producing 1.22 million metric tons of fisheries products in 2022.[37] The South China Sea is an incredibly biodiverse region, consisting of hundreds of small islands, reefs, and interisland straits. Within Indonesia's SCS maritime boundaries lies the Natuna Islands, a highly contested territory. The waters surrounding the Natuna Islands have significant marine and fisheries resource potential, estimated to be 504,212 tons per year.[38] Primary fish products targeted in Indonesia's SCS are lobster, crab, reef fish, and large pelagic species, like tuna.[39]

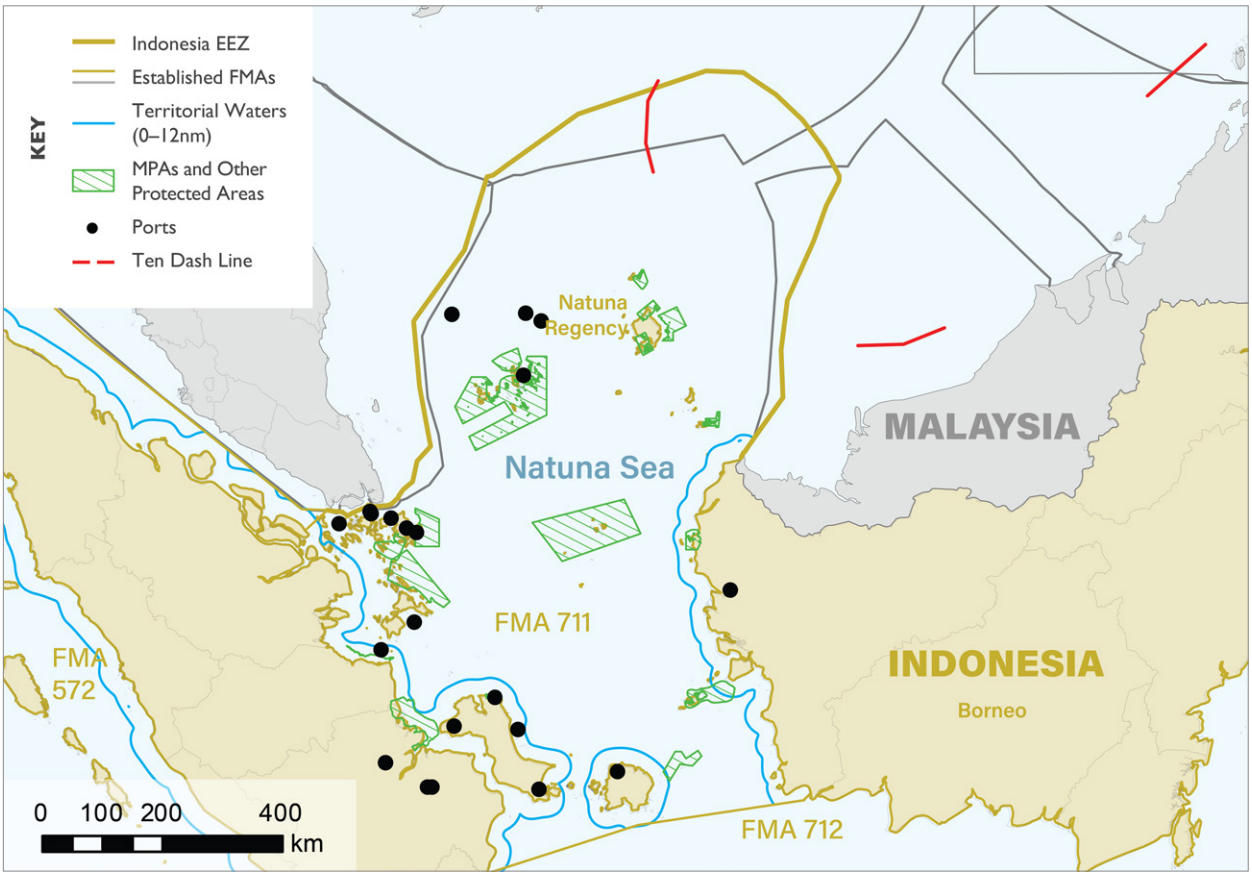
The fishing industry is regulated at the national level by the ministry of Marine Affairs and Fisheries (MMAF), while provincial authorities regulate territorial waters.[i] Indonesia is the only country in Southeast Asia to establish a ministry with a sole focus on marine affairs and fisheries. This shows a high level of commitment to marine conservation and protection. MMAF organizes national marine and fisheries policies and regulates Indonesian seascapes via fisheries management areas (FMA) and MPAs. Indonesia has 11 FMAs and 411 MPAs– which frequently overlap but have different boundaries and regulations. Indonesia's territory in the SCS is located inside FMA 711 and there are 18 MPAs established within its boundaries encompassing 7.2 percent of total Indonesian MPA coverage.[40] While provincial authorities are responsible for enforcement in territorial waters, artisanal fishers are not required to report their catch, obtain licenses, or land at designated sites.

Fisheries enforcement efforts in Indonesia's SCS are limited by territorial incursions, low capacity, and low political will. First, KIs report that foreign vessels have the perception that Indonesia's waters have relatively higher stocks of fish, incentivizing foreign vessels to encroach. Despite foreign vessels being banned in Indonesian waters, PRC-, Malaysia-, Philippines-, Thai-, and Vietnamese-flagged vessels continue to encroach in the SCS. Vietnamese and Chinese-flagged vessels are active in the Natuna Sea, with Chinese vessels backed by the Chinese coast guard. Expanded patrol areas due to incursions, and rising fuel prices, have limited at-sea enforcement, according to KIs. While the government has taken steps to improve marine and fisheries management by announcing expansions of Indonesia's MPA network and increased funding to FMAs[41], KIs report that implementing mechanisms to regulate IUU fishing is politically contentious.[42] There is a large voting base of small-scale and artisanal fishers that

i Territorial waters are between 0 and 12 nautical miles.

are disproportionately impacted by fisheries enforcement activities. Moreover, securitization of the fishing industry in the South China Sea has resulted in a prioritization of security patrols over fisheries management. This shift in priorities is reflected in Indonesia's depleted fish stocks; 53 percent of FMAs are fully exploited, including demersal fish, large and small pelagic stocks, lobster, and crab in FMA 711.[43]

Figure 11: Map of Indonesia's Maritime Domain in the SCS

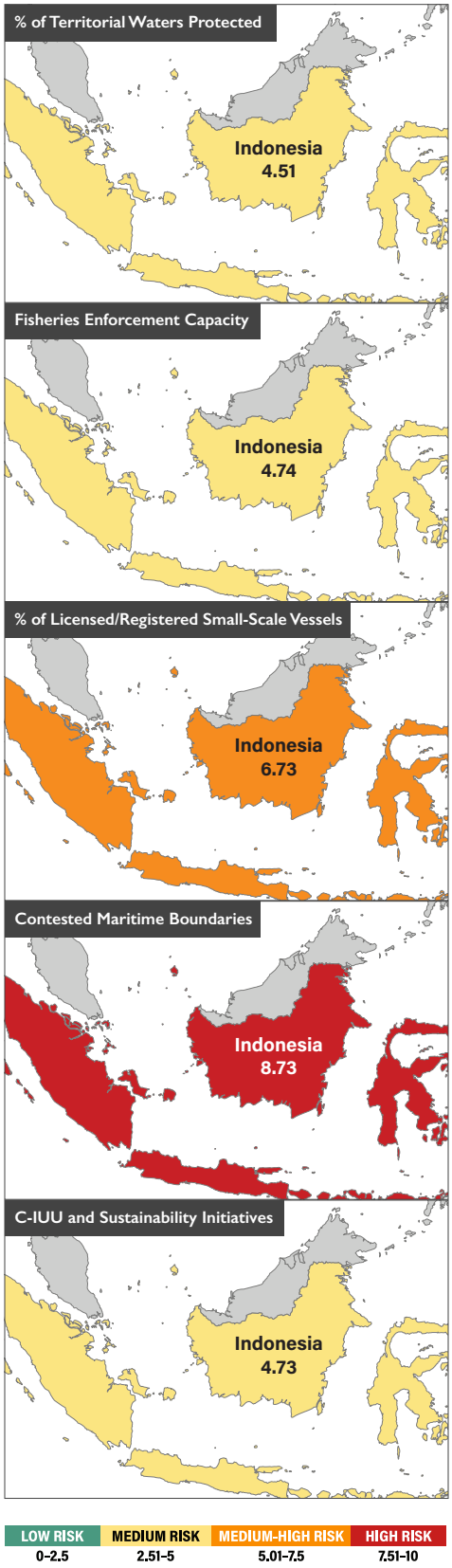


Note: Labeled features on the map above are specific features mentioned in this country profile.

GOVERNANCE RISK

Governance risk is the highest of the categorical risk indicators for Indonesia in the SCS, rated as medium-high risk *(5.75)*. Higher risks *in percent of artisanal/small scale vessels (6.73)* and *contested maritime boundaries (8.73)* lay a framework for understanding shortcomings in IUU fishing enforcement in the SCS. Approximately 97 percent of Indonesian fishing vessels are small-scale fishers. While domestic small-scale fishers require provincial licenses to fish close to shore, provincial governments do not have the capacity or funding incentives to enforce those regulations. KIs report that at the provincial and the national level intent to better manage marine resources is strong, but better management requires funding levels higher than current allocations. According to government data, funding for MPAs in the state budget, regional budget, and from foreign NGOs—approximately Rp 225 billion (USD 15.5mn) per year—only covers one-third of estimated fisheries management costs.[44] Indonesia has twelve MPAs within its SCS maritime domain. Regulatory gaps are exploited by foreign fishers who perceive that Indonesia does not have the funding and capacity to patrol its own waters. KIs note that increased patrol areas due to territorial incursions, and rising fuel costs, have limited at-sea enforcement.

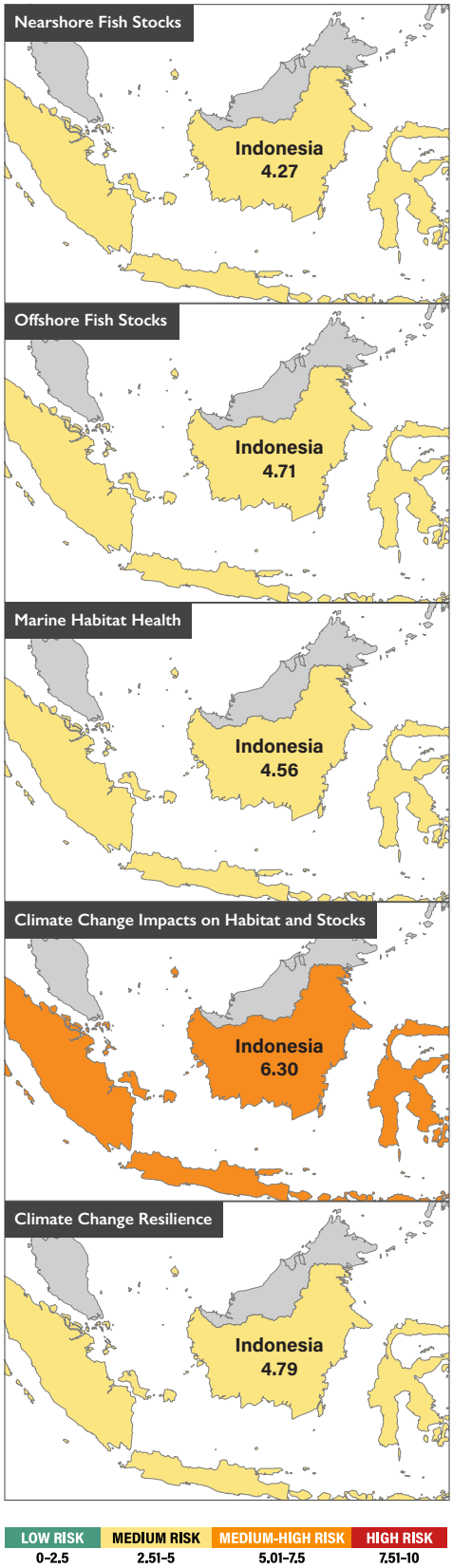
Figure 12: Indonesia Governance Scores by Indicator



Increasing tension over maritime boundaries in the SCS further diverts resources away from fisheries management. Indonesia's EEZ in the South China Sea overlaps with Vietnam's EEZ and the PRC's ten-dash line; the history of tension between and among these countries with respect to maritime boundaries has increased and securitized the fishing industry in the region. During a high point of tension between Indonesia and the PRC over the highly contested Natuna Islands, Jakarta directed industrial fleets operating in other FMAs to move their fishing operation to the Natuna Sea to reinforce Indonesia's sovereign rights.[45] Between 2014 and 2019, the MMAF blew up and sunk more than 500 Chinese and Vietnamese fishing vessels that were caught encroaching on Indonesia's maritime territory.[46] In recent years, steps have been taken to ramp up enforcement of Indonesia's sovereign rights, including with respect to fishing regulations. First, in 2021 President Joko Widodo budgeted IDR 12.2 trillion (USD750.6 million) in military spending for strengthening marine security in Natuna.[47] Second, in 2022 Vietnam and Indonesia settled on new EEZ boundaries with no overlapping territorial claims.[48] Lastly, in 2022 Indonesia resumed joint patrols against IUU fishing in overlapping territorial waters with neighboring Malaysia.[49]

Enforcement challenges and efforts to address them are perceived as a medium risk across three indicators: *capacity of fisheries enforcement (4.74), percent of territorial waters documented as protected (4.51), and government initiatives to counter-IUU fishing (4.73).* Overall perceptions of enforcement against IUU fishing are tempered by Indonesia's having a dedicated fishing ministry and a perception of improvement in government regulatory capacity. In addition to military spending and diplomatic engagement, the MMAF announced expansions of MPA coverage to 325,000 square kilometers, or 10 percent of its global waters, by 2030.[50] In addition to expanding coverage, the ministry also intends to increase investment in instruments to increase monitoring and surveillance capacity through four strategic development objectives: improving capacity and competence of human resources in the fisheries sector, increasing the contribution of the fisheries sector to the national economy, improving conservation, and improving good corporate governance within the MMAF.

Figure 13: Indonesia Environmental Scores by Indicator

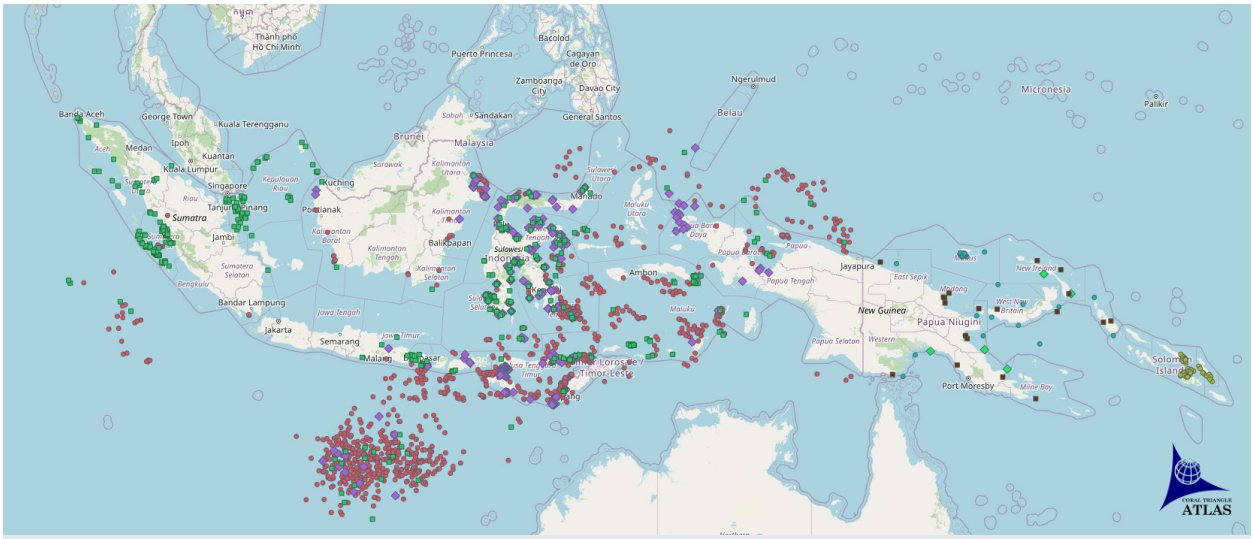


ENVIRONMENTAL RISK

Environmental risk is reported as the lowest of the three categorical risk indicators, rated as medium (4.95). The SCS has enormous fishing potential; 22 percent of the world's fish species are found in the SCS.[51] According to recent data, FMA 711 has an estimated fishing potential of 504,212 tons per year.[52] *Nearshore fish stocks (4.27), offshore fish stocks (4.72),* and *marine habitat health (4.56)* are all perceived as medium risk indicators. KIs report a perception that Indonesian stocks are relatively healthier compared to other regional states. Despite this belief, the majority of fish stocks in FMA 711 are fully or over-exploited.[53] According to 2022 Indonesian stock assessments, stocks of large and small pelagic are fully exploited while stocks of lobster and crab are overexploited. Recent reports note that strict enforcement of the maritime boundaries of the Natuna Islands saw some fish stocks and marine habitats recover from overexploitation. For example, Indonesian stock assessments saw the utilization rate for small pelagic and reef fish fall.[54] Utilization rate is determined by calculating the proportion of total catches each year from the maximum sustainable production value. The utilization rate for small pelagic species and reef fish fell from 1.41 and 1.53 in 2017 to 0.8 and 0.5 in 2022, respectively.

