

**Options for Strengthening
Monitoring, Control and
Surveillance of Human
Activities in the Southeast
Pacific Region**

Citation

Cremers, K., Wright, G., Rochette, J., “Options for Strengthening Monitoring, Control and Surveillance of Human Activities in the Southeast Pacific Region”, STRONG High Seas Project, 2020.

Authors

Klaudija Cremers, Research Fellow, International Ocean Governance, Institute for Sustainable Development and International Relations (IDDRI)

Glen Wright, Senior Research Fellow, International Ocean Governance, Institute for Sustainable Development and International Relations (IDDRI)

Dr. Julien Rochette, Ocean Programme Director, Institute for Sustainable Development and International Relations (IDDRI)

Acknowledgements

The authors wish to thank the participants to the Expert Workshop on MCS in the Southeast Pacific (Guayaquil, November 2019) as well as participants to the MCS session during the STRONG High Seas Dialogue Workshop in Lima (February 2020).

Moreover, the authors wish to thank the following people for their invaluable input and feedback: Galo Andrade (Armada del Ecuador), Ben Boteler, Carole Durussel and Jana Fasheh (Institute for Advanced Sustainability Studies), Permanent Commission for the South Pacific (CPPS), Xavier Chalén (Conservation International Ecuador), Colombian National Section to the CPPS, Martin Cryer and Craig Loveridge (South Pacific Regional Fisheries Management Organisation), Andrés Martín Garrido Sánchez (Servicio Diplomático del Perú), Shannon Hampton (International Ocean Institute – Africa Region), Carolina Hazin (BirdLife International), José Luis Herrera Afa (Ministerio de la Producción del Perú), Captain Jesús A. Menacho Piérola (Marina de Guerra del Perú – Dirección General de Capitanías y Guardacostas, DICAPI), Juan Luis Orellana Caces (Ministerio del Medio Ambiente, Gobierno de Chile), Rita Orozco Moreyra (Instituto del Mar del Perú, IMARPE), Pedro Ampuero Moreno (Armada de Chile), Tim Packeiser (WWF Germany), Peruvian National Section to the CPPS, Vladimir Puentes Granada (Fundacion Amano, Colombia), Maria Alejandra Riaño (IDDRI), Osvaldo Rosas (Ministerio de Ambiente de Panama) and Michael Scott (Inter-American Tropical Tuna Commission).

Design and Layout

Alain Chevallier

Supported by:



based on a decision of the German Bundestag



The STRONG High Seas project is part of the International Climate Initiative (IKI; www.international-climate-initiative.com/en/). The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) supports this initiative based on a decision adopted by the German Bundestag.

The STRONG High Seas project contributes to the work of the Partnership for Regional Ocean Governance (PROG), a partnership hosted by UN Environment, the Institute for Advanced Sustainability Studies (IASS), the Institute for Sustainable Development and International Relations (IDDRI), and TMG – Think Tank for Sustainability.

© STRONG High Seas 2020. STRONG High Seas, an independent scientific project, is responsible for the content of this publication. This report does not necessarily reflect the views of the funding agencies.

www.prog-ocean.org/our-work/strong-high-seas/

© Cover Photo: Matt Howard (248418)/Unsplash

Contents

Acronyms	4
Executive Summary	5
1. Introduction	6
2. Overview of the Southeast Pacific	7
2.1. Ecology	7
2.2. Human activities and pressures on the marine environment	8
2.3. Regional cooperation and governance	9
2.4. Shared challenges	11
3. Management of Marine Activities and MCS efforts in the Southeast Pacific	13
3.1. Chile	13
3.2. Colombia	17
3.3. Ecuador	22
3.4. Peru	24
3.5. Case studies	31
Box 1. Case study of Panama	31
Box 2. Case study of Costa Rica	31
Box 3. Best practices of RFMOs in the Southeast Pacific	32
4. Options to strengthen MCS in the region	37
4.1. Improving communication, cooperation and coordination	37
The importance of communication and cooperation	37
Stronger regional approach to MCS	37
Role of civil society in national and regional MCS policies	38
Improved cooperation between regional and sectoral regimes	39
4.2. Establishing data-based policies	39
4.3. Ensuring an appropriate penalty system and effective sanctions	40
References	43
About the STRONG High Seas Project	46

Acronyms

ABMT	Area-based management tool	IUU	Illegal, unreported and unregulated
ABNJ	Areas beyond national jurisdiction	LME	Large marine ecosystems
AIS	Automatic Identification Systems	MCS	Monitoring, control and surveillance
AUNAP	Autoridad Nacional de Acuicultura y Pesca, Colombia	MoU	Memorandum of Understanding
BBNJ	Marine biological diversity of areas beyond national jurisdiction	MPA	Marine protected area
CBD	Convention on Biological Diversity	NBSAP	National Biodiversity Strategies and Action Plan (CBD)
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources	NOAA	National Oceanic and Atmospheric Administration, USA
COC	Colombian Ocean Commission	NPA	Natural protected areas
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora	OSPESCA	Central America Fisheries and Aquaculture Organization
CMM	Conservation and management measure	PSMA	Port State Measures Agreement
CPPS	Permanent Commission for the South Pacific	PSSA	Particularly Sensitive Sea Area (IMO)
DICAPI	General Directorate of Captaincies and Coastguards – National Maritime Authority, Peru	RFMO	Regional fisheries management organisation
DIMAR	Dirección General Marítima, Colombia	SAR	Search and rescue
EEZ	Exclusive economic zone	SEPEC	Sistema Estadístico Pesquero de Colombia
EMS	Electronic monitoring system	SERNAPESCA	Servicio Nacional de Pesca y Acuicultura, Chile
EU	European Union	SIMTRAC	System of Information and Monitoring of Aquatic Trafficking
FAO	Food and Agriculture Organization	SINAP	System of National Protected Areas, Colombia
GDP	Gross domestic product	SISESAT	Satellite Monitoring System for Fishing Vessels
GEF	Global Environment Facility	SPRFMO	South Pacific Regional Fisheries Management Organisation
GFW	Global Fishing Watch	UN	United Nations
GMDSS	Global Maritime Distress and Safety System	UNCLOS	United Nations Convention on the Law of the Sea
IATTC	Inter-American Tropical Tuna Commission	UNFSA	United Nations Fish Stocks Agreement
ICCAT	International Commission for the Conservation of Atlantic Tunas	UNEP	United Nations Environment Programme
IDDRI	Institut du Développement Durable et des Relations Internationales	VIIRS	Visible Infrared Imaging Radiometer Suite
INTERPOL	International Criminal Police Organisation	VLMPA	Very large marine protected area
IMARPE	Instituto del Mar del Perú	VMS	Vessel monitoring system
IMO	International Maritime Organization	WWF	World Wide Fund for Nature

Executive Summary

Effective monitoring, control and surveillance (MCS) of maritime activities is critical for the success of marine conservation and management. The STRONG High Seas project ("Strengthening Regional Ocean Governance for the High Seas") explores ways to enhance the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction (BBNJ) through enhanced regional governance, including by strengthening MCS measures.

The negotiations for an international legally binding instrument on the conservation and sustainable use of BBNJ provides a unique opportunity to strengthen international MCS provisions. This can be done through the future BBNJ treaty (Cremers *et al.*, 2020a) but also through existing frameworks, including at the regional level. In this context, this report offers recommendations to the Member States of the Permanent Commission for the South Pacific (CPPS) with a view to supporting decisions on how MCS can be strengthened in the region.

As part of the STRONG High Seas project, IDDRI, together with the Secretariat of the CPPS, organised an expert workshop on "Strengthening Monitoring, Control and Surveillance (MCS) in the Southeast Pacific" (14-15 November 2019, CPPS headquarters, Guayaquil, Ecuador). The workshop provided a space for informal exchange and discussion on MCS in areas beyond national jurisdiction (ABNJ) in the Southeast Pacific region, including identifying legal, institutional and technological challenges, sharing success stories, and highlighting needs. Participants also identified proposals for strengthening MCS in the Southeast Pacific. These issues were further discussed with regional stakeholders at a STRONG High Seas Dialogue Workshop (26-27 February 2020, Lima, Peru).

The report provides three concrete proposals to strengthen MCS in the Southeast Pacific:

- Improve communication, cooperation and coordination on MCS within and between CPPS States, as well as between regional and sectoral bodies.
- Establish an effective joint data-based MCS strategy which includes a regional information exchange platform and capacity-building workshops for decision-makers as well as compliance officers on the ground.
- Ensure an appropriate penalty system is in place, including: effective sanctions; prompt intervention when suspected illegal activities occur; and a requirement to develop a MCS strategy when designating an area-based management tool including marine protected areas.

1. Introduction

Effective monitoring, control and surveillance (MCS) of human activities taking place on and in the ocean is critical for successful ocean management. MCS encompasses a wide range of tools, technologies and policies that can be used in a variety of contexts to promote compliance, increase transparency and contribute to the effective conservation and sustainable use of marine resources (Cremers *et al.*, 2020b). Whereas States have the right to explore, exploit, conserve and manage the marine resources within their national jurisdiction (i.e. in territorial waters and the exclusive economic zone),¹ areas beyond national jurisdiction (ABNJ)² are subject to a complex patchwork of international rules and regulations (Wright *et al.*, 2018). As States are negotiating an international instrument concerning the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ), there is growing interest in how MCS tools and policies can be applied to this vast global commons (Cremers *et al.*, 2020a).

The STRONG High Seas project (“Strengthening Regional Ocean Governance for the High Seas”) aims to strengthen regional ocean governance for the conservation and sustainable use of BBNJ, including by strengthening MCS.³ This five-year project works together with key science and policy actors in the Southeast Pacific and Southeast Atlantic regions to improve regional coordination and provides new lessons and approaches for high seas governance.

As part of the STRONG High Seas project, the Institute for Sustainable Development and International Relations (IDDRI), together with the Secretariat of the Permanent Com-

mission for the South Pacific (CPPS), organised an expert workshop on “Strengthening Monitoring, Control and Surveillance (MCS) in the Southeast Pacific” (14-15 November 2019, CPPS headquarters, Guayaquil, Ecuador).⁴ The workshop provided a space for informal exchange and discussion of MCS in ABNJ of the Southeast Pacific, including identifying legal, institutional and technological challenges, sharing success stories, and highlighting needs of States and non-State actors in the region. Participants also identified options for strengthening the MCS of human activities in ABNJ of the Southeast Pacific. These options were further discussed during a MCS session organised during the STRONG High Seas Dialogue Workshop with regional stakeholders (26-27 February 2020 in Lima, Peru).⁵ The information and recommendations in this report are based on the discussions that took place during these two workshops.

The following section presents a brief overview of the ecological and socio-economic landscape of ABNJ in the Southeast Pacific. Section 3 provides detailed information on the MCS activities of the four CPPS member States (Chile, Colombia, Ecuador and Peru - see Figure 1), explores case studies of MCS activities in Panama and Costa Rica and highlights the activities of regional fisheries management organisations (RFMOs) in the region. Finally, section 4 builds on this analysis and the outcomes of the aforementioned workshops to propose three options to strengthen MCS in the region.

1 United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3, Articles 2 & 56.

2 Ibid, Articles 1 and 86. Areas beyond national jurisdiction are composed of the ‘high seas’ and ‘the Area’. ‘High seas’ refers to “all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State”. ‘The Area’ refers to the “seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction”.

3 <https://www.prog-ocean.org/our-work/strong-high-seas/>

4 <https://www.prog-ocean.org/blog/2019/11/20/strong-high-seas-expert-workshop-on-strengthening-monitoring-control-and-surveillance-mcs-in-the-southeast-pacific/>

5 <https://www.prog-ocean.org/blog/2020/03/30/strong-dialogue-workshop-3-on-enhancing-the-knowledge-base-for-cross-sectoral-management-and-ocean-governance-in-abnj-of-the-southeast-pacific/#more-1951>

2. Overview of the Southeast Pacific

This Section provides an overview of the ecology (2.1), human activities and pressures on the marine environment (2.2), regional co-operation and governance (2.3) and shared challenges (2.4) of CPPS member States to provide some background information on the context in which CPPS member States are conducting their MCS activities.

2.1. Ecology

The study area of the Southeast Pacific region is loosely defined as the Eastern side of the South Pacific Ocean, between Colombia and Chile (Durussel *et al.*, 2018).

The Southeast Pacific region is characterised by (Durussel *et al.*, 2018) 1) high primary productivity,⁶ 2) high levels of species endemism,⁷ 3) submarine volcanic ridges with a high density of hydrothermal vents and seamounts⁸ and 4) upwellings, such as the Humboldt Current off the coasts of Chile and Peru, which produces around 10% of the global fish catch and yields more fish per unit area than any other region (Salvettenci *et al.*, 2018). The Humboldt Current System is the most productive marine ecosystem in the world in terms of fish caught (see Figure 2) (Barange *et al.*, 2018).⁹ According to climate scenarios, the Southeast Pacific region has been the world's least affected region by ocean warming, but the frequency and strength of the El Niño phenomenon¹⁰ is projected to increase (Boteler *et al.*, 2019). At the same time, global models predict that climate change can shift the Humboldt Current System out of its "favourable state in terms of fish productivity" and could lead to "a moderate decrease in catch potential by 2050 and 2095 (-1.6% to -3%

for Chile and approximately 0% to -7.6% for Peru)" (Barange *et al.*, 2018). However, "considering the high variability in the Humboldt Current System, these forecasts are expected to change in the future" (Barange *et al.*, 2018).

Figure 1. Focal Region of the STRONG High Seas Project in the Southeast Pacific



Source: Durussel *et al.*, 2018.

6 E.g. the Equatorial High-Productivity Zone and the Humboldt Current.

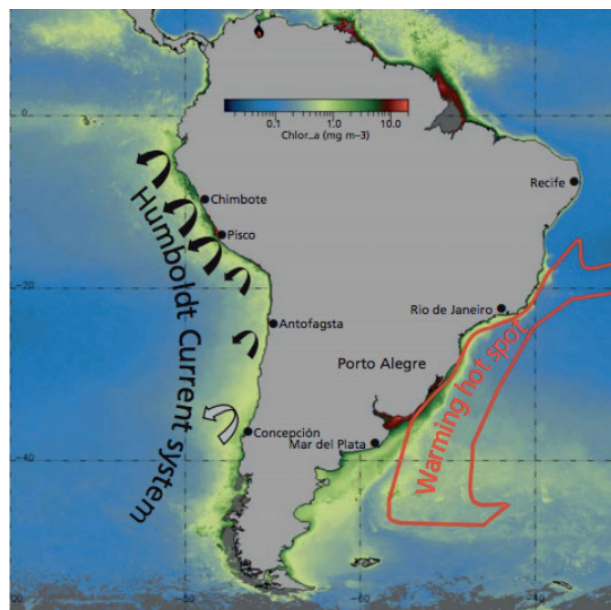
7 Especially around the islands of Galapagos, Rapa Nui, Juan Fernández and Desventuradas.

8 E.g. the East Pacific Rise and the Salas y Gómez and Nazca ridges.

9 In HCS, "wind causes an offshore flow in the surface driving intense oceanic upwelling along the coast, bringing cold, deep, nutrient-rich waters to the surface. When the upwelled nutrient-rich water reaches the surface, sunlight triggers the onset of phytoplankton production. This is the first link of the marine food web and thus the basis for a high production from zooplankton to fish and top predators" (Barange *et al.*, 2018).

10 The El Niño is the oceanographic phenomenon that describes the fluctuations in sea surface temperature in the area off the Pacific coast of South America. El Niño oceanographic conditions strongly influence the abundance of anchoveta (accounting for 50-70 percent of total catches in FAO fishing area 87): FAO, 2020, "The State of World Fisheries and Aquaculture 2020: Sustainability in action," Rome; <https://doi.org/10.4060/ca9229en>

Figure 2. The Humboldt Current System extends from Southern Chile to Northern Peru-Southern Ecuador where cold and nutrient-rich, upwelled waters intersect with warm tropical waters to form the equatorial front



Source: Barange *et al.*, 2018. Figure courtesy of Hervé Demarcq. The legend with different colours are chlorophyll levels that indicate the amount of photosynthetic plankton present in the Ocean and show the levels of primary productivity. Photosynthetic plankton contribute approximately 50% to global primary productivity as they form the basis of many marine food webs and take up carbon dioxide from the atmosphere (Käse and Geuer, 2018).

2.2. Human activities and pressures on the marine environment

CPPS member States are conducting MCS activities to tackle an increasing number of multi-faceted challenges: search and rescue (SAR); contamination and illegal waste disposal; natural disasters; and illegal, unreported and unregulated (IUU) fishing.

Most existing MCS rules were developed in the context of fisheries management. This is reflected in early definitions of MCS, which focus on monitoring of fishing effort and resource yields, controlling fishing activity with regulations, and conducting surveillance to ensure compliance with such regulations.¹¹ Fishing is the human activity causing the most significant pressure on marine ecosystems in ABNJ of the Southeast Pacific and most MCS measures that have been introduced in the Southeast Pacific study area relate to fishing activities. Such measures include both fisheries management regulations that determine how, where and when fishing is permitted, as well as area-based management tools (ABMTs), such as marine protected areas (MPAs) that are aimed at conservation more generally.

Commercial fishing activities in ABNJ of the Southeast Pacific¹² began in the 1960s. After increasing significantly in the 1980s (from 600,000 tons in 1987 to 1,800,000 tons in 1990), catches decreased again in the mid-1990s (Boteler *et al.*, 2019). Annual catches in the entire Southeast Pacific have decreased from more than 20 million tonnes in 1994 to approximately 7.2 million tonnes of fish in 2017 (10% of global landings).¹³ This is mainly the result of a decrease in catches of two of the main target species: anchoveta and Chilean Jack mackerel.¹⁴ However, catches of jumbo flying squid have significantly increased since the 2000s.¹⁵ The main countries fishing in the region are Chile, Ecuador and China (Boteler *et al.*, 2019). In 2017, 54.5% of stocks in the Southeast Pacific were fished at unsustainable levels¹⁶ compared to 61.5% in 2015.¹⁷ There is limited data on the scope of illegal, unreported and unregulated (IUU) fishing in the Southeast Pacific, but the state of the fish stocks indicate that more efforts are needed to achieve sustainable fisheries management.¹⁸

¹¹ FAO, 1981, Report on an expert consultation on MCS for fisheries management, Rome, FAO.

¹² United Nations Food and Agriculture Organization (FAO) Major Fishing Area 87.

¹³ FAO, 2020, "The State of World Fisheries and Aquaculture 2020: Sustainability in action," Rome: <http://www.fao.org/3/ca9229en/ca9229en.pdf>

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ FAO, 2018, "The State of World Fisheries and Aquaculture 2018: Meeting the sustainable development goals," Rome: <http://www.fao.org/3/i9540en/i9540en.pdf>

¹⁸ MarViva Foundation, 2016, "Conclusions and Recommendations Compendium from Regional Workshops on Illegal, Unreported, and Unregulated Fishing within the Project: Strengthening the control of illegal, unreported and unregulated fishing in the Eastern Tropical Pacific Seascape": http://marviva.net/sites/default/files/documentos/pescailegal_ingles.pdf

2.3. Regional cooperation and governance

CPPS member States have often demonstrated their interest in regional cooperation and coordination, including in relation to the conservation and sustainable management of BBNJ. Table 1 provides an overview of the membership of these States of relevant international and regional agreements with MCS provisions as well as of regional organisations. In the framework of the Inter-American Conference for the Maintenance of Peace and Security of the Continent, held in Rio de Janeiro in September 1947, the governments of the American countries signed the Inter-American Treaty of Reciprocal Assistance.¹⁹ This Treaty was elaborated with the Coordination Plan of Defence of the Inter-American Maritime Traffic (*Coordinación de la Defensa del Tráfico Marítimo Interamericano*; PLAN CODEFTRAMI) whose purpose is to coordinate tasks that must be implemented by the Navies of the American continent for the establishment of an integrated system that allows the coordination of the monitoring and defence of maritime traffic.²⁰

In 1952, Chile organised a conference in Santiago on the exploitation and conservation of marine resources in the South Pacific. In order to protect the productive Humboldt Current fishing grounds, Chile, Ecuador and Peru adopted the “Declaration on the Maritime Zone,” also known as the “Declaration of Santiago”,²¹ claiming exclusive sovereignty and jurisdiction over the sea out to 200 nautical miles from the coast (including the

seabed and subsoil).²² This Declaration also established the CPPS, a strategic regional alliance among its member States²³.

