Maritime Boundaries in the Pacific and the way forward with Marine Spatial Planning

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Disclaimer

The views expressed herein are those of the author and do not necessarily reflect the views of the Government of Fiji, the United Nations, the Nippon Foundation of Japan or the World Maritime University.

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List of Acronyms

ABNJ: Areas Beyond National Jurisdiction

ALCs: Automatic Location Communicators

BBNJ: Biodiversity Beyond National Jurisdiction

CC: Climate Change

CLCS: Commission on the Limits of the Continental Shelf

CROP: Council of Regional Organisations in the Pacific

CS: Continental Shelf

CSIRO: Commonwealth Scientific and Industrial Research Organisation

CMT: Customary marine tenure

DWFN: Distant Water Fishing Nations

DOALOS: Division for Ocean Affairs and the Law of the Sea

EEZ: Exclusive Economic Zone

ECS: Extended Continental Shelf

ECOSOC: United Nations Economic and Social Council

EPOG: Enhancing Pacific Ocean Governance

EU: European Union

FFA: Forum Fisheries Agency

FFC: Forum Fisheries Committee

FLMMA: Fiji Locally Managed Marine Areas

GA: General Assembly

GIZ: Deutsche Gesellschaft für Internationale Zusammenarbeit

ICJ: International Court of Justice

ITLOS: International Tribunal on the Law of the Sea

ITRF: International Terrestrial Reference Frames

IUCN: International Union for Conservation of Nature

ISO/TC211: International Organization for Standardization, Technical Committee 211

JMZ: Joint Management Zone

UN: United Nations

UNCLOS: United Nations Convention on the Law of the Sea

LOSC: Law of the Sea Convention

LAT: Lowest Astronomical Tide

LTE: Low-tide elevation

MACBIO: Marine and Coastal Biodiversity Management in Pacific Island Countries

MACC: Maritime Affairs Coordinating Committee

MARZONE: Maritime Zone boundary

MCS: Monitoring Control Surveillance

MPAs: Marine Protected Areas

MSP: Marine Spatial Planning

MSWG: Marine Sector Working Group

MTU: Mobile Transmitting Unit

NM: nautical miles

NOC: National Oceanography Centre

PCA: Permanent Court of Arbitration

RFMO: Reginal Fisheries Management Organization

PGSC: Pacific Geospatial and Surveying Council

PIFS: Pacific Island Forum Secretariat

PICTs: Pacific Island countries and territories

PSIDS: Pacific Small Islands Developing States

RMBP: Regional Maritime Boundaries Project

SCS: South China Sea

SDGs: Sustainable Development Goals

SOPAC: South Pacific Applied Geoscience Commission

SPREP: Secretariat of the Pacific Regional Environment Program

SPC: The Pacific Community

SQ KM: square kilometre

SSP: standards, specifications, and procedures

TC: Tropical Cyclones

TS: Territorial Sea

TMSP: Transboundary Marine Spatial Planning

UK: United Kingdom

UN-GA: United Nations General Assembly

UN-GGIM: United Nations Global Geospatial Information Management

UN-IGIF: United Nations Integrated Geospatial Information Framework

UNFSA: United Nations Fish Stock Agreement

UNFAO: United Nations Food and Agriculture

VDS: Vessel Day Scheme

VMS: Vessel Monitoring System

WCPFC: Western and Central Pacific Fisheries Commission

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Introduction:

The vast coverage of the Pacific Ocean encompasses an intricate tapestry of diverse ecosystems, cultures, and maritime interests. Amidst this expansive sphere, resides the group of predominantly Pacific Island Countries and its Territories (PICTS).[1] Majority of these island States are arguably geographically disadvantaged and based on its land to water ratio are being further classified as “large ocean States" (LOS).[2] More specifically and in reference to the scope of this research, information gathered will be regarding the Pacific Small Islands Developing States (PSIDS)[3] and their specific interest in reaching their SDG targets.

The PICTs are trying to address the numerous challenges induced by their environment, especially in an era defined by global climate change and, indeed, climate crisis. Among these challenges is the identification and clarification of baselines along the coast, the delineation of the outer limits to zones of maritime jurisdiction and maritime boundaries delimitation. These tasks are of paramount importance for these island nations as they define the scope of their national maritime jurisdictions which, in turn, is fundamental to the sustainable management of marine resources.[4]

Moreover, the need for effective ocean governance and cooperation in the Pacific region has become ever more urgent, owing to increasing global recognition of its significance. Fortunately, the Pacific has been the forefront runners for regional cooperation in the ocean space chaired by the Pacific Islands Forum (PIF) leaders.[5] Considerable collaboration and time

[1] Pacific Possible: *long-term economic opportunities and challenges for Pacific Island Countries* (English). Pacific possible series Washington, D.C.: World Bank Group. http://documents.worldbank.org/curated/en/168951503668157320/Pacific-Possible-long-term-economic-opportunities-and-challenges-for-Pacific-Island-Countries.

[2] The process of formally replacing the category of island developing countries with SIDS (Small Island Developing States) began indirectly in 1992 during the United Nations Conference on Environment and Development, also known as the "Earth Summit," held in Rio de Janeiro. Also refer to Executive Board of the United Nations Development Programme, the United Nations Population Fund and the United Nations Office for Project Services, Subregional programme document for the Pacific Island Countries and Territories (2018-2022), 2017.

[3] Refers to the Cook Islands, Federated State of Micronesia, Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu. This is based on the identification and studies done by the United Nations Conference on Trade and Development (UNCTAD) during the 1970s.

[4] Marine Sector Working Group (MSWG): Council of Regional Organisations in the Pacific (CROP), *Pacific Islands – Regional Ocean Policy and Framework for Integrated Strategic Action (PIROP-ISA)*, 2002.

[5] The Pacific Islands Forum was established in 1971 as a collective voice for the South Pacific region. See also https://www.forumsec.org/forum-leaders/ for current Forum Leaders list. See also Pacific Community, *Stocktake of the Bathymetry and Topographic Datasets* and mFAT, *Indicative Business Case for climate decision making*, 2019.

has been invested by the PIF leaders on the protection of the region's largest economic resource. Through the development of policies, treaties, and communiques that that have gained recognition on the global stage, the concept of regionalism has consistently conveyed its message.[6] An overview of regional policies and frameworks will be covered in the following chapters which has made significant impact on the advancement of both technical and policy initiatives in the region.[7]

From throughout history to the present day, the ocean has been a source of many Pacific country's food security, transportation, traditional worship grounds and for many generations it has deep-rooted meanings.[8] Consequently, it is hard to over-state the significance of the ocean in the Pacific context. This explains the importance of the present research, which will contribute, at least to some extent, to the goal of defining baselines in the South Pacific region as well as the delineation of the outer limits of maritime zones and delimitation of regional maritime boundaries and the way forward with marine spatial planning. (MSP).

Despite the vital importance of the Pacific Ocean, the warning signs are becoming gradually clearer concerning escalating threats through pressure such as commercial overfishing, land-based sedimentation, solid waste disposal, climate change induced sea-level rise amongst other things.[9] For these reasons, the necessity for regional cooperation has proved to be a major driver offer the Pacific Island countries (with assistance from international counterparts). This has led to sustained efforts to strategize methods to diminishing maritime risks and providing resilience mechanisms towards sustainable development.

Marine conservation strategies have been regionally supported over the years to protect resources for future generations through regional cooperation and following through with references from past regional and international meetings and workshops.[10] The following

[6] From the establishment of the Pacific Islands Regional Ocean Policy, Framework for a Pacific Oceanscape, also included are the Palau Declaration on "The Ocean: Life and Future" (2014) and the Pohnpei Ocean Statement: A Course to Sustainability (2016). https://www.forumsec.org/wp-content/uploads/2018/03/Overview-of-Pacific-Islands-Forum-Ocean-Policies-2017.pdf

[7] Peebles, D., Pacific Regional Order, The Pacific Islands Forum, 2025. See also, O'Connor, S., The Pacific Plan Review and the Forum Secretariat, Pacific Update, Australia National University, 2014.

[8] Hilmi, N., Bambridge, T., Quinquis, B., and D'Arcy, P., Fisheries in the Pacific, *Socioeconomic significance of fisheries in the Small Island Developing States: natural heritage or commodity?* 2016. See also Office of the Pacific Ocean Commissioner (OPOC), *Our Sea of Islands - Our Livelihoods - Our Oceania*, Pacific Regional Ocean Policies, 2017.

[9] Caldwell, M. & Hoffmann, &. T, *Pacific Ocean Synthesis*, 2009.