In addition to fish stocks, the South China Sea is home to 20 percent of the world's coral reefs. According to a recent analysis, destructive fishing practices and rising sea surface temperature were the primary impediments to reef recovery in the Natuna Sea.[55] *Climate change impacts on marine habitat health and fish stocks (6.3)* is the highest perceived risk in the environmental risk category. KIs report that changing typhoon seasons makes it difficult for fishers, particularly small-scale and artisanal, to predict when it will be safe to fish. Additionally, warming sea temperatures are changing fish spawning seasons. Recent analysis of the threat of climate change to marine health in Indonesia supports KIs' perceptions, quantifying a 20-30 percent reduction in maximum catch potential under a high emissions scenario and a 12-20 percent reduction in a low emissions scenario.[56] Additionally, reefs in the SCS are under threat due to destructive fishing practices and coral bleaching events driven by changes in sea surface temperature. FMA 711 faces some of the greatest exposure to climate hazard due to overfished stocks, loss of maximum catch potential, and dependency on reef fish.[57]

Figure 14: Indonesia's Rich Marine Diversity



KEY

- ■ Square (any color): Sightings of marine mammals
- ◆ Diamond (any color): Sightings of sharks and rays
- ● Circle (any color): Sightings of turtles

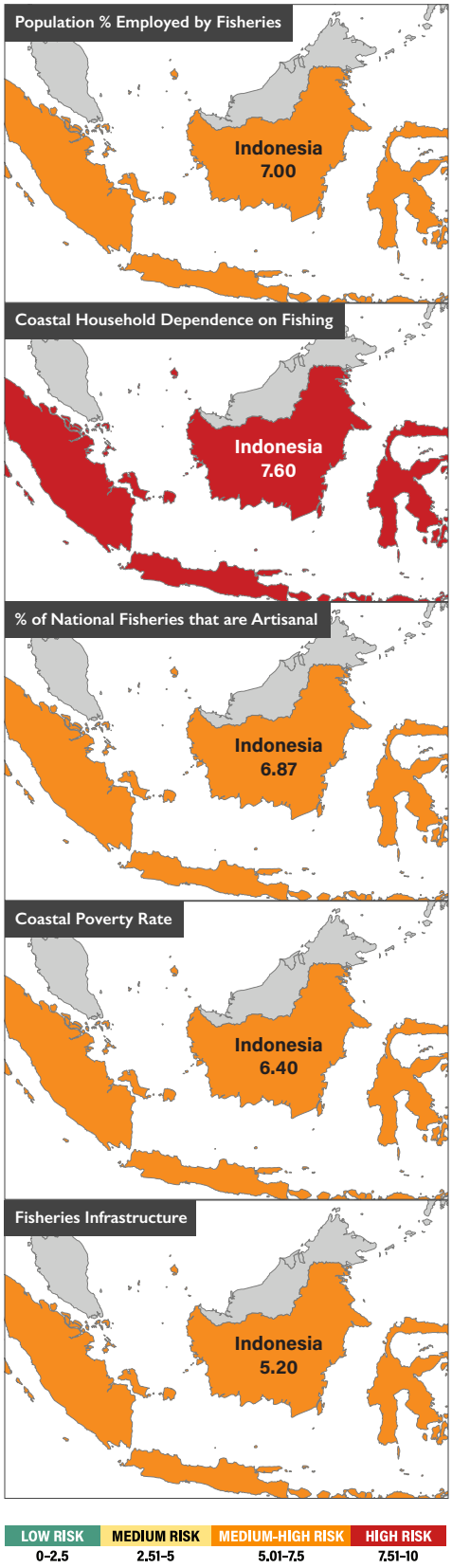
Visualized data collected between 2006-2019 from the Coral Triangle Atlas shows the densest instances of sightings of marine mammals, sharks, rays, and turtles occur within Indonesia's territorial waters. The prevalence of these species is a useful indicator for the general abundance of fish species within a defined area.

Climate change resilience (4.79) is medium risk, reflecting recent efforts to establish more climate resilient coastal communities, FMAs, and MPAs. The MMAF is currently developing strategies to improve planning and monitoring of MPAs, emphasizing the importance of fish spawning grounds for absorbing carbon, and the need to improve the economic benefits of conservation by engaging with coastal communities.[58] Compared to regional peers, Indonesia's adaptive capacity to climate change has seen improvements in recent years. Improvements reflect programs such as the Coral Reef Rehabilitation and Management Program (COREMAP) and investments in mangrove restoration which will help protect coastal ecosystems from the threat of climate change and destructive fishing practices.

ECONOMIC RISK

The economic risk is perceived as medium risk *(5.09)* when averaging together five indicators in this category. The two indicators with the highest perceived risk are the *percent of the population employed by fisheries (7.0) and household economic dependence on fishing in coastal communities (7.6)*. The fisheries industry directly employs 2.7 million fisherfolk, approximately 95 percent of whom are artisanal fishers.[59] In addition, the fishing industry supports the livelihoods of upwards of 6 million Indonesians. While Indonesia is the world's second largest producer of marine capture fisheries products, the country's fisheries product does not rank in the global top ten in seafood exports, which reflects the importance of the industry for domestic economic production and food security. Data from the government of Indonesia corroborates that fisheries products account for 54 percent of animal protein consumed in Indonesia. Recent analysis suggests that fisheries communities in FMA 711 will have difficulty adapting

Figure 15: Indonesia Environmental Scores by Indicator



to risks in coming years due to a high household reliance on reef fish, overfished stocks, and loss of maximum catch potential as a result of climate change.[60] Data from the Indonesian Statistics Bureau (BPS) estimates that the number of households involved in capture fisheries was cut in half from 2000 to 2016 – from 2 million in 2000 to 966,000 in 2016. This shows a decline in the economic viability of marine capture fisheries, particularly for small-scale fishers.[61]

Maritime boundary disputes threaten the livelihoods of small-scale fishers due to unequal access marine resources, resulting in a medium-high perceived risk in the risk indicators *percent of national fisheries that are artisanal (6.87)* and *coastal poverty rate (6.4)*. Most catches brought ashore in Indonesia's SCS are targeted by vessels smaller than 10GT in the Natuna Islands. Conversely, according to the MMAF, FMA 711 has the second largest number of licensed vessels over 30GT in Indonesia. According to KIs, local communities have access to fish stocks that are relatively more depleted and struggle to compete with commercial vessels. Further threatening artisanal and small-scale fishers is a new quota-based fishing policy implemented by MMAF which leaves only a small portion of the total capture quota for traditional, artisanal, and small-scale fishers. Experts note that this quota will further alienate small-scale fishers and reinforce imbalances in the distribution of marine resources.[62] Indonesia has a coastal poverty rate of 53 percent, which drives small-scale fishers to engage in IUU fishing as they're competing with foreign vessels.[63] Small-scale fishers in the Natuna Islands note that large foreign commercial vessels almost never land their catches on the island which reduces incentive for the development of fisheries infrastructure. While Indonesia has five PSMA compliant ports, the government has only established a cold storage center and a boat repair station in Natuna.[64] A lack of robust fisheries infrastructure in FMA711 is reflected in the medium-risk categorical indicator of *fisheries infrastructure (5.2)*.

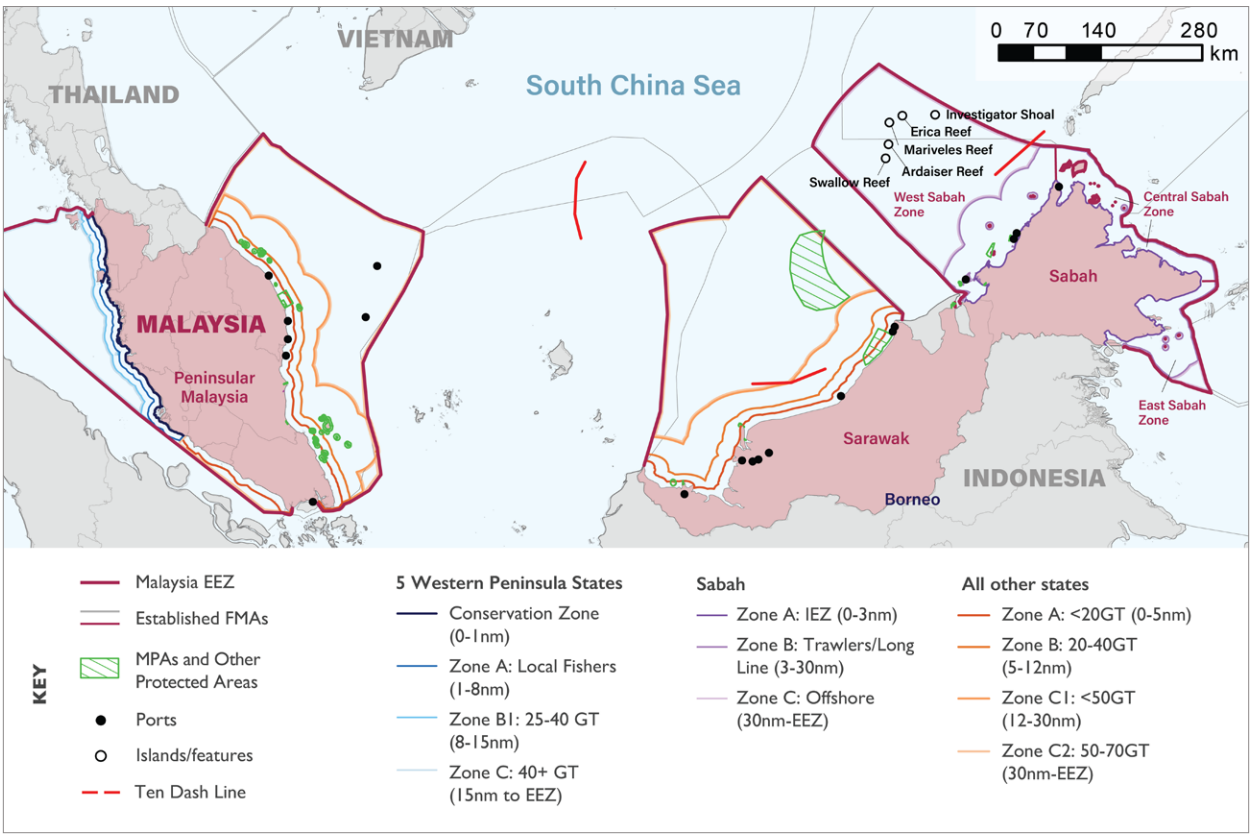
MALAYSIA

OVERVIEW

Summary risk scores for Malaysia rank medium-high risk in the environmental (5.27) and economic (5.56) categories and medium risk for governance risk (3.71) indicators.

50 percent of Malaysia's fishing catch is lost to IUU fishing each year, accounting for a loss of USD 1.4 billion (RM 6 billion) annually in the fishing sector.[65] Approximately 70 percent of the population lives in coastal zones of Malaysia,[66] and the country is ranked as one of the highest consumers of fish and seafood in the world with 53.3 kg consumed per capita in 2020.[67] The fishing industry nets USD 2.5 billion per year and directly employs 116,000 Malaysian fisherfolk, not including many foreign workers on Malaysian vessels.[68] The primary fisheries species targeted in Malaysia's SCS are demersal reef fish, large and small pelagic species, in addition to a large market for illegally trafficked wildlife. While specific data for Malaysia's SCS catch are not known, according to Malaysian stock assessments, in 2022 the total marine capture fish caught in Malaysia amounted to 1.21 million tons, a 16.5 percent decline from 1.57 million tons in 2016.[69]

Figure 16: Map of Malaysia's Maritime Domain in the SCS



Note: Labeled features on the map above are specific features mentioned in this country profile.

Management of Malaysian fisheries is divided between the federal government, the governments of Malaysia's 13 states, and the nation's three federal territories.[ii] The Department of Fisheries divides the Malaysian coast into 68 fisheries districts for local management.[70] In Eastern Peninsular Malaysia and Sarawak State, the coastal areas which define Malaysia's maritime boundaries in the SCS, fisheries management is administered by state ministries and overseen by regional Department of Fisheries (DoF). In Eastern Peninsular Malaysia and Sarawak there are 18 and 15 fisheries districts, respectively.[71] The primary piece of legislation guiding IUU fishing regulations in Malaysia is the Malaysian Fisheries Act of 1985, which bans foreign fishing and transshipment in Malaysian waters unless approved by the government. In 2012 and 2019, the law was amended to restrict the trade of live fishing and prohibit the usage of illegal gear. The Malaysia Maritime Enforcement Agency (MMEA) works closely with the Marine Police, Navy, Ministry of Fisheries, and other relevant agencies for on-the-water enforcement. Generally, waters in Malaysia up to 5 nautical miles (nm) are reserved for small-scale fisherfolk. Large-scale commercial vessels (50+GT) can only operate past 30nm. In six Malaysian states, there are varied maritime zoning regulations (see Figure 16). Industrial vessels operating beyond 5nm must have AIS, and vessels beyond 12nm must install VMS. Additionally, Malaysia has 42 MPAs designated to protect nearshore coral reefs with some permitting traditional fishing and mariculture.

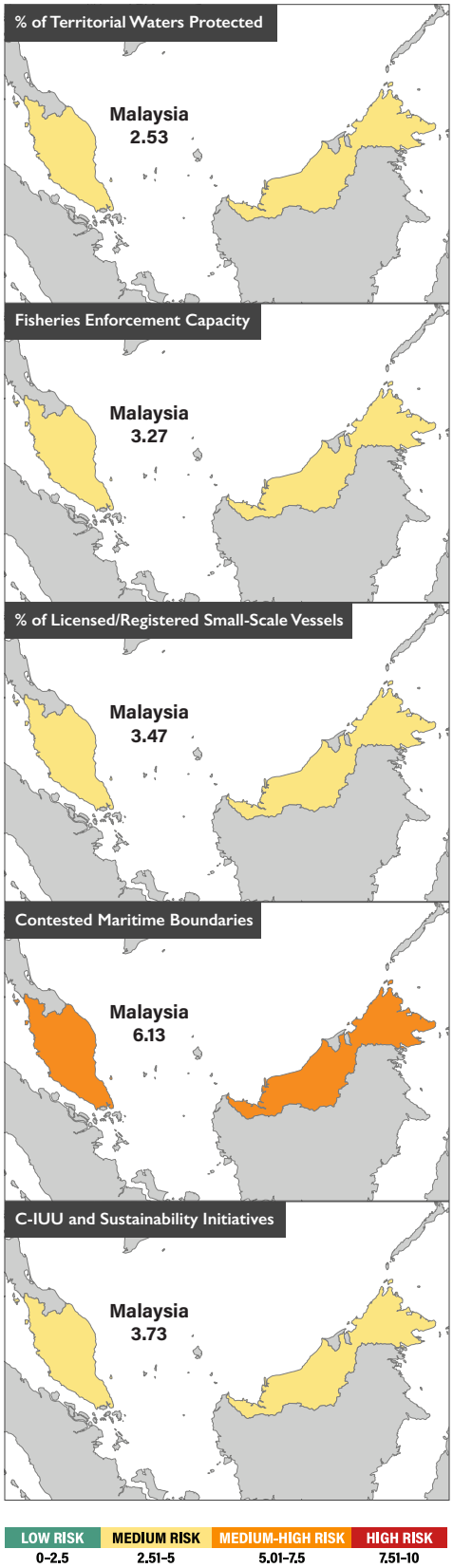
KIs report that enforcement of IUU fishing regulations in Malaysia's SCS is hindered by incursions of foreign vessels and is more robust for enforcement of domestic vessel violations. IUU fishing in Malaysia's SCS driven by territorial encroachments from PRC-, Philippines-, Thai-, and Vietnamese-flagged vessels encroaching on Malaysian waters. Recent PRC oceanographic mapping operations in Malaysian waters for fisheries, energy, and seabed mining resources have increased diplomatic tensions between Malaysia and the PRC. KIs in Sabah State and Peninsular Malaysia highlighted the role of transnational organized criminal groups in IUU fishing. These groups fin sharks and poach endangered, threatened, and protected (ETP) species, duplicate and falsify licenses and registration documents, sponsor fish bombing, and facilitate corruption. Commercial vessels encroach on the IEZ and MPA. Artisanal fishers, driven by poverty, encroach in conservation areas and use prohibited gear and fish bombs to target ETP species for sale to the domestic and foreign markets. Malaysia's Department of Defense has attempted to diversify funding for at-seas enforcement in the SCS by funding for vessel construction for the Royal Malaysian Navy to patrol the SCS.[72] Additionally, the MMEA uses patrol vessels to surveil registered Malaysian vessels.