The CPPS member States are also members of the Operative Network for Regional Cooperation of Maritime Authorities of the Americas (*Red Operativa de Cooperación Regional de las Autoridades Marítimas de las Américas*; ROGRAM), an informal regional organisation.²⁴

The 1981 Convention for the Protection of the Marine Environment and Coastal Area of the South-East Pacific (Lima Convention and associated protocols) is the main regional legal framework for regional cooperation on the protection of the marine environment and coastal areas of the Southeast Pacific from pollution. The CPPS hosts the Secretariat of the Lima Convention that is part of the overarching UN Environment Regional Seas Programme with a mandate that extends to adjacent high seas areas affected by marine and coastal pollution (Durussel *et al.*, 2018). In 2012, CPPS member States signed the Galapagos Commitment, aiming to promote coordinated action “regarding their interests in living and non-living resources in ABNJ”.²⁵

Two RFMOs have a mandate to manage high seas fish stocks in the Southeast Pacific, namely the Inter-American Tropical Tuna Commission (IATTC) and the South Pacific Regional Fisheries Management Organisation (SPRFMO). These regional fisheries organisations and the CPPS together cover nearly the entire Southeast Pacific region, with only the northern and southern-most tips of

19 The member countries of the Treaty are: Argentina, Brazil, Chile, Colombia, El Salvador, Ecuador, USA, Honduras, Mexico, Paraguay, Peru, Uruguay and Venezuela; <https://treaties.un.org/doc/Publication/UNTS/Volume%2021/volume-21-I-324-English.pdf>

20 <http://www.coamas.org/Documentos/pdf/Publicaciones/PLAN%20CODEFTRAMI%20ED.%202011%20ESPA%C3%91OL.pdf>

21 <https://treaties.un.org/doc/Publication/UNTS/Volume%201006/volume-1006-I-14758-English.pdf>; Article 3 I): “The geological and biological factors which determine the existence, conservation and development of marine fauna and flora in the waters along the coasts of the countries making the Declaration are such that the former extension of the territorial sea and the contiguous zone are inadequate for the purposes of the conservation, development and exploitation of these resources, to which the coastal countries are entitled”.

22 Ibid, Article 3 II) and III). With the adoption of the United Nations Convention on the Law of the Sea (UNCLOS) in 1982, the 200 nautical mile exclusive economic zone became part of internationally recognised law of the sea.

23 The CPPS member States are Chile, Colombia, Ecuador and Peru. Panama is a signatory to the Lima Convention and participates to CPPS as an observer. CPPS does not have a management mandate; “CPPS *Estatuto* Article 4 gives CPPS the competency to promote the conservation of marine living resources beyond the national jurisdiction of its member States without mentioning to which extent this competency applies. Article 1 of the Lima Convention applies to areas within national jurisdiction and adjacent high seas areas that are impacted by marine pollution” (Durussel *et al.*, 2018).

24 http://www.rogram.net/prontus_rogram/site/artic/20080512/pags/20080512223345.php; other members include: Argentina, Bolivia, Brazil, Cuba, Mexico, Panama, Paraguay, Uruguay and Venezuela.

25 CPPS, Compromiso de Galapagos para el Siglo XXI, VII Reunion de Ministros de Relaciones Exteriores de la Comision Permanente del Pacifico Sur (Galapagos, 17 de agosto de 2012), Art. VIII.20; <http://cpps.dyndns.info/cpps-docsweb/planaccion/docs2016/Mayo/compromiso-galapagos-siglo21.pdf>

the region lacking full institutional coverage (Durussel *et al.*, 2017). Overlap in management responsibilities, collaboration, and co-operation between these two organisations is limited (Durussel *et al.*, 2018). States in the region are also signatories to a range of international conventions that are relevant to MCS

(Table 1). It is important to note that as part of the discussion sessions during the MCS expert workshop in Guayaquil and the dialogue workshop in Lima, participants found that it is necessary to have cooperation networks among the countries on specific interests to achieve better results in regional cooperation.

Table 1. Membership of relevant international and regional agreements

	Chile	Colombia	Ecuador	Peru
International agreements²⁶				
Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Convention)	1977			2003
Protocol to the London Convention 1996	2011			2019
International Convention for the Prevention of Pollution From Ships 1973 (MARPOL) – Annex I-V	1995	1983	1990	1983
MARPOL Protocol – Annex VI	2007			2014
International Convention on Maritime Search and Rescue 1979 (SAR Convention)	1985	2001	1988	1988
United Nations Convention on the Law of the Sea 1982 (UNCLOS)	1997	1982	2012	
Convention on Biological Diversity 1992 (CBD)	1994	1995	1993	1993
Food and Agriculture Organization (FAO) Compliance Agreement 1993	2004			2001
Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks 1995 (United Nations Fish Stock Agreement; UNFSA)	2016		2016	
Port State Measures Agreement 2009 (PSMA)	2012		2019	2017
Cape Town Agreement on Safety of Fishing Vessels 2012 ²⁷				
Regional agreements²⁸				
Inter-American Treaty of Reciprocal Assistance 1947	1949	1948	1950	1950
Declaration on the Maritime Zone 1952 (Santiago Declaration)	1952	1979	1952	1952
Convention on Monitoring and Control Measures of the Maritime Zones of the Signatory Countries 1954	1954		1964	1955
Convention for the Protection of the Marine Environment and Coastal Area of the South-East Pacific 1981 (Lima Convention)	1986	1985	1983	1988
Convention for the Strengthening of the Inter-American Tropical Tuna Commission 2003 (Antigua Convention)	*	2007	2000	2018
Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean 2009 (SPRFMO Convention)	2012	2010*	2015	2016

Green: ratified; yellow: signed, but not ratified; red: not signed or ratified. *Cooperating non-contracting party.

26 <http://www.imo.org/en/About/Conventions/StatusOfConventions/Pages/Default.aspx> (IMO instruments); https://www.un.org/Depts/los/convention_agreements/convention_overview_fish_stocks.htm (UNCLOS; UNFSA); <https://www.cbd.int/information/parties.shtml> (CBD); <http://www.fao.org/iuu-fishing/international-framework/fao-compliance-agreement/en/> (FAO Compliance Agreement) and <http://www.fao.org/port-state-measures/background/parties-psma/en/> (PSMA) – all accessed in March 2020.

27 States adopted the Cape Town Agreement in 2012 under the auspices of the IMO: <http://www.imo.org/en/MediaCentre/PressBriefings/Pages/44-SFV-conf-ends.aspx#.XwRDFcgzblU>. The CTA aims to improve the safety and working conditions of commercial fishers and observers. Once the CTA enters into force, it will set up a harmonised regime and set minimum requirements on the design, construction, equipment and inspection of fishing vessels 24 meters or longer that operate on the high seas.

28 <http://www.oas.org/juridico/english/sigs/b-29.html> (Inter-American Treaty of Reciprocal Assistance); <http://www.iattc.org/IATTCDocumentsENG.htm> (1949 IATTC Convention and Antigua Convention); <http://cps.dyndns.info/consulta/index.php/institier/capitulo-i> (Santiago Declaration, Convention on Monitoring and Control Measures and Lima Convention); <http://www.sprfmo.int/about/docs/article-36-ratification/> (SPRFMO Convention) – all accessed in March 2020.

2.4. Shared challenges

An analysis conducted by WildAid in 2010 identified common law enforcement problems encountered by Ecuador,²⁹ Colombia, Panama and Costa Rica in relation to their na-

tional MPAs (see Table 2).³⁰ The resulting recommendations can serve as useful guidance for strengthening MCS policy in the study area of the Southeast Pacific region, because ten years later the challenges are still topical for both regions.³¹

Table 2. Challenges related to the designation, establishment and management of MPAs in the Eastern Tropical Pacific³²

Challenge	Recommendation
Uncontrolled population growth	➤ Improve migration control
Tourism activities by unlicensed vessels	➤ Improve coordination between Ministry of Tourism and MPA Authorities
Lack of awareness of MPA regulations in neighbouring communities	➤ Awareness campaigns in coordination with NGOs and MPA managers
Excessive artisanal fleet size	➤ Screen the fishing register ➤ Reduce fleet size
Lack of bio-security regulations	➤ Establish procedures for inspections and quarantines
Park Warden salaries not competitive	➤ Raise salaries and budget or improve per diems
Lack of MPA personnel and no job profiles upon which to base appointments	➤ Increase budget to hire new personnel ➤ Create job profiles for these staff ➤ Produce a Park Wardens Handbook ➤ Increase Park Warden level of training ➤ Create a Regional School for Park Wardens
High personnel rotation, especially in navy	➤ More frequent training for new personnel ➤ Incentives to discourage personnel stabilisation at MPAs
MPA income goes to general state treasury and not to MPA	➤ Encourage decentralisation of MPAs
Lack of operational funds	➤ Reorganise MPA financial systems so that income generated remains at MPA ➤ Develop fundraising programs
Poor communication between MPA personnel and central headquarters	➤ Obtain better communications equipment
Poor violation detection rate	➤ Incorporate onboard or land based radar ➤ Obtain more vessels and faster vessels ➤ Increase number of park wardens ➤ Form strategic alliance with NGO, e.g. MarViva ➤ Adopt an electronic vessel monitoring system ➤ Improve coordination between MPA authorities and Navy/Coastguard/Police
Tuna vessels enter MPAs	➤ Adopt an electronic monitoring system ➤ Strengthen patrols ➤ Carry out inspections prior to sailing ➤ Improve coordination between MPA managers and police/navy ➤ Establish buffer zones around MPA ➤ Share maritime information (vessel registers, navigation routes, vessel detention) among Authorities of the four countries ➤ Strengthen sanctions to prevent return to the MPA
Lack of control of shark finning	➤ Review fisheries regulations
Lack of vessel maintenance	➤ Provide training in vessel and motor maintenance ➤ Increase budget for vessel maintenance ➤ Implement external technical assistance

29 Some recommendations have already been addressed in recent years. Ecuador has, for example, taken migration control measures, issued regulations that regulate tourism in protected areas and acquired more coast guard vessels.

30 WildAid, 2010, "An Analysis of the Law Enforcement Chain in the Eastern Tropical Pacific Seascape": <https://www.issueclub.org/resources/26036/26036.pdf>

31 Ecuador also faces the challenge of piracy activities. This can be tackled by strengthening maritime police control to avoid loss of lives, boats, fishing gear and fisheries products.

32 WildAid, 2010, "An Analysis of the Law Enforcement Chain in the Eastern Tropical Pacific Seascape": <https://www.issueclub.org/resources/26036/26036.pdf>

Challenge	Recommendation
Lack of an appropriate register of interventions at each link of the law enforcement chain (patrols, detection, interception, arrest, prosecution, sentences)	➤ Design protocols for interventions ➤ Maintain an electronic up-to-date record of violations
Impunity of offenders	➤ Hire more lawyers
Slow processes	➤ Review procedures
Interference from the government and institutions in the legal process	➤ Form alliances with NGOs for legal assistance ➤ In administrative cases, confiscate and destroy fishing gear ➤ Restrict port exit for violators ➤ Detain vessels which have committed violations, and revoke their fishing and navigation permits ➤ Improve coordination between institutions ➤ Improve press relations so that cases are publicised
Conflicts of interest between the Fisheries Authority, fishing industry and the Environmental Authority	➤ Reconstitute the Fisheries Authority Executive Board/Board of Directors

3. Management of Marine Activities and MCS efforts in the Southeast Pacific

In the last decade, traditional approaches to MCS (such as on board observers, logbooks and surveillance planes) have been supplemented by a range of new technological tools. These new tools include: vessel tracking systems;³³ electronic monitoring systems (EMS), which can include a combination of cameras, satellite and sensor data; advanced computing techniques, such as machine learning, that can infer information about vessel activity from a range of data; and drones that can be used for surveillance in remote or inaccessible areas (Cremers *et al.*, 2020b).

This Section describes the various MCS tools and strategies that CPPS member States are currently using (3.1-3.4) and provides some examples of best practices and lessons learned from Panama, Costa Rica and the two RFMOs active in this region (IATTC and SPRFMO) (3.5).

3.1. Chile

The Republic of Chile has an extensive coastline, approximately 4,300 km long, which endows it with one of the world's largest exclusive economic zones (EEZ; almost 3.5 million km²). Chile is responsible for the fifth largest search and rescue area³⁴ and is the fifth's major exporter of fish and fish products with a total worth of US\$6.6 billion in 2019.³⁵ Chile dominates the world's export market of mussels with 76,000 tonnes exported in 2019.³⁶

In 2018, Chile adopted the National Biodiversity Strategy 2017-2030 which includes an Action Plan for Marine Conservation and ad-

dresses five topics: 1) promoting the sustainable use of marine biodiversity for human well-being; 2) the development of awareness, participation, information and knowledge; 3) the development of a robust institutional framework, good governance and fair and equitable distribution of the benefits of marine biodiversity; 4) the insertion of biodiversity objectives in public policies and 5) the protection and restoration of marine biodiversity and its ecosystem services.³⁷ All these topics were incorporated into the National Ocean Policy, which covers a variety of other sectors, such as artisanal and industrial fishing, aquaculture, maritime transport, the development of ports, tourism, marine sciences and renewable energy.

Chile is one of the few countries in the world that have exceeded the 30% target for ocean protection recommended by scientists, civil society and governments (O'Leary *et al.*, 2019, 2016; Visalli *et al.*, 2020)³⁸ Since 2010, the number of MPAs increased threefold. As of July 2020, Chile has 41 MPAs (i.e. marine reserves, marine parks, marine nature sanctuaries and multi-use coastal marine protected areas) that together cover almost 1.5 million km² of its EEZ (43.1%) making it difficult to control all human activities at sea (Figure 3). These include the largest MPAs in South America: the Motu Motiro Hiva Marine Park (150,000 km²) designated in 2010 and the Nazca-Desventuradas Marine Park (300,035 km²) designated in 2016 (Petit *et al.*, 2018).³⁹ Moreover, in February 2018, Chile designated the Rapa Nui (Easter Island) Tapu or Rahui MPA (579,378 km²) and the Marine Park Cabo de

33 E.g. using Automatic Identification Systems (AIS) and Vessel Monitoring Systems (VMS).

34 After Australia, New Zealand, South Africa and the EU.

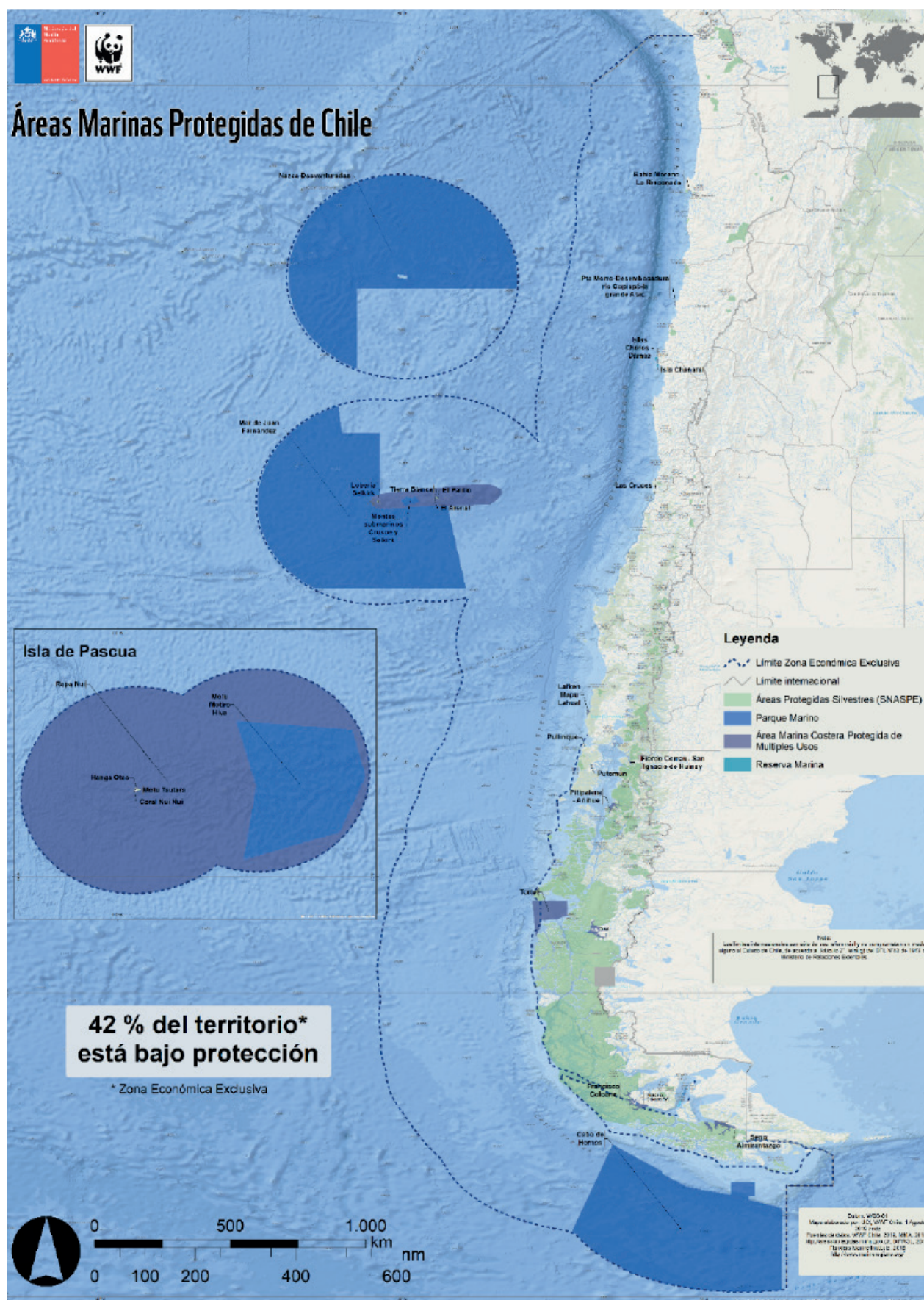
35 FAO, 2020, "The State of World Fisheries and Aquaculture 2020: Sustainability in action," Rome: <http://www.fao.org/3/ca9229en/ca9229en.pdf>

36 FAO, 2020, "GLOBEFISH Highlights April 2020 issue, with Annual 2019 Statistics – A quarterly update on world seafood markets: Globefish Highlights No. 2–2020,3" Rome: <https://doi.org/10.4060/ca9528en>

37 <https://biodiversidad.mma.gob.cl/>

38 IUCN World Conservation Congress Hawaii, USA (2016), "Increasing marine protected area coverage for effective marine biodiversity conservation," WCC-2016-Res-050-EN: https://portals.iucn.org/library/sites/library/files/resrecfiles/WCC_2016_RES_050_EN.pdf; https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/eu-biodiversity-strategy-2030_en

39 <http://areasprotegidas.mma.gob.cl/>

Figure 3. Overview of Chile's MPAs

Shaded areas in the map are protected areas. 42% of Chile's EEZ is protected.