[10] PIROF-ISA above n 4.

section is a brief history in the development of the regional ocean policy as it has paved the way to some global firsts in the areas of ocean management and climate crisis awareness.

Background

From Regional Practise to Global Awareness

In recent years, Pacific regional leaders have directed their attention towards strengthening maritime collaborations. The idea of an integrated ocean governance approach and development of advisory frameworks[11] has been a longstanding ambition of Pacific region political leaders since the advent of the Convention on the Law of the Sea (UNCLOS).[12] For example, a series of recommendations was made during the Pacific Regional Follow-up Workshop on the Implementation of UNCLOS convened in Tonga in 1999.[13]

One such recommendation was the development of the Pacific Islands Regional Ocean Policy (PIROP)[14] and its related Framework for Integrated Strategic Action (PIROF-ISA) which served as a guideline in harmonizing and consolidating ocean endeavours in the Pacific while aligning to its vision:

"…*healthy ocean that sustains the livelihoods and aspirations of the Pacific Island Communities…"*[15]

It sought to address the deficiencies that existed under the blueprint guideline for ocean management and regional actions which is the Pacific Plan[16] with the goal of:

"…*Enhance and stimulate economic growth, sustainable development, good governance and security for Pacific countries through regionalism*…"[17]

[11] Pacific Islands Forum Leaders Communique, 1972. Also referring to regional initiatives and bodies of leadership prior to UNCLOS through the establishment of the then South Pacific Forum (now PIF) and getting towards regional independence from the metropolitan states as outlined in: Manoa, Pio., and Veitayaki, J., *Regional Ocean Governance in the Pacific Revisited*, 2009.

[12] United Nations Convention on the Law of the Sea 1982 (UNCLOS) (adopted 10 December 1982, entered into force 16 November 1994, 1833 UNTS 3.

[13] https://www.forumsec.org/timeline-of-major-events-since-1971/

[14] PIROP above n 4.

[15] Ibid.

[16] Master plan of all the framework for ocean management and policies and was adopted in 2005 by the PIF leaders.

[17] Adopted in 2002 by the PIF leaders.

However, the Pacific Plan did not lead to practical action and failed to provide the fundamental guidance[18] that was necessary for driving solution through political leadership.[19]

While the PIROF and PIROF-ISA were indeed dynamic documents intended to foster relationships and engage with stakeholders at international, regional, and national levels, they did not establish an operational body to oversee oceans governance. Further, review of the Pacific Plan paved the way for Framework for Pacific Regionalism.[20]

The foundation for ocean management and collaborative over responsibilities in building efforts towards regionalism been established by the Council of Regional Organisations in the Pacific (CROP).[21] This has occurred, through the work of the Marine Sector Working Group (MSWG)[22] involving agencies and institutions in the Pacific region with ocean related mandates. However, the attainment of political consensus remains elusive, given the divergent priorities of various states; declarations made during one regional gathering might not necessarily align with the prevailing focus at a given moment.[23]

Subsequent succession of regional guidelines - From Policy to Action

As PIROP and PIROP-ISA advance from the Pacific Plan, many Pacific nations have both signed and ratified UNCLOS.[24] Although not legally bounding to each state, the formulation of PIROP has paved the way for community of practise that has been the reputation of Pacific region.[25] Out of the four principles, number one was accounted towards "Improving our Understanding of the Ocean" which encompasses the work of the CROP agencies in information gathering and data collection. These programmes provide coherence to the research and outreach activities including the conclusion of the delimitation of maritime boundaries in the region. Additionally, capacity building is included in recognition that

[18] Pratt., C, and Brierley., C, *Ocean Governance, and the Ocean Commissioner in the Pacific*, 2016.
[19] Pacific Plan Review – Report to Pacific Leaders, Vol 1, Pacific 2013.
[20] Above n 10.
[21] PIFS, Council of Regional Organisations of the Pacific Charter, 2018.
[22] Refers to the following regional organizations: Forum Fisheries Agency (FFA), Secretariat of the Pacific Community (SPC), Secretariat of the Pacific Regional Environment Programme (SPREP), South Pacific Geoscience Commission (SOPAC) and University of the South Pacific (USP).
[23] Veitayaki, J., Evans, N., & South, G., Pacific Islands Regional Ocean Policy: The Quest for Good Ocean Governance, The. Ocean Yearbook, 18, 558-577, 2004.
[24] By then the following countries have ratified UNCLOS: Kiribati (2003), Cook Islands (1995), Fiji (1982); Marshall Islands (1991); Federated States of Micronesia (1991), Nauru (1996), Palau (1996), Papua New Guinea (1997), Samoa (1995), Solomon Islands (1997), Tonga (1995), and Vanuatu (1999), including Australia (1994), and New Zealand (1996).
[25] Cordonnery, L., *Implementing the Pacific Islands Regional Ocean Policy: How Difficult is it going to be?* 2005.

capacity and knowledge in this area of expertise was limited, and countries were slowly building momentum in the delimitation of their maritime boundaries.[26]

Over time, new and emerging issues, most prominently the impacts of climate change on the ocean, notably with respect to food security concerns, arose that led to changes in the directives of PIF leaders. Accordingly, the concept of a more rational ocean conservation and management was presented and the plan for the Framework of the Oceanscape (FOP) was born.[27] The FOP complemented the PIROP in areas of resource mobilization and the vision for:

"…a secure future for Pacific Island Countries and Territories based on sustainable development, management and conservation of our Ocean..."[28]

In 2014, the Australian government supported FOP (Funding Response towards FOP) as part of the Enhancing Pacific Ocean Governance[29] (EPOG) initiative. This support was carried out in collaboration with various CROP agencies and was implemented across fourteen Pacific Island countries and territories (PICTs). The strategies employed under EPOG closely resembled those of the FOP, focusing on empowering PICTs to efficiently oversee their marine and coastal resources. This approach aimed to stimulate economic growth while also preserving ecosystems. The four key components of this endeavour include:[30]

- *Strengthening ocean governance through regional ocean leadership*
- *Provision of technical and legal advice for maritime boundary delimitation*
- *Support marine spatial planning at regional, national and local levels*
- *Improve data management and building national and regional marine policy, planning, science and geospatial knowledge and capabilities.*[31]

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[26] Above n 21.
[27] Framework for a Pacific Oceanscape: a catalyst for implementation of ocean policy, first presented by Kiribati in 2009 and adopted by PIF leaders in 2011.
[28] Pratt, C and Govan, H, *Framework for a Pacific Oceanscape: a catalyst for implementation of ocean policy*, 2010.
[29] Australian Government, *Enhancing Pacific Ocean Governance (EPOG),* 2014 – 2017, www.environment.gov.au/marine/international-activities.
[30] Australian Government, Department of the Environment and Energy, *Enhancing Pacific Ocean Governance Evaluation Report- Evaluation of the relevance, effectiveness, efficiency and sustainability of the Australian aid funded Enhancing Pacific Ocean Governance project,* 2018.
[31] Ibid.

The EPOG funded and materialized the prerogatives of the FOP, including the establishment of the Office of the Pacific Ocean Commissioner (OPOC)[32] . These developments also involved the appointment of the Secretary General of the Pacific Islands Forum Secretariat (PIFs) as the Pacific Ocean Commissioner and leader for regional coordination and ocean advocacy in an initial strategic move. The main intent of this role was to potentially provide a "*bridge that united the Pacific Islands environmentally, economically, socially, and culturally"*[33]without bias or being beholden to any specific interest. Additionally, a cross-sectoral entity named the Pacific Ocean Alliance (POA) was established[34] that was designed to oversee the work of the OPOC and carry forth its objectives in discussion that would eventually lead to good ocean governance.[35]

The second strategic action is an interconnected and on-going work[36] among Geoscience Australia, the Attorney-General's Department, Sydney University/GRID Arendal, the Pacific Forum Fisheries Agency (FFA) and Pacific Community (SPC). The Pacific Community (SPC) plays a significant role as the CROP agency, offering the technical capacity for much of the ocean governance, planning and delimitation. This collaboration aimed at the implementation of UNCLOS for improved preservation and responsible utilization of the ocean, aligned with the objectives of FOP strategic priority one.

The marine spatial planning (MSP) and oceans data management segment of the EPOG connected technical and data management enthusiast from the CROP agencies through the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Australia.[37] As per the assessment report from EPOG, this particular project element demonstrated partial effectiveness. It underwent a pilot phase in just two nations, namely the Solomon Islands and Kiribati. This trial aimed to assess the functionality of integrated planning tools within the comprehensive management framework for oceanic resources.