GOVERNANCE RISK

Governance is rated as low risk *(3.71)* when averaged across five indicators. *Contested maritime boundaries (6.13)* is the highest ranked indicator at medium-high risk. The Malaysian government has repeatedly rejected China's claim to Malaysia's SCS along the ten-dash line off the coast of Borneo. Recent PRC oceanographic mapping operations in these waters for fisheries, energy, and seabed mining resources have increased diplomatic tensions between Malaysia and the PRC.[73] Additionally, China, Taiwan, and Vietnam lay claim to the Spratly Islands—off the coast of Sabah—in their entirety. In the contested Spratly Islands, Malaysia occupies five features: the Adasier Reef, the Erica Reef, the Investigator Shoal, the Mariveles Reef, and the Swallow Reef.[74] Between 2020 and 2023, Malaysia lost an estimated USD 72 million in fisheries production because of 428 incursions by foreign-flagged vessels.[75] Radar analysis surrounding the Spratly Islands between September and October of 2018 logged 264 vessel detections, with only eight broadcasting AIS.[76] Limited data availability on vessels operating in Malaysia's EEZ bolsters IUU fishing by transnational criminal groups, according to KIs in Sabah State and Peninsular Malaysia. PRC- and Vietnamese-flagged vessels speculated to be involved with criminal groups, fin sharks and poach ETP species, falsify license and registration documents, and facilitate corruption.

ii Federal territories carry the same status as states, but without heads of state or separate legislatures.

Figure 17: Malaysia Governance Scores by Indicator



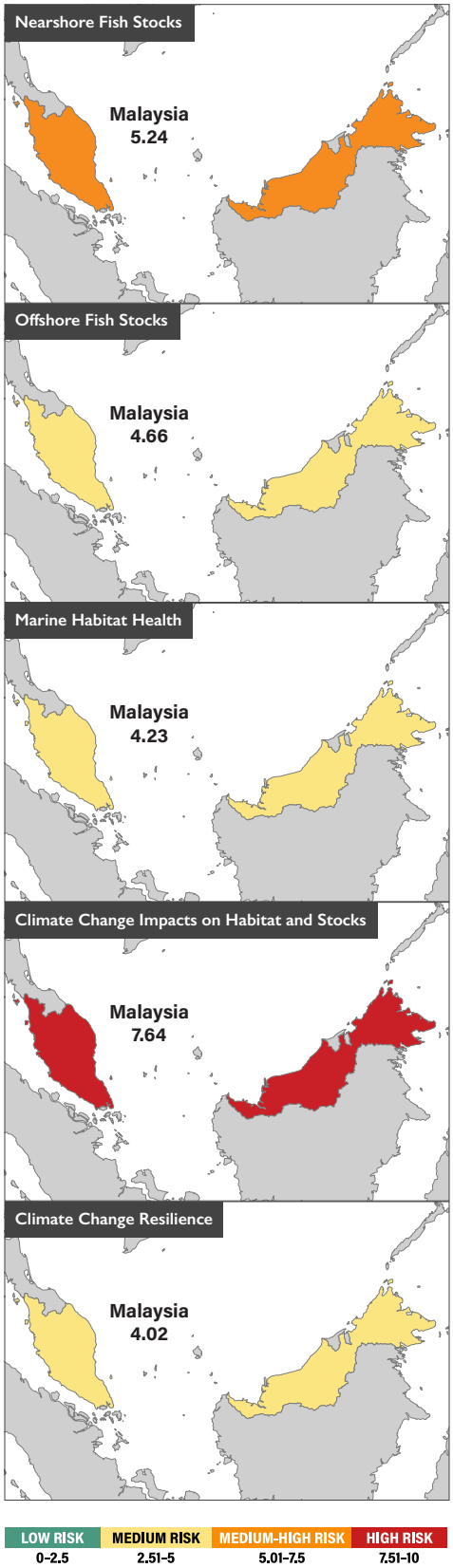
Capacity for fisheries enforcement (3.27) is rated as medium-low risk. The MMEA has robust operating procedures in Malaysia's SCS, using a combination of new generation patrol crafts (NGPCs) and aerial enforcement to monitor fishing activities.[77] In 2020, the MMEA received two NGPCs to help monitor and curb illegal fishing in the SCS. Additionally, in 2016, the Royal Malaysian Navy and MMEA adopted new "*Permanent Procedures (PROTAP) for Joint Operations*" to consolidate standard operating procedures in at-seas enforcement in the SCS. However, confidence in enforcement in the SCS extends only to domestic vessels. KIs report that primary perpetrators of IUU-fishing in the SCS are foreign actors and transnational criminal groups. Additionally, five states on peninsular Malaysia are piloting a new zoning system with a conservation zone up to 1nm, and an IEZ from 1nm-8nm.

Risk indicator scores for *percent of territorial waters documented as protected (2.53)* and *percent of artisanal/ small-scale vessels (3.47)* are therefore also medium-low risk. To address low enforcement capacity against incursions in Malaysia's SCS, the government has ramped up enforcement initiatives by spearheading regional cooperation and announcing new domestic policies At the Asia-Pacific Economic Cooperation Leaders' Meeting in November 2023, representatives from Malaysia and Vietnam agreed to boost cooperation in their shared seascapes to address illegal fishing in Malaysian Waters.[78] Additionally, DoF Director Adnan Hussain is standardizing the Monitoring, Control, and Surveillance Program under the Fisheries Act of 1985 to streamline fisheries management.[79] These initiatives are reflected in the risk indicator *government initiatives to counter-IUU fishing (3.73),* which is perceived as medium-low risk.

ENVIRONMENTAL RISK

Environmental risk is rated as medium-high risk *(5.27)* when averaged across five indicators. The Malaysian government does not conduct regular fish stock assessments which hampers proper fisheries management. The most recent national assessment, released in 2016, revealed that the demersal fish stock had dropped nearly 88 percent since the 1960s.[80] According to DoF data, there was a 16.5 percent decrease in fish caught between 2016 and 2022, attributed to the intrusion of foreign fishermen.[81] Primary fish targeted in Malaysia's SCS are large pelagic species, small pelagic species, and demersal fish (groundfish). Recent analysis finds that fisheries in the SCS have depleted stocks by 70-95 percent since the 1950s and 66-75 percent over the last 20 years.[82] Stress on fish stocks is reflected in the risk indicators

Figure 18: Malaysia Environmental Scores by Indicator



nearshore fish stock (5.24) and *offshore fish stock (4.66),* which are medium risk and medium-high risk, respectively. The SCS is home to an expansive network of coral reefs that support marine life. Coral reefs in the SCS are declining at a rate of 16 percent per decade.[83] Additionally, giant clam harvesting and artificial island building in the SCS has destroyed approximately 83 acres of coral reef within Malaysia's EEZ.[84] Reflecting these threats, the risk indicator *marine habitat health (4.23)* was reported as medium risk.

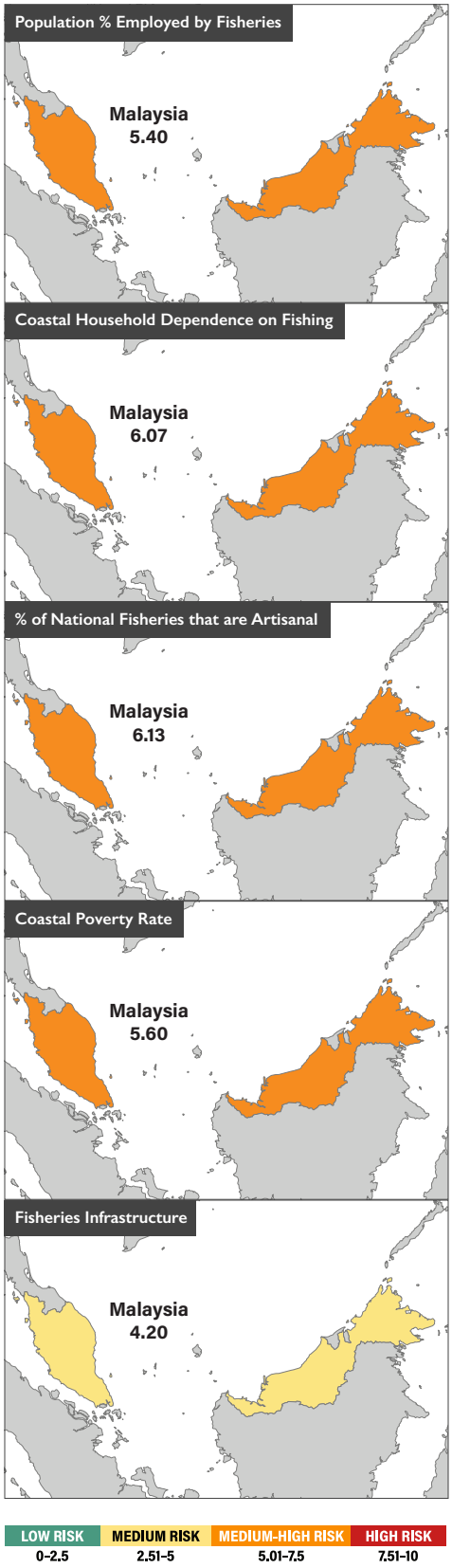
The indicator with the highest perceived risk among environmental indicators is *climate change impact on marine habitat health and fish stocks (7.64)* at high risk. According to KIs, climate change is delaying monsoons, shortening fishing efforts and changing the species harvest cycle. Warming ocean temperatures and reduced reef size alter the migratory patterns of fish in the SCS, changing anticipated catch for fisherfolk.[85] Malaysia is on track to experience 0.9 centimeters of sea level rise annually through 2100, which is estimated to increase the intensity of coastal flooding, damaging mangrove ecosystems and reducing fisheries production by RM 300 million annually (USD 63.6 million) by 2030.[86]

Climate change resilience (4.02) is reported as medium risk. Analysis suggests that fisheries in the SCS will come under significant pressure in coming years due to climate change and overexploitation.[87] This score is partially tempered by recent initiatives to protect livelihoods of small-scale fisherfolk. The Malaysian National Fishermen Association (PNK) recently introduced an affordable protection scheme worth RM 100 (USD 20) per year to protect small-scale fishers from climate change-related threats.[88] In addition, in 2016 the association expanded coverage for fishermen who are involved in accidents while fishing to RM 150,000 (USD 31,820), an increase from RM 50,000 (USD 10,606). Expansions in coverage reflect the impacts that climate change will have on the economic viability of commercial and artisanal fisheries.

ECONOMIC RISK

Economic risk is the leading categorical risk indicator at medium-high risk *(5.56)* when averaged across five risk indicators. The leading risk indicator is the *percent of national fisheries that are artisanal (6.13)* at medium-high risk. Artisanal fishers represent 70 percent of Malaysia's total population of fisherfolk, of this 82 percent live below the poverty line. Artisanal and small-scale fishers are forced to compete with commercial vessels while confined to provincial zones and are therefore most exposed to

Figure 19: Malaysia Economic Scores by Indicator



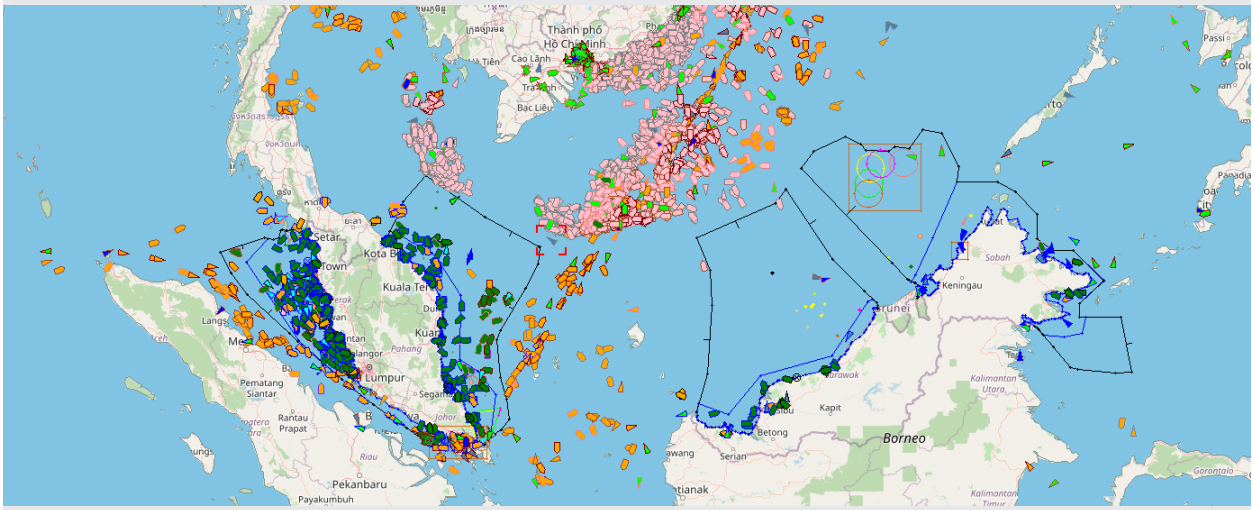
economic shocks in the fishing industry. Consequently, small-scale fishers resort to IUU fishing to reduce economic pressures and support their families. The risk indicator for *percent of population employed by fisheries (5.4)* is slightly lower at medium-high risk, reflecting labor demographics in the Malaysian fishing vessels. KIs report that 90 percent of workers on Malaysian vessels are not Malaysian, and many Malaysian-owned vessels are captained and operated by Vietnamese fisherfolk. However, declining fish stocks and increasing competition for remaining stocks are pushing even more Malaysian fisherfolk out of the industry.[89]

While the Malaysian fishing industry directly employs relatively fewer domestic laborers than other countries, the fishing industry is critical to the economies of coastal areas. About 70 percent of the total population lives in coastal zones. Additionally, coastal zones are some of the poorest regions of the country. A 2016 study quantifies that 28 percent of respondents living in coastal regions were living in extreme poverty – below RM 460 per year (USD 98) -- and 81.5 percent were living in poverty RM 700 per year (USD 149).[90] The fisheries sector supports coastal communities through small-scale business, industries, and entrepreneurs.[91] Additionally, fishing is seen as a safety net for coastal Malaysians. During the COVID-19 pandemic, coastal community members who lost their jobs due to pandemic lockdowns turned to fishing to pad their incomes.

Risk associated with coastal poverty and coastal dependence on fishing is reflected in the risk indicators *coastal poverty rate (5.30)* and *household economic dependence on fishing (5.15)*, rated as medium-high risk. The risk indicator for *fisheries infrastructure (4.2)* is medium risk despite Malaysia not being a signatory to the PSMA. This reflects the strength of domestic-level port regulations. First, the Eleventh Malaysia Plan (2016-2020) expanded port capacity, access, and operations through the National Port Policy.[92] Second, the Malaysian government established a Standard Operating Procedure (SOP) to handle foreign fishing vessels engaged in IUU fishing.