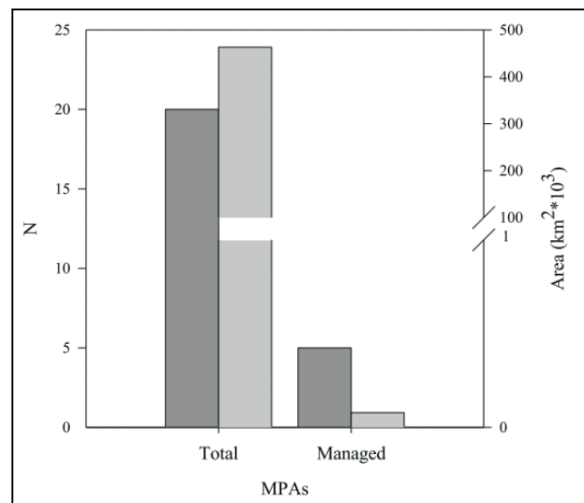
Hornos e Islas Diego Ramírez (144,391 km²) as well as expanded the Juan Fernández MPA to 286,000 km².⁴⁰

In 2016, five out of a total of 20 MPAs had management plans in place (Figure 4) (Petit *et al.*, 2018).⁴¹ The management, monitoring and enforcement of its MPAs is a key challenge for Chile to ensure that its MPAs do not remain “paper parks”.⁴² A range of recommendations have been made in this regard, including: 1) involving more private actors and NGOs, 2) creating a single MPA authority to monitor biodiversity, 3) investing more in scientific studies to study the relationship between MPAs, conservation and climate change, 4) incorporating nearby communities and actors in the design of MPAs, 5) putting in place management plans for each MPA with formal procedures to supervise the areas and 6) ensuring that inspectors are not dependent on third parties to carry out inspections.⁴³ Moreover, according to a study conducted by the Wildlife Conservation Society in 2018, the budget of 2018 only covered 1.7% of the amount needed to adequately manage the MPA network with an additional US\$12 million required.⁴⁴ The study provides several recommendations to ensure there will be structural funding for the management of MPAs in the future.

In recent years, the Chilean Ministry of the Environment has been working on putting in place more management plans to ensure effective administration of the MPAs. For example, Chile has invested more in satellite technologies and drones to strengthen its MCS capacity, especially for MPAs that are not close to the coast.⁴⁵ This issue was also discussed during the 4th International Marine Protected Areas Congress (IMPAC4) in La Serena-Coquimbo that the Chilean Ministry of the Environment organised in September 2017. During the congress, Chile and France signed a cooperation agreement to exchange best practices in ocean conservation and

to provide tools for effective conservation in terms of the monitoring, implementation and management of MPAs.⁴⁶ In the past decade, the Chilean government had plans to adopt a law creating a Service of Biodiversity and Protected Areas that aims to streamline the management of both terrestrial and marine protected areas, but this project is still in the pipeline with no clear date for implementation (Petit *et al.*, 2018; Squeo *et al.*, 2012).

Figure 4. Extent of MPA surface area in Chile's EEZ associated with a management plan



Source: Petit *et al.*, 2018). Total number (N, dark bars) and area (thousands of km², light bars) of MPAs and those having a management plan. Note the break in the Y-axis for MPAs area from 1 to 100 km².

In order to comply with its obligations under the SAR Convention, Chile established a “vessel situation notification system” (CHILREP) that serves as the primary means to report on the monitoring of vessels in transit or bound for ports in Chile's SAR area of responsibility. Over the years, technologies have been added in accordance with the contemporary nature of the Global Maritime Distress and Safety System (GMDSS).

⁴⁰ Ibid.

⁴¹ <http://areasprotegidas.mma.gob.cl/>

⁴² <https://www.woi.economist.com/chiles-marine-protected-areas-a-case-study-in-coastal-governance/?linkId=100000013141633>; <https://www.paiscircular.cl/biodiversidad/pesca-ilegal-y-escaso-presupuesto-para-su-resguardo-las-principales-amenazas-que-enfrentan-las-areas-marinas-protegidas/>

⁴³ Ibid; <https://www.emol.com/noticias/Nacional/2019/09/27/962528/Parques-maritimos-no-planear-administracion.html>

⁴⁴ <https://chile.wcs.org/Portals/134/adjuntos/InformeWaltondig.pdf?ver=2018-11-22-195516-003>

⁴⁵ This would allow for a permanent presence of surveillance tools in remote areas: <https://www.paiscircular.cl/biodiversidad/pesca-ilegal-y-escaso-presupuesto-para-su-resguardo-las-principales-amenazas-que-enfrentan-las-areas-marinas-protegidas/>

⁴⁶ <https://mma.gob.cl/finaliza-impac4-chile-realiza-llamado-a-la-accion-por-los-oceanos-del-mundo/>

Despite this increase in its technological capacities, it was not until 2007 that the Chilean government was alerted to weaknesses in its MCS system when two fires occurred on fishing vessels from the Faroe Islands with fatal consequences for some of its crewmembers while they were operating outside the EEZ of Chile. When the vessels deployed by the Chilean Navy arrived to the rescue, they realised there were many more fishing vessels that were not monitored or controlled by Chile's MCS system at the time. This situation encouraged the Chilean navy to experiment with technology to find vessels that are not voluntarily reporting their positions. In this context and considering that the South Pacific lacked a RFMO, the State of Chile promoted the creation of SPRFMO.⁴⁷ Moreover, the State of Chile has been working on a national plan with a single coordination point to address IUU fishing and other threats in its jurisdictional waters through its "National Ocean Policy", the establishment of marine protected areas and its contributions towards the BBNJ negotiations.

In February 2019, the Chilean government adopted a new law to modernise and strengthen its National Fisheries and Aquaculture Service (SERNAPESCA).⁴⁸ This new law increased SERNAPESCA's human resources capacity and introduced labelling requirements to improve traceability as well as new sanctions for IUU activities throughout the entire supply chain. Moreover, SERNAPESCA started working together with Global Fishing Watch (GFW)⁴⁹ in 2019 to make its satellite positioning data publicly available to promote transparency and provide citizens with free access to this information.⁵⁰

Chile has signed various agreements with other States for the exchange of information on safety and security matters, such as the memorandum of understanding on maritime search and rescue with New Zealand, Tahiti (ALPACI/France) and with Argentina in the case of the Antarctic waters, encouraged by the 1979 SAR Convention.⁵¹ The Chilean navy has also clearly defined surveillance and protection tasks in cooperation with RFMOs in the region.⁵² Moreover, there are neighbourhood agreements on hydrographic, meteorological and aeronautical issues. Chile has also played a lead role in the fight against IUU fishing. In 2019, it hosted the second meeting of the parties to the PSMA to ensure effective implementation of the Agreement.⁵³ In the same year, Chile organised the Annual Ministerial Meeting of Asia-Pacific Economic Cooperation (APEC) where it made the adoption of a Roadmap on Combatting IUU Fishing one of its priorities.⁵⁴

Chile conducts the following MCS activities:

- Directing 120 surveillance activities⁵⁵ and 10 operations with long-range aircraft, freight vessels, airplanes and helicopters in its internal waters, territorial sea, contiguous zone and its EEZ;
- In ABNJ, specifically around its islands located in the area of responsibility for maritime SAR where there are many fishing activities by various foreign fishing fleets, it conducts 'Oceanic Fisheries Control Operations' whose purpose is to prevent IUU fishing as well as to ensure that MPAs are respected. For this purpose, the Chilean navy has patrol boats, naval units and air-sea exploration aircraft, and other embarked vehicles;

47 Before SPRFMO was created, the Chilean Navy had identified the main foreign fishing fleets and their support vessels, the area in which they operate and the target resources with the help of satellite technology. This led to the denunciation of the former Russian flag factory ship Lafayette (Damanwaihao/Peruvian flag) and the Russian fishing vessel Aurora. These vessels were the first to be blacklisted by the SPRFMO Secretariat for their IUU fishing activities.

48 <http://www.subpesca.cl/portal/615/w3-article-88020.html>

49 A partnership founded by Oceana, Google and SkyTruth in September 2016 and now an independent NGO that aims to make global commercial fishing activity publicly available.

50 <http://www.sernapesca.cl/informacion-utilidad/monitoreo-satelital-de-naves-y-embarcaciones-pesqueras>; <https://globalfishingwatch.org/vms-transparency/chile-leadership>

51 [http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-on-Maritime-Search-and-Rescue-\(SAR\).aspx](http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-on-Maritime-Search-and-Rescue-(SAR).aspx)

52 Chile is part of three main fisheries conservation organisations: IATTC, SPRFMO and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

53 <http://www.fao.org/port-state-measures/meetings/meetings-parties/en/>

54 https://www.apecchile2019.cl/apec/site/docs/20191207/20191207115419/report_on_the_outcomes_of_apec_chile.pdf

55 Including 10 surveillance operations for its MPAs in its EEZ.

- Analysing VMS, AIS and CCTV data;
 - Cooperating with universities to use recognition software to identify species;
 - Collecting information, surveillance and intelligence from web platforms and databases;
 - Collecting optical and other synthetic aperture radar satellite images;⁵⁶
 - Access to the Global Fishing Watch platform;
 - Exploring ways to automate the integration of data from different sources and programmes into a geographic information system platform called GRAFIMAR;⁵⁷
 - Using technology with infrared tracking; and
 - Identifying different fleets based on a range of different data.
- ➡ Chile has recently adopted a National Biodiversity Strategy, a new National Ocean Policy and a new law to update its National Fisheries and Aquaculture Service. At the same time, it designated 43.1% of its EEZ as MPAs.
 - ➡ Despite the wide variety of MCS tools to its disposition, the management, monitoring and enforcement of MPAs is still a key challenge for Chile with many MPAs still lacking management plans.

3.2. Colombia

The Republic of Colombia has a territory of 2,070,408 km², of which 55.15% (1,141,748 km²) corresponds to emerged, continental and island lands and 44.85% to maritime territory (589,560 km² in the Caribbean Sea and 339,100 km² in the Pacific Ocean); it also has 4,171 km of coastline (2,582 km in the Caribbean and 1,589 km in the Pacific).⁵⁸ 12,817,181 ha (13.8%) of Colombia's waters constitute MPAs.⁵⁹ In addition, Colombia is the only country in South America that has access to two Oceans. Compared to most coastal countries, Colombia's population percentage inhabiting its coastal zones is relatively low: approximately 9.94%.⁶⁰ Marine commercial fishing contributes only 0.24% of the gross domestic product (GDP) of Colombia in the first quarter of 2020,⁶¹ but "subsistence fisheries largely support the local economy and underpin coastal community wellbeing" (Puentes *et al.*, 2015; Ramirez, 2016).

In Colombia, two ministries have the competency to manage the fisheries and aquaculture sector. Whereas hydrobiological resources are managed by the environmental sector (Ministry of Environment), fisheries resources are managed by the National Authority for Aquaculture and Fisheries (*Autoridad Nacional de Acuicultura y Pesca*, AUNAP).⁶² Since 1974, Colombia has been working on a System of National Protected Areas (SINAP) to coordinate stakeholders, resources and initiatives.⁶³ As part of this process, Colombia designed a Sub-system of National Marine Protected Areas (SMPA) that now includes 35 MPAs (Figure 5).⁶⁴ Moreover, Colombia's Institute of Marine and Coastal Research (INVEMAR)⁶⁵ provides research results that support decision-making processes on issues such as

56 Type of satellite-based remote sensing tool that derives information from analysing radiation received by a sensor.

57 <https://revistavigia.cl/grafimar-eficaz-y-robusta-herramienta-de-vigilancia/revistavigia/2016-09-06/165325.html>

58 <https://colaboracion.dnp.gov.co/CDT/Conpes/Econ%C3%B3micos/3990.pdf>

59 <https://runap.parquesnacionales.gov.co/cifras>

60 <https://www.dane.gov.co/index.php/estadisticas-por-tema/demografia-y-poblacion/censo-nacional-de-poblacion-y-vivenda-2018>

61 <https://www.dane.gov.co/index.php/estadisticas-por-tema/cuentas-nacionales/cuentas-nacionales-trimestrales>; this percentage will likely decrease during the remainder of 2020 because of the COVID-19 pandemic.

62 Only when determining total allowable catch (TAC), the environmental sector is involved in fisheries issues; www.aunap.gov.co

63 <http://www.parquesnacionales.gov.co/portal/es/sistema-nacional-de-areas-protegidas-sinap/politicas-y-marco-normativo/>

64 <https://www.thegef.org/news/spanning-two-shores-designing-representative-system-marine-protected-areas-colombia>

65 Colombia's National Environmental System (SINA) aims to ensure inter-sectoral coordination in the public sphere of environmental and renewable natural resources policies, plans and programmes. INVEMAR is one of the entities that is part of SINA together with the Ministry of the Environment, the Regional Autonomous Corporations, the Territorial Entities and other research institutes linked to the Ministry; <http://corpouraba.gov.co/que-es-el-sistema-nacional-ambiental-sina/>; <http://www.invemar.org.co/web/guest/quienes-somos>

the design, creation and establishment of MPAs, marine biodiversity assessments, marine environmental quality assessments and the evaluation of trawl fisheries activities in the Pacific Ocean and the Caribbean Sea.⁶⁶ INVEMAR has launched different systems (e.g. Colombia's Marine Environmental Information System or *Sistema de Información Ambiental Marina*, SiAM) that help to bring together all information regarding marine areas, policies and stakeholders and has created interactive satellite maps that provide information on, for example, biodiversity, water quality and coastal erosion.⁶⁷

Colombia has a variety of area-based management tools at its disposal to protect its marine areas. These include: 1) National Nature Parks (NNP) and Fauna and Flora Sanctuaries,⁶⁸ 2) Regional Nature Areas,⁶⁹ 3) National Districts of Integrated Management,⁷⁰ 4) Regional Districts of Integrated Management,⁷¹ 5) MPAs⁷² and 6) the Seaflower Biosphere Reserve.⁷³

In 2001, Colombia approved the National Environmental Policy for the Sustainable Development of Oceanic Spaces, Coastal and Island Areas (PNAOCI) to integrate the management of its marine and coastal environment. Taking into account the need for information on the marine and coastal environmental conditions of Colombia for the prevention, control and mitigation of marine pollution and the environmental deterioration of ecosystems, Colombia created in the same year the "surveillance network for the conservation and protection of marine and coastal waters of Colombia – REDCAM". This national environmental monitoring programme has been operating for 20 years and its main objective is to contribute to scientific bases of coastal marine environmental quality. This in-

formation is useful to environmental authorities to formulate plans and programmes that allow the integral management of the water, the sustainable use of associated natural elements and to guarantee the quality of life of Colombians.⁷⁴

The *Dirección General Marítima* (DIMAR; the Maritime Directorate of the Ministry of Defence) was established with the goal of consolidating the governance of its maritime, river and coastal activities, while contributing to its positioning as a regional maritime power by 2030. DIMAR verifies whether all its registered residents comply with their obligations, controls sea-related activities and works together with different international bodies to comply with international agreements. The headquarters of DIMAR lies in Bogotá, with 20 local offices in the Caribbean and the Pacific, which also serve as port authorities (see Figure 6). DIMAR coordinates these institutions; while the Ministry of the Environment administers environmental legislation, e.g. it takes decisions regarding MPAs. MCS is a responsibility of both DIMAR and the Colombian Navy. The priority of the Navy is to protect Colombian borders and to fight drug trafficking while it invests only limited resources in the MCS of fisheries (Randin, 2015). Fisheries management rules and MCS activities are different in neighbouring countries, thereby encouraging IUU fishing activities in Colombian waters, where there are less MCS activities.

In 2007, the Colombian government through the Colombian Ocean Commission (COC), whose current president is Colombia's Vice-president (2018-2022),⁷⁵ created and adopted its first National Policy of the Ocean and Coastal Spaces (PNOEC).⁷⁶ In 2020, the PNOEC contains an action plan with 172 ac-

66 Stock assessments are done by the AUNAP.

67 <https://siam.invemar.org.co/informacion-geografica>

68 These are protected areas under the National Natural Parks System; <https://www.parquesnacionales.gov.co/portal/es/parques-nacionales/>

69 Not part of the NNP system, but managed by regional environmental authorities.

70 These are protected areas designated by the Ministry of the Environment and Development where sustainable use of certain resources (e.g. fisheries) is allowed.

71 These are protected areas managed by regional environmental authorities where sustainable use of certain resources (e.g. fisheries) is allowed.

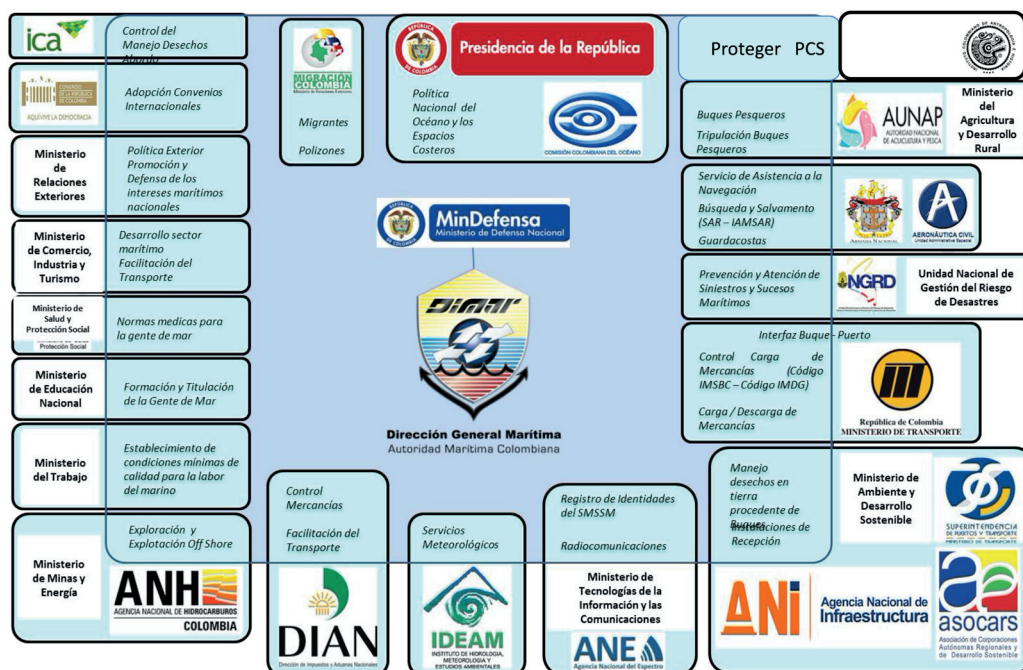
72 E.g. the MPAs in the Seaflower Biosphere Reserve in the San Andres and Providencia Archipelago.