[32] Above n 24.
[33] Above n 24.
[34] Ibid, n above 24.
[35] To date, the POA has met three times since its establishment in 2014. See also, Pacific Ocean Alliance Meeting 2022, *Accelerating Blue Pacific Ocean Action for 2030 and Beyond: Pathway to Lisbon UN Ocean Conference, Records of the Meeting,* 2022.
[36] Pacific Maritime Boundaries Project (PMBP), refer https://gem.spc.int/projects/pacific-maritime-boundaries-programme.
[37] Above n 31.

By 2017, the EPOG received tremendous support from its regional partners and the stakeholders from the pilot countries.[38] The outcomes of the work done for strategic priorities one and two and funding continued for the work of OPOC and most importantly, the maritime boundaries work in the region was also extended through renewed collaborations of the consortium of partners.

The following sections will outline the history and the importance of integrated ocean management systems in the context of holistic approach that have enhanced regionalism.[39] Challenges were encountered due to disparities in technical understanding of the nature of MSP and the various areas of work within each government ministries.[40] However, this component of EPOG established the MSP work in the region and left a notable impact on both the initial two pilot nations and the projects that followed.[41]

Maritime Boundaries History in the Pacific

The success of the EPOG component of maritime boundary delimitation can be attributed to the community of practise that started with the leader's decision on a shared vision which has culminated in the works of the CROP agencies. Prior to 2017 and the EPOG work, the maritime boundaries work started within the FFA as part of its fisheries programme to track illegal fishing activities. In 2000, the project was transferred to the South Pacific Applied Geoscience Commission (SOPAC).[42] This body had the technical capacity to lead the work as UNCLOS implementation was starting out in the region. SOPAC then merged under SPC[43] in 2011 which then became to be the Regional Maritime Boundaries Project with the Australian government being the major donor to date after the EPOG success.

Desired outcomes:

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[38] EPOG, 2018.

[39] See also Vince, J., Brierley, E., Stevenson, S., and Dunstan, P., *Ocean governance in the South Pacific region*, 2017.

[40] Above n 36.

[41] "*The Solomon Islands was able to demonstrate the value of marine spatial planning and apply it to a high-level national government oceans policy process—Oceans12*" The Solomon Islands carried this work through with the
IUCN.

[42]From SOPAC to SPC's Geoscience, Energy and Maritime Division: The Pacific Community at 75 | The Pacific Community. (n.d.). Www.spc.int. Retrieved November 6, 2023, from https://www.spc.int/updates/blog/did-you-know/2022/09/from-sopac-to-spcs-geoscience-energy-and-maritime-division-the

[43] Tavola, et al., Reforming the Pacific Regional Institutional Framework, 2006.

- *Pacific island countries have established maritime zones and limits, including shared boundaries, high sea limits, and extended continental shelf areas.*
- *Pacific island countries have strengthened ocean management, including systems, tools, and engagement mechanisms supporting the application of maritime zone data for blue economic development.*[44]

The project has assisted the fourteen members[45] countries in the technical and legal aspects. This included capacity building workshops, field works on basepoint surveys, updating the national legislation to include the coordinates of the basepoints to final submission to United Nations-Division for Ocean Affairs and the Law of the Sea (UN DOALOS). The target was to also achieve a consistency amongst the countries in all the necessary areas to assist with formalising maritime boundaries.

Need for Settling Maritime Boundaries in the region.

Now more than ever, mitigating current stresses such as climate change has been the priority of the PIF leaders.[46] As such, PICs are urged to define their maritime boundaries that will provide certainty and proper policing of national ocean jurisdiction when and if challenged by reduction of coastlines.[47]

This will ultimately lead to strengthening national maritime security where countries can and are able to harness one of their greatest economic resources which are derived from fisheries.[48]The proper monitoring and evaluation of marine resources through definite maritime boundaries will enable enhanced economic opportunities and clarity for sustainability for future generations.

To date, the concerns[49] that emerged during the project implementation phase have been addressed. Basepoints have been verified through survey's, capacity in-country has been established and national legislations have been updated to adhere UNCLOS standards.

[44] SPC, Maritime Boundaries Project.
[45] Refer to the map shown in figure 1.
[46] PIF Leaders Communique, 2019.
[47] Above n 8. Refer also to Jones, A. (2020, September 29). Pacific Community. From Why Maritime Zones Matter: refer - https://www.spc.int/updates/blog/2020/09/dr-andrew-jones-why-maritime-zones-matter-for-the-future-of-our-blue-pacific.
[48] World Bank, Pacific Possible, *Tuna Fisheries*, 2016.
[49] Artack, E., *Pacific Islands Regional Maritime Boundaries Project: Future Directions*, 2006.

What follows next?

In 2021, SPC together with its consortium partners and member countries celebrated the 20th year of the project. The efforts extend beyond a mere procedural fulfillment of the UNCLOS or a superficial accomplishment of an SDG target. Great remarks were made to the existential work of the region in the demarcation of more than fifty percent of maritime boundaries within the region as it entails more than routine administrative tasks.

In its end of investment evaluation report, the Department of Foreign Affairs and Trade (dFAT) of Australia's stated the new project design directions. [50] Now managed by SPC with technical assistance of the Geoscience Australia (GA), the project will:

- *Support the specific needs and interest of the member countries.*
- *Partially oversee the work of the extended continental shelf (ECS) that countries have submitted to the UN in 2009[51] and thereafter.*
- *Align with the PIF leaders' commitment on climate induced sea level rise [52]*
- *Develop strategic engagement activities that will gain political traction that will influence the progression of stagnant maritime boundaries.*

The fourth directive can be illusive to grasp but just as important as political consensus remains elusive, given the divergent priorities of various member countries; declarations made during one regional gathering might not necessarily align with the prevailing focus at a given moment.[53] This drags the work even further which diverges from the initial funding goals and a new plan of action is required to push stagnant boundary negotiations to reach its end goal.

Marine Spatial Planning – A tool for initiating boundary delineation?

Therefore, the notion of MSP has surfaced as a promising path for navigating the way forward in dormant maritime boundary discussions in terms of guided pre delimitation context and as an added activity after maritime boundary delimitations. While this idea has been previously introduced in the region in a conservation sense, its complete execution as a catalyst for maritime boundaries negotiations has not yet been realized.

While not widely embraced in the Pacific region, the practice of MSP aimed at ensuring the security of shared resources like oil, gas, and petroleum has been conducted in other regions

[50] Pacific Maritime Boundaries Project—*End of Investment Evaluation DFAT Management Response*, 2020.
[51] Artack, above n 46.
[52] Above n 8.
[53] Pratt., C, and Brierley., C, *Ocean Governance, and the Ocean Commissioner in the Pacific*, 2016.

around the globe. Early practise of spatial division of shared maritime zones was in 1974,[54] between Japan and Korea in the mutual interest of exploiting transboundary petroleum reserves.[55]In the context of marine governance, MSP mechanism was utilized to curb illegal sand mining in the Kinmen's coastline in China; shared among four cities with diverse socio-economic conditions.[56] Moreso, in south of California, United States of America (USA), and the north of Baja California, Mexico; transboundary MSP was identified as a tool for consolidating differences in conservation actions across the border.[57]Presently within the North Sea region, experiences between Norway and the Netherlands has been data collection and analysing the fragmented legal frameworks prior formalising the MSP process.[58] For their transboundary MSP (TMSP) decisions to succeed, both countries will have to find common ground and align their respective national priorities through compromise.[59]

In contrast, and to an extensive range, the practice of Joint Management Zones (JMZ) in relation to transboundary resources governance has been written and explored between states with and without presence of maritime boundary.[60] Most states usually refrain from addressing the demarcation of boundaries or even discussing the act of establishing boundaries. However, at some juncture, these states will likely need to engage in boundary delimitation discussions.

Recalling the statements from scientists and in-country technical experts from the EPOG and MACBIO[61], that indeed MSP process can be a mechanism for enabling policy into shared actions for PICs that have yet to agree.[62] The Pacific has already got its backbone structure in

[54] Board zones, with alternate sub zone and criminal jurisdiction. Look at joint zones and the arrangements in that. Sharing of the resources between these two States and having alternate periods of caring of the resources between them.

[55] Agreement concerning joint development of the southern part of the continental shelf adjacent to the two countries (with map, appendix, agreed minutes and exchanges of notes). Signed at Seoul on 30 January 1974.

[56] Cho, C.-C.; Kao, R.-H. A Study on Developing Marine Space Planning as a Transboundary Marine Governance Mechanism —The Case of Illegal Sand Mining. Sustainability, 2022.

[57] Arafeh-Dalmau N, Torres-Moye G, Seingier G, Montaño-Moctezuma G and Micheli F, *Marine Spatial Planning in a Transboundary Context: Linking Baja California with California's Network of Marine Protected Areas*, 2017.