BEST PRACTICES

Malaysia has developed a sophisticated system to locate, identify, and track vessels suspected of IUU fishing in partnership with private businesses in the logistics and technology sectors. Greenfinder's AIS tracking platform can identify vessels involved in IUU fishing even when AIS contains erroneous or duplicate information. Greenfinder uses this data to inform relevant government agencies who can intercept vessels suspected of IUU fishing.



KEY

- Shades of Green: Malaysian-flagged fishing vessels
- Pink: Vietnamese-flagged fishing vessels
- Orange: Fishing vessels from other countries
- Shades of Blue: Malaysian enforcement

Example of Greenfinder's AIS vessel tracking filtered for fishing vessels and enforcement vessels. Image by Greenfinder, Inc.

THE PHILIPPINES

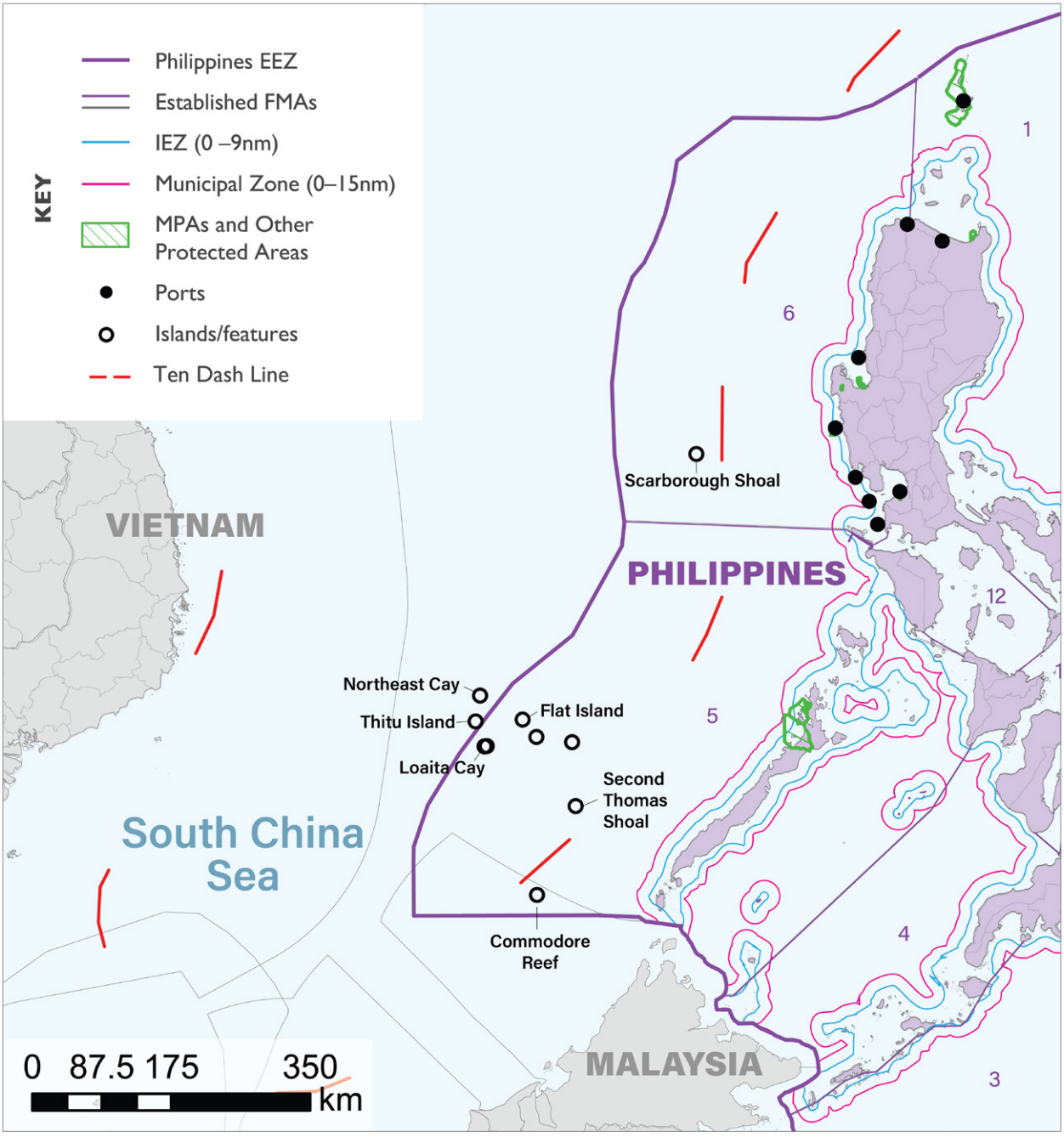
OVERVIEW

Summary risk scores for the Philippines in governance (5.77), environment (6.52), and economic (6.96) categories all rank within the medium-high risk range.

Long archipelagic coastlines and a large EEZ translate into an estimated loss of USD 1.3 billion (PHP 75.3 billion) yearly to IUU fishing in the Philippines, accounting for 27-40 percent of the total catch. Within the Philippines' EEZ in the SCS lies two hotly contested locations: the Spratly Islands and the Scarborough Shoal. The Philippines currently occupies nine features in the Spratly Islands: Commodore Reef, Flat Island, Loaita Cay, Loaita Island, Nanshan Island, Northeast Cay, Second Thomas Shoal, Thitu Island, and West York Island.[93] Coastal regions in the Philippines are some of the most densely populated in world at 141 people per square kilometer, and 60 percent of coastal Filipinos rely on marine resources for their livelihood. In 2021, marine captures fisheries production was valued at USD 2.83 billion. There are 2.08 million registered fisherfolk, 50 percent of whom are employed by marine capture fisheries.[94] Primary species targeted in the SCS are sardines, tuna, and crab. Approximately 70 percent of the Philippines' fishing grounds are overfished. Additionally, KIs report that Vietnamese-, Malaysian-, and Indonesian-flagged vessels encroach on the Philippines' SSS waters and target ETP species.

The Marcos Administration (2022-2027) has made food security and sustainable fisheries a priority. In response to a 2014 'yellow card' warning from the EU, Fisheries Administrative Order 263 created 12 FMAs, which are co-managed by Local Governance Units (LGU) and the national Bureau of Fisheries and Aquatic Resources (BFAR). BFAR is responsible for managing and enforcing regulations from 15nm-200nm, while LGUs are responsible for enforcement in municipal waters (0-15nm). Moreover, waters up to 9nm are reserved for municipal fishers as an inshore exclusion zone (IEZ). The national government has two primary laws which regulate IUU fishing enforcement. *Republic Act No. 10654* (2015) establishes a framework to regulate and prevent IUU fishing, while *Republic Act No. 9147* (2001) established the national wildlife fund used to fund IUUF enforcement. In municipal waters, LGUs maintain their own fisheries regulations and are responsible for enforcement. Monitoring of fishing vessels is also delineated between LGUs and BFAR, with municipal vessels registered and monitored by LGUs while commercial vessels are monitored by BFAR. Approximately 30 percent of the municipal fleet is unregistered. The municipal sector is not required to report their catch upon return to port, while up to 422,000 metric tons of fish are unreported by commercial fishers each year. The Philippines has also established a network of 1,500 MPAs, co-managed by LGUs and coastal communities.[95]

Figure 20: Map of The Philippines' Maritime Domain in the SCS

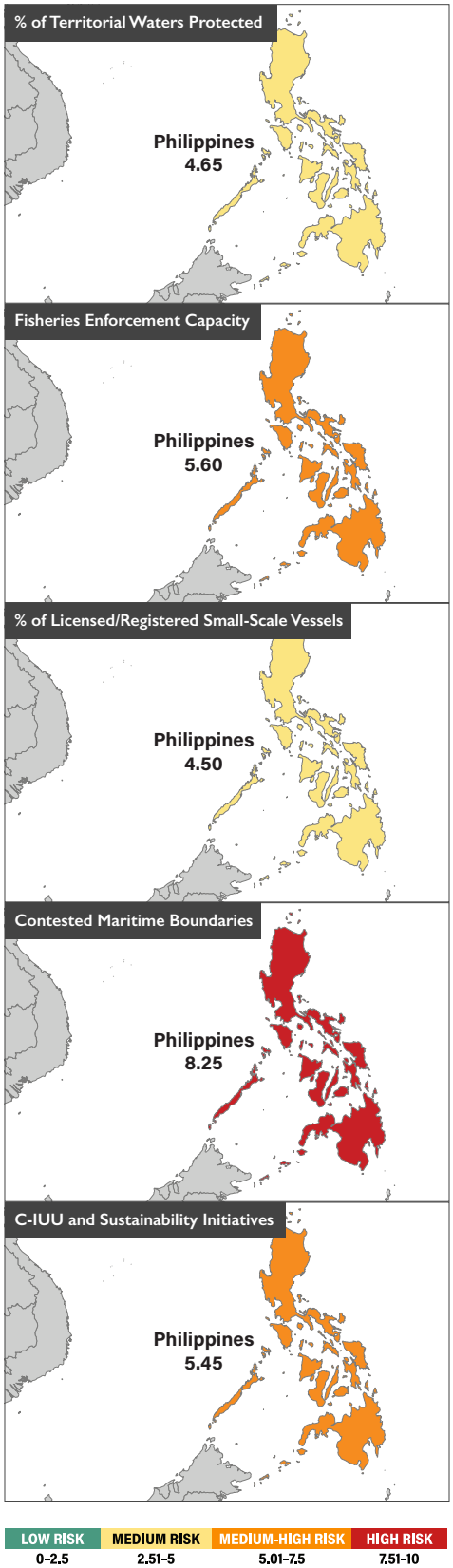


Note: Labeled features on the map above are specific features mentioned in this country profile.

GOVERNANCE RISK

Governance risk is measured as medium-high risk *(5.77)* when averaged across five risk indicators. The leading risk indicator is *contested maritime boundaries (8.25)* at high risk. Incursions into Philippines' SCS occur primarily around the contested Second Thomas Shoal and Scarborough Shoal. Scarborough Shoal, located 142 miles off Masinloc, Luzon, is a traditional fishing ground for Filipino fishers. The Second Thomas Shoal is located within the Spratly Islands and is an important reef fishing ground. The PRC

Figure 21: Philippines Governance Scores by Indicator

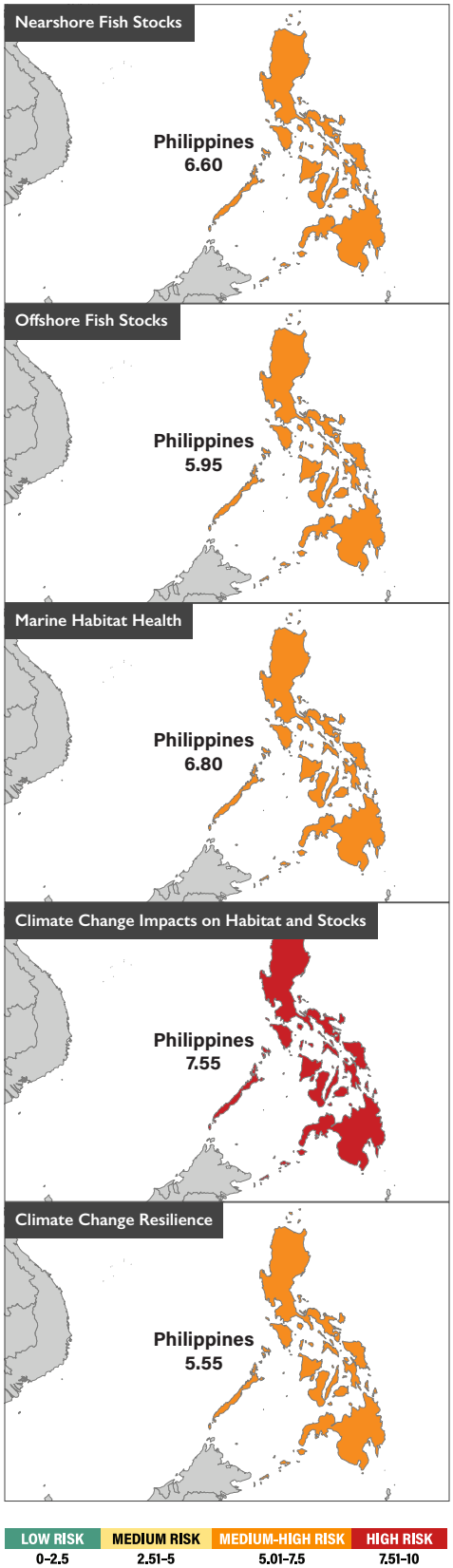


claims the Second Thomas Shoal near the Spratly Islands and the Scarborough Shoal on the basis of its ten-dash line. In 2016, the Permanent Court of Arbitration at The Hague ruled in favor of the Philippines, arguing that the PRC's historical claim to the Spratly Islands is invalid under the UNCLOS.[96] The PRC has defied this ruling by effectively occupying the Scarborough Shoal by maintaining a constant coast guard presence there since 2012, and by installing seven outposts on reefs in the Spratly Islands.[97] According to KIs, Taiwanese- and Vietnamese-flagged vessels take advantage of the instability created by aggressive PRC actions to fish illegally in the IEZ. The Marcos Administration (2022-2027) has responded to a recent escalation in tensions by strengthening partnerships with neighbors in the Indo-Pacific. Additionally, in 2023 Marcos signed deals with the United States to increase base access, joint military training, and weapons transfers.

The second-highest perceived risk is *capacity for fisheries enforcement (5.6)* at medium-high risk. Most IUU fishing the SCS takes the form of underreported catch, commercial vessels breaching the IEZ, and the use of illegal gear, according to KIs. Underreporting, misreporting, or non-reporting catch is incentivized by voluntary reporting requirements for small-scale fishers. Enforcement for small-scale fishers engaged in IUU fishing is limited by differences in IUU definitions and rules between the federal and municipal level. KIs report that confusion about overlapping areas in the SCS leads to unintentional IUU fishing in the Philippines' EEZ.

Government initiatives to counter-IUU fishing (5.45) are also rated at medium-high risk, reflecting low enforcement capacity and difficulties regulating illegal fishing in contested SCS waters. The *percent of territorial waters documented as protected (4.65),* and the *percent of artisanal/small-scale vessels licensed (4.5)* are perceived as medium-high risk. There are over 1,500 MPAs in the Philippines that are co-managed by LGUs and coastal communities. Eight of these MPAs are within the Philippines' SCS maritime domain. According to recent analysis, only 34 percent of the 564 MPAs examined were working to improve fish biomass.[98] MPAs in the SCS face challenges from intrusions by foreign vessels and overfishing by small-scale fishers. Small-scale and artisanal fishers have open access to municipal fisheries. BFAR requires that small-scale fishers obtain licenses, but cumbersome and varied licensing processes represent a large roadblock to acquiring these licenses. Additionally, varying regulations at the national and municipal level leads small-scale and artisanal vessels to unintentionally IUU fish in

Figure 22: Philippines Environemental Scores by Indicator



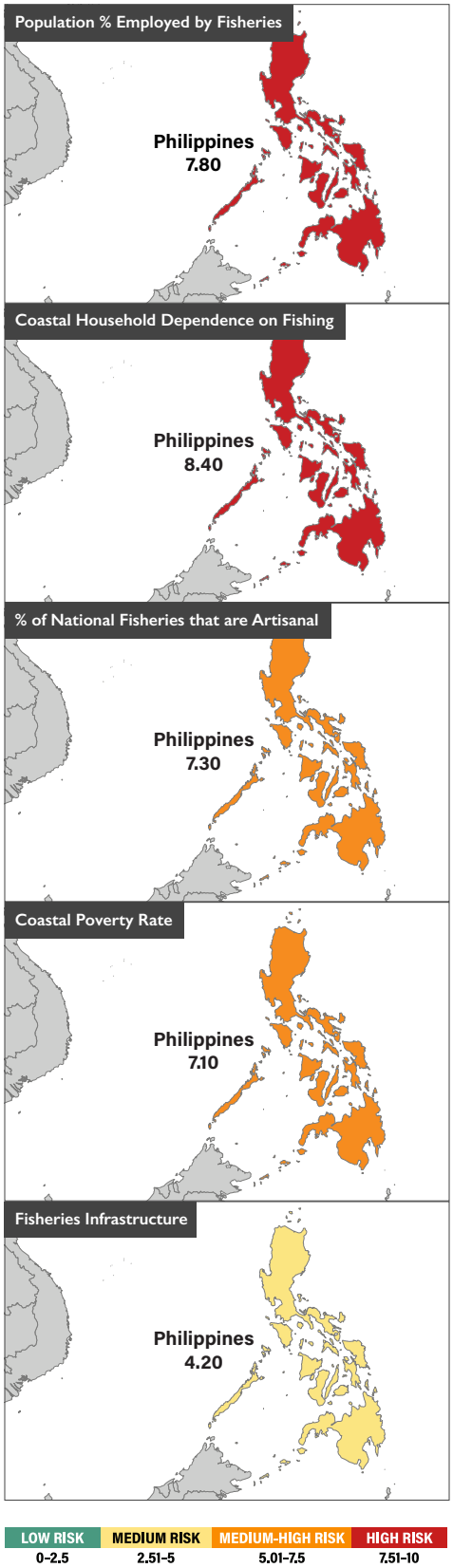
protected areas. Due to these shortcomings, BFAR has been assisting with boat registration and catch reporting in recent years according to KIs but has been met with pushback from coastal communities.