73 <https://en.unesco.org/biosphere/lac/seaflower>

74 The monitoring data is stored in the REDCAM information system: <https://siam.invemar.org.co/redcam>

75 The President of the Republic of Colombia has the power to elect any senior official as President of the COC.

76 <http://www.cco.gov.co/pnoec.html>



Source: DIMAR; INVEMAR is not included in this overview, but provides the conceptual basis and technical support for the implementation of ocean governance.

tivities that are divided in 19 strategies and is executed by the 17 members of the COC. In the same year, the National Planning Department, through the National Council for Economic and Social Policy (CONPES) approved a strategic policy document (CONPES 3990 "Colombia Potencia Bioceánica Sostenible 2030") to increase governance in its coastal marine affairs by consolidating policies, plans, and projects at national, regional, local and inter-sectoral levels, establishing its national public agenda and specifying its strategies to make Ocean policy play a role in sustainable development in the upcoming decade.⁷⁷

In order to enhance institutional cooperation and advance actions to prevent, discourage and eliminate illegal fishing activities in Colombia, COC created the National Roundtable on Illegal Fishing and Illicit Fishing Activities (MNPPI) in 2015. This initiative brings togeth-

er the National Aquaculture and Fisheries Authority, the Foreign Affairs Ministry, the Colombian Ministry of Agriculture and Rural Development (MADR), the Navy, DIMAR, the Special Administrative Unit of the Network of National Nature Parks of Colombia (*Unidad Administrativa Especial del Sistema de Parques Nacionales Naturales de Colombia*; PNN), migration and fiscal authorities, police authorities and the COC Executive Secretariat.⁷⁸ Within this framework, Colombia approved and adopted Law 1851 to prevent, deter and eliminate illegal fishing in the Colombian maritime area.⁷⁹

In recent years, Colombian authorities have participated in various “workshops and seminars on the PSMA, Global Record [of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels], conservation and management of marine resources and capacity build-

77 <https://colaboracion.dnp.gov.co/CDT/Conpes/Econ%C3%B3micos/3990.pdf>

78 https://www.oecd.org/colombia/Fisheries_Colombia_2016.pdf

79 <http://www.fao.org/3/ca7572en/CA7572EN.pdf>;
<http://cpps.dyndns.info/cpps-docs-web/subsec/2017/nov/taller-pesca-indnr/presentaciones/2>

ing of magistrates, public attorneys, administrative and police authorities”.⁸⁰ They also organised two workshops on IUU fishing in 2018.⁸¹ In 2019, the FAO, under the auspices of its Global Programme, organised a multi-stakeholder workshop for Colombian national institutions to “provide the basis for Colombia to strengthen its national legislation, institutional setup, and MCS systems and operations to be consistent with the provisions of the PSMA and complementary international instruments”.⁸²

Colombia employs the following MCS tools:

- Two patrol vessels for offshore surveillance operations, three maritime patrol aircraft and several light wing aircrafts;⁸³
- Coastal radars, aerial patrols and Automatic Identification Systems (AIS)⁸⁴ technologies, which are used both to tackle drug trafficking and to monitor, control and prevent incursions of fishing vessels;⁸⁵
- Permit requirements for flagged vessels fishing on the high seas;⁸⁶
- An on-board observer programme (*Programa Nacional de Observadores de Colombia* (PNOC); created in 2005 with the support of the IATTC) that includes a simplified procedure (in writing, on the phone or online) to file complaints about observed illegal fishing activities;⁸⁷
- Another observer programme (*Programa de Observadores Pesqueros de Colombia*, POPC) created by AUNAP that aims to serve as a strategic tool to collect technical and scientific information on fisheries through observers on board or in port depending on the scale of the fi-

shery, its characteristics and dynamics.⁸⁸ AUNAP signed an agreement in August 2020 with the University of Magdalena to work together on the collection, registration and analysis of information on fish stocks through observers;⁸⁹

- An oceanographic research vessel;
- A maritime traffic control station that controls the traffic in Colombia’s national waters and monitors potential oil spills. With this station, Colombia can also carry out surveillance activities;
- The Oceanographic Parameter Measurement Network that performs real time monitoring of ocean conditions; and
- A database through which the public can access information in real-time. The public can make enquiries on the website, in accordance with Colombia’s transparency policy;⁹⁰
- A management tool (*Red de Vigilancia para la Conservación y Protección de las Aguas Marinas y Costeras de Colombia*; REDCAM) for the collection, compilation, systematization and analysis of information on marine environmental quality, with information on the Colombian Pacific and Caribbean coast, being a national and international reference for monitoring coastal marine water resources. REDCAM is an inter-institutional activity, coordinated by INVEMAR, sponsored by the Ministry of Environment and Sustainable Development and Regional authorities with coastal jurisdiction in Caribbean (CORALINA, CORPOGUAJIRA, CORPAMAG, CRA, CARDIQUE, CARSUCRE, CVS and CORPOURABÁ) and in the Pacific

80 Ibid.

81 Ibid.

82 <http://www.fao.org/iuu-fishing/news-events/detail/en/c/1252913/>

83 <https://iuuriskintelligence.com/wp-content/uploads/2019/05/Colombia-country-Report-Global-Fisheries-MCS-Report-2018.pdf>

84 Autonomous and continuous vessel identification and monitoring that allows vessels to exchange data with nearby ships and coastal authorities (vessel identification data, position, course, speed) to facilitate traffic management and avoid collisions.

85 <https://iuuriskintelligence.com/wp-content/uploads/2019/05/Colombia-country-Report-Global-Fisheries-MCS-Report-2018.pdf>

86 Ibid.

87 https://www.oecd.org/countries/colombia/Fisheries_Colombia_2016.pdf

88 <http://www.fao.org/faolex/results/details/es/c/LEX-FAOC119902/>

89 <https://www.aunap.gov.co/index.php/sala-de-prensa/boletines/283-el-programa-de-observadores-pesqueros-de-colombia-popc-acompanaran-faenas-de-barcos-industriales-y-de-la-pesca-artesanal-marino-costera-en-el-pacifico-y-caribe-colombiano>

90 www.dimar.mil.co/; <https://arccg.is/HmTf4>

(CODECHOCÓ, CVC, CRC and CORPONARIÑO) which are nodes in each coastal department;⁹¹

- VMS is mandatory for 1) deep-sea shipping, international traffic and industrial fishing vessels flying the Colombian flag with gross tonnage (GT) ≤ 25 and ≥ 500 , 2) foreign-flagged vessels with >25 GT dedicated to industrial fishing and scientific research operating in Colombian waters and 3) foreign-flagged recreational/sports vessels that, once they arrive in jurisdictional waters, sail between the jurisdictions of two or more harbour captaincies.
- The National Programme for the Monitoring of Water Resources (*El Programa Nacional de Monitoreo del Recurso Hídrico*; PNMRH).⁹²

In 2016, the OECD identified several ways to strengthen MCS in Colombia, including 1) increasing monitoring and surveillance capacity at landing sites as well as at the level of local communities, 2) creating an effective real time catch and fishing effort information system for target species and by-catch, 3) simplification of administrative procedures, 4) better inter-institutional cooperation and 5) scaling-up efforts to incentivise fishers to obtain a license.⁹³ In the meantime, Colombia developed a real time catch and fishing effort information system and created a national committee for the management of by-catch. The AUNAP uses Colombia's Statistical System (Sistema Estadístico Pesquero de Colombia; SEPEC) to provide statistics on marine and continental fisheries. In 2020, AUNAP doubled SEPEC's budget, thereby increasing its data collection and analysis capacity.

➡ For Colombia, the fishing sector and associated MCS activities have not been a key priority until recently. That is why the MCS of fishing activities (and other human activities in its coastal areas) is relatively weak.

➡ Recently, Colombia has invested capacity in tackling IUU fishing through better inter-institutional cooperation at a national level, but there is still a lack of clarity among State institutions with competence in this sector of the responsibility for MCS activities. Cooperation and coordination between Colombia and neighbouring countries to tackle MCS issues and share information or capacity at a regional level is limited.

3.3. Ecuador

The Republic of Ecuador currently exercises jurisdiction over an EEZ of 1,092,140 km², an area four times larger than its land territory. Ecuador plans to extend its continental shelf and National Aquatic Spaces⁹⁴ to cover an area 5.3 times larger than its land territory.⁹⁵ The exploration and use of living and non-living resources in its EEZ, as well as in ABNJ, contribute significantly to Ecuador's economy. Ecuador is the world's second biggest exporter of tuna after Thailand⁹⁶ (Ecuadorian-flagged vessels account for 44% of total catch in the Southeast Pacific) and the world's second biggest shrimp exporter after India.⁹⁷

Ecuador's Galapagos Marine Reserve covers approximately 133,000 km², making it the world's fourth-largest reserve.⁹⁸ This large

91 <http://www.invemmar.org.co/redcam>

92 <https://www.minambiente.gov.co/index.php/gestion-integral-del-recurso-hidrico/gobernanza-del-agua/programa-nacional-de-monitoreo-del-recurso-hidrico>

93 https://www.oecd.org/countries/colombia/Fisheries_Colombia_2016.pdf

94 This includes the jurisdictional maritime spaces and the navigable rivers and lakes.

95 The government of Ecuador has signed a Memorandum of Understanding with the government of Chile to exchange experiences and share scientific and technical information and knowledge on the subject of the continental shelf. The two countries are carrying out scientific and technical studies to present their respective cases to the United Nations Commission on the Limits of the Continental Shelf (CLCS) with the aim of achieving the extension of their continental shelves: <https://www.elcomercio.com/actualidad/ecuador-chile-ampliacion-plataforma-continental.html>

96 FAO, 2020, "GLOBEFISH Highlights April 2020 issue, with Annual 2019 Statistics – A quarterly update on world seafood markets: Globefish Highlights No. 2–2020,3" Rome: <https://doi.org/10.4060/ca9528en>

97 Ibid.

98 According to the IUCN, strict nature reserves are "protected areas that are strictly set aside to protect biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such protected areas can serve as indispensable reference areas for scientific research and monitoring": <https://www.iucn.org/theme/protected-areas/about/protected-area-categories>

size and relative remoteness means that a significant investment of resources is needed to monitor the area and to ensure effective cooperation and coordination.⁹⁹ The confiscation by Ecuador's Navy and the Galapagos National Park of the Chinese ship *Fu Yuan Yu Leng* 999 within the Galapagos Marine Reserve's waters in August 2017 illustrates the size of the challenge. The ship was carrying approximately 300 tons of fish including 6000 finned sharks that fall within the category of threatened species according to the IUCN (Alava *et al.*, 2017). More recently, in May 2020, Hong Kong Customs detected and seized 13 tonnes of suspected dried shark fins of endangered species in two containers arriving from Ecuador with an estimated market value of approximately US\$8.6 million in total.¹⁰⁰

Strong MCS capacity is therefore vital for protecting the biodiversity of the Galapagos Islands, as well as fisheries. The Ecuadorian Navy and the Galapagos National Park carry out patrols using AIS and VMS technology that broadcast GPS locations via satellite and radio to the park's central compliance station (Alava *et al.*, 2017; Douvere, 2015). Moreover, experts from Australia's Great Barrier Reef Marine Park Authority share best management practices, such as how to build an intelligence system that helps target enforcement efforts, with compliance officers from the Galapagos Marine Reserve under the UNESCO World Heritage Marine Programme.¹⁰¹

Ecuador has a National Oceanic and Coastal Policy that has been in force since 2011. This policy addresses: 1) Scientific and technical research, productive and logistical activities; 2) Sustainable exploitation of coastal and marine resources; 3) Conservation of natural and cultural heritage; 4) Control of pollution and the protection of the coast against natural and/or anthropogenic threats; and 5) Safety and defence of marine areas of national interest (Mestanza-Ramón *et al.*, 2019).

The Ecuadorian general assembly adopted a new Law on the Development of Aquaculture and Fisheries in April 2020.¹⁰² In terms of MCS, this law 1) establishes a National Fund for Aquaculture and Fisheries Research; 2) obliges artisanal vessel owners to install satellite monitoring devices on board for safety purposes and 3) indicates the means to carry out MCS activities and implement the law, e.g. using technical reports issued by the Satellite Monitoring Center, RFMOs, on-board observers and the Public Research Institute of Aquaculture and Fisheries.¹⁰³ Moreover, the Ecuadorian authorities are in the process of adopting a new law on navigation, security management and maritime protection that will aim to tackle increasing security concerns related to fishing activities, the increasing illegal fishing and drug trafficking routes in the Pacific Ocean and ensure that Ecuadorian's national law is in accordance with international ocean governance requirements.¹⁰⁴ Ecuador has faced challenges in effectively maintaining MCS infrastructure, which has resulted in reduced capacity. Ecuador has therefore shown an interest in collaborating with international institutions and other countries to maintain and enhance its MCS capacity and strengthen research.

Ecuador uses the following MCS tools:

- Oceanographic research vessel to monitor the conditions of oceanography, physics, chemistry, biology and marine meteorology in ABNJ. This vessel conducts two oceanographic surveys per year in coordination with CPPS to monitor the oceanographic conditions (O'Hern *et al.*, 2018);
- Research activities on the living and non-living resources in ABNJ in the context of its project to extend its continental shelf;

99 Especially given the Galapagos Islands' authorities have legislative powers and can therefore promulgate regulations that differ from the rest of the country.

100 https://www.customs.gov.hk/en/publication_press/press/index_id_2906.html

101 <https://whc.unesco.org/en/news/1335>

102 <http://www.pudeleco.com/infos/leydepesca.pdf>

103 Ibid, see Section IV, Article 113 and Article 161.

104 <https://www.eluniverso.com/noticias/2019/08/28/nota/7491228/tres-leyes-seguridad-cola-tramite-legislativo>; https://observatoriolegislativo.ec/media/archivos_leyes/Proyecto_de_Ley_de_Navegaci%C3%B3nGesti%C3%B3n_de_la_SeguridadProtecci%C3%B3n_Mar%C3%ADtima.pdf

➤ In 2014, the Ecuadorian Ministry of Aquaculture and Fisheries started a pilot project to fit more than 4,000 of the country's 13,000 artisanal fishing vessels with GlobalStar satellite tracking devices to follow their movements within EEZ and on the high seas;¹⁰⁵

➤ Three patrol craft and eight patrol boats for coastal surveillance as well as two offshore patrol vessels;¹⁰⁶

➤ Air, water and underwater control and surveillance systems via boats, helicopters, airplanes and a submarine to tackle IUU fishing and control marine/maritime traffic (Mestanza-Ramón *et al.*, 2019);

➤ 285 fisheries inspectors distributed in 25 provinces for monitoring catches at major ports and landing beaches;¹⁰⁷

➤ Industrial tuna fisheries are covered through an observer scheme;¹⁰⁸

➤ All Ecuadorian flagged vessels of over 20 registered tons have the obligation to have a satellite monitoring system on board with mandatory reporting every four hours. This data is automatically sent to the Maritime and Port Management System (SIGMAP) and permanently controlled by the Maritime Authority.

Ecuador does not have an integrated MCS system, though there is some cooperation with Chile in this regard.

➤ Ecuador has previously faced capacity challenges and has recently introduced a new law to strengthen its MCS infrastructure.

➤ Ecuador sees value in more collaboration and coordination with State and non-

State actors to increase its capacity, but is not in favour of operational participation of non-State actors within its jurisdictional maritime spaces.

3.4. Peru

The Republic of Peru has a coastline of more than 3,080 km and is a global hotspot for marine biodiversity. The fisheries sector is the fourth biggest component (7.15% of total export) of Peru's economy after the energy and mining sector, agriculture and livestock.¹⁰⁹ Peru has the world's largest anchovy fishery, with 98% of the catch used for the production of fishmeal and fish oil (Carlson *et al.*, 2018). In 2018, Peru was the world's biggest producer of fishmeal and fish oil, but the early closure of the fishing season due to the COVID-19 pandemic in combination with the lower quota for anchovies is likely to halt or decrease the production in 2020.¹¹⁰ A strong El Niño affected scallop production in Peru in the last four years, but in 2019 Peru became the world's second biggest scallop exporters with an export of 10,000 tonnes after China.¹¹¹ To a lesser extent, there are also squid, horse mackerel and jack mackerel fisheries.¹¹² In 2015, Peru lost US\$360 million due to illegal fishing and there are often complaints about foreign vessels entering the Peruvian jurisdictional waters without authorisation to extract tuna or squid stocks.¹¹³

The Presidency of the Council of Ministers of Peru established the Multisectoral Commission for State Action in the Maritime Field (COMAEM) in 2017, a permanent body to facilitate the coordination of research and scientific training activities for the environmental management of the coastal marine area and the management of fisheries resources.¹¹⁴ This permanent body aims to monitor and oversee sectoral, regional and local policies

¹⁰⁵ <https://www.worldfishing.net/news101/products/electronics/satellite-tracking-devices-for-ecuadorian-fishing-fleet>

¹⁰⁶ <https://iuriskintelligence.com/wp-content/uploads/2019/12/Ecuador-Country-Report-Global-Fisheries-MCS-Report-2019.pdf>

¹⁰⁷ Ibid.

¹⁰⁸ Ibid.

¹⁰⁹ <https://www.gob.pe/institucion/mindef/normas-legales/391605-012-2019-de>

¹¹⁰ FAO, 2020, "GLOBEFISH Highlights April 2020 issue, with Annual 2019 Statistics – A quarterly update on world seafood markets: Globefish Highlights No. 2–2020,3" Rome: <https://doi.org/10.4060/ca9528en>

¹¹¹ Ibid.

¹¹² <https://www.gob.pe/institucion/mindef/normas-legales/391605-012-2019-de>

¹¹³ Ibid.

¹¹⁴ <http://extwprlegs1.fao.org/docs/pdf/per177691.pdf>

and to issue technical reports.¹¹⁵ It is organised in technical groups of specialised work on: 1) Monitoring and Control of Pollution in the Marine Coastal Area; 2) Integrated Management of Coastal Marine Areas; 3) The Protection and Conservation of Coastal Marine Biodiversity (mammals and turtles); and 4) Climate change.

Peru adopted the National Maritime Policy 2019-2030 in December 2019 based on the work of the COMAEM.¹¹⁶ The national maritime policy aims to harmonise policies concerning maritime activities conducted in Peru's waters, thereby strengthening the governance framework and supporting sustainable use of maritime spaces and exploitation of marine resources. The policy includes five strategic objectives, developed based on the consensus of all ministries involved: 1) strengthen Peru's influence on international maritime affairs; 2) strengthen productive activities in the maritime field, in a rational and sustainable way; 3) increase trade in a sustainable and diversified manner in the maritime field; 4) ensure the sustainability of resources and ecosystems in the maritime field; and 5) strengthen security in the maritime field.¹¹⁷ In the next four years, Peru plans to develop a Multi-Sectoral Strategic Plan.

Peru strongly values the relationships and the cooperation and coordination with other States. For example, in April 2019, Peru and the United States signed an agreement to strengthen cooperation in maritime search and rescue operations – the first binding search and rescue agreement between the United States and a South American country.¹¹⁸ Peru is currently negotiating similar agreements with Ecuador and plans to do the same with Chile and France. Moreover, the Peruvian navy, through the General Directorate of Captaincies and Coastguards—National Maritime Authority (DICAPI), has entered into bilateral agreements on cooperation, training

and information exchange with the following neighbouring countries: Bolivia, Brazil, Chile, Colombia and Ecuador.

Peru protects less than 0.5% of its national waters through four natural protected areas (NPAs): the Paracas National Reserve (RNP);¹¹⁹ the San Fernando National Reserve (RNSF); the System of Islands, Islets and Guanera Points National Reserve (RNSIIPG); and the Illescas Reserved Zone. Peru has not designated any MPAs yet, but it has plans to designate *La Dorsal de Nazca*¹²⁰ as a MPA in 2020 within the framework of the United Nations Convention on Biological Diversity (CBD) National Biodiversity Strategies and Action Plan (NBSAP).¹²¹ If designated, 7.3% of Peru's waters will be protected.¹²²

The national maritime policy indicates that MCS is mainly used to 1) complement the actions of monitoring and auditing of extractive activities, 2) preserve hydrobiological resources and 3) obtain the necessary means of evidence for the respective sanctioning procedures. The Ministry of Production is responsible for monitoring compliance with fishing regulations, for which it uses the Satellite Monitoring System for Fishing Vessels (SISESAT) (Figure 7).