[58] Platjouw, F. M. (2018). Marine Spatial Planning in the North Sea—Are National Policies and Legal Structures Compatible Enough? The Case of Norway and the Netherlands. The International Journal of Marine and Coastal Law 33, 1, 34-78, Available From: Brill https://doi.org/10.1163/15718085-12320075 [Accessed 24 August 2023]

[59] Jan P. M. van Tatenhove, *Transboundary marine spatial planning: a reflexive marine governance experiment?* Journal of Environmental Policy & Planning, 19:6, 783-794, 2017.

[60] Schofield, C., *Blurring the Lines?* Maritime Joint Development and the Cooperative Management of Ocean Resources.

[61] Above n 30.

[62] Ibid, pp 17 – 18.

place through the shared vision of the PIF leaders. This is important for MSP to work as Soininen, Hassan[63] and others shared in defining transboundary MSP development[64]for the sustainable management of natural resources through the following:

Objectives

- To explore the concept of marine spatial planning as a tool for managing maritime boundary delimitation
- To explore marine spatial planning in managing overlapping claims
- To propose recommendations for PICs to use marine spatial planning as a way forward after completing maritime boundary work/efforts.
- To provide an update on the Pacific Maritime Boundary work

Thesis Scope

This thesis will primarily focus on the shared resources that between the EEZ and ECS. It will delve into the historical context of boundary demarcations in the region, analysing the impact of past disputes on present-day relationships between coastal states. By assessing the legal frameworks that underpin maritime boundary delimitation, the study seeks to shed light on the complexities that often hinder resolution. It will also conduct research on the possibility of MSP as a building block for conflict resolution in areas where boundary negotiation has become stagnant as a way forward for the region.

[63] Wesley Flannery, Anne Marie O'Hagan, Cathal O'Mahony, Heather Ritchie, Sarah Twomey, *Evaluating conditions for transboundary Marine Spatial Planning: Challenges and opportunities on the island of Ireland*, Marine Policy, Volume 51, 2015.

[64] Daud Hassan, Tuomas Kuokkanen, and Niko Soininen, eds, *Transboundary Marine Spatial Planning and International Law*, 2015.

Part 1: Maritime Boundaries in the Pacific (40 pages)

Part 1 will look at the legal frameworks for jurisdiction in the maritime zones in the Pacific. It will start with the application of UNCLOS in the Pacific, followed by maritime boundary delimitation and the importance of proclaiming the EEZ as well as contemplation of ECS submissions before addressing maritime boundaries disputes and resolving conflicts and the implications of unresolved maritime boundaries will be discussed before addressing the role of technologies in determining maritime boundaries. This will be followed by the challenges and opportunities in governing maritime boundaries in the Pacific. One of the main points here is to highlight Pacific regionalism and how this has contributed to the success of maritime boundary delimitation and moving forward with boundary permanency.

Chapter 1: Legal Framework for Maritime Boundaries in the Pacific (20 pages)

Section A: Overview of the United Nations Convention on the Law of the Sea (UNCLOS) in the Pacific

Subsection A.1: UNCLOS application in maritime boundaries in the Pacific

The South Pacific Region– Overview of islands and its ocean

Taken altogether, the PICs combined EEZ area covers an area of 28,894,739.2 square kilometres (sq km)[65] which is equivalent to 20% of the global EEZ.[66] In comparison, the cumulative land area is 551,542 sq km,[67] which accounts for a mixture of volcanic and atoll islands. The overall population is projected to reach 14,563,650 by 2030 and is set to rise further by 2050.[68]In general, the ocean plays a crucial role crucial in the Pacific, where many island nations are highly dependent on fisheries for both food security and economic revenue.[69]

While the region might not be globally significant in its global oil and gas reserve, it does contain the world's largest and healthy tuna fishing grounds.[70] PIF leaders endorsed the Regional Roadmap for Sustainable Pacific Fisheries[71] in 2015 where it identified some of the potential additional economic contributions to PICs. The leaders emphasized once more that

[65] Refer Table 1. Values are extracted from the authoritative datasets from PICs. The geospatial (GIS) layers can be accessed through https://pacificdata.org/dashboard/maritime-boundaries.
[66] See figure 1. Extracted from https://pacificdata.org/
[67] SPC, Pacific Islands Population 2020.
[68] Ibid.
[69] Hilmi, N., Bambridge, T., Quinquis, B., and D'Arcy, P., *Socioeconomic significance of fisheries in the Small Island Developing States: natural heritage or commodity?* 2016.
[70] Above n 43.
[71] Gillett, R., & Tauati, M, I., Food and Agriculture of the United Nations (FAO), *Fisheries of the Pacific Islands – Regional and National Information*, 2018.

recognizing *the ocean as the bridge that links* between communities and the importance of declaring maritime boundaries for enhancing sovereign rights and access to economic independence.[72] Hence, it is only logical that majority of the Pacific states ratified UNCLOS in its early stages and initiated regional collaboration efforts in managing their oceans, to harness the region's greatest resource.[73]

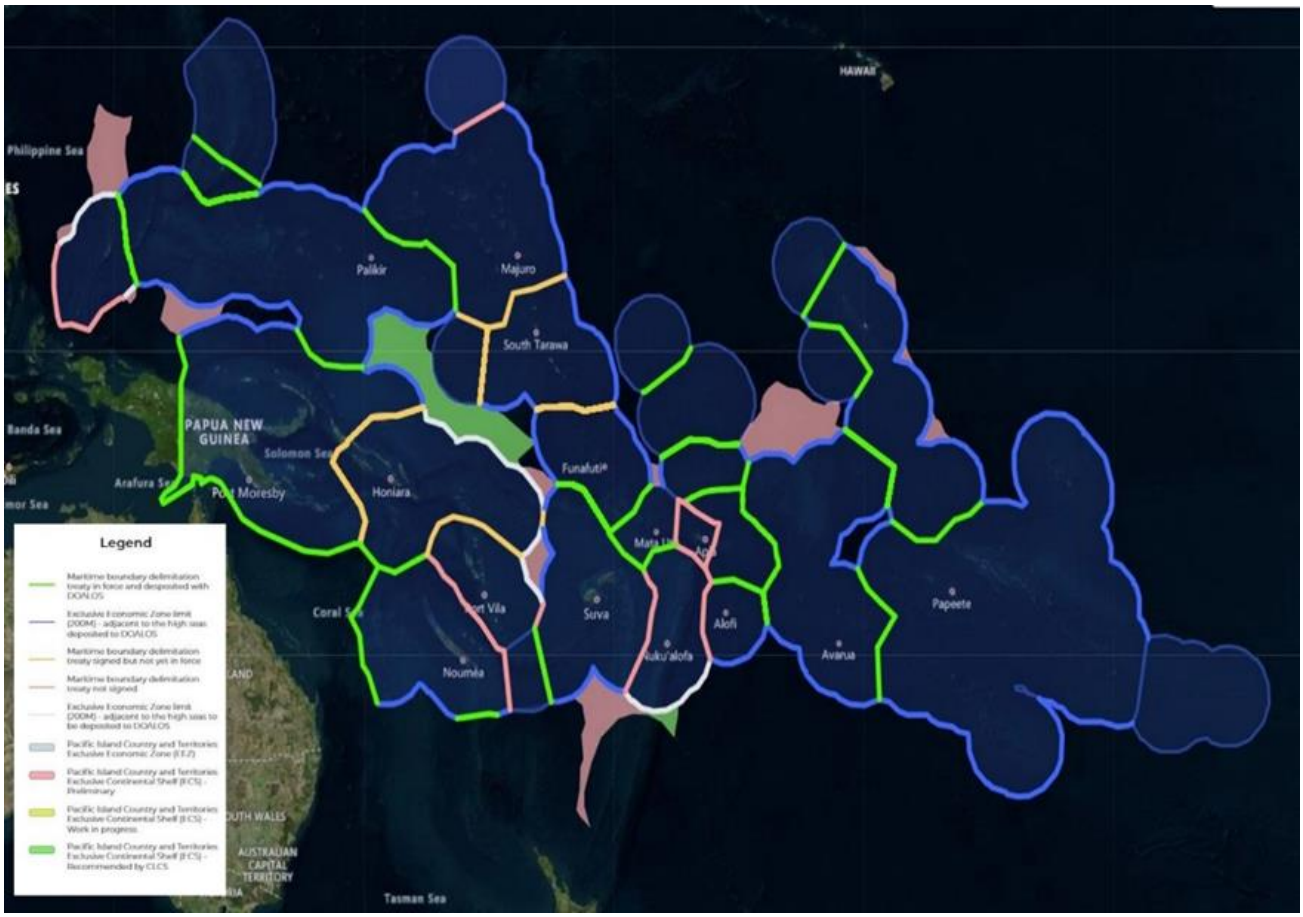

Figure 1: Status of the maritime boundaries in the Pacific as of 2023. Source: SPC

[72] PIF leader's communique 2015.