ENVIRONMENTAL RISK

Environmental risk is reported as medium-high risk *(6.52)* when averaged across five risk indicators. The category's medium-high risk score is led by *climate change impacts on marine habitat health and fish stocks (7.55)* and *marine habitat health (6.80).* The Philippines' 2015-2028 Biodiversity Action Plan quantifies an estimated 40-65 percent decline in habitat suitability for reef fish in the Philippines' SCS due to climate change, causing fish to migrate out of the Philippines' EEZ.[99] According to KIs, elevated sea temperatures also increase disease in mariculture. Additionally, destructive fishing practices and island building from the PRC are acting as threat multipliers for marine habitats. On a September 2023 patrol of Iroquois Reef in the Philippines EEZ, the Philippines Coast Guard found massive reef damage by PRC-flagged fishing vessels illegally harvesting corals and giant clams. In the 2023 Ocean Health Index, a measure of habitat health and protection initiatives, the Philippines was ranked 214th out of 222 countries due to massive coral reef destruction. According to the Asia Maritime Transparency Initiative, approximately 4,648 acres of reef have been destroyed by the PRC.[100]

Skipjack tuna and small pelagic species are the primary targets of commercial vessels in the Philippines. Sardinella accounts for approximately 25 percent of the total catch. Catch per unit of effort is declining as population growth and demand for fishery resources increase. Fish are harvested at a 30 percent higher rate than they can reproduce. Production fell from 201,640 metric tons in Q1 2020 to 177,170 metric tons in Q1 2022. Approximately 56.9 metric tons of fish caught in the Philippines' SCS were caught using bottom trawling, a practice that destroys seabed ecosystems.[101] Recently, the PRC imposed a unilateral closed season in the SCS until September of 2024 which has been protested by the Philippines.[102] The risk indicators *nearshore fish stock (6.6)* and *offshore fish stock (5.95)* are reported as medium-high risk. BFAR has responded to environmental threats by supplying new gear to fishermen, and the national government has begun planting mangroves to improve storm resilience. According to the Philippines' development plan (2023-2028), critical support for accessing green financing and risk insurance will be expanded to small-scale farmers and fisherfolks. The threat of climate change and adaptive initiatives are represented in the medium-high risk indicator *climate change resilience (6.0).*

Figure 23: Philippines Economic Scores by Indicator



ECONOMIC RISK

Economic risk is measured as medium-high risk *(6.96)* when averaged across five risk indicators. *Household economic dependence on fishing in coastal communities (8.4)* and *percent of population employed by fisheries (7.8)* lead the risk indicators and are reported as high risk. In 2021, marine captures fisheries production was 1.5 million metric tons. Approximately 60 percent of coastal Filipinos rely on coastal and marine resources for their livelihood, both directly and indirectly.[103] There are 2.08 million registered fisherfolk, approximately half of whom are employed by marine capture fisheries.[104] In the Filipino fishing sector, there is no standardized payment practice, with fishermen typically getting a share of catch instead of money. Additionally, KIs report that there are rampant labor rights violations in the industry. Carrier vessels stay at sea for 6-8 months, creating an atmosphere conducive to lack of oversight and abuse, and children often work on small vessels (between 3 and 20GT) using passive gear.

Coastal poverty rate (7.1) and *percent of national fisheries that are artisanal (7.3)* are also measured as high risk. Roughly 80 percent of Filipino fisherfolk are artisanal fishers. According to BFAR, from 2011 to 2020 the municipal and aquaculture subsectors contributed 73 percent to total fisheries production.[105] Small-scale fishers are among the country's poorest and most vulnerable demographic groups. Fisherfolk have the second highest poverty rate of any profession in the Philippines, with 26.2 percent of fisherfolk living below the official poverty threshold. Territorial incursions in the Philippines' EEZ have left traditional fisherfolk without access to their fishing grounds. For example, China's occupation of the Scarborough Shoal has left approximately 250 traditional fisherfolk without access to their fishing ground. Overfishing acts as a threat multiplier to livelihood risk for fisherfolk. KIs report that due to overexploitation and commercial vessels encroaching on their fishing ground, subsistence fishers are leaving coastal areas for other industries. Further threatening livelihoods for small-scale fisherfolk are lobbying efforts by the commercial fishing industry to reduce the IEZ and cut into municipal fishing zones.

The *fisheries infrastructure (4.6)* risk indicator was reported as medium-low risk. With 7,100 islands in the Philippines, there is a complicated system for bringing in catch. KIs report that carrier vessels linger for 6-8 months before unloading at port or transferring fish to legal vessels. Once the fish catch arrives at port, legal and illegal fish are then comingled, making oversight a challenge. Indeed, catch reporting largely occurs through self-declaration which created an environment of underreporting. Since 2021, the Philippines

Fisheries Development Authority (PFDA) has launched three programs to improve port infrastructure—the Regional Fish Ports Program and the Municipal Fish Ports Program which provides training and facilities to facilitate catch reporting and compliance with IUU fishing laws, and the Ice Plants and Cold Storage Program which prevents waste of fisheries products.[106] In 2024, the Department of Budget and Management approved Php 6 billion (USD 102.5 million) to improve and maintain regional fish ports throughout the Philippines.[107]

UNIQUE THREATS: SPRATLY ISLANDS & SCARBOROUGH SHOAL OCCUPTATION BY PRC VESSLES

Scarborough Shoal, located 142 miles off Masinloc (Zambales Province), is a traditional fishing ground for Filipino fishers.[108] Access to the lagoon has been intermittently blocked by PRC Coast Guard vessels since 2012. Some Filipino fishers report that their lines have been cut by the Chinese Coast Guard.[109] This has placed additional strain on Luzon's nearshore resources. Taiwanese- and Vietnamese-flagged vessels also take advantage of instability created by aggressive PRC actions to fish illegally in the IEZ. The Philippines Coast Guard estimated that foreign vessels contributed to 50 percent of the stock depletion in Manisloc in 2017.[110] Island building activity and defense buildup by the PRC in the Spratly Islands destroy spawning grounds which affects the stock distribution and health in nearshore waters.

PRC trawlers blocking access to Scarborough Shoal, May 8, 2023. Image by CSIS Asia Maritime Transparency Initiative.

THAILAND

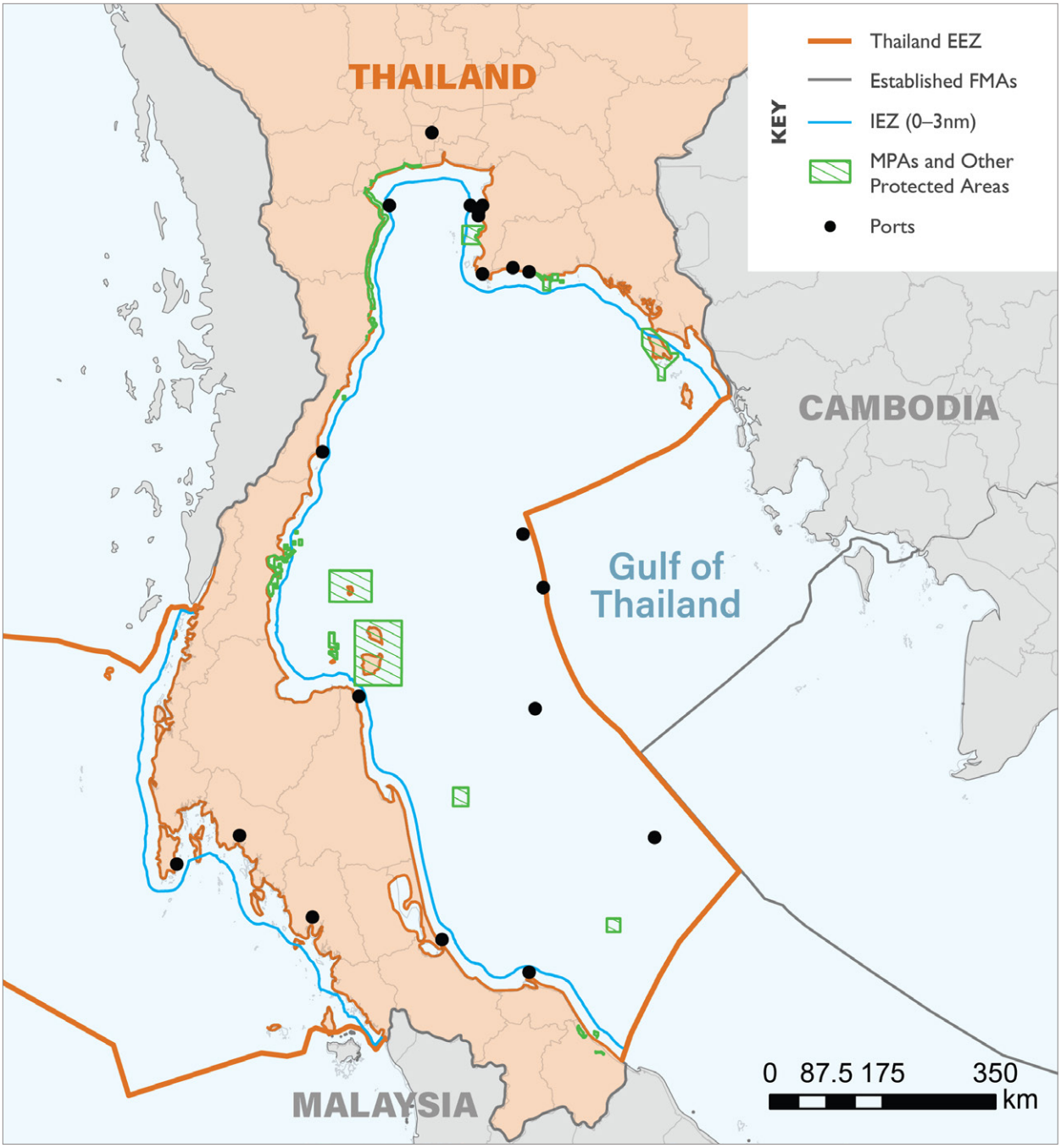
OVERVIEW

Categorical risk scores for Thailand in environment (6.40) and economic (5.46) rank within the medium-high risk range, and the categorical risk score for governance (3.84) ranks within the medium risk range.

Thailand is both a fish harvesting country and a processing country which creates unique risks for IUU fishing practices and labor abuses across the seafood supply chain. Total fishery production in Thailand in 2020 amounted to 2.39 million metric tons and was valued at USD 5.07 billion (THB 168 billion).[111] Marine capture fisheries account for 60 percent of annual production. According to estimates from KIs, there are approximately 30,000 artisanal vessels, 5,000 30GT+ vessels, and 5,000 1-29 GT vessels in Thailand's domestic fleet. Thai industrial vessels (30GT+) catch 80 percent of Thai fishery products, while artisanal fishermen catch the remaining 20 percent. The primary fish targeted by marine capture fisheries are anchovies, scads, squids, sardinellas, and mackerel.[112] In 2015, the European Commission (EC) issued Thailand a 'yellow card' for shortcomings in Thailand's legal and administrative system and for poor MCS of the domestic fleet. During this period, IUU fishing cost the Thai fishing industry approximately USD 30 million each year,[113] and up to 40 percent of tuna imports to the United States from Thailand was illegal or unreported.[114] To resolve the issues related to the yellow card, the Thai government has implemented a slew of reforms to its fishing industry post-2015.

The Department of Fisheries under the Ministry of Agriculture and Cooperatives is responsible for the sustainability and promotion of Thai fisheries and aquaculture. The Royal Thai Navy oversees MCS and at-sea enforcement through the Command Center for Combatting Illegal Fishing. The *Royal Ordinance on Fisheries B.E. 2558* (2015) implements a licensing system, VMS requirements for 60GT+ vessels, vessels inspection procedures, and an e-license and catch monitoring system. As part of its post-2015 fisheries reforms, Thailand's VMS requirements were expanded to 30GT+ vessels. Regulations are implemented at Port In-Port Out (PiPo) sites. Post-2015 reforms increased the presence of port inspectors and established 30 PiPo sites, according to KIs. The Thai government's counter-IUU fishing policies are unpopular amongst commercial fishers. Commercial fishers in Thailand organize through the Thai National Fisheries Association (NFAT) and have a large amount of political clout, posing a potential threat to regulatory progress since 2015. In 2019, the European Commission lifted Thailand's yellow card, reflecting robust changes to fisheries management.[115]

Figure 24: Map of Thailand's Maritime Domain in the SCS

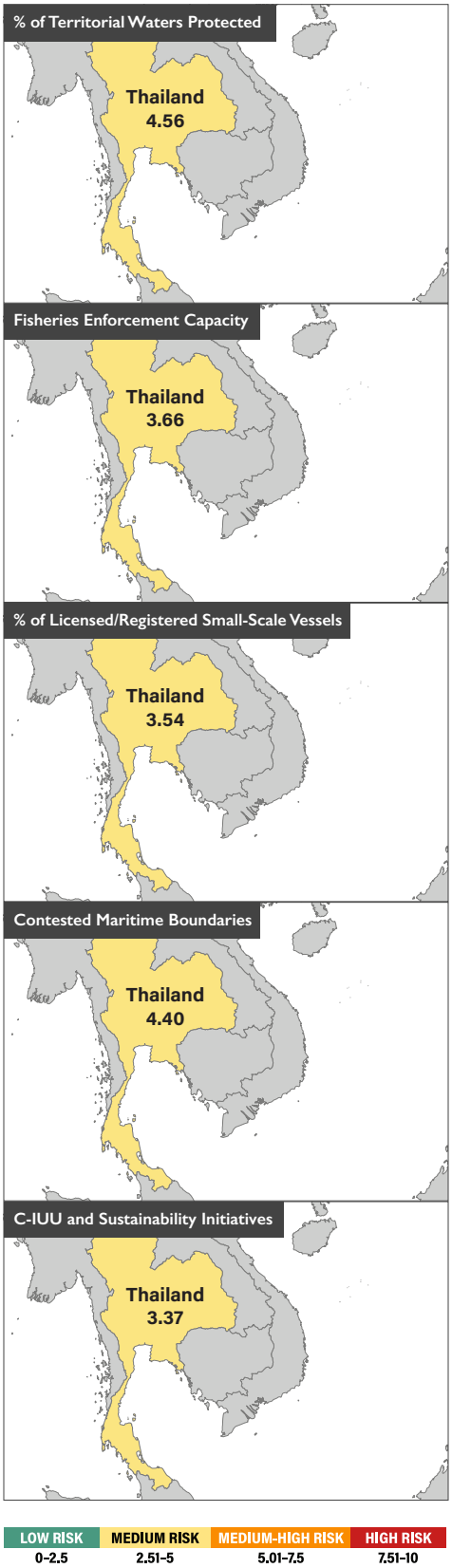


Note: Labeled features on the map above are specific features mentioned in this country profile.