On the other hand, the Peruvian navy (through DICAPI) is responsible for combatting illegal activities. For that purpose, it deploys a range of air, surface, land and electronic tools, as well as a position and security information system, using the Automatic Identification System (AIS) of ships and the System of Information and Monitoring of Aquatic Trafficking (SIMTRAC) (Figure 8), within the framework of International Maritime Organization (IMO) legislation. The Peruvian navy has established a long-term plan whose general objective is to exercise MCS of human activities through 1) developing operational capacities, 2) ensuring strict compliance with national and

¹¹⁵ The Peruvian navy through the Directorate of Maritime Interests serves as the technical secretariat of COMAEM.

¹¹⁶ <https://www.gob.pe/institucion/mindef/normas-legales/391605-012-2019-de>

¹¹⁷ Ibid.

¹¹⁸ <https://andina.pe/ingles/noticia-peru-us-strengthen-cooperation-in-search-and-rescue-operations-750017.aspx>

¹¹⁹ The RNP has been approved by the IMO since 2003 as a Particularly Sensitive Sea Area (PSSA) where specific measures are used to control maritime activities such as the organisation of maritime traffic, the strict application of the MARPOL Convention requirements on the uploading and equipment of ships (especially for oil tankers) and maritime traffic services.

¹²⁰ The proposed Nazca National Reserve is located 76 nautical miles off the coast of Ica and covers an area of 5,292,134.39 hectares.

¹²¹ <https://www.cbd.int/nbsap/>

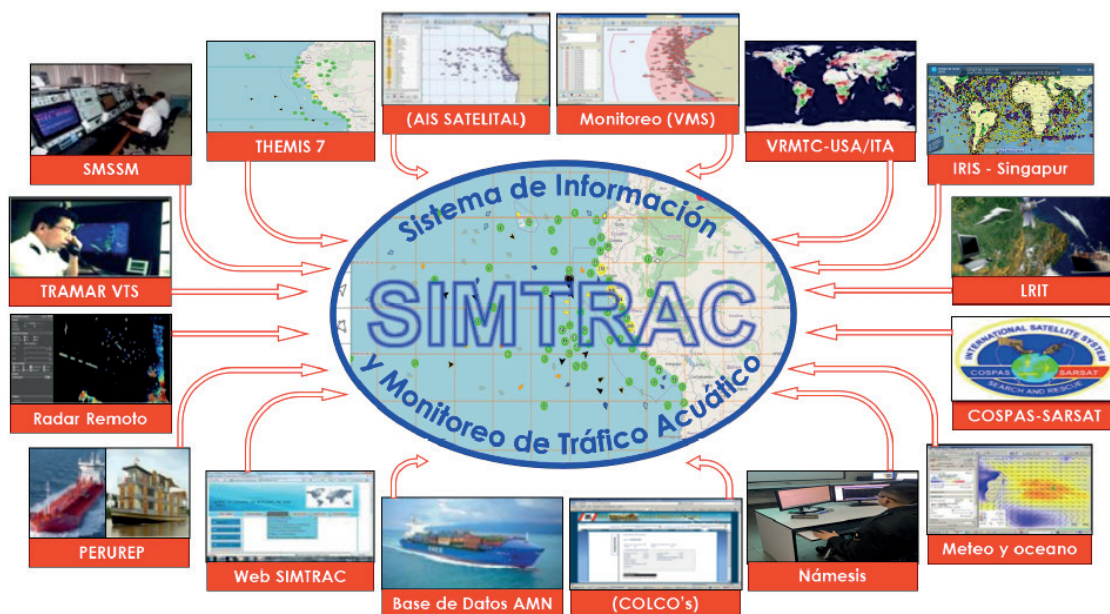
¹²² <https://laotracordillera.pe/protejamos-el-mar-peruano/>

Figure 7. The role of Peru's satellite monitoring system (SISESAT) in fisheries compliance



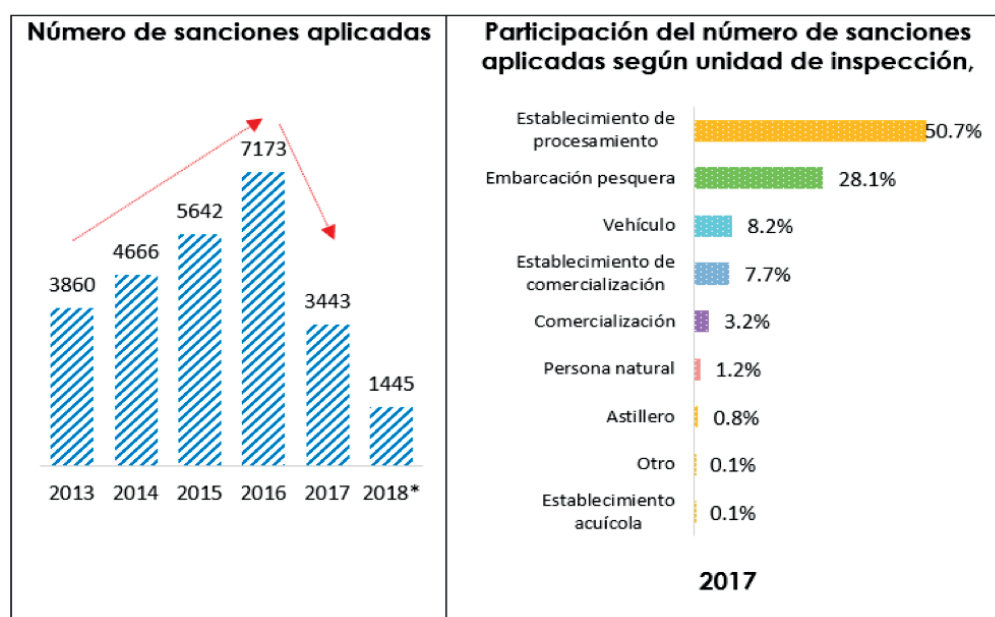
Source: PowerPoint presentation of the Peruvian Ministerio de la Producción, Ministerio de Relaciones Exteriores and IMARPE during the STRONG High Seas expert workshop in Guayaquil, November 2019.

Figure 8. Overview of the System of Information and Monitoring of Aquatic Trafficking (SIMTRAC)



Source: Peruvian navy.

Figure 9. Overview of sanctions applied by the Peruvian government per sector



Source: <https://www.gob.pe/institucion/mindef/normas-legales/391605-012-2019-de>

international legal obligations, 3) strengthening and intensifying the control of maritime traffic and conducting operations for the repression of illegal activities, 4) promoting the effective participation of national merchant, fishing and recreational units in the operation of a national MCS system and 5) leading the national search and rescue system in the area of responsibility that includes the strip of the Peruvian coast up to the 120° W meridian, by means of the exploitation of available naval and naval-aerial means as well as information and communication technologies.

In terms of sanctions, Figure 9 shows that the number of applied sanctions has an upward trend until 2016 followed by a decrease in the number of sanctions by 52% in 2017 compared to the previous year. Most sanctions were issued to fisheries processing establishments. There were 21 sanctions applied to foreign flagged vessels in 2017 (Figure 10). Most sanctions were applied because foreign flagged vessels did not have a permit (47.6%), did not hire a minimum of 30% of personnel with Peruvian nationality as part of its crew (23.8%) and prevented or hindered the work of mon-

itoring, control, inspection and supervision (19%). In 2012, only 39.5% (6333) of the 16,045 artisanal boats distributed along the national coast had a valid fishing permit.¹²³ The reasons that ship owners gave for not having a permit included: ignorance of the procedure (59.3%), scarce economic resources (12.9%) and others considered that the procedure is complicated (12.6%).¹²⁴

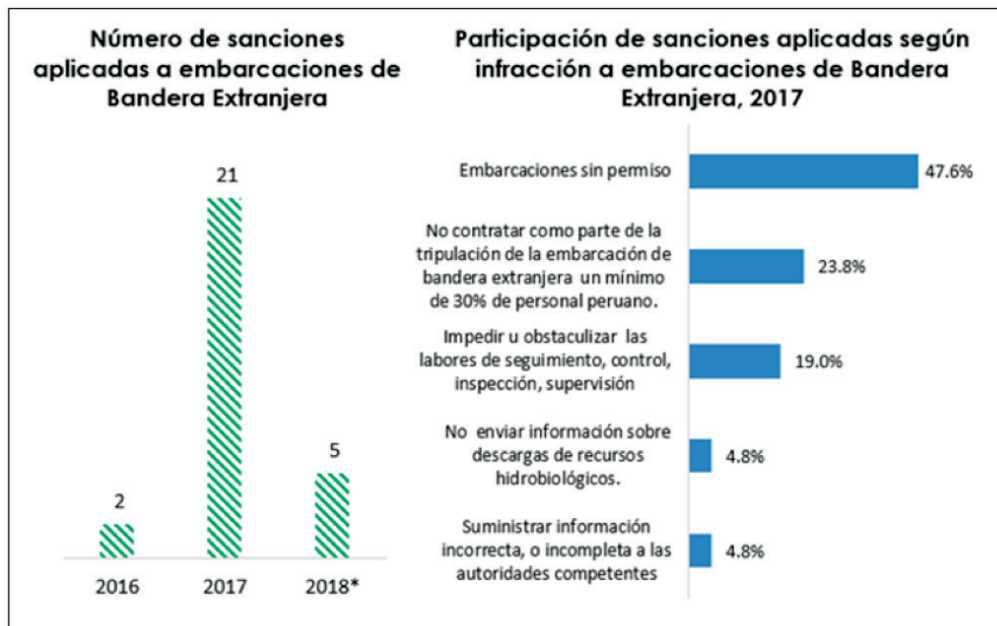
The government of Peru is using the following MCS tools (Figure 11):

- The scientific authority, the *Instituto del Mar del Perú* (IMARPE), carries out research of the hydrological resources for the sustainable management of the conservation of the marine environment as well as for meteorological research;
- Integrated VMS monitoring. The entire industrial¹²⁵ Peruvian fleet is obliged to have VMS software on board;
- Radio communication to exchange information with vessels in real time;

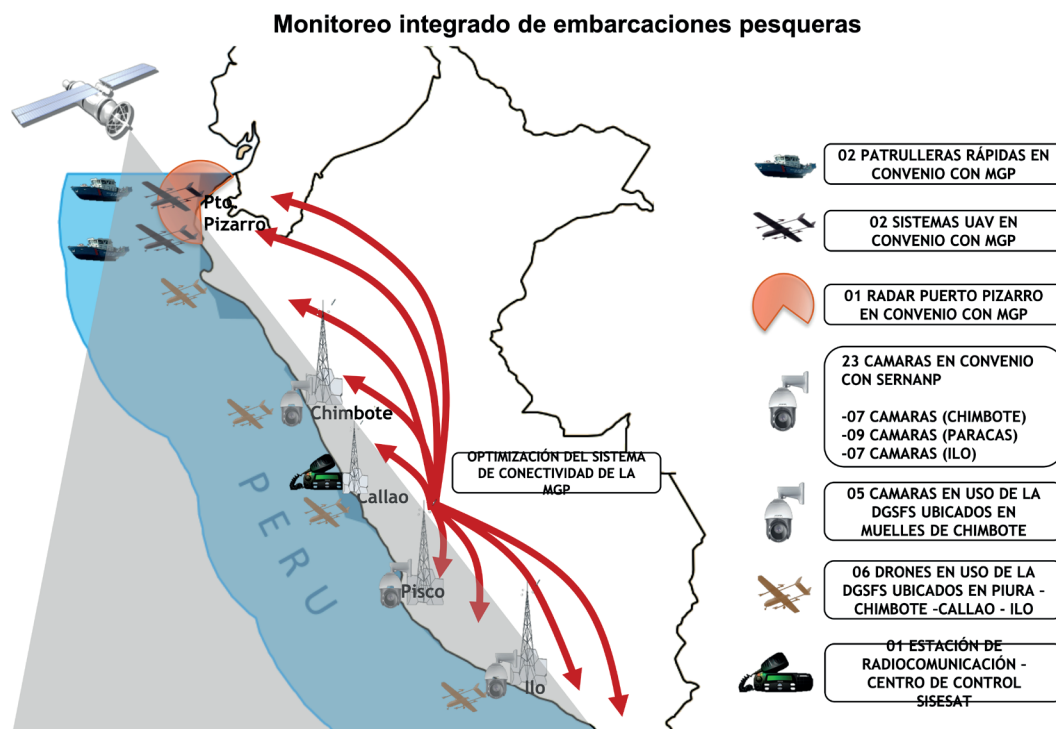
¹²³ <https://www.gob.pe/institucion/mindef/normas-legales/391605-012-2019-de>

¹²⁴ Ibid.

¹²⁵ The artisanal fleet is not required to have VMS onboard.

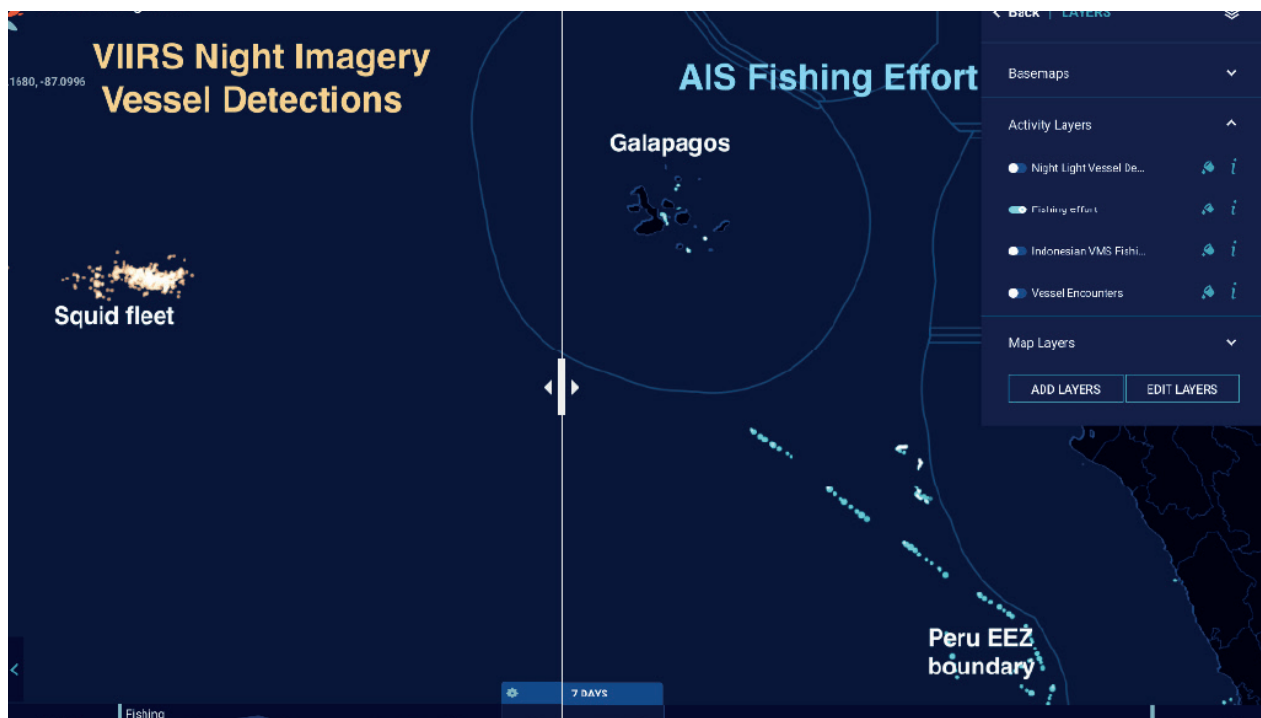
Figure 10. Overview of sanctions applied by the Peruvian government to foreign-flagged vessels

Source: <https://www.gob.pe/institucion/mindef/normas-legales/391605-012-2019-de>

Figure 11. Overview of MCS tools to monitor the landing of seafood off Peru's coast

Source: PowerPoint presentation of the Peruvian Ministerio de la Producción, Ministerio de Relaciones Exteriores and IMARPE during the STRONG High Seas expert workshop in Guayaquil, November 2019.

Figure 12. Vessel detections of a squid fleet with night imagery sensors (left) and AIS fishing effort (right)



This figure shows tracking data of a squid fleet using night-time satellite imagery from NASA's Visible Infrared Imaging Radiometer Suite (VIIRS) providing an approximate count of the number of vessels with their fishing lights lit up at a particular moment and vessel AIS broadcasts which provides information on a vessel's location and identity; <https://skytruth.org/2018/10/tracking-the-chinese-squid-fleet-in-the-south-pacific-part-1/>

- Integrated system for traffic monitoring through the *Sistema de Información y Monitoreo de Tráfico Acuático* (SIMTRAC), *Sistema de Seguimiento, Control e Información sobre Tráfico Marítimo* (PERU-REP), the *Plataforma de Seguimiento a Larga Distancia de los Buques* (LRIT) and through the Coastal Stations operating within the framework of the Global Maritime Distress and Safety System;
- AIS systems to monitor and control activities of foreign vessels;
- Night-time images provided by Peru's ocean institute to locate the squid fleet;
- Satellite technology (PerúSat-1);
- Access to the Global Fishing Watch platform (Figure 12);
- Copernicus system to obtain synthetic aperture radar images that can be used for the detection of vessels that are not using or transmitting satellite data;
- Dockside video surveillance system, radar surveillance systems and cameras in certain national protected areas;
- Unmanned aerial vehicle¹²⁶ systems for video surveillance;
- Electronic logbooks (using an app on a mobile phone) that provides information in real time;
- 100% of the jumbo flying squid fishery in the Peruvian EEZ is monitored by on-board observers (Barange *et al.*, 2018);
- The Peruvian navy can carry out maritime interventions with six maritime pa-

¹²⁶ Robotic aircraft that can fly without a human pilot or crew and can be controlled remotely.

- trol ships, as well as joint actions aimed at strengthening monitoring and audit capacities of national and international vessels engaged in fishing, cabotage and transit. Peru has two more maritime patrol ships under construction and is planning to acquire more patrol boats to tackle IUU fishing;
- The Peruvian navy (through DICAPI), is upgrading the System of Information and Monitoring of Aquatic Trafficking (SIMTRAC), with the capabilities of satellite photography and detection;
 - Integrated fishing vessel monitoring (e.g. GPS follow up for all fishing vessels) of 1,200 vessels in the system. Currently, Peru is formalising the monitoring of artisanal fishing activities. At the end of 2020, Peru hopes to be able to monitor 5,000 artisanal vessels;
 - Since 2018, Peru has implemented a mechanism that connects directly to SPRFMO control systems in order to automatically update the location of its vessels.
- However, despite these MCS tools, according to the FAO: “a deficiency in monitoring, control, surveillance and enforcement of management actions” threatens the future of the Peruvian small-scale fishing fleet.¹²⁷
- Peru has a wide variety of advanced MCS tools at its disposal and has made MCS one of its priorities in its National Maritime Policy.
 - Peru sees the value of regional cooperation and coordination on MCS activities and has been the initiator of several bilateral agreements in the Southeast Pacific region and beyond.