[73] Refer to Table 2, extracted from the United Nations Treaty Collection, (UNTS).

UNCLOS in the Pacific

Referred to by many scholars as the *constitution of the oceans*, as it serves as the fundamental legal framework governing all human engagements with the ocean.[74] UNCLOS governs all uses of the ocean and its resources by allocating rights and jurisdiction across maritime zones. when it entered into force on 16 November 1994.[75] UNCLOS established the groundwork for a regional community of practice that advocates for the sustainable utilization of oceans. Encompassing a comprehensive range of provisions, it governs states regulation of oceanic matters. responsibilities concerning ocean space.[76]

These comprise diverse aspects, including marine resource management, marine scientific research, and the delineation and delimitation of maritime zones for coastal States.[77] In the Pacific context, UNCLOS has triggered significant progress since the inception of the maritime boundaries work to date with 36 out of the 48 shared boundaries formalised and deposited.[78] To date, UNCLOS has been used extensively as a guide in assisting PICs in formulating claims for their territorial seas (12NM), contiguous zones (24NM), EEZs, and ECS.[79] In a region as vast as the Pacific, maintaining control over one's maritime boundaries is crucial for safeguarding national interests. These maritime zones outline the scope of a country's authoritative control over its waters and their associated resources.[80]

With 48 shared maritime boundaries, the territory of small island nations has extended significantly due to the 200 nautical miles (NM) expansion defined under UNCLOS Article .[81]In addition, states have the possibilities of extendingexplore beyond their 200NM given geophysical evidence and recommendations by the Commission on the Limits of the

[74] Havercroft, J., & Kloker, A., A constitution for the ocean? An agora on ocean governance. Global Constitutionalism, 2023.
[75] UNCLOS, 1982.
[76] Rothwell, D. et al, *Charting the Future for the Law of the Sea*. 2016.
[77] SPC, *Concept Note - Twenty Second Pacific Maritime Boundaries Working Session*, 2023.
[78] The recent treaty signed in July 2022 between the Solomon Islands and Fiji making it the 36th. See also, Frost, R., Hibberd, P., Nidung, Masio., Artack, E., & Bourrel, M., *Redrawing the map of the Pacific*, 2018.
[79] Refer to Figure 2. The extended continental shelves of sub-Antarctic Islands: Implications for Antarctic governance - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/Maritime-Zones-Including-the-continental-shelf-beyond-200-nm-Source-Commonwealth-of_fig1_248621479.
[80] Trahanas, C, *Recent Developments in the Maritime Boundaries and Maritime Zones of the Pacific*, 31 Australian Yearbook of International Law 41, 2013.
[81] Schofield, C., H., The Delimitation of Maritime Boundaries of the Pacific Island States, 2010. Parliament of the Republic of Fiji, *Agreement between the Republic of Fiji and Solomon Islands Concerning their Maritime Boundary* – Written Analysis, 2021.

Continental Shelf (CLCS) on the presence of their ECS.[82] This is specified in article 76 paragraph 8 of UNCLOS. [83]

"Information on the limits of the continental shelf beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured shall be submitted by the coastal State to the Commission on the Limits of the Continental Shelf set up under Annex II on the basis of equitable geographical representation. The Commission shall make recommendations to coastal States on matters related to the establishment of the outer limits of their continental shelf. The limits of the shelf established by a coastal State on the basis of these recommendations shall be final and binding."

Countries	200M - Area (sq km)
Fiji	1,300,509
Vanuatu	638,577
Solomon Islands	1,630,895
Papua New Guinea	2,862,319
Palau	616,021.00
New Caledonia	1,197,584
Samoa	133,348
Tonga	664,453
Tuvalu	753,139
Cook Islands (Territories)	1,969,961
Niue	321,018
French Polynesia	4,775,042
FSM	3,009,802
Kiribati – Line Group	1,641,587
Kiribati – Phoenix Group	745,763
Kiribati – Gilbert	1,053,602
Marshal Islands	2,002,933
Nauru	308,952
Pitcairn	842,381
American Samoa	406072
Tokelau	320647
NorthernMarianas	764064.0717
Matthew Hunter	187714

Table 1: Authoritative EEZ areas for the PICs and its territories. (Inclusive of land areas) Source: SPC

[82] Ibid, Song, L., & Mosses, M. *Revisiting Ocean Boundary Disputes in the South Pacific in Light of the South China Sea Arbitration: A Legal Perspective*, 2018.
[83] Article 76 (8), UNCLOS 1984.

As LOS, many PICs, experience various factors that hinders progress on ocean-based development.[84] Countries through their ocean and fisheries ministries work with regional organizations for capacity building, facilitate discussions, technical assistance, and promote cooperation in the ocean governance space.[85]As such, the SPC and PIFS has been playing a vital role in providing support for Pacific nations in managing their maritime boundaries work through the Regional Maritime Boundaries Project (RMBP).[86]

Countries	**Signature**	**Ratification**
Cook Islands	10 Dec 1982	15 Feb 1995
Fiji	10 Dec 1982	10 Dec 1982
Kiribati		24 Fe 2003
Marshall Islands		9 August 1991
Vanuatu	10 Dec 1982	10 August 1999
Palau		30 September 1996
Nauru		23 January 1996
Papua New Guinea	10 Dec 1982	14 January 1997
Solomon Islands	10 Dec 1982	23 June 1997
Tonga		2 August 1995
Tuvalu	10 Dec 1982	9 Dec 2002

Table 2: PICs date of signing and ratification of UNCLOS. [87]

An example occurred during the margins of the 2012 PIF Leaders meeting where the region witnessed signing of five shared maritime boundaries in one sitting.[88] These amongst prior treaty signing has been guided by SPC and PIFS through facilitating the flow of work as an intermediary within political and local government sectors.

[84] Hume, A., Leape, J., Oleson, K., Polk, E., Chand, K., and Dunbar, R., *Towards an ocean-based large ocean states country classification*, 2021.
[85] Above n 71.
[86] Above n 44.
[87] United Nations Treaty Collection, Law of the Sea.
[88] Treaty signing by the following countries: Cook Islands, Kiribati, Nauru, Niue, Marshall Islands, Tuvalu and Tokelau. PIF Leaders Communique, 2012.

Moreso, upon the conclusion of the EPOG funding,[89]two thirds of the Pacific's maritime boundaries have been negotiated and submitted to UN-DOALOS.[90] Nonetheless, there remains PICs that have yet to even deposit their charts or lists of geographical coordinates and is the current goal of the RMBP to formalize these boundary negotiations through inventive solutions as mentioned in the prelude.

Delimitation Case studies in the Pacific

Despite the clear guidelines provided by UNCLOS, the delimitation of maritime boundaries in the Pacific has been a contentious and complex process where numerous countries share common oceanic boundaries[91]. Again, UNCLOS guarantees procedures that through a consulted process, State parties conform to a peaceful and equitable position to accurately define its maritime boundary.[92] Fortunately, PICs have maintained the peace and diplomatic relations between them through the assistance of the CROP agencies in propelling matters in the political realms.[93] Below are some highlights from notable delimitation case studies from the three sub-regions in the Pacific.

Micronesia Group

Treaty between the Federated States of Micronesia (FSM) and the Republic of the Marshall Islands (RMI) Concerning Maritime Boundaries and Cooperation on Related Matters[94]

This bilateral agreement between FSM and RMI was signed on the 11th of September 2006 and entered into force on the 24th of July 2015, focused on both states *desire to strengthen bonds of friendship*. With a total of 8 articles, the key features addressed were:

Maritime Jurisdiction: A list of the geographic coordinates which defines the precise maritime boundaries between FSM and RMI is listed together with the reference frame[95] and the clause

[89] Above n 30.
[90] https://www.un.org/depts/los/LEGISLATIONANDTREATIES/asia.htm
[91] Above n 44.
[92] Sloan, J, *The Importance of regional cooperation between Pacific Island Countries for fisheries management and to increase the benefits for Pacific Islanders*. Refer - Ocean Law Bulletin, 2020.
[93] Referring to PIF leader's management of integrated approach through years of collaborations as is manifested in the various regional ocean strategies. See also, Pacific Plan and PIROP-ISA.
[94] Government of the Federated States of Micronesia and Government of the Republic of Marshall Islands, *Treaty between the Federated States of Micronesia (FSM) and the Republic of the Marshall Islands (RMI) Concerning Maritime Boundaries and Cooperation on Related Matters,* 2006.
[95] Refers to position accuracy on Earth. The internationally recognized WGS84 is widely accepted under UNCLOS.

for any changes brought about by shifts in the basepoints to be addressed and revised accordingly by approved nominated technical agencies.