GOVERNANCE RISK

Governance risk in Thailand was rated as medium risk *(3.84)*, the second lowest in the SCS. This comparatively low categorical risk score is led by the risk indicator *percent of territorial waters documented as protected (4.56)* which is reported as medium risk. Thailand has established 22 national marine parks, six non-coastal hunting areas, 160 sites of reserved mangrove forest, 56 marine fishery sanctuaries, and six environmental protection areas.[116] Total coastal marine and protected areas amount to 18,000

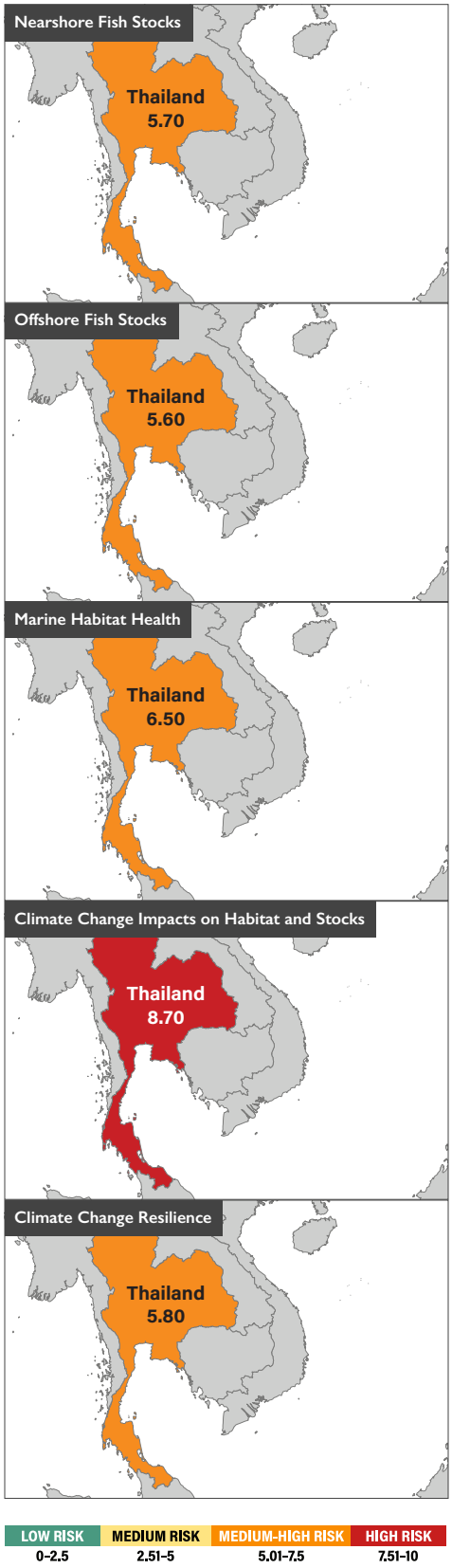
Figure 25: Thailand Governance Scores by Indicator



square kilometers, or 5.6 percent of total Thai waters. This relatively high risk, compared with other indicators, reflects the high level of fragmentation in the network of protected areas, and inadequate coverage of ETP species' habitats.[117] KIs report that foreign trawlers from Vietnam and Indonesia are the worst offenders for encroachments into Thailand's protected areas, trawlers use drag nets which disrupt seabed ecosystems. *Contested maritime boundaries (4.4)* is the second-riskiest indicator and is also reported as medium risk. In the Gulf of Thailand, Cambodia, Malaysia, Thailand, and Vietnam have overlapping claims to islands around this area.[118] The Thai Navy frequently seizes Vietnamese boats that encroach in the Gulf of Thailand.[119] However, this score is tempered by recent joint patrols between the Vietnamese and Thai navies of shared territorial waters to improve at-sea MCS and counter IUU fishing.[120]

The categorical governance score is tempered by medium risk indicators *capacity of fisheries enforcement (3.66)* and *percent of artisanal / small-scale vessels licensed (3.54)*. Perceptions for these scores are based on robust reforms that have been implemented since the EC 'yellow card' issuance in 2015. KIs note that industrial operations are responsible for 80 percent of the catch and are the primary perpetrators of IUU fishing in Thailand's SCS. Strategies to reform the industry and reduce industrial fishing capacity have included reforming the legal system, investing in the MCS system, and further cooperating with regional RFMOs. Comprehensive revision of the fisheries law (Royal Ordinance on Fisheries B.E. 2558) was passed soon after the 'yellow card' and acknowledges IUU fishing as a crime carrying a fine of up to five times the value of the catch and expanded enforcement patrols. Since the Royal Ordinance came into effect, approximately 4,400 IUU cases have been prosecuted.[121] Additionally, a 2015 fisheries act established an inshore exclusion zone of up to 3nm for artisanal vessels to access coastal seas. In 2016, policies to benefit small-scale and artisanal fisherfolk were expanded with a freeze on new licenses for industrial trawlers. Registered commercial vessels fell from 13,000 vessels in 2015 to 10,000 vessels in 2020, while the number of registered artisanal vessels ballooned from 27,000 vessels in 2015 to 50,000 vessels in 2020.[122] Additionally, weight of landed fisheries product by industrial vessels fell by 19 percent between 2008 and 2019.[123] Reflecting the Thai government's robust reforms *government initiatives to counter IUU fishing and promote sustainable fisheries management (3.37)* is also medium risk.

Figure 26: Thailand Environmental Scores by Indicator

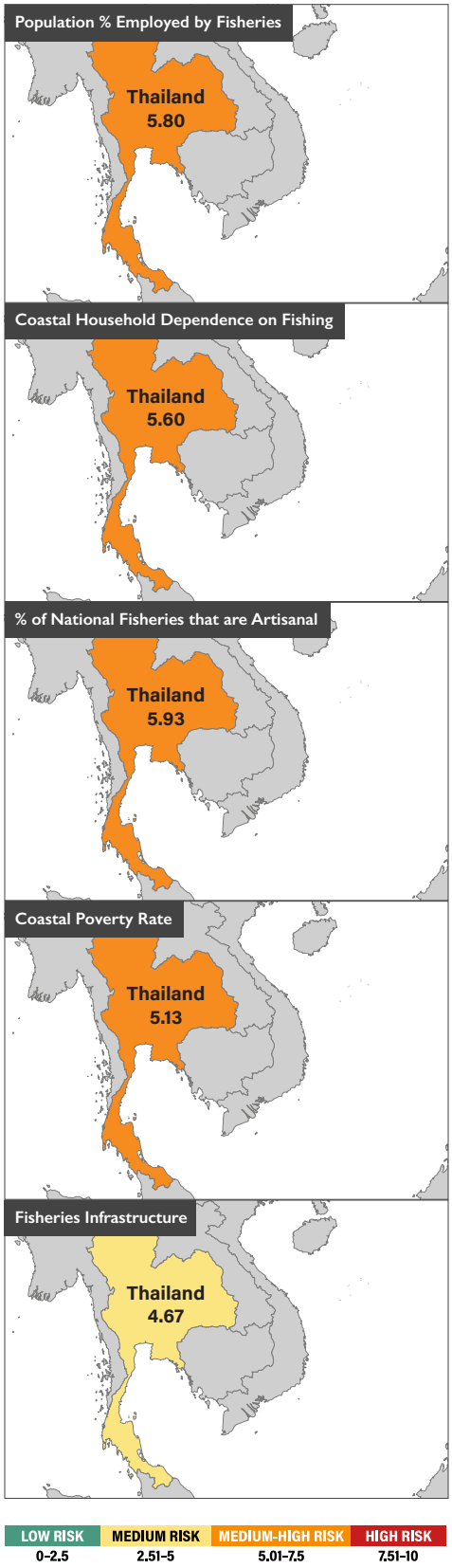


ENVIRONMENTAL RISK

Thailand's environmental risk analysis denotes a medium-high risk *(6.40)*. The leading risk indicator is *climate change impacts on habitat and fish stocks (8.70),* which is reported as high risk. KIs report that climate change has shifted monsoon season, and in turn, the concentration and number of fish available. Climate change acts as a threat multiplier for habitat health and fish stocks, with KIs reporting that climate change and overexploitation have depleted commercially important fish, including mackerel. Environmental advocacy groups in Thailand note that warming oceans and coral bleaching have slowed fish stock recovery following the implementation of reforms.[124] *Marine habitat health (6.50)* is the second highest risk indicator and is reported as medium-high risk. This perception reflects coastal development driving mangrove deforestation and biodiversity loss, and trawlers damaging the sea floor. According to the Mangrove Action Project, since 1975 between 50-65 percent of Thailand's have been deforested for shrimp farm development, posing a threat to nearshore ecosystems.[125] Additionally, research illustrates how trawlers can leave scars in the seabed, destroy coral reefs, disrupt sediment, and damage seabed dwelling marine wildlife.[126] *Climate change resilience (5.80)* is reported as medium-high risk. Thailand is consistently ranked in the top of countries most vulnerable to climate-related disasters and the impacts of climate change. KIs note that small-scale fisherfolk can no longer support themselves by fishing in territorial waters and must venture further out at sea in search of reliable fish stocks and healthy marine habitats. To address widespread concerns about climate change, the Thai government has development a National Adaptation Plan (NAP) (2018) which includes adaptation strategies for fisheries, including building coastal erosion protection zones.[127] Thailand has 18 MPAs within its SCS maritime domain.

Nearshore fish stock (5.60) and *offshore fish stock (5.70)* are both reported as medium-high risk. According to KIs, Thailand's domestic fleet is largely confined to near-shore fishing. Nearshore fisheries are declining which has led to the loss of traditional fishing and conservation practices. According to Global Fishing Index, nearly all of Thailand's fisheries products come from unassessed stocks, and negligible progress has been made towards restoring fish stocks to sustainable levels despite relatively strong fisheries governance.[128] Approximately 88 percent of Thailand's catch is unassessed and just one percent is covered by stock assessments led by regional fisheries management organizations. However, Thai waters are considered some of the most over-fished regions on the planet, with catch per unit of effort falling by more than 86 percent since 1966.[129] This score is partially tempered by the

Figure 27: Thailand Economic Scores by Indicator



Thai government's initiatives to restore its mangroves and to reduce fishing capacity by banning trawlers.

ECONOMIC RISK

The economic risk category is measured at medium-high risk *(5.46)* when averaged across five indicators. This score is led by the *percent of national fisheries that are artisanal (5.93)*. Thailand has over 51,000 artisanal and small-scale vessels, accounting for 82 percent of all registered Thai vessels. Trawlers enter the nearshore IEZ for small-scale artisanal fisher where they disrupt fish spawning and overexploit fish stocks. According to KIs, Thai domestic small-scale fleets are outcompeted by industrial coastal fleets in the region, with some reportedly leaving the industry all together. Commercial fishing vessels, despite accounting for 12 percent of Thai vessels, are responsible for 90 percent of marine catch.[130] Moreover, small-scale fisherfolk lack political clout which leaves them out of the policymaking process. This risk rating reflects current attempts to rollback regulations that benefit artisanal fisherfolk, such as banning the licensing of trawlers (discussed below). The next highest risk indicator is the *percent of the population employed by fisheries (5.80)* which is also reported as medium risk. There are approximately 535,210 fisherfolk employed by the Thai fishing industry.[131] However, this number is likely an underestimate due to the large number of migrants working on Thai fishing vessels. High risk in this category reflects labor abuses within the Thai fishing industry. From 2009 to 2014, reports quantified that 70 percent of fishers on Thai vessels experienced physical or sexual abuse, 80 percent reported never feeling free, and almost all reported having no outside contact.[132] According to KIs, post-2015 reforms has made Thailand a regional leader in reforming labor laws.

Household economic dependence on fisheries (5.60) and coastal poverty rate (5.13) are also reported as medium-high risk. There are approximately 250,000 fishing villages in coastal Thailand. [133]There are an estimated two million people employed in the fisheries sector, an estimated 40 percent are fishermen or fish farmers, and 60 percent are in the processing industry.[134] The coastal poverty rate in 23 coastal provinces decreased from 1.95 percent in 2011 to 1.52 percent in 2015. In addition to capture fishing, the Thai fish processing industry is expansive. Thailand is one of the biggest world markets for canned fish for the U.S. and Middle East, according to KIs. However, relatively high risk is reflective of challenges facing coastal communities. First, overexploitation is reportedly driving some fisherfolk out of the industry. Second, KIs report that the processing industry takes advantage of

migrant workers for cheap labor. *Fisheries infrastructure (4.67)* is reported as medium risk. There are 1,043 ports in coastal provinces.[135] Thailand is party to the PSMA, and, according to KIs, has robust adherence to the PSMA framework, including support from AIS partnerships, trip logs, temperature logs, and crew checks.

UNIQUE THREATS: THAI FISHERIES ACT ROLLBACKS

In response to investigations into labor abuses onboard Thai fishing vessels, international seafood buyers in the EU and U.S. imposed sanctions on Thailand's fisheries sector. Thailand's Fisheries Act (2015) was passed to respond to challenges with IUU fishing and associated labor abuse. These reforms have been critical to restoring Thailand's seafood export revenues and to supporting improved labor practices in the seafood industry. However, the NFAT, which represents the commercial fisheries sector, has called on the government to reverse the post-2015 reforms citing that the fisheries industry is no longer profitable due to strict regulations.[136] In May of 2023, the new administration under Prime Minister Srettha Thavisin vowed to restore the profitability of the fishing industry. In the beginning of 2024, a slew of rollbacks to the Fisheries Act were proposed through eight pieces of draft legislation submitted by the Thai cabinet.[137] CSOs in the region have identified 17 amendments that weaken laborer and worker protections, reduce requirements for VMS, reverse regulations on destructive fishing gear, and weaken transshipment regulation. Since the start of 2024, Thailand's Ministry of Agriculture and Cooperatives and the Thailand Department of Fisheries have signed 15 legally binding regulations that have rolled back numerous reforms on illegal fishing gear and port requirements.[138] The Environmental Justice Foundation estimates that these rollbacks will jeopardize worker safety, harm long-term sustainability of fish stocks and marine habitats, and endanger Thailand's seafood export revenues.[139]

Laborers on Thai fishing vessels. Photo by Environmental Justice Foundation.

VIETNAM

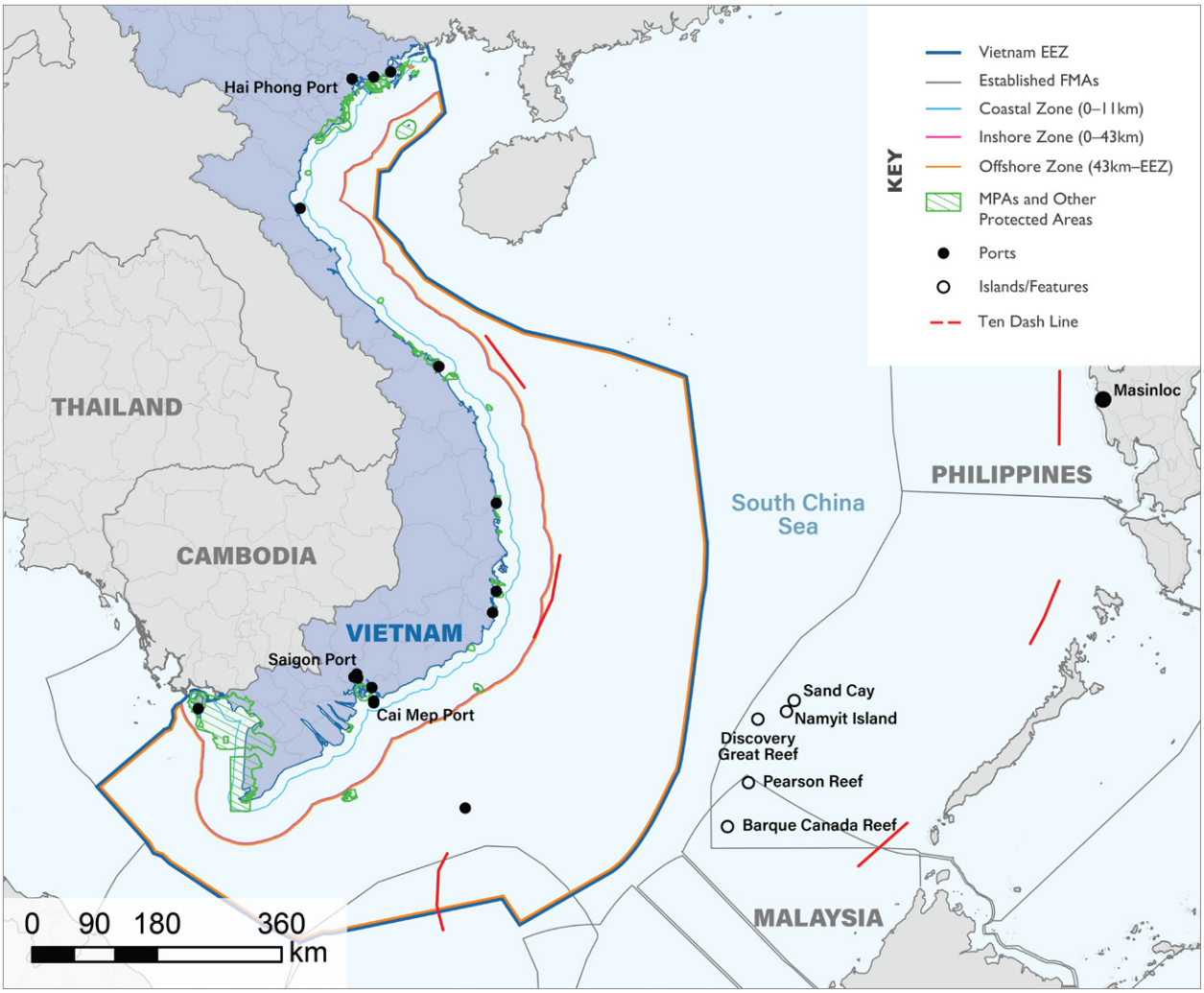
OVERVIEW

Summary risk scores for Vietnam in governance (5.73), environmental (5.86), and economic (5.73) all rank within the medium-high risk range.