The aforementioned overviews of the various MCS tools and strategies that CPPS member States are currently using illustrate the differences in capacity levels of these States for MCS activities. Peru and Chile, for example, have many MCS tools at their disposal whereas the MCS capacity in Colombia and Ecuador is less developed. MCS and enforcement can be costly to implement, especially on the high seas. That is why it would be beneficial for these neighbouring States to cooperate more closely to match capacity-building needs by providing personnel and the use of vessels, aircraft or other items of equipment for monitoring, control, surveillance and law enforcement purposes.

There is some bilateral cooperation among CPPS member States (e.g. between Ecuador and Chile on satellite tools), but there is no regional MCS strategy, integrated MCS data framework or single platform where these States can share best practices, exchange data and increase trust amongst compliance and law enforcement agents.

All four CPPS member States experience challenges in ensuring compliance with regulations through transparency and sanctions. Most MPAs in the region do not have (effective) management plans in place and it is questionable whether existing sanctions are sufficient to deter IUU fishing activities.

¹²⁷ Other factors include a lack of scientific knowledge on ecology and population dynamics of most exploited species; open access regimes; and lack of regulations for most exploited species (e.g. quota, fishing closure, effort control, minimum size); Ibid.

3.5. Case studies

This section explores case studies of MCS activities in Panama and Costa Rica and highlights the activities of RFMOs in the region.

Case study of Panama

The Republic of Panama occupies a unique position on the central American isthmus. Panama has both a Caribbean and a Pacific coast and its land territory is divided into two halves by the Panama Canal, the artificial waterway that connects the Atlantic and the Pacific and today serves as a model for vessel traffic management. Panama has registered more than 8,000 vessels worldwide (about 18% of the world's maritime fleet), more than any other country in the world. Panama will host the 2021 UN 'Our Ocean Conference' and will publish a set of ocean law guidelines together with Chile. Given its position as a major flag State, Panama could play a key leadership role to strengthen and implement MCS standards at both a regional and global level.

In 2004, Panama created Coiba National Park (PNC) made up of Coiba, the largest island in the Central-American Pacific, and 38 smaller islands, islets and rocks.¹²⁸ The MPA covers 2,024 km² and encompasses one of the most extensive coral reef systems in the Eastern Pacific.¹²⁹ In 2019, Panama created the Isla Boná Wildlife Refuge that covers 3,885 km² and protects the islands of Boná and Estivá.¹³⁰ Panama has also cooperated closely with Costa Rica and Colombia to identify priority sites for biodiversity conservation in the Caribbean and the Pacific coastal zones.¹³¹

Panama established the Commission for the Formulation, Development and Monitoring of the National Policy of Oceans in 2018, creating an institutional framework for MCS activities.¹³² This general framework articulates

and guides regulation and government action. Panama has three main objectives as part of its national ocean governance strategy, namely to 1) update and execute management plans for its MPAs, 2) establish measures for protection, conservation and sustainable use of marine resources, as well as monitoring and control procedures and 3) formulate prevention and mitigation measures for marine pollution and other risk factors.

Panama receives a significant amount of support for its MCS activities from international funders. In ABNJ, Panama's MCS work is funded by the Global Environment Facility (GEF) with the FAO as the implementing partner.¹³³ In order to strengthen its capacity in MCS, Panama plans to:

- Allocate funds for research and innovation in the following areas: oceanography, marine biology, fisheries science, geology and marine technology;
 - Generate data and indicators that can be used for offshore monitoring; and
 - Develop research skills through postgraduate level courses (masters and doctorates) in areas of marine technology, oceanography, fisheries science, geology and marine biology.
- ➡ CPPS member States may wish to enhance their cooperation with Panama by developing joint research projects on MCS in order to strengthen MCS in the entire Southeast Pacific region.

Case study of Costa Rica

In order to tackle IUU fishing, the Republic of Costa Rica has established "Six Marine Areas for Responsible Fisheries located on Pacific coast, where 90% of landings occur".¹³⁴ Sev-

128 WildAid, 2010, "An Analysis of the Law Enforcement Chain in the Eastern Tropical Pacific Seascape": <https://www.issuelab.org/resources/26036/26036.pdf>

129 Ibid.

130 <https://menafn.com/1099378751/Isla-Bon%C3%A1-becomes-a-Wildlife-Refuge>

131 These priority sites were developed through the Tropical Eastern Pacific Ecoregional Plan, a project led by the Nature Conservancy with the cooperation of Conservation International, several research institutions, NGOs and government agencies of the three countries: <https://www.cbd.int/doc/meetings/mar/rwebsa-wcar-01/other/rwebsa-wcar-01-colombia-01-en.pdf>

132 https://www.gacetaoficial.gob.pa/pdfTemp/28643_B/GacetaNo_28643b_20181029.pdf

133 <https://www.thegef.org/country/panama>

134 FAO, 2015, "Report of the Fourth Global Fisheries Enforcement Training Workshop, San José, Costa Rica, 17–21 February 2014," FAO Fisheries and Aquaculture Report No. 1078, Rome: <http://www.fao.org/3/a-i4488e.pdf>

eral lessons can be learned from civil society initiatives off the coast of Costa Rica. Conservation International and *Asociación Costa Rica por Siempre*, for example, started a project in 2012 that uses available technologies, resources and existing infrastructures to implement Costa Rica's maritime surveillance system.¹³⁵

The objective of the project was to find out what kind of MCS tools exist that can be used from land, sea and air and to identify the components that need to be modernised (allocations, personnel qualification and infrastructure maintenance). The project also aimed to strengthen the legal framework, propose administrative rules and/or reforms, encourage inter-institutional actions as well as sanctioning processes to enforce the law. Moreover, the project was involved with the creation of a new MPA in the waters adjacent to the Cocos Islands in 2011. This is the first MPA that has been created in the region through a common effort of both the Ministry of the Environment and the Ministry of Fisheries.

In the context of this project, the Ministers of Environment, Security and Defence from Costa Rica, Ecuador and Panama signed a framework agreement in 2013 and thereby committed to participating in a process of creating a regional control and maritime surveillance strategy. In 2016, the project partners installed a radar in the Cocos Islands MPA. The logistics of setting this up was a challenge. More than US\$3.5 million has been invested in the radars around the Cocos Islands MPAs, but there have not been significant advances with the MCS strategy in Costa Rica because of a lack of coordination between government organisations. The Ministry of Security does not want to manage the radars because of the maintenance costs and the Ministry of the Environment has indicated that it does not fall within its mandate. Another challenge is that the Cocos MPA does not have a management plan in place.

➡ The main lesson learned from aforementioned projects in Costa Rica is that even if financial resources and technology are available for MCS purposes, this is not sufficient to strengthen MCS. The State in question should also have the political will to make use of (foreign) capital and capacity to expand its mandate or efforts to ensure something will change on the ground. This includes the willingness to clarify which government institution is responsible for which type of MCS activity and to establish coordination mechanisms between different government institutions.

Best practices of RFMOs in the Southeast Pacific

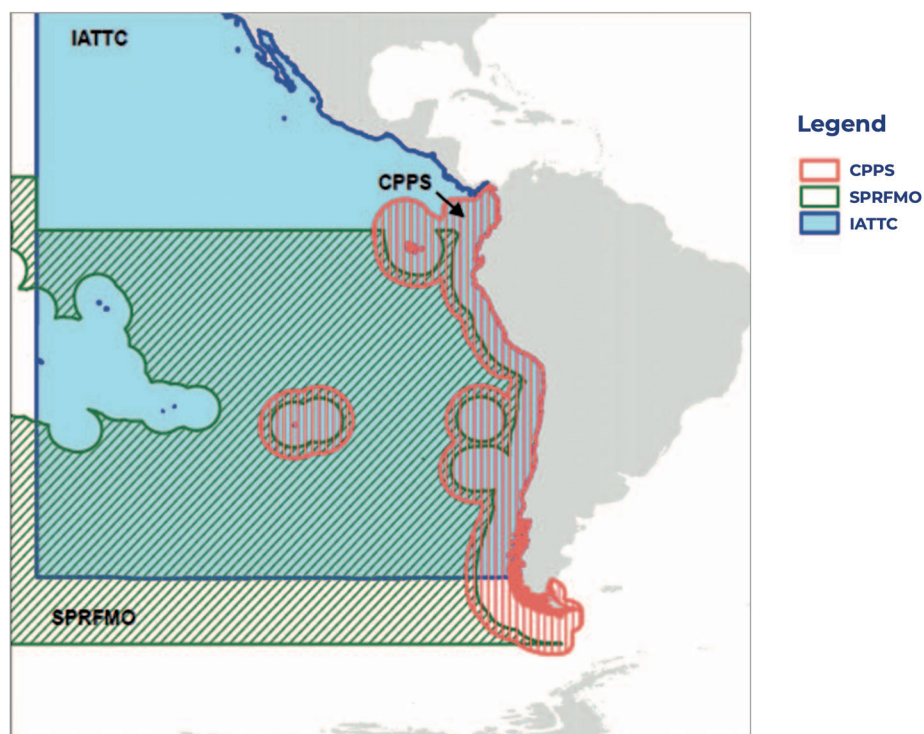
MCS has been strengthened at a regional level through regional fisheries management organisations (RFMOs), which are in a unique position to develop MCS standards for fisheries, guide the development of efficient and effective MCS systems, and facilitate coordinated efforts to ensure effective implementation of conservation and management measures (Hutniczak, B., 2019). RFMOs have developed various measures to enhance MCS efforts of their members and to encourage compliance with their rules, e.g. (Cremers *et al.*, 2020a):

- ➡ The implementation of mandatory VMS, observer programmes, electronic reporting and monitoring systems;
- ➡ The adoption of regional MCS schemes for port State measures;
- ➡ The development of vessel lists for authorised fishing vessels as well as those reported as engaging in IUU fishing activities. Several RFMOs have a special procedure for cross-listing IUU vessels from other organisations;
- ➡ Requiring members to meet minimum standards (Hutniczak, B., 2019).

¹³⁵ <https://costaricaporsiempre.org/portfolio/control-y-vigilancia/?lang=en>

In the Southeast Pacific, two RFMOs play a key role in strengthening MCS at a regional level: the Inter-American Tropical Tuna Commission (IATTC)¹³⁶ and the South Pacific Regional Fisheries Management Organisation (SPRFMO)¹³⁷ (Figure 13). Both SPRFMO and IATTC have adopted legally binding provisions with regard to the adoption of conservation and management measures for fisheries resources in their respective Convention areas. Table 3 provides a comparison of the kinds of MCS measures that the RFMOs have adopted.

Figure 13. Geographical mandate of IATTC, SPRFMO and CPPS (Durussel et al., 2018)



¹³⁶ IATTC was established by the *Convention for the Establishment of an Inter-American Tropical Tuna Commission* in 1949 and is mandated with the long-term conservation and sustainable use of tuna and other marine resources in the eastern Pacific Ocean. It has the following members: Belize, Canada, China, Colombia, Costa Rica, Ecuador, El Salvador, the EU, France, Guatemala, Japan, Kiribati, Korea, Mexico, Nicaragua, Panama, Peru, Chinese Taipei, the USA, Vanuatu and Venezuela. See: <https://www.iattc.org/HomeENG.htm>

¹³⁷ SPRFMO was established by the *Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean* and aims to safeguard the long-term conservation and sustainable use of non-highly migratory fish species in ABNJ of the South Pacific. It has the following members: Australia, Belize, Chile, China, Cook Islands, Cuba, the EU, France, Denmark (in respect of the Faroe Islands), Korea, New Zealand, Peru, the Russian Federation, the USA, Chinese Taipei and Vanuatu. See: <https://www.sprfmo.int/about/docs/>

Table 3. A comparison of MCS standards established by IATTC and SPRFMO

Type of MCS measure	IATTC	SPRFMO
List of authorised vessels	Established a Regional Vessel Register ¹³⁸	Maintains a list of authorised vessels ¹³⁹
IUU vessel list	Has a publicly available IUU vessel list on its website that includes links to other IUU vessel lists ¹⁴⁰	Has a publicly available IUU vessel list on its website that includes links to other IUU vessel lists; ¹⁴¹ only RFMO which automatically recognises IUU vessel lists of all other RFMOs ¹⁴²
Catch reporting	Yes ¹⁴³	Yes ¹⁴⁴
VMS	Requirement for tuna or tuna-like species fishing vessels with a length of 24 meters or more operating in the Antigua Convention's area ¹⁴⁵	All fishing vessels on the list of authorised vessels have to operate 'on a permanent basis' a VMS within the SPRFMO Convention Area as well as within a buffer zone of 100 nautical miles outside the Convention area ¹⁴⁶
On-board observer programmes	Requires 100% observer coverage for large purse seine vessels (> 363 metric tons) and 5% for longline vessels; ¹⁴⁷ observers have to report relevant data and infractions to the IATTC Secretariat; the International Review Panel is responsible for reviewing IATTC observer reports and determining infractions (e.g. fishing without an observer) which it reports to the relevant government (which has to report back on actions taken) ¹⁴⁸ ; makes yearly observer summary reports publicly available of contracting parties ¹⁴⁹	Has a regional-level observer programme in place, but does not specify minimum levels of coverage. ¹⁵⁰ However, conservation and management measures (CMM) require minimum levels of observer coverage for jack mackerel (10%), ¹⁵¹ bottom fisheries (10% for line and 100% for trawl gear) ¹⁵² and most recently for squid (minimum observer coverage of five full time at sea observers or 5% of fishing days). ¹⁵³ In addition, each exploratory fishery has a CMM and all specify 100% observer coverage during exploratory fishing ¹⁵⁴
Transshipment monitoring	Maintains a record of vessels authorised to undertake transshipment at sea and in port ¹⁵⁵	Maintains a record of vessels authorised to undertake transshipment at sea and in port; requires pre-notification of transshipment activities for the jack mackerel fishery ¹⁵⁶ as well as annual reporting of all transshipment activities ¹⁵⁷

138 <http://www.fao.org/tempref/FI/DOCUMENT/IPOAS/regional/IATTC-73-EPO-Capacity-Plan.pdf>;
https://www.iatct.org/PDFFiles/Resolutions/IATTC/_English/C-00-06_Regional%20Vessel%20Register.pdf

139 <https://www.sprfmo.int/data/record-of-vessels/>

140 <https://www.iatct.org/VesselRegister/IUU.aspx?Lang=ENG>; https://www.iatct.org/PDFFiles/Resolutions/IATTC/_English/C-19-02-Active_Amendments%20and%20replaces%20C-15-01%20IUU%20fishing.pdf

141 <https://www.sprfmo.int/measures/iuu-lists/>

142 Regulation CMM 04-17 Establishing a List of Vessels Presumed to Have Carried Out Illegal, Unreported and Unregulated Fishing Activities in the SPRFMO Convention Area states "measures [against IUU fishing vessels] referred to in paragraph 14 shall apply mutatis mutandis to fishing vessels included in the final IUU list established by another RFMO and operating in the SPRFMO Convention Area"; <https://www.sprfmo.int/assets/Fisheries/Conservation-and-Management-Measures/CMM-04-2017-IUU-List-27Feb17.pdf>; (Hutniczak, B., 2019).

143 <https://www.iatct.org/CatchReportsDataENG.htm>

144 <https://www.sprfmo.int/data/data-submission/>

145 https://www.iatct.org/PDFFiles/Resolutions/IATTC/_English/C-14-02-Active_Amendments%20and%20replaces%20C-04-06%20Vessel%20Monitoring%20System.pdf

146 <https://www.sprfmo.int/assets/Fisheries/Conservation-and-Management-Measures/2019-CMMs/CMM-06-2018-5Mar2018.pdf>; this buffer zone does not apply to vessels flagged to coastal States fishing within their national jurisdiction.

147 https://www.iatct.org/PDFFiles/Resolutions/IATTC/_English/C-11-08-Active_Observers%20on%20longline%20vessels.pdf

148 http://www.iatct.org/Meetings/Meetings2018/AIDCP-38/Docs/_English/MOP-38-01_Report%20on%20the%20International%20Dolphin%20Conservation%20Program.pdf

149 <https://www.iatct.org/InformationalReportsENG.htm>

150 <http://www.sprfmo.int/assets/Fisheries/Conservation-and-Management-Measures/2019-CMMs/CMM-16-2019-5Mar2019.pdf>

151 <http://www.sprfmo.int/assets/Fisheries/Conservation-and-Management-Measures/2020-CMMs/CMM-01-2020-Trachurus-murphy-31Mar20.pdf>

152 <http://www.sprfmo.int/assets/Fisheries/Conservation-and-Management-Measures/2020-CMMs/CMM-03-2020-Bottom-Fishing-31Mar20.pdf>

153 <http://www.sprfmo.int/assets/Fisheries/Conservation-and-Management-Measures/2020-CMMs/CMM-18-2020-Squid-31Mar20.pdf>

154 <https://www.sprfmo.int/measures/>

155 https://www.iatct.org/PDFFiles/Resolutions/IATTC/_English/C-08-02_Transshipments.pdf

156 <https://www.sprfmo.int/assets/Fisheries/Conservation-and-Management-Measures/2018-CMMs/CMM-12-2018-Transshipment-8March2018.pdf>

157 <http://www.sprfmo.int/assets/Fisheries/Conservation-and-Management-Measures/2020-CMMs/CMM-02-2020-Data-Standards-31Mar20.pdf>

Type of MCS measure		IATTC	SPRFMO
Inspections in ports	No		Member States and cooperating non-member States are required to carry out inspections on at least 5% of landing and transshipment operations made by foreign fishing vessels in their ports and are required to follow the Port State Inspection Standards established by SPRFMO ¹⁵⁸
Designation of landing ports	No		Member States and cooperating non-member States are required to create a list of designated ports where foreign fishing vessels can land their catches and have to notify the SPRFMO Secretariat of their listing ¹⁵⁹
Regional management plan	Regional management plan on fishing capacity ¹⁶⁰	No	
Fleet capacity limits	For purse-seine and long-line fleets ¹⁶¹	No	
Compliance	Has a Committee for the Review of Implementation of Measures Adopted by the Commission (prior to 2010 known as the Permanent Working Group on Compliance); minutes available from the IATTC ¹⁶²		Has a Compliance and Technical Committee that monitors and reviews the implementation of, and compliance with, conservation and management measures adopted by SPRFMO and reviews the implementation of cooperative measures for monitoring, control and surveillance and enforcement ¹⁶³
Infringements	No		If the information collected during an inspection provides evidence that a foreign fishing vessel has committed a breach of the SPRFMO conservation and management measures, the inspector is obliged to record the breach in the inspection report, transmit the inspection report and evidence collected to the port State competent authorities (which has to forward a copy to the SPRFMO Executive Secretary and the relevant flag State) and ensure safekeeping of the evidence ¹⁶⁴
Annual implementation report	No		Member States and cooperating non-member States are required to submit an annual implementation report, which serves as a basis for evaluation through the Compliance and Technical Committee of States' Compliance ¹⁶⁵
Biodiversity rule	No		Has a so-called 'move-on rule': bottom fishing vessels have to assess their benthic bycatch and, if specified triggers are exceeded, cease fishing and move away from the area where the potential vulnerable marine ecosystems were encountered ¹⁶⁶
Recognition of special requirements of developing States	"The Commission shall seek to adopt measures relating to technical assistance, technology transfer, training and other forms of cooperation, to assist developing countries that are members of the Commission to fulfil their obligations under this Convention, as well as to enhance their ability to develop fisheries under their respective national jurisdictions and to participate in high seas fisheries on a sustainable basis" ¹⁶⁷		Cooperation among Contracting Parties and other regional organisation shall be directed towards "monitoring, control, surveillance, compliance and enforcement, including training and capacity-building at the local level, development and funding of national and regional observer programmes and access to technology and equipment" ¹⁶⁸

158 <https://www.sprfmo.int/assets/Fisheries/Conservation-and-Management-Measures/2019-CMMs/CMM-07-2019-5Mar2019.pdf>

159 Ibid.

160 <http://www.fao.org/tempref/FI/DOCUMENT/IPOAS/regional/IATTC-73-EPO-Capacity-Plan.pdf>

161 Ibid.

162 <https://www.iattc.org/Minutes/IATTC-AIDCP-Minutes-ReportsENG.htm>

163 <https://www.sprfmo.int/assets/Basic-Documents/Convention-web-12-Feb-2018.pdf> (Article 11).