Dispute Resolution and Transboundary Resource Sharing: The treaty includes mechanisms for resolving any future disputes related to its interpretation or implementation through peaceful negotiations accepted under international law.

Marine Environment Protection: The treaty emphasizes the sustainable management of the living resources within its shared EEZs. In addition to defining maritime boundaries, the treaty fosters continuous collaboration between FSM and RMI concerning marine resources, environmental conservation, and economic advancement.

Polynesia Group

Agreement between the Government of the Cook Islands and the Government of Niue Concerning the Delimitation of the Maritime Boundaries between the Cook Islands and Niue[96]

This treaty was signed on the 4th of August 2010 and entered into force on 12th November 2012 with 4 articles that recognized the need to an equitable maritime boundary delimitation. The key features were:

EEZ: The use of equidistance method which was determined from the baseline by which the territorial sea was measured.

List of the geographic coordinates: Table of coordinates which shows the intersection from the equidistant measurement.

Transboundary Resource Sharing: The treaty underlines measures for exploiting accumulation of minerals if deposit is evident on one side of the boundary and its equitable sharing.

[96] Government of the Cook Islands and Government of Niue, *Agreement between the Government of the Cook Islands and the Government of Niue Concerning the Delimitation of the Maritime Boundaries between the Cook Islands and Niue*, 2012.

Melanesia Group

Agreement between the Republic of Fiji and Solomon Islands Concerning their Maritime Boundary[97]

This treaty is another milestone signed during the PIF leaders 51st meeting on the 11th of July 2022. With a total of 10 articles, it addressed the following key issues:

Maritime Boundary: This section shows the delimitation line between the EEZs and the ECS and the use of the equidistance line method with the use of the mutually agreed geodetic reference system.

Equitable Benefit from Resource Exploitation: Much like in the other two treaties already mentioned, this treaty has measures for effective *exploitation by either or both Parties and both Parties shall equitably share the benefits of such resource exploitation*. In addition, Dispute Resolution settlement to be settled in a peaceful manner as with international law agreements. These delimitation case studies demonstrate the region's commitment to peaceful negotiations and adherence to UNCLOS. They also underscore the importance of addressing historical, cultural, and economic factors when determining maritime boundaries in the Pacific.[98]

[97] Government of the Republic of Fiji and Government of Solomon Islands, *Agreement between the Republic of Fiji and Solomon Islands Concerning their Maritime Boundary*, 2022.

[98] In this case the PIF leader's unity in recognizing the oceans as their main resource and to supplement the power of numbers as compared to working in silos in combating international issues such as IUU. PIF leader's communique 2015 & 2017.

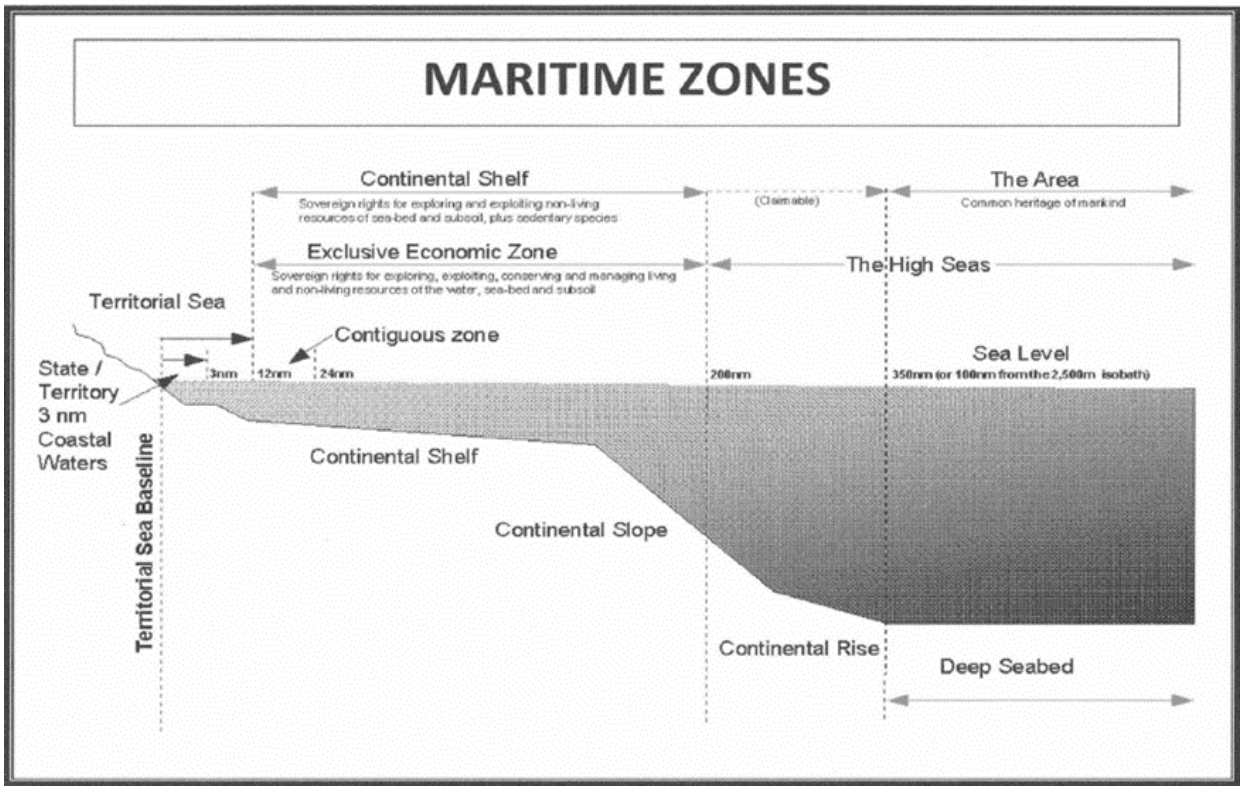

Figure 2: Shows the various maritime zones defined by UNCLOS.

Source: Commonwealth of Australia. 1997. Australia's oceans – new horizons: oceans policy consultation paper. URL: gov.au/coasts/oceans-policy/publications/new-horizons.html

A common clause used in all three examples is the Transboundary Resource Sharing and Equitable Benefit from Resource Exploitation. States, when marking their maritime boundary are also in consideration of future events that might jeopardize their treaty agreements. From this assessment, transboundary MSP can be an option if in fact, disputes arise and resources arising from within the treaty boundary can be equitably shared.

Need to write more and connect those clauses to MSP activities – dependent on total page.

Subsection A.2: Baselines - The starting point.

Within the broader scope of this research, it is important to examine the baseline laws as it underpins the various aspects for defining Pacific maritime zones. Moreover, this section merits a brief explanation of baseline history as it forms a background in the upcoming section on sea level rise related to climate changes where baselines are of concern.

Drafters of UNCLOS have provided in a series of articles; the guiding principles for states establishing their baselines.[99] They have varied characteristics and applications which has evolved over time.[100] The evolution of baseline concepts has been influenced by ongoing legal and diplomatic progress, offering guidelines, interpretations, and conflict resolutions.[101] The 1958 Geneva Convention on the Territorial Sea and Contiguous Zone provided some guidance on baselines, but it was the UNCLOS 1982 that significantly advanced the legal framework for baselines and maritime boundary delimitation with inclusion of the EEZ. [102]

Through the careful demarcation of these baselines, nations can determine their maritime boundaries and in establishing a provisional equidistance line between shared boundaries. [103] However, baseline discussions have also been the cause of tension for coastal and developed.[104] Many questions based on meaning, definition of features on coast such islands, reefs, bays, and the lack of consensus during its development and still an on-going debate in some international cases presented at the ICJ and ITLOS. [105]

The presence of varied baselines exists in the Pacific region. The baseline set up for the Pacific has led to the following delineations of the Internal Waters, Territorial Sea (12NM), Contiguous Zone (24NM), EEZ 200NM) and the ECS (beyond 200NM).[106] The latter maritime limit has its own set of complex measurements and provisions stipulated in Article 76. With

[99] UNCLOS, 1982. Articles 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 55 refers to the measurements of the various maritime zones measured from the from the baselines.