Vietnam is estimated to lose USD 1.3 billion (VND 32 trillion) annually to IUU fishing.[140] The fisheries sector in Vietnam is crucial for food security, economic growth, and rural employment. In 2020, marine capture fisheries produced 3.7 million metric tons of fisheries products.[141] In Vietnam, capture fisheries account for 47 percent of national production, while aquaculture accounts for 53 percent. The primary species targeted by marine capture fisheries are tuna, squid, crab, and shrimp. Small-scale vessels account for the largest share of the domestic fleet; in 2022, there were approximately 91,000 fishing vessels smaller than 24 meters. [142] Vietnam's fishing industry has an export value of USD 9.2 billion, the third largest in the world.[143] In 2017, the EC issued a 'yellow card' warning because of Vietnam's failure to comply with European Union regulations. Prior to 2017, the Vietnamese government had not taken strong measures to combat IUU fishing, largely due to the government's resources going towards strengthening its fishing fleet as part of gray zone tactics against the PRC in contested SCS waterways.[144] The European Commission's yellow card has remained in place since, reflecting persistent challenges in regulating Vietnam's immense fishing industry.

The 14th National Assembly passed the Fisheries Law of 2017 was passed in response to the EC 'yellow card,' and includes provisions for the protection and growth of marine resources, including marine conservation, for sustainable fisheries development.[145] The Vietnamese government takes an all-of-government approach to prevent IUU fishing and promote sustainable fisheries management. This approach is spearheaded by the Vietnamese National Steering Committee to Combat IUU Fishing, which is comprised of relevant ministries and defense agencies. The Vietnamese government assigns fisheries management to provincial-level governments, resulting in varied effectiveness and robustness of counter-IUU fishing mechanisms in coastal provinces.[146] At-sea enforcement is conducted by Vietnam's the Coast Guard, the Navy, the Department of Fisheries Resources Surveillance (DFIRES). These three agencies have a cooperative mechanism to streamline patrol, inspection, and enforcement operations. Vietnam has 11 designated MPAs, which cover 0.001 percent of its total EEZ.[147] In 2023, the Steering Committee issued a plan of action to combat IUU fishing and lift the EC 'yellow card'. However, despite high-level prioritized political commitments, KIs highlighted challenges to at-sea enforcement. In addition to dealing with harassment by PRC-flagged vessels, KIs identified common domestic IUU fishing offenses as well, including harvesting in no-take zones, or during closed season, use of banned gear types, and targeting ETP species.[148]

Figure 28: Map of Vietnam's Maritime Domain in the SCS

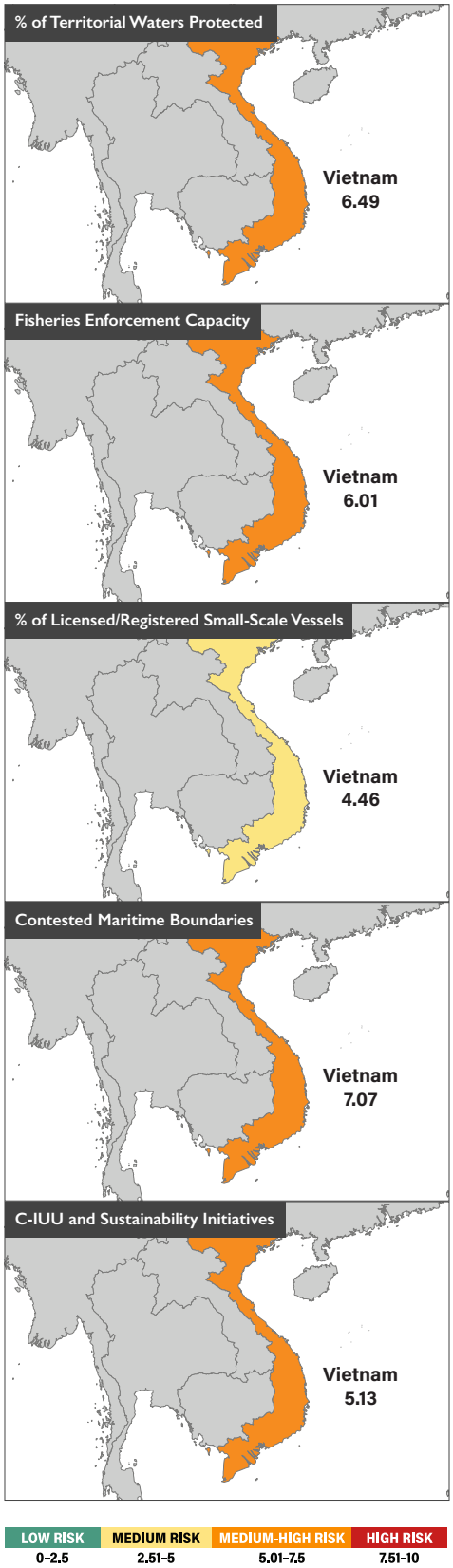


Note: Labeled features on the map above are specific features mentioned in this country profile.

GOVERNANCE RISK

The risk analysis identified governance risk as a medium-high *(5.73)* when averaged across five risk indicators. The highest risk indicator reported is *contested maritime boundaries (7.07)* at high risk, which reflects incursions by Vietnam's domestic fleet and boundary disputes with the PRC within Vietnam's EEZ. Despite a high level of commitment to address governance issues and engage in regional action on IUU fishing, KIs identified Vietnamese-flagged vessels as the region's most common perpetrator of IUU fishing. Artisanal and industrial fishers routinely encroach on territorial waters of nearby states, sometimes moving in fleets of 100 vessels of more. Unregulated "Blue Boats," purportedly run by criminal syndicates, poach in waters as far away as Australia and Palau. For the first six months of 2019 there were 250 Vietnamese vessel detention and arrests of over 640 crew members across 11 countries in the Asia-Pacific.[149] The PRC also encroaches on Vietnam's EEZ in the SCS, leading Vietnam to securitize its fishing industry and establish a maritime militia.[150] Vietnamese fishing vessels are frequently harassed by PRC-flagged fishing vessels, as well as the

Figure 29: Vietnam Governance Scores by Indicator



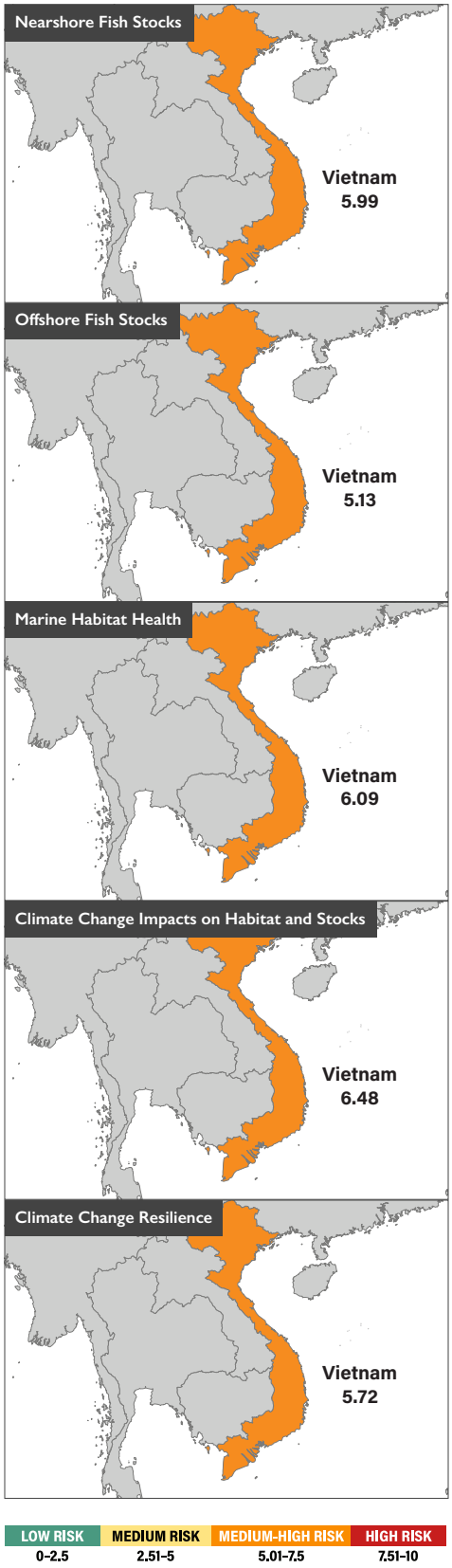
Chinese maritime militia and Coast Guard for fishing near PRC oil rigs that have been illegally established in Vietnamese waters.[151] As a result, the Vietnamese government places a greater emphasis on enforcing maritime boundaries than on fisheries management in SCS waterways.[152]

Percent of territorial waters documented as protected (6.49) and *capacity of fisheries enforcement (6.01)* are rated as medium-high risk. Vietnam has 11 MPAs which are managed by provincial-level governments.[153] Enforcement of MPA boundaries and regulations is hampered the presence of corruption and weak management. Beyond MPA management, KIs note that there is strong political will to address IUU fishing by the domestic fleet, but efforts to promote interagency cooperation on IUU fishing have been limited by a lack of standard operating procedures, poor evidence chain of custody, and a lack of monitoring capacity at ports. Domestic fleet violations include harvesting in no-take zones or during closed seasons, using banned gear, and targeting ETP species. Additionally, Vietnam adopts a "catch, fine, and release" approach for fishers who encroach on Vietnamese waters—which avoids antagonizing neighboring states but does little to deter future incursions. In October of 2018, the Vietnam Central Committee General Secretary, Nguyen Phu Trong, signed the *Resolution on the strategy for the sustainable development of Viet Nam's marine economy by 2030*.[154] This resolution calls for developing the marine economy based on green growth, conservation of biodiversity, and maintenance of resources to support Vietnam's fishers. These initiatives temper the risk indicator *government initiatives to counter-IUU fishing (5.13)* which is reported as medium-high risk, as well as the *percent of artisanal/small-scale vessels licensed or registered (4.46)* which is reported as medium risk.

ENVIRONMENTAL RISK

Environmental risk, the highest categorical risk for Vietnam among three categories, is rated at medium-high risk *(5.86)* when averaged across five risk indicators. Risk is reported as the highest for *marine habitat health (6.09)* and *climate change impacts on marine habitat health and fish stocks (6.48)*, which are both at medium-high risk. Perceptions of risk to marine habitat health reflect destructive fishing practices in the SCS. First, Vietnam participates in island-building activities around the Spratly Islands. According to data from the Asia Maritime Transparency Initiative, Vietnam's overall dredging and landfill in coral reefs is 2,360 acres.[155]

Figure 30: Vietnam Environmental Scores by Indicator



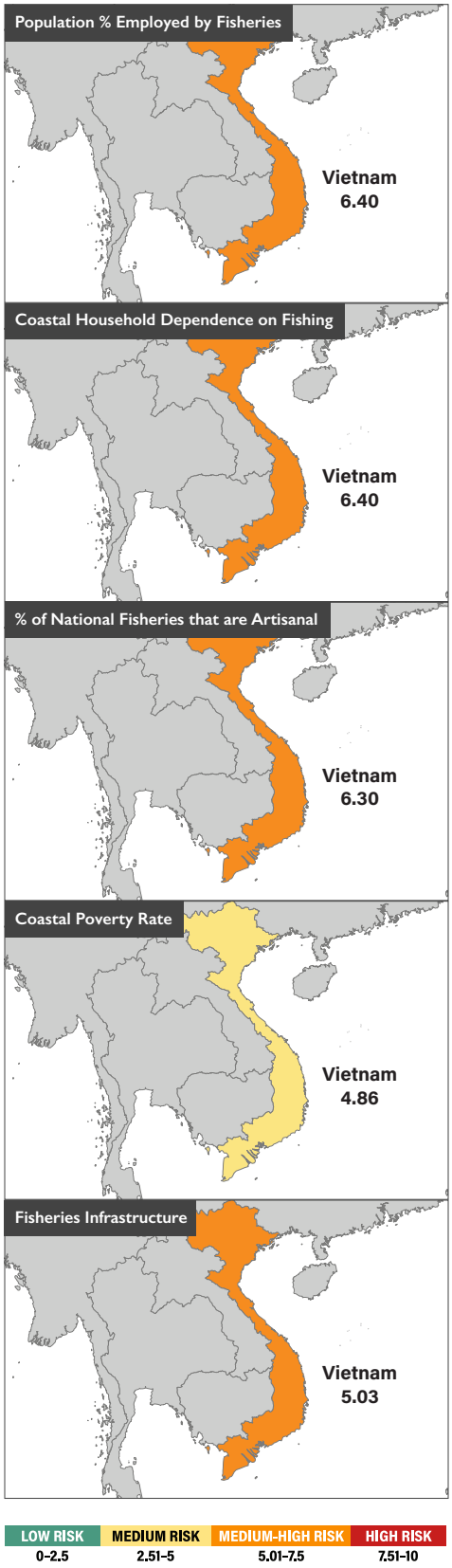
This is an acceleration from 2020 when the total amount of island-building activities amounted to just 329 acres. Vietnam occupies half of the Spratly's largest features: Barque Canada Reef (412 acres), Namyit Island (194 acres), Pearson Reef (170 acres), Discovery Great Reef (147 acres), and Sand Cay (94 acres). Reefs are also under stress from warming sea temperatures and coral bleaching, which is causing a 16 percent decline in coral cover per decade in the SCS.[156] Second, commercial trawlers frequently encroach on nearshore SCS waters, damaging seabed ecosystems according to KIs. Approximately 2,661 metric tons of catch in the SCS are caught by Vietnamese trawlers annually, comprising 66 percent of annual catch by Vietnam in the SCS.[157]

Vietnam and the PRC account for the largest share of overall fish catch in the SCS. In 2019, Vietnam's fishing catch amounted to 4.02 million metric tons.[158] According to KIs, nearshore fish stocks are overexploited. Overcapacity and depleted stocks drive fishers to fish in foreign waters where stocks are better managed by their respective national governments. KIs report that offshore fish stocks of yellowfin, bigeye, and skipjack tuna are relatively better managed. Overexploitation and effects of climate change are estimated to reduce fishery revenue in Vietnam by a total of 11.3 percent between 2010 and 2050.[159] These perceptions are reflected in the medium-high risk scores for *offshore fish stocks (5.13)* and *nearshore fish stocks (5.99)*. According to KIs, climate change impacts, habitat damage, and stock depletion have forced fishers to adopt new gear, travel more, and expend more fishing effort than in the past, bringing the *climate change resilience (5.72)* risk indicator to medium-high risk.