164 <https://www.sprfmo.int/assets/Fisheries/Conservation-and-Management-Measures/2019-CMMs/CMM-07-2019-5Mar2019.pdf>

165 Article 30 of the SPRFMO Convention.

166 <https://www.sprfmo.int/assets/2018-SC6/Meeting-Documents/SC6-DW09-Methods-deriving-VME-thresholds.pdf>

167 Antigua Convention, Part VI, Article XXIII; https://www.iattc.org/PDFFiles/IATTC-Instruments/_English/IATTC_Antigua_Convention%20Jun%202003.pdf

168 <https://www.sprfmo.int/assets/Basic-Documents/Convention-web-12-Feb-2018.pdf> (Article 19(4)(c)).

Table 3 illustrates the great variety of measures that IATTC and SPRFMO have used to enhance MCS efforts of their parties as well as cooperating non-parties and to encourage compliance with their rules. SPRFMO has adopted more MCS measures, which could partly be explained¹⁶⁹ because it is a younger RFMO (established in 2012) compared to IATTC (established in 1950, before the UNCLOS negotiations had taken place). Despite the different mandates of both organisations, IATTC and SPRFMO could benefit from cooperation and coordination on MCS.

Both RFMOs could improve their on-board observer programmes. Only three out of 17 RFMOs (Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea, Northwest Atlantic Fisheries Organisation and South East Atlantic Fisheries Organisation) require 100% observer coverage for all fishing vessels operating in their convention area (Ewell *et al.*, 2020). IATTC, for example, requires 100% observer coverage for purse seine vessels and 5% for longline vessels (Table 3). However, a review of contracting party compliance with the requirement of longline observer coverage in the period from 2015 to 2018 found that most contracting parties do not meet the 5% coverage requirement and that many contracting parties fail to submit observer reports (Ewell *et al.*, 2020). This lack of observer coverage can hinder data collection on whether vessels are implementing IATTC measures.¹⁷⁰

In addition, IATTC could strengthen its port State measures by “requiring its Parties to notify other international actors about their actions against IUU fishing vessels; designating ports for entry of foreign vessels; requiring prior-to-entry information from vessels; denying entry into port to IUU fishing vessels or taking equally effective port State measures against them; and denying IUU fishing vessels any access to port services”.¹⁷¹ A recent comparative analysis of tuna RFMOs¹⁷² by the International Seafood Sustainability Founda-

tion concludes that 1) IATTC’s compliance process does not have a standard to distinguish between non-compliance of a minor or technical nature and serious non-compliance that undermines the effectiveness of the Antigua Convention or resolutions adopted by the Commission and that 2) IATTC has not yet developed a scheme of sanctions and incentives to improve compliance.¹⁷³

SPRFMO is the only RFMO globally, together with the International Commission for the Conservation of Atlantic Tuna (ICCAT), which has granted a formal role to NGOs in regional compliance procedures (Guggisberg, 2019). At its annual meeting, the Compliance and Technical Committee considers the Draft Compliance Report and “may take into account any additional information” provided by NGOs (Guggisberg, 2019). For the IATTC, NGOs have a formal role as part of the International Review Panel that monitors infractions related to dolphin interactions (mandated under the Agreement for the International Dolphin Conservation Program), but the IATTC might also wish to clarify or expand the role that NGOs can play in its other compliance procedures.

169 Other reasons include the different mandates, State parties and convention areas.

170 https://www.iattc.org/Meetings/Meetings2019/IATTC-94/OtherDocs/_English/IATTC-94-OTR-International%20Seafood%20Sustainability%20Foundation-Position-statement.pdf

171 https://www.pewtrusts.org/-/media/legacy/uploadedfiles/peg/publications/fact_sheet/iattc20gap20analysis20june20final203pdf.pdf

172 RFMOs that manage straddling and highly migratory fish stocks (generally tuna and tuna-like species).

173 <https://iss-foundation.org/knowledge-tools/technical-and-meeting-reports/download-info/issf-2020-06-tuna-rfmo-compliance-assessment-processes-a-comparative-analysis-to-identify-best-practices/>

4. Options to strengthen MCS in the region

This section identifies three pathways to strengthen MCS in the region, namely through 1) communication, cooperation and coordination, 2) data-based policy and 3) an appropriate and effective penalty system to deter illegal activities. These recommendations are the outcome of discussions held during the STRONG High Seas workshops in Guayaquil in November 2019 and Lima in February 2020.

4.1. Improving communication, cooperation and coordination

One of the key challenges for effective MCS in the Southeast Pacific is the lack of communication, cooperation and coordination - within States (e.g. different Ministries), amongst States (e.g. for a joint maritime strategy), with civil society and amongst regional and sectoral regimes (e.g. RFMOs and the IMO).

Recent developments indicate that there is sufficient appetite amongst CPPS States to take a regional approach to MCS. In August 2020, the 13th Special Assembly of the CPPS adopted the Declaration on IUU Fishing, which calls on its members to strengthen the exchange of information, to encourage the use of satellite technology, such as Global Fishing Watch, to increase transparency, to improve monitoring and surveillance of fishing activities in the region and requests the Secretary General of the CPPS to identify mechanisms for international cooperation to strengthen the capacity of its members to combat and prevent IUU fishing.¹⁷⁴

On 3 November 2020, the foreign ministers of Ecuador, Colombia, Chile and Peru adopted a declaration in which they declare the need to optimise mechanisms for coordination, cooperation and the exchange of information in real time, with the aim of evidencing alleged IUU fishing practices and promoting the adoption of prompt and efficient measures at the local and regional levels. Moreover, they

declared their willingness to hold meetings with the purpose of joining efforts and consolidating common interests aimed at ensuring the conservation and sustainable use of marine resources in the region.¹⁷⁵

The importance of communication and cooperation

The interests of different Ministries (e.g. Ministry for the Environment versus Ministry of Trade or Defense) are not always aligned. The relevant competencies can be spread across many institutions. This is, for example, the case in Colombia where there are 20 relevant institutions that must coordinate on maritime policy. For this reason, Colombia has conducted efforts, since 1969, to integrate various actors (different ministries, government entities and members of civil society) in the implementation and development of its policy through the Colombian Ocean Commission. The COC uses tools such as National Committees and National Working Groups to work on the sustainable development of its marine and coastal spaces from an inter-sectoral perspective. The challenges in ABNJ refer to various human activities at sea and therefore it is important that both those who are facing the operational reality as well as those playing an executive role take part in the development of common and collaborative procedures.

Any MCS effort in national or international waters therefore requires an effective communication strategy, not only internally but also externally to the public, such as specific stakeholders (e.g. fishers). Decision-makers may be more likely to invest in MCS tools if it is clear that these tools can serve multiple purposes and can maintain a common interest. For instance, satellite technology can be used to conserve marine biodiversity (e.g. through tackling IUU), but also for maritime security (e.g. through addressing drug or human trafficking). The IMO has used a similar strategy in the past by using a process to manage commercial vessels that transmit their posi-

¹⁷⁴ http://cpps.dyndns.info/consulta/documentos/xiii_asamblea_extra_declaracion.pdf

¹⁷⁵ <https://minrel.gob.cl/noticias-antiores/declaracion-conjunta-respecto-a-la-pesca-de-naves-extranjeras-en-las>

tion while using a similar process to tackle invasive species. When relevant stakeholders are involved in MCS efforts, there is a higher chance that ocean users, such as fishers, will take ownership in the process of collecting data, will perceive the management system as legitimate and will be more compliant (Battista *et al.*, 2018; Cremers *et al.*, 2020a). Decision-makers at a national level need to understand that managing resources in ABNJ, a common resource, in a sustainable way can also be beneficial for the conservation and sustainable use of resources in neighbouring national waters, which is in line with their national interest.

Stronger regional approach to MCS

Distant water fishing fleets engaging in IUU activities in the Southeast Pacific present a shared threat to the national interests of all States in the region. As no one State can tackle this problem alone, there may be a clear impetus for enhancing regional cooperation. Furthermore, once the BBNJ treaty will enter into force, States could benefit from increasing cooperation to regionally monitor and enforce the new rules and sustainably manage the common resources in ABNJ. Regional agreements can underpin global standards established in the BBNJ treaty and go beyond these standards while considering the specificity of the region, its challenges and needs (Gjerde *et al.*, 2018).

This is especially relevant in the context of ABMTs, including MPAs, because “a global process to establish MPAs can help to ensure that third parties outside of the specific region recognise regional MPAs” and “build on advances already made at the regional level for identifying and using scientific data for MPA establishment” (Gjerde *et al.*, 2018). The effectiveness of MCS can be the deciding factor for whether MPAs will realise their conservation and management objectives (Rowlands *et al.*, 2019). One option would be to create a region-

al mechanism with clear leadership that could monitor and assist with the implementation of the BBNJ treaty. Stronger regional cooperation could also take the form of joint MCS activities (e.g. joint patrol activities or research) and data exchange. By sharing MCS activities, States could reduce costs, improve coverage and increase trust between enforcement authorities at a regional level. These advantages have to be seen in light of any potential challenges such as additional reporting responsibilities for States, the security of sensitive data and the difficulty of agreeing a unified regional position that takes into account differences in economic situations of member States (Cremers *et al.*, 2020a).

Several regional initiatives could provide inspiration for stronger cooperation on MCS. For example, Costa Rica, Ecuador, Colombia and Panama signed a Memorandum of Understanding in 2018 to develop a joint strategy to improve transparency and fisheries control management at the regional level.¹⁷⁶ In the context of search and rescue activities, Peru has signed an agreement with the United States and is also in the process of negotiating with Ecuador and soon with Chile to increase regional capacity to cruise the ocean. With the adoption of a regional MCS strategy, States could jointly work towards a common long-term objective that is not as likely to be replaced because of a regime change at a national level.

Role of civil society in national and regional MCS policies

States in the Southeast Pacific might wish to clarify how they see the role of NGOs¹⁷⁷ in their MCS policies and to what extent they would like to cooperate with civil society. The increasing availability and declining cost of MCS technologies has granted civil society with more access to ocean governance (Cremers *et al.*, 2020b; Toonen and Bush, 2018). NGOs play several important roles in promoting compliance

¹⁷⁶ <https://globalfishingwatch.org/press-release/new-partnership-to-strengthen-transparency-in-fisheries-in-the-eastern-tropical-pacific/>

¹⁷⁷ Examples of NGOs active in the CPPS region include: **Global Fishing Watch** (a partnership founded by Oceana, Google and SkyTruth in September 2016, and now an independent NGO that aims to make global commercial fishing activity publicly available); **OceanMind** (began in 2014 as “Project Eyes on the Seas”, a collaboration between the Satellite Applications Catapult and The Pew Charitable Trusts”, but since July 2018 it has become an independent NGO with the aim to support enforcement and MCS professionals globally); **Conservation International** (American NGO founded in 1987 with a project on the Eastern Tropical Pacific Seascape, the waters, coasts and islands off the shores of Costa Rica, Panama, Colombia and Ecuador) and **Sea Shepherd Conservation Society** (American NGO that started with Operation Mamacocha in 2018, a high seas maritime patrol campaign that uses the vessel M/V Brigitte Bardot to patrol the Eastern Tropical Pacific Marine Biodiversity Corridor for IUU fishing activities).

with international fisheries regulations ranging from monitoring, investigating and reporting IUU fishing activities to direct actions (e.g. data gathering and sharing) in both EEZs as well as the high seas (Guggisberg, 2019). In the Southeast Pacific, Global Fishing Watch (GFW), for example, has partnerships with Peru, Panama and Chile.¹⁷⁸ Moreover, it signed a MoU with PACÍFICO, a coordination platform comprised of four environmental funds in Central and Latin America,¹⁷⁹ with the goal to collaborate with Costa Rica, Colombia, Ecuador and Panama to develop a joint strategy to improve transparency and fisheries control management at the regional level and strengthen their capacity to use fisheries surveillance and other MCS technology.¹⁸⁰ With the help of GFW data, the Peruvian Fishing Authority (Ministry of Production) and the Peruvian Maritime Authority (DICAPI) had sufficient evidence to penalise a foreign vessel that was fishing in Peruvian jurisdictional waters for squid without the required authorisation.

Another example of successful cooperation between State and non-State actors is the interception of the MV Nika vessel in Indonesia which was suspected of conducting illegal fishing in the Southern Ocean and other illicit activities while operating under the flag of Panama. Panama asked INTERPOL for its assistance in locating, tracking and coordinating international efforts to inspect the vessel and the UK-based not-for-profit organisation OceanMind together with GFW provided data on the movement of the vessel. The vessel was detained in Indonesia and the crew of the vessel were detained for questioning.

On the one hand, NGO involvement in State policy on MCS can improve efficiency in detecting potential IUU fishing cases and highlight shortcomings of flag State enforcement

activities (Guggisberg, 2019). On the other hand, States might be reluctant to involve NGOs in compliance processes as it “implies that States cannot or are not willing to respect and enforce international law” (Guggisberg, 2019). It is clear that the human resources, data and technology of NGOs like GFW and OceanMind can be used as a useful tool for policy-making, but it is in the end up to State representatives to decide whether they want to do something with this information.

Improved cooperation between regional and sectoral regimes

CPPS States could also strengthen MCS in the Southeast Pacific region by improving cooperation between regional and sectoral regimes and by contributing to international partnerships (e.g. joint programmes of the FAO, IMO, International Labour Organization and the United Nations Office of Drugs and Crime). One initiative that can be used for this purpose is the Network for the Exchange of Information and Shared Experiences between Latin American and Caribbean countries to prevent, deter and eliminate IUU Fishing which aims to simplify the exchange of information and experiences to fight IUU fishing.¹⁸¹ The Peruvian government assumes the role of Technical Secretariat and current member States are Peru, Chile, Costa Rica, Panama, Ecuador, Colombia, Spain and the United States.¹⁸² SPRFMO, CPPS, IATTC, the Environmental Program Project Scale from INTERPOL and the National Oceanic and Atmospheric Administration (NOAA) are all co-operating agencies. This network can be used to share experiences, information about vessels and laws and promote cooperation actions in the region, such as a training course for ship inspectors that Chile and Peru organised.¹⁸³ The CPPS could use this network to co-

178 GFW is currently in discussion with Colombia and Ecuador to form a partnership. In May 2018, Costa Rica's Ministry of Public Security and Ministry of Environment and Energy signed a letter of intent with the goal of making their VMS data public through the GFW map: <https://globalfishingwatch.org/press-release/new-partnership-to-strengthen-transparency-in-fisheries-in-the-eastern-tropical-pacific/>

179 Patrimonio Natural [Natural Heritage] (Colombia), Fondo Acción [Action Fund] (Colombia), Fundación Natura [Nature Foundation] (Panama) and Asociación Costa Rica por Siempre [Forever Costa Rica Association] (Costa Rica). Its mission is to serve as an innovative regional funding platform to ensure the sustainable management of the Eastern Tropical Pacific (ETP): www.redpacifico.net

180 <https://globalfishingwatch.org/press-release/new-partnership-to-strengthen-transparency-in-fisheries-in-the-eastern-tropical-pacific/>

181 The network is a response to the request made by countries under the FAO TCP/RLA/3604 regional project: <http://www.fao.org/3/a-i7013s.pdf>; to facilitate interaction, the Peruvian government, in close collaboration with the FAO, has created the following website: <http://www.redpescaindnr.gob.pe/>

182 Argentina, El Salvador, Guatemala, Mexico, Dominican Republic and Uruguay are observers.

183 <http://www.fao.org/americas/noticias/ver/en/c/1138050>

ordinate responses of its four member States with the view to discuss possible joint measures.

Another option to strengthen cooperation between regional and sectoral regimes in the Southeast Pacific could be to adopt a Memorandum of Understanding (MoU) between SPRFMO, IATTC and CPPS (Durussel *et al.*, 2017).¹⁸⁴ This MoU could formalise cross-sectoral cooperation on data collection and analysis as well as lead to joint monitoring and enforcement actions for the MCS of human activities in ABNJ. Various initiatives have already been undertaken to strengthen cooperation between RFMOs, such as the Kobe process¹⁸⁵ and the Tuna Compliance Network¹⁸⁶ (Wright *et al.*, 2018), but more efforts are needed in terms of cross-sectoral cooperation.

4.2. Establishing data-based policies

Until recently, the lack of technological capacity was often cited as a barrier to strengthening MCS in the region, but currently there are a range of tools available and more technology may not necessarily be the solution. For MCS to work, it is necessary to decide on a case-by-case basis which tools are relevant based on what kind of information needs to be monitored, for what purpose, associated costs, accessibility, profitability and coverage. One of the biggest challenges now is the lack of capacity to store, process and analyse data, as well as a lack of a strategic approach (e.g. defining which questions need to be answered and which actors and stakeholders need to be involved) to how we respond to new knowledge (Cremers *et al.*, 2020a). It is therefore necessary to identify ways to integrate MCS tools into concrete operational and scientific research activities and to ensure that transversal verification of data is possible. More steps can be taken to digitalise

information so that information can easily be exchanged. Data can only be helpful for decision-makers if it is effectively gathered and adapted to support strong compliance provisions (Cremers *et al.*, 2020a). That is why technical as well as political personnel might need to receive training on what kind of MCS tools exist and how they can be used for policy purposes.

There is also no uniform and equal implementation of MCS rules, partly because of differences between States in terms of available capacity and capital for investment and varying levels of willingness of governments to eliminate non-compliance (Barbara Hutniczak, 2018). CPPS States could ensure that there is a structural (i.e. not too dependent on electoral budget cycles) budget available for legal, institutional and operational needs to carry out MCS activities and to guarantee financial stability. In order to allocate sufficient and long-term funding, CPPS States could look into alternative funding sources such as taxes (e.g. incentives for donations with environmental purposes) or fees on activities that put pressures on biodiversity (e.g. tourism).¹⁸⁷ Moreover, the aforementioned chapters have illustrated that there are many initiatives to develop MCS capacity in the Southeast Pacific region by intergovernmental organisations, NGOs, States and international donors. The delivery of this support could be more coordinated to avoid duplication of effort and to make the support more cost-effective, impactful and targeted to specific long-term needs in the region.¹⁸⁸

In order to improve regional cooperation and coordination, CPPS States may wish to standardise the MCS tools they are using in ABNJ so that it is easier to conduct joint MCS activities. It would also be useful to have a single platform for the exchange of information (e.g. cartographic data) that could be used for MCS activities. There is a significant amount of turnover of personnel responsible for data

¹⁸⁴ CPPS and SPRFMO signed a MoU in March 2019: <http://www.sprfmo.int/cooperation/mous/>; SPRFMO and IATTC have agreed the text for a MoU (in February 2020), but it has yet to be formally signed by both parties: <http://www.sprfmo.int/assets/0-2020-Annual-Meeting/Reports/Annex-10a-MoU-SPRFMO-IATTC.pdf>

¹⁸⁵ The Kobe process was launched in 2007 by Japan to harmonise the activities of five tuna RFMOs regarding scientific research, market issues, MCS, the impact of bycatch, and support for developing countries.