[100] Schofield, C., *Departures from the Coast: Trends in the Application of Territorial Sea Baselines under the Law of the Sea Convention*, 2012. See also United Nations Office for Ocean Affairs and the Law of the Sea, The Law of the Sea – *Baselines: An Examination of the Relevant Provisions of the United Nations Convention on the Law of the Sea*, 1989. Part II, Section 2 of UNCLOS outlines all the provisions set out to measure baselines.

[101] Caron, D. D., *When law makes climate change worse: rethinking the law of baselines in light of rising sea level*, 1990.

[102] UNTS 205. See also: Lathrop, C. (2016). Baselines. D. Rothwell, A. G. Oude, K. N. Scott & T. Stephens (Ed). The Oxford handbook of the law of the sea. (69 - 90)

[103] Bateman, S., & Schofield, C.,"*Straight Baselines in the Indo-Pacific: Legal, Technical and Political Issues in a Changing Environment*", 2022.

[104] Above n 99 n 101.

[105] Ibid.

[106] Figure 3 shows a matrix of maritime boundary and its status as of May 2020.

the recent milestone of the Biodiversity Beyond National Jurisdiction (BBNJ) agreement, PICs should consider formally depositing their EEZ and considering the new treaty would implicate to their sovereignty.[107]

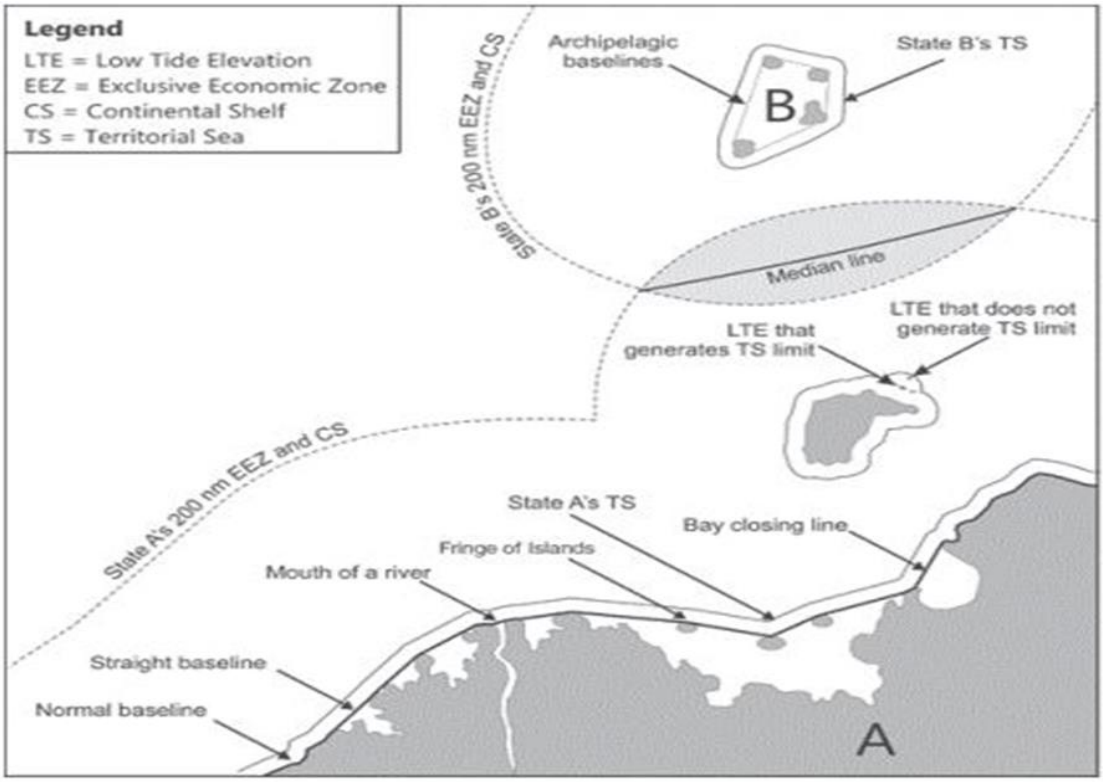

Figure 5: Maritime Limits and Baseline Types

Source: Lathrop – Baselines

Baselines of the Pacific

In adherence to Article 5 of UNCLOS, the standard measurements are typically derived from the low-water line along the coast. *[108]* It is imperative to note that for some PSIDS, a distinctive topographical feature exists in the form of an outer connection comprising barrier or fringing reefs. This is apparent in Article 6 of UNCLOS and the application of the seaward limit of the reef edge using the lowest astronomical tide (LAT) as the reference mark becomes a practical consideration in the determination of baseline measurements in this land formation.[109]

[107] Agreement under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, signed 19th of June 2023.

[108] Art 5, UNCLOS 1982.

[109] Artack, E., and Kruger, J., *Status of maritime boundaries in Pacific Island countries*, 2015. LAT is defined as:

"The lowest tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions." See also*:* Dorst, L., Slobbe, C., and Verlann, M., *Lowest Astronomical Tide as Chart Datum*: definition and safety aspects, 2014.

Article 7 of UNCLOS tackles the topic of straight baselines where it prevents misuse and safeguards the rights of all states applicable under the following conditions:

"In localities where the coastline is deeply indented and cut into, or if there is a fringe of islands along the coast in its immediate vicinity, the method of straight baselines joining appropriate points may be employed in drawing the baseline from which the breadth of the territorial sea is measured…"[110]

This provision has been used by Pacific States as a work around to close the gaps in reefs and lagoon waters enclosing them as internal waters.[111] Additional characteristic geographical formation common in Pacific region are the archipelagos. As explained in Article 46 (b) of UNCLOS:

(b) "archipelago" means a group of islands, including parts of islands, interconnecting waters and other natural features which are so closely interrelated that such islands, waters and other natural features form an intrinsic geographical, economic and political entity, or which historically have been regarded as such."[112]

Whereas an archipelagic State definition given in Article 46 (a) means:

"*a State constituted wholly by one or more archipelagos and may include other islands…"*[113]

The content of Article 46 undertook extensive deliberations among drafters and scholars of UN Law of the Sea Conferences, given the inherent uncertainties surrounding various aspects of coastal and mid-ocean archipelagos. [114] An historical milestone occurred during the 1974 UNCLOS III meeting when the codification of archipelagic states was officially established under the definition that it stands today.[115]

Compared to the normal baseline measured along the coast, the archipelagic baselines follow Article 47 as:

[110]Article 7, UNCLOS.
[111] Above n 76, Frost, R., Hibberd, P., Nidung, Masio., Artack, E., & Bourrel, M., *Redrawing the map of the Pacific,* 2018
[112] Article 46 (b), UNCLOS 1982.
[113] Article 46 (a), UNCLOS 1982.
[114] Barron, N., Archipelagos and Archipelagic States under UNCLOS III: No Special Treatment for Hawaii, 4 Hastings Int'l & Comp. L. Rev. 509, 1981.
[115] Above n 108 pp 512 – 516. See also: Lokita, S., *The Role of the Archipelagic Baselines in Maritime Boundary Delimitation,* 2010.

"1. An archipelagic State may draw straight archipelagic baselines joining the outermost points of the outermost islands and drying reefs of the archipelago provided that within such baselines are included the main islands and an area in which the ratio of the area of the water to the area of the land, including atolls, is between 1 to 1 and 9 to 1.

2. The length of such baselines shall not exceed 100 nautical miles, except that up to 3 per cent of the total number of baselines enclosing any archipelago may exceed that length, up to a maximum length of 125 nautical miles.

3. The drawing of such baselines shall not depart to any appreciable extent from the general configuration of the archipelago.

4. Such baselines shall not be drawn to and from low-tide elevations, unless lighthouses or similar installations which are permanently above sea level have been built on them or where a low-tide elevation is situated wholly or partly at a distance not exceeding the breadth of the territorial sea from the nearest island.

5. The system of such baselines shall not be applied by an archipelagic State in such a manner as to cut off from the high seas or the exclusive economic zone the territorial sea of another State.

6. If a part of the archipelagic waters of an archipelagic State lies between two parts of an immediately adjacent neighbouring State, existing rights and all other legitimate interests which the latter State has traditionally exercised in such waters and all rights stipulated by agreement between those States shall continue and be respected.

7. For the purpose of computing the ratio of water to land under paragraph l, land areas may include waters lying within the fringing reefs of islands and atolls, including that part of a steep-sided oceanic plateau which is enclosed or nearly enclosed by a chain of limestone islands and drying reefs lying on the perimeter of the plateau.

8. The baselines drawn in accordance with this article shall be shown on charts of a scale or scales adequate for ascertaining their position. Alternatively, lists of geographical coordinates of points, specifying the geodetic datum, may be substituted."[116]

[116] Article 47, UNCLOS 1982.

The form of "special status" of archipelagic State has made significant progress since the topic was debated in the early 1920's.[117] In addition, the historical case law on the subject *Anglo Norwegian Fisheries Case* has helped paved the way for many archipelagic States to own their special status as conflicting opinion were not clarified and did little to enhance coastal States archipelagic claims.[118]

The dynamics of power have driven this certain development in international law-making.[119] Some legal scholars have observed that, in the context of decolonization, a shift in control towards sovereignty anticipated for numerous mid-ocean archipelagos, will introduce variations in their baseline circumstances.[120] Interestingly, it should be noted that not all archipelago is an archipelagic state and that the special status of archipelagic State is governed by sole independence, the ability to function as a State.

[121]The Montevideo Convention (1933), reaffirms the definition that *"a state must possess a permanent population, a defined territory, a government, and the capacity to conduct international relations."*[122]

As newly established States, some coastal States were in the process of adapting to their recently acquired marine resource extensions and as political situations lacked their capacity to actively influence deliberations pertaining to maritime jurisprudence were limited.[123]

For instance, Fiji was not given the special treatment by the United Kingdom (UK), although it qualified as being mid-ocean archipelago.[124] Nevertheless, Fiji played a role in drafting the current UNCLOS.[125]

In the Pacific, groups of islands are common representative of geographical features and the consideration at the UNCLOS III to have single entity has enhanced the boundaries for Fiji,

[117] Munavvar, M., Ocean States: Archipelagic Regimes in the Law of the Sea, 1995.
[118] Fisheries Case (United Kingdom v. Norway) [1951] I.C.J. 116.
[119] Amerasinghe, C. F., The Problem of Archipelagos in the International Law of the Sea, 1974.
[120] Above n 108. Ku. C., The Archipelagic States Concept and Regional Stability in Southeast Asia, 1991. See also: Certain Legal Aspects Concerning the Delimitation of the Territorial Waters of the Archipelagos, Report by Jens Evenson, 1U.N. Conf.on the Law ofthe Sea (Preparatory Document No. 15)
at 289 U.N. Doc. A/Conf. 13/18, 1958.
[121] Davenport, T., The Archipelagic Regime. D. Rothwell, A. G. Oude, K. N. Scott & T. Stephens (Ed). The Oxford handbook of the law of the sea. (134-158), 2016.
[122] Montevideo Convention, 1933. See also: Shaw, M. (2023, November 3). international law. Encyclopedia Britannica.
[123] Above n 113.
[124] Above n 118 pg 544 – 556.
[125] Above n 113. See also U.N. Doc. A/AC 138 SC II/L. 48 (1973).

Marshall Islands, Palau, Papua New Guinea, Solomon Islands, Kiribati, Tuvalu and Vanuatu. Tonga, although have not formally deposited its basepoints have adopted the archipelagic baseline in its maritime zone delineations. All in all, these progressive stages of the baseline development have endured over the years and PSIDS have so far not reached a maritime boundary disagreement that needs international intervention.

Geographical Coordinates and Charts

Traditional baseline demarcation of the maritime boundaries in the Pacific has been based on digitising of large scaled hydrographic charts.[126] Recent practise of deposit to the UN-SG has been mainly through the submission of geographical coordinates digitized from high resolution optical data when technology allowed high accuracy mapping. [127]

On the contrary charts have been surveyed during pre-colonial era for the purpose of navigation and at large are outdated. Majority of the charts used predates UNCLOS III as many PSIDS gained independence by 1970's, which coincides with the last UK vessel mapping the region.[128] Fortunately, certain Pacific States have received financial support for the revision of their hydrographic charts, facilitated through collaboration with the IHO, a measure undertaken in the interest of maritime safety.[129]

This method circumvents the necessity of employing maritime charts to depict the positions of established baselines, limits, and boundaries.[130] Schofield have also stated this and added that this practise addresses a potential repercussion in that the charts utilized for baseline purposes might not accurately represent the true coastal geography, posing a threat to the safety of navigation.[131]

However, on a more comprehensive viewpoint, this signifies the region's commitment to self-reliance and a departure from the traditional practice of maintaining and upgrading paper charts.[132] To date, Tuvalu, Kiribati, Marshall Islands, Kiribati, Cook Islands, Niue, Federated

[126] Above n 111.
[127] Ibid.
[128] International Hydrographic Organization, IHO Report on Hydrography and Nautical Charting in The Republic of Vanuatu, 2011.
[129] Ibid.
[130] Above n
[131] Schofield, C., A New Frontier in the Law of the Sea? Responding to the Implications of Sea Level Rise for Baselines, Limits and Boundaries, 2021.
[132] To date, Tuvalu, Kiribati, Marshall Islands, Kiribati, Cook Islands, Niue, Federated States of Micronesia and Papua New Guinea have revised new maritime zone legislation and have deposited the outer limits of their maritime zones.

States of Micronesia, Palau and Papua New Guinea have revised new maritime zone legislation and have deposited the outer limits of their maritime zones through coordinates.

The surveying and validating of basepoints are a fundamental entry point in maritime claims.[133] Given the resurgence of international interest in exploring and exploiting in the Pacific region and a growing incidence of illegal, unreported, and unregulated (IUU) fishing activities, support by the government on the significance of securing basepoints will be beneficial.

Therefore, baselines, in their various manifestations, serve as the legal representation of the coast. [134] The use of coordinates to establish maritime boundary treaties reinforces stability in the context of SLR as basepoints in coastlines are used in negotiations of the boundary by Parties. The coordinates provide the exact location of a maritime boundary and creates certainty of where the boundary line is located. Once the treaty is in force, a boundary defined in this way has a legal definition that is separated from the coastlines of the Parties. This is the case even where the treaty provides that the coordinates were agreed using the principle of equidistance.

[133] Peng, R.-C & Wang, J.-Y & Tian, Z. & Guo, L.-X & Chen, Z.-P., *A New Technique about Selecting Base Points of the Territorial Sea Based on the Principle of Convex Hull Creating*. 34. 53-57., 2005.
[134] Alexander, L. M., The delimitation of maritime boundaries, 1986.

MAY 2020	CK	FJ	FM	KI	MH	NR	NU	PW	PG	SB	TV	TO	VU	WS
Tasks														
Territorial seas (normal) baseline defined and developed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	WIP	WIP (Torres Strait)	Yes	Yes	WIP	Yes	Yes
Archipelagic baseline defined and developed	NA	Yes updated	NA	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes	WIP	Yes	NA
National maritime laws reviewed and amended	Yes	WIP	WIP	Yes	Yes	Yes	Yes	WIP	Yes	WIP	Yes	WIP	Yes	Yes
Territorial seas (normal) baseline gazetted	WIP	Yes	WIP	Yes	Yes	WIP Review	Yes	WIP	Yes (Torres Strait)	Yes	Yes	WIP	Yes	Yes
Archipelagic baseline gazetted	NA	Yes	NA	Yes	Yes	NA	NA	WIP	Yes	Yes	Yes	WIP	Yes	NA
Maritime limits computed & developed	Yes	WIP	Yes	Yes	Yes	Yes	Yes	WIP	Yes (Torres Strait)	WIP	Yes	WIP	WIP	Yes
Maritime limits gazetted	Yes-EEZ No-TS, CZ	WIP (1981) TS, EEZ	WIP	Yes	Yes	WIP Review	Yes	No	Yes (Torres Strait)	WIP	Yes	No	No	YES TS, CZ
Territorial seas (normal/archipelagic) baselines deposited with DOALOS	WIP	Yes - updated	Yes	Yes	Yes	WIP Review	Yes	WIP Review	WIP	WIP	Yes	No	Yes	Yes
Maritime boundaries deposited with DOALOS	Yes-EEZ No-TS, CZ	Yes (3)	Yes	Yes	Yes	WIP Review	Yes	WIP	WIP	No	Yes TS, EEZ No-CZ	No	No	Yes TS, CZ

Figure 4: Status of PICs maritime boundary claims as of May 2020. Source: SPC

I want to write some more on this topic, depending on the total pages. Have written a bit more in the Climate Change section.

Section B: The Role of Technology in the Mapping, Surveying, and Monitoring of the Maritime Boundaries in the Pacific.

Subsection B.1: The use of geographic information systems (GIS) and remote sensing (RS) to map and survey maritime boundaries in the Pacific.

In recent years, the integration of GIS and RS technologies has revolutionized the precision and efficiency of maritime boundary mapping, through improved accuracy and means of data collection.[135] The technical aspect can be considered as the high impact phase and on the ground proof of how states can relate the legality of their claims at the international forefront. Carleton and Schofield have written:

"In practice, however