ECONOMIC RISK

The economic category is reported as medium-high risk *(5.86)* when averaged across five risk indicators. In Vietnam, both the capture fishing and fisheries processing industries are a major source of employment and income. 60 percent of Vietnam's seafood exports go to major markets in the U.S., China, Japan, and Europe.[160] This amounts to approximately 8 billion dollars per year, or 4-5 percent of Vietnam's GDP.[161] *Percent of population employed by fisheries (6.40)* and *household economic dependence on fishing in coastal communities (6.40)* are noted as the highest risk factors. Wild capture fisheries employ more than 1.4 million fishers; the fishing industry indirectly employs approximately five million people. Risk is reflective of perceptions of labor rights violations on-board Vietnamese

Figure 31: Vietnam Economic Scores by Indicator



fishing vessels, including failure to adequately compensate fishers and reports of child labor. Seafood also accounts for 40 percent of protein in the Vietnamese diet. There has been a 60 percent decline in annual fishing yields compared to 20 years ago, posing a food security and economic risk to small-scale fishers.[162]

Percent of national fisheries that are artisanal (5.30) is also reported as medium-high risk. Fisheries are dominated by artisanal and small-scale vessels who fish in nearshore waters. KIs note that there are approximately 2-3 million fishers in the nearshore fleet, far exceeding the carrying capacity of the EEZ. The number of coastal fishing vessels fell to 76,589 in 2016 down six percent from 81,188 vessels in 2014.[163] In 2018 approximately 18,000 vessels had engines of greater than 400 horsepower, a 30 percent increase from 2016. These changes are reflective of overcapacity and decreased economic viability in nearshore fisheries, with domestic fisherfolk expending more fishing effort to sustain their livelihoods. KIs indicate that rising prices of fuel and decreasing reserves are also causing many fishermen to leave the sector and seek employment elsewhere. *Fisheries infrastructure (5.03)* is also reported at medium-high risk. KIs note that Vietnam's PiPo procedure is highly centralized and is difficult to implement at all 53 fishing ports. Three seaports in Vietnam are ranked in the top 50 globally in terms of processed cargo including Saigon port, Hai Phong port, and Cai Mep port. *Coastal poverty rate (4.87)* is the least risky of the economic risk indicators, reported at medium risk, reflecting relatively lower poverty rates for coastal regions of Vietnam compared to mountainous regions.[164]

UNIQUE THREATS: BLUE BOATS

KIs noted Vietnam's government has difficulty managing the "Blue Boat" fleet, which includes about 1000 unregistered vessels run by criminal syndicates in the Quang Ngai province. The fleet encroaches on territorial waters throughout the region and travel as far as Australia and the Pacific Islands. Recent analysis from the Environmental Justice Foundation (EJF) quantifies that Blue Boats go as far as 6,000 kilometers from their landing sites.[165] Blue Boats poach bêche-de-mer, sea turtles, and giant clams to sell on lucrative markets in the PRC and Vietnam, grossing up to USD 100,000 per trip.

Inset map: Countries with media reports of sighting of Vietnam's blue boats.

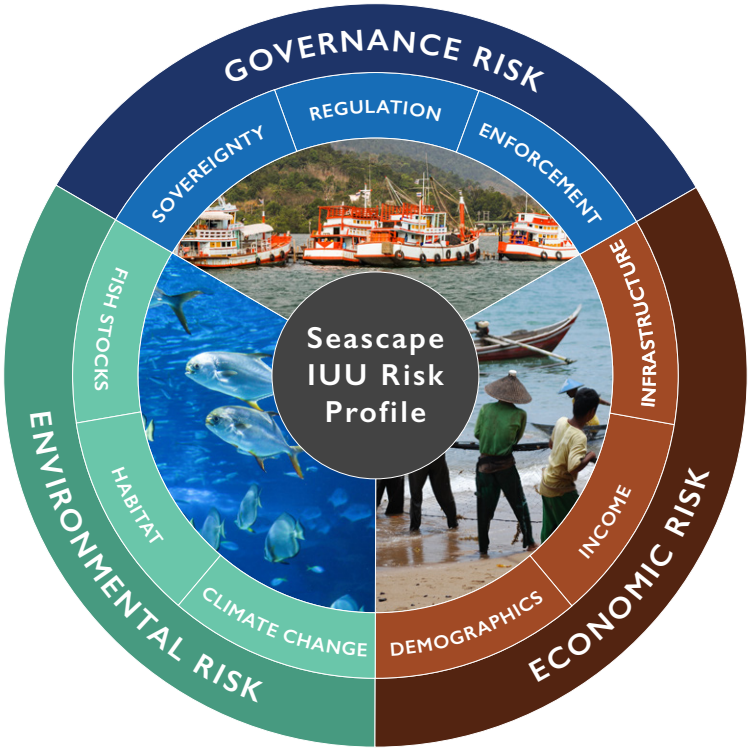
METHODOLOGY

Illegal, unreported and unregulated (IUU) fishing costs the Indo-Pacific region an estimated USD 5.8 billion each year.[166] IUU fishing threatens the food and human security of over five million people living in the ASEAN member states, undermines the rule of law and the sustainable management of the region's fisheries, and is connected to organized crime and forced labor. Foreign vessels from distant water fleets and neighboring states threaten the sovereignty and territorial integrity of ASEAN countries. USAID Sustainable Fish Asia Technical Support (SuFiA-TS) works to promote sustainable fisheries management and marine biodiversity conservation in the Indo-Pacific, address gender and forced labor concerns in the seafood supply chain and provide technical support services and tools to combat IUU fishing.

To develop effective policies aimed at reducing the harm caused by IUU fishing requires critical data and information on IUU fishing activities across the ASEAN region and within the territory and maritime domain of individual countries. However, the inherently clandestine nature of IUU fishing makes it difficult to access adequate local and regional data needed to accurately estimate risks associated with IUU fishing. IUU fishing in the maritime domains of ASEAN member states and regional water bodies is perpetrated by a variety of fishers and other actors in the seafood supply chain: foreign and domestic, artisanal, small-scale, and industrial. In addition, IUU fishing activities are distinct and actions to combat IUU fishing require approaches that are sometimes unique to the offenses requiring different interventions to eliminate them. Yet IUU fishing also requires a combined, all-of-government approach to address the multi-pronged nature of the problem. Each country surveyed by the SuFiA-TS team has distinct enabling economic, environmental, and governance conditions that allow IUU fishing to continue, further complicating a comparative risk assessment.

To address the challenges of a data-scarce environment in the country and subregional waterbody-based IUU fishing risk assessments conducted in SuFiA-TS, the activities which produced this seascape risk profile employ an adapted version of the Climate and Ocean Risk Vulnerability Initiative (CORVI) methodology designed by the Stimson Center's Environmental Security Program. The CORVI method has been applied in 16 coastal cities and Small Island Developing States (SIDS) around the world. CORVI is a data-driven, stakeholder-led process to help governments, businesses, and financial institutions assess climate risks and pinpoint priority areas for building resilience to climate change. The SuFiA-adapted CORVI methodology takes an integrated approach to risk by assessing the economic, environmental, and governance factors that drive IUU fishing in the region. This relies on a mixed method approach to quantify the risk of IUU fishing in each country and regional water body surveyed. The quantitative data generated by this methodology is coupled with qualitative data from semi-structured expert interviews conducted in country and virtually to provide a holistic IUU fishing risk profile.

Figure 32: Seascape IUU Risk Profile



WHAT IS THE SUFIA-ADAPTED CORVI METHODOLOGY AND HOW DOES IT BUILD IUU FISHING RESILIENCE IN DATA SPARSE ENVIRONMENTS?

SuFiA-adapted CORVI is an analytical tool developed by the Stimson Center's Environmental Security and Southeast Asia Programs to support regional bodies in assessing vulnerabilities to IUU fishing in data sparse environments. It pinpoints areas in need of adaptation by providing a comprehensive understanding of the economic, environmental, and governance risks associated with IUU fishing. SuFiA-adapted CORVI assesses the vulnerability of ASEAN countries within a regional seascape to the impact of IUU fishing by comparing 15 different IUU-related risk factors across 3 different categories, using the structure expert judgement (SEJ) method to quantify risk in data-sparse environments.[167] Through structured interviews and surveys with subject matter experts, accompanied by a weighting process to ensure representative data points, the SEJ method provides quantitative insight. Through this analysis on a diverse range of economic, environmental, and governance risks, SuFiA-adapted CORVI produces robust assessments of the vulnerabilities and resilience of ASEAN countries to current and future IUU fishing impacts and allows for risk-level comparisons between countries within a pre-defined regional seascape.

These risk assessments- consisting of SEJ-derived risk scores, semi-structured expert interviews, and literature reviews- help to identify countries' strengths and weaknesses in addressing IUU fishing resilience and vulnerability mitigation. They also highlight discrepancies between risk scores, existing literature, and subject matter experts. The combination of quantitative risk scores and qualitative insight from experts form the basis of actionable policy recommendations, which, in turn, can be communicated to a broad range of stakeholders through tailored messaging to specific groups in a structured and concise manner. Through the implementation of this process, SuFiA-adapted CORVI can assist in the prioritization of actions, development of targeted policy solutions, and improvement of the decision-making process.

HOW THE SUFIA-ADAPTED CORVI METHOD IS DIFFERENT

The SuFiA-adapted CORVI Method builds on the work of previous indices but is distinct in three ways.

1. Regional Seascape-Based: Unlike many other indices that tend to focus on the national or sub-national level, this method focuses on comparative country-level analysis within the context of IUU fishing within a regional seascape. This focus is based on extensive interviews with key stakeholders and actors who noted the difficulty of applying risk assessments to the regional seascape scale to inform policy action to reduce and address issues of IUU fishing and reduce sustainable fisheries management.

2. Holistic: This method looks across a broad set of governance, environmental, and economic risk factors that are connected to IUU fishing and influence sustainable fisheries management. As part of the category and indicator selection process, indicator inclusion was primarily based on its ability to capture and explain IUU fishing risks within a respective seascape and not on whether data was available. This approach promotes a holistic understanding of risks to IUU fishing.

3. Data-Driven: Through its utilization of SEJ, this method is suited to producing actionable insights in data-sparse environments. By combining empirical and survey data across a wide range of indicators, this method fills data gaps to provide a holistic assessment, while reducing data availability bias. This approach provides a contextual and data-driven evaluation of IUU fishing risks.

INDICATORS

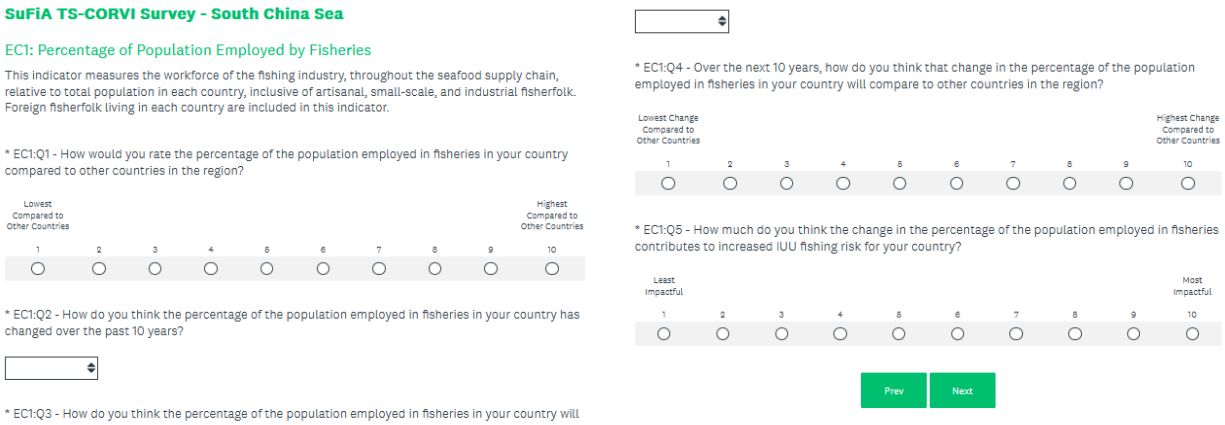
To ensure that the SuFiA-adapted CORVI indicator scores provide a holistic risk rating, each comprises five factors: current, past, and expected trends, the rate of change of the risk, and the impact of this risk on the country.

1. **Baseline** measures the current level of IUU fishing risk for an indicator relative to other countries in the seascape.
2. **Past Trend** assesses the trend of risk for the past ten years.
3. **Expected Trend** assesses the anticipated trend of risk in the next ten years.
4. **Magnitude** measures the degree of expected future trend change relative to other countries in the seascape. Change that happens more quickly than expected are assumed to increase risk when compared to changes that take place over a longer time scale. This assumes that longer periods of change contribute to less risk, as decision makers have more time to adapt and build resilience.
5. **Impact** assesses the importance of change for an indicator in describing future risk in the country.

Figure 33: Indicator Factors

In the SuFiA-adapted CORVI survey, respondents are asked to answer five questions per indicator derived from the process outlined above. The questions are also informed by extensive desk research and expert interviews carried out during the survey design process. Figure 34 is a representation of the five survey questions related to an individual indicator.

Figure 34



DATA COLLECTION AND STRUCTURED EXPERT JUDGEMENT

To overcome data gaps, SuFiA-adapted CORVI employs structured expert surveys to collect data that is otherwise unavailable. This primary data is combined with secondary data using SEJ to produce a comparative score for each category in the assessment. SEJ is a well-established social science technique that seeks to quantify risk when preexisting secondary data is inadequate. Through interviews and surveys, and a series of weighting procedures to ensure data is representative, SEJ allows researchers to quantify topics that might otherwise be challenging to study systematically.

To apply SEJ to SuFiA-adapted CORVI, subject matter experts across academia, government, civil society, and the private sector were identified by the SuFiA-TS Regional Experts Technical Team (RETT). These experts were interviewed by the research team and then asked to complete the survey. To guard against confirmation bias, survey answers are compared to a regional secondary empirical dataset to weigh the expert responses by utilizing a coherence check.[168] The coherence check ensures that experts whose answers do not match secondary data are not weighed as highly as those who do and are adjusted accordingly. Weighted survey answers per question are then averaged to determine a weighted mean score per indicator. The five weighted indicator scores are then averaged to determine a mean score for each respective category.

Figure 35: Survey Participants

Who Took the Survey?	Academic Expert	Government Official	Private Sector Representative	NGO representative	Total
# of respondents	5	17	4	19	45

This approach has several strengths. First, SuFiA-adapted CORVI incorporates the views of subject matter experts and local stakeholders at each stage of its implementation. This allows the final product to better reflect the specific context it is seeking to measure and provide more focused information for end users. Second, pairing primary survey data with secondary data through SEJ allows SuFiA-adapted CORVI to provide insight into risks relating to IUU fishing that existing secondary datasets do not cover. While the use of SEJ allows SuFiA-adapted CORVI to assess a diverse range of risks, it should not be regarded as a substitute for empirical data collection. Rather, SEJ is best viewed as an alternative research technique specialized to analyzing topics with significant data gaps.[169]

CONCLUSION

By conceptualizing risk profiles for IUU fishing in the SCS, this report offers an opportunity for key actors to understand the drivers of IUU fishing and develop potential pathways for collaboration on fisheries management and marine conservation. Importantly, KIs highlighted that the securitization of the fisheries industry in the SCS has impeded regional collaboration on fisheries management. The initial sections of this report offered insight into current regional initiatives established by countries in the SCS. This section drew on KI statements and analysis of the risk profiles to recommend a few potential opportunities moving forward for regional governmental and non-governmental organizations to conserve marine ecosystems in the SCS.

In order to advance marine conservation and security, regional organizations should promote and increase cooperation between regional state governments. Environmental degradation in the SCS – the destruction of reefs, overexploitation of fish stock, seabed ecosystem damage, and coral bleaching – often has transboundary implications. Geopolitical tensions hinder cooperative efforts and reduce trust between regional states. Unlike other vital regional seascapes, the SCS does not have an RFMO or a fisheries management convening organization; as a result, it is almost impossible to conduct regional or national stock assessments and other joint research activities. The over-emphasized discourse of national sovereignty of contested maritime boundaries promotes both a "race-to-fish" mentality and the use of fishing fleets as tools for military objectives. Therefore, regional organizations should promote diplomatic engagement to resolve boundary incursions and to reduce tensions.

Currently, beyond AN-IUU to report instances of IUU fishing, the SCS has no cooperative mechanism to promote information sharing and data harmonization. Regional states can build a greater capacity for MCS by promoting data sharing between states. In addition, RPOA-IUU notes that efforts to promote data sharing by non-governmental partners are hindered by a lack of standardization within the respective database systems.[170] Sharing databases promotes trust between regional actors and is critical to identifying locations in the seascape that are at-risk. Additionally, ecological and IUU fishing data that is shared regionally on fish stocks, vessels, and marine ecosystems can reduce the limitations to transboundary governance of important natural resources. Highlighting hot spots of IUU fishing, combined with information and data on the health of key habitats for ETP and/or at-risk species will help focus specific areas that require regional attention and benefit the long-term health and blue economy for all states in the region. Regional organizations have an opportunity to promote diplomatic engagement between states to reduce distrust and promote data sharing and harmonize sub-national data systems to facilitate cooperation with partner organizations.

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