¹⁸⁶ The Tuna Compliance Network was launched in 2017 to facilitate communication and cooperation between the compliance officers of the five tuna RFMOs, supported by the FAO/GEF Common Oceans program.

¹⁸⁷ <https://chile.wcs.org/Portals/134/adjuntos/InformeWaltondig.pdf?ver=2018-11-22-195516-003>

¹⁸⁸ The FAO is currently working on a public list of capacity-building projects that is planned to go public in 2020.

analysis at a national level in the Southeast Pacific. By creating a single platform, these gaps could be filled at a regional level while at the same time ensuring that decision-makers do not lose oversight of where information can be found. The clearing-house mechanism that is expected to be established in the BBNJ treaty could also fulfil this role at a global level by encouraging States Parties to share best practices, increasing capacity for the design and implementation of MCS technologies and policies and highlighting opportunities to collaboratively monitor activities at sea (Cremers *et al.*, 2020a). In addition, CPPS States could explore ways in which data gathered by RFMOs (e.g. SPRFMO and IATTC) can be linked to global or regional information exchange systems.

4.3. Ensuring an appropriate penalty system and effective sanctions

Although CPPS States are member of a variety of international and regional agreements (Table 1) that bind them to MCS obligations, adherence to these agreements and global MCS standards varies widely. MCS tools are sometimes only useful “provided the legal requirements and pathways for prosecution are clear” (De Santo, 2018). CPPS States could therefore seek to ensure that they have an appropriate and effective penalty system in place with sanctions of sufficient severity to deter illegal activities (Cremers *et al.*, 2020a).¹⁸⁹ The lack of enforcement actions is sometimes linked to the lack of political will. States have the equipment and technology to monitor vessels and their activities, but it is not common to exercise law enforcement (e.g. the withdrawal of the authorisation to fish), especially in international waters. Even though authorities are aware of vessels conducting illicit activities, control entities do not often allow for intervention.

CPPS States find it important that the human aspect of MCS is taken into account as they realise that any enforcement measures can affect local communities. That is why it is essential that local authorities cross-check

all evidence of any suspected illegal activities with various MCS tools and make fast and efficient inspection possible. For example, when the Peruvian Navy (through DICAPI) detected Chinese vessels conducting illegal activities in their waters, they worked together with the Ministry of Foreign Affairs to send a diplomatic communication to the Embassy of China in Lima. Whereas China did not respond to the letter, seven or eight vessels were detained in the period that followed. Participants recommended CPPS States to have a mechanism in place to share information about sanctions to other States in the region so that the States can take joint action.

Moreover, CPPS States have created several MPAs in their waters, but for most of them there is no management plan in place yet. The vastness and remoteness of these very large MPAs (VLMPA) can make MCS tools impractical or expensive to implement (Rowlands *et al.*, 2019; Singleton and Roberts, 2014). CPPS States may therefore consider proposing a provision in the BBNJ treaty to require a MCS strategy to be provided with proposals for ABMTs and MPAs. This could encourage proponents to consider the possible technological tools and institutional frameworks available to ensure compliance. This could provide States Parties with an initial indication of the resources required to ensure effective MCS of the proposed measure and encourage them to consider the kinds of MCS tools they have at their disposal for different kinds of ABMTs (Cremers *et al.*, 2020a).

The European Union (EU) catch certification scheme also plays a role in the MCS landscape of the CPPS States. The EU issues warnings (yellow cards) in case exporting States are not combatting IUU fishing effectively and can ban the export of fish to the EU through issuing a red card.¹⁹⁰ The European Commission, for example, issued Ecuador a yellow card on 30 October 2019 based on shortcomings in its fisheries legal framework because it is not in line with international standards and required Ecuador to develop an enforcement and sanctioning system to address IUU fishing activities.¹⁹¹ One of the first responses of Ecuador was to implement a new fisheries law that

¹⁸⁹ In the context of IUU fishing, for example, strengthening the legal system and increasing sanctions against repeat offenders and foreign illegal fishing can significantly enhance MCS efforts (Doubouya *et al.*, 2017).

¹⁹⁰ https://ec.europa.eu/fisheries/cfp/illegal_fishing_en

¹⁹¹ https://ec.europa.eu/commission/presscorner/detail/en/IP_19_6036

is more stringent, includes higher fines and provides the possibility to detain vessels that have conducted illegal activities. There was a situation in which Ecuadorian vessels were providing fuel at an international price (fuel is subsidised in Ecuador) to Chinese vessels in ABNJ close to the Galapagos Islands. Under national pressure (e.g. in the media), the Ecuadorian vessels stopped providing fuel to the Chinese vessels. However, only when vessels are conducting suspicious activities or are blacklisted can control authorities really act against them.

On 12 December 2019, the European Commission decided to issue a second yellow card to Panama after the first yellow card was lifted in October 2014.¹⁹² The European Commission determined that there are serious deficiencies in terms of control, that these deficiencies undermine the reliability of the traceability system, that law enforcement is affected by inefficient administrative procedures and a lenient approach towards infringements (i.e. significant delays in the imposition of sanctions and the sanctioning system is neither depriving the offenders from the benefits accruing from IUU fishing, nor deterrent) and that there are serious deficiencies in the implementation of the Port State Measures Agreement.¹⁹³

The EU's market-based approach to tackling IUU fishing can enhance both traceability and transparency. Other international market-based measures include catch documentation schemes and eco-labelling (Cremers *et al.*, 2020a). The CPPS States could look into strengthening their MCS capacity using a market-based approach through coordinated actions under other international conventions, such as CITES,¹⁹⁴ or through RFMOs (e.g. catch documentation schemes) they are a member of to prevent IUU fishing products from entering global markets.¹⁹⁵

Table 4. Proposals to strengthen MCS in the Southeast Pacific

- Improve communication, cooperation and coordination on MCS within and between CPPS States, as well as between regional and sectoral bodies.
- Establish an effective joint data-based MCS strategy which includes a regional information exchange platform and capacity-building workshops for decision-makers as well as compliance officers on the ground.
- Ensure an appropriate penalty system is in place, including: effective sanctions; prompt intervention when suspected illegal activities occur; and a requirement to develop a MCS strategy when designating an area-based management tool including marine protected areas.

¹⁹² https://ec.europa.eu/commission/presscorner/detail/en/QANDA_19_6756

¹⁹³ Ibid.

¹⁹⁴ The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an agreement between governments that aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival.

¹⁹⁵ <http://www.fao.org/3/y3536e0a.htm>

References

- Alava, J., Barragán-Paladines, M., Denkinger, J., Muñoz-Abril, L., Jiménez, P., Paladines, F., Valle, C., Tirapé, A., Gaibor, N., Calle, M., Calle, P., Reyes, H., Espinoza, E., Grove, J. (2017). Massive Chinese Fleet Jeopardizes Threatened Shark Species around the Galápagos Marine Reserve and Waters off Ecuador: Implications for National and International Fisheries Policy. *International Journal of Fisheries Science and Research* 1, 1001.
- Barange, M., Bahri, T., Beveridge, M.C.M., Cochrane, K.L., Funge-Smith, S., Poulain, F. (2018). Impacts of climate change on fisheries and aquaculture: synthesis of current knowledge, adaptation and mitigation options. *FAO Fisheries and Aquaculture Technical Paper No. 627*, Rome.
- Barbara Hutniczak, C.D. and A.L. (2018). Combatting Illegal, Unreported and Unregulated Fishing: Where countries stand and where efforts should concentrate in the future.
- Battista, W., Romero-canyas, R., Smith, S.L., Fraire, J., Effron, M., Larson-konar, D., Fujita, R., Purcell, S.W. (2018). Behavior Change Interventions to Reduce Illegal Fishing 5, 1–15. <https://doi.org/10.3389/fmars.2018.00403>
- Boteler, B., Wanless, R., Dias, M., Packeiser, T., Awad, A., Yannicelli, B., Zapata Padilla, L.A., Aburto, J., Seeger, I., Hampton, S., Jackson, L., Wienrich, N., Ajagbe, A., Hazin, C., Castellanos Galindo, G.A., German Naranjo, L., F., Suárez, C., Prussmann, J., Valenzuela, S., Gomez Giraldo, L.S., Higgins, M.L., Contreras, C., Luna, G., Luna, N., Munizaga, M., Sellanes, J., Tapia, C., Thiel, M. (2019). Ecological Baselines for the Southeast Atlantic and Southeast Pacific: Status of Marine Biodiversity and Anthropogenic Pressures in Areas Beyond National Jurisdiction. *STRONG High Seas Project*. <https://doi.org/10.2312/iass.2019.061>
- Carlson, A.K., Taylor, W.W., Liu, J., Orlic, I. (2018). Peruvian anchoveta as a telecoupled fisheries system. *Ecology and Society*. <https://doi.org/10.5751/ES-09923-230135>
- Cremers, K., Wright, G., Rochette, J. (2020a). Strengthening Monitoring, Control and Surveillance in Areas Beyond National Jurisdiction. *STRONG High Seas Project*. <https://doi.org/10.2312/iass.2018.015>
- Cremers, K., Wright, G., Rochette, J. (2020b). Strengthening monitoring, control and surveillance of human activities in marine areas beyond national jurisdiction: Challenges and opportunities for an international legally binding instrument. *Marine Policy*. <https://doi.org/https://doi.org/10.1016/j.marpol.2020.103976>
- De Santo, E.M. (2018). Implementation challenges of area-based management tools (ABMTs) for biodiversity beyond national jurisdiction (BBNJ). *Marine Policy* 97, 34–43. <https://doi.org/10.1016/j.marpol.2018.08.034>
- Doumbouya, A., Camara, O.T.T., Mamie, J., Intchama, J.F.F., Jarra, A., Ceesay, S., Guèye, A., Ndiaye, D., Beibou, E., Padilla, A., Belhabib, D. (2017). Assessing the Effectiveness of Monitoring Control and Surveillance of Illegal Fishing: The Case of West Africa. *Frontiers in Marine Science* 4. <https://doi.org/10.3389/fmars.2017.00050>
- Douvere, F. (2015). *World Heritage Marine Sites: Managing effectively the world's most iconic Marine Protected Areas - Best Practice Guide*. United Nations Educational Scientific and Cultural Organization, Paris.
- Durussel, C., Oyarzún, E.S., Uruttia S., O. (2017). Strengthening the Legal and Institutional Framework of the Southeast Pacific: Focus on the BBNJ Package Elements. *The International Journal of Marine and Coastal Law* 32, 635–671. <https://doi.org/https://doi.org/10.1163/15718085-12324051>
- Durussel, C., Wright, G., Wienrich, N., Boteler, B., Unger, S., Rochette, J. (2018). Strengthening Regional Ocean Governance for the High Seas: Opportunities and Challenges to Improve the Legal and Institutional Framework of the Southeast Atlantic and Southeast Pacific. *STRONG High Seas Project*.
- Ewell, C., Hocevar, J., Mitchell, E., Snowden, S., Jacquet, J. (2020). An evaluation of Regional Fisheries Management Organization at-sea compliance monitoring and observer programs. *Marine Policy*. <https://doi.org/10.1016/j.marpol.2020.103842>
- Gjerde, K., Boteler, B., Durussel, C., Rochette, J., Unger, S., Wright, G. (2018). Conservation and Sustainable Use of Marine Biodiversity in Areas Beyond National Jurisdiction: Options for Underpinning a Strong Global BBNJ Agreement through Regional and Sectoral Governance. <https://doi.org/10.2312/iass.2018.015>
- Guggisberg, S. (2019). The roles of nongovernmental actors in improving compliance with fisheries regulations. *Review of European, Comparative and International Environmental Law* 28, 314–327. <https://doi.org/10.1111/reel.12304>
- Hutniczak, B., C.D. and A.L. (2019). Intensifying the Fight Against IUU Fishing at the Regional Level. *OECD Food, Agriculture and Fisheries Papers*.

- Käse, L., Geuer, J.K. (2018). Phytoplankton Responses to Marine Climate Change – An Introduction, in: Jungblut, S., Liebich, V., Bode-Dalby, M. (Eds.), *YOUMARES 8 – Oceans Across Boundaries: Learning from Each Other*. Springer, Cham, pp. 55–71. https://doi.org/https://doi.org/10.1007/978-3-319-93284-2_5
- Mestanza-Ramón, C., Sanchez Capa, M., Figueroa Saavedra, H., Rojas Paredes, J. (2019). Integrated Coastal Zone Management in Continental Ecuador and Galapagos Islands: Challenges and Opportunities in a Changing Tourism and Economic Context. *Sustainability* 11.
- O'Hern, J.E., Sculley, M., Jean-Smith, K., Biggs, D., Slowey, N., Alarcon Ruales, D., Duncan, R. (2018). Marine mammal distribution in Ecuador: surveys aboard a ship of opportunity as a means of monitoring relative abundance. *Latin American Journal of Aquatic Mammals*. <https://doi.org/10.5597/00235>
- O'Leary, B.C., Allen, H.L., Yates, K.L., Page, R.W., Tudhope, A.W., McClean, C., Rogers, A.D., Hawkins, J.P., Roberts, C.M. (2019). 30x30: A Blueprint for Ocean Protection. *Umweltstiftung Greenpeace*.
- O'Leary, B.C., Winther-Janson, M., Bainbridge, J.M., Aitken, J., Hawkins, J.P., Roberts, C.M. (2016). Effective Coverage Targets for Ocean Protection. *Conservation Letters*. <https://doi.org/10.1111/conl.12247>
- Petit, I.J., Campoy, A.N., Hevia, M.-J., Gaymer, C.F., Squeo, F.A. (2018). Protected areas in Chile: are we managing them? *Revista Chilena de Historia Natural* 91. <https://doi.org/https://doi.org/10.1186/s40693-018-0071-z>
- Puentes, V., Escobar, F.D., Polo, C.J., Gutiérrez, J., Castaño, F., Amado, C., Alonso, J.C., Mojica, D.F., Suárez, A.M., Ramírez, J.G. (2015). Evaluación Integral y Perspectivas del Sector Acuicola y Pesquero de Colombia 2015 – 2040, in: Ortega-Lara, A., Amado, A.C., Cordoba-Rojas, D.F., Barbosa, L.S. (Eds.), *Avances de Acuicultura y Pesca Vol. I. Autoridad Nacional de Acuicultura y Pesca. Oficina de Generación del Conocimiento y la Información – AUNAP©, FUNINDES ©*, pp. 51 – 76.
- Ramirez, L.F. (2016). Marine protected areas in Colombia: Advances in conservation and barriers for effective governance. *Ocean and Coastal Management*. <https://doi.org/10.1016/j.ocecoaman.2016.03.005>
- Randin, O. (2015). Small-Scale Fishers, Changing Borders: The Case of San Andrés Archipelago (Colombia) and the International Court of Justice, in: Jentoft, S., Chuenpagdee, R. (Eds.), *Interactive Governance for Small-Scale Fisheries: Global Reflections*. Springer: Dordrecht.
- Rowlands, G., Brown, J., Soule, B., Boluda, P.T., Rogers, A.D. (2019). Satellite surveillance of fishing vessel activity in the Ascension Island Exclusive Economic Zone and Marine Protected Area. *Marine Policy* 101, 39–50. <https://doi.org/10.1016/j.marpol.2018.11.006>
- Salvettici, R., Field, D., Gutiérrez, D., Baumgartner, T., Ferreira, V., Ortlieb, L., Sifeddine, A., Grados, D., Bertrand, A. (2018). Multifarious anchovy and sardine regimes in the Humboldt Current System during the last 150 years. *Global Change Biology* 24, 1055–1068. <https://doi.org/10.1111/gcb.13991>
- Singleton, R.L., Roberts, C.M. (2014). The contribution of very large marine protected areas to marine conservation: Giant leaps or smoke and mirrors? *Marine Pollution Bulletin* 87. <https://doi.org/10.1016/j.marpolbul.2014.07.067>
- Squeo, F.A., Estévez, R.A., Stoll, A., Gaymer, C.F., Letelier, L., Sierralta, L. (2012). Towards the creation of an integrated system of protected areas in Chile: achievements and challenges. *Plant Ecology & Diversity* 5, 233–243. <https://doi.org/https://doi.org/10.1080/17550874.2012.679012>
- Toonen, H.M., Bush, S.R. (2018). The digital frontiers of fisheries governance: fish attraction devices , drones and satellites. *Journal of Environmental Policy & Planning* 1–13. <https://doi.org/10.1080/1523908X.2018.1461084>
- Visalli, M.E., Best, B.D., Cabral, R.B., Cheung, W.W.L., Clark, N.A., Garilao, C., Kaschner, K., Kesner-Reyes, K., Lam, V.W.Y., Maxwell, S.M., Mayorga, J., Moeller, H. V., Morgan, L., Crespo, G.O., Pinsky, M.L., White, T.D., McCauley, D.J. (2020). Data-driven approach for highlighting priority areas for protection in marine areas beyond national jurisdiction. *Marine Policy*. <https://doi.org/10.1016/j.marpol.2020.103927>
- Wright, G., Rochette, J., Gjerde, K., Seeger, I. (2018). The long and winding road: negotiating a treaty for the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction. *IDDRI Study, IDDRI Studies* 8/18.

Published by

Institute for Sustainable Development and International Relations (IDDRI)
27 rue Saint-Guillaume
75337 Paris Cedex 07
France

Tel: +33 (0)1 45 49 76 60
Fax: +33 (0)1 45 52 63 45
E-Mail: iddri@iddri.org
www.iddri.org

Contact

STRONG High Seas Project Team at IASS: stronghighseas@iass-potsdam.de

ViSdP

Sébastien Treyer, Executive Director
November 2020



About the STRONG High Seas Project

The STRONG High Seas project is a five-year project that aims to strengthen regional ocean governance for the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction. Working with the Secretariat of the Comisión Permanente del Pacífico Sur (CPPS; Permanent Commission for the South Pacific) and the Secretariat of the West and Central Africa Regional Seas Programme (Abidjan Convention), the project will develop and propose targeted measures to support the coordinated development of integrated and ecosystem-based management approaches for ocean governance in areas beyond national jurisdiction (ABNJ). In this project, we carry out transdisciplinary scientific assessments to provide decision-makers, both in the target regions and globally, with improved knowledge and understand-

ing on high seas biodiversity. We engage with stakeholders from governments, private sector, scientists and civil society to support the design of integrated, cross-sectoral approaches for the conservation and sustainable use of biodiversity in the Southeast Atlantic and Southeast Pacific. We then facilitate the timely delivery of these proposed approaches for potential adoption into the relevant regional policy processes. To enable an interregional exchange, we further ensure dialogue with relevant stakeholders in other marine regions. To this end, we set up a regional stakeholder platform to facilitate joint learning and develop a community of practice. Finally, we explore links and opportunities for regional governance in a new international and legally-binding instrument on marine biodiversity in the high seas.

Project duration: June 2017 – May 2022

Coordinator: Institute for Advanced Sustainability Studies (IASS)

Implementing partners: BirdLife International, Institute for Sustainable Development and International Relations (IDDRI), International Ocean Institute (IOI), Universidad Católica del Norte, WWF Colombia, WWF Germany

Regional partners: Secretariat of the Comisión Permanente del Pacífico Sur (CPPS), Secretariat of the Abidjan Convention

Website: prog-ocean.org/our-work/strong-high-seas

Contact: stronghighseas@iass-potsdam.de

Partners of the STRONG High Seas project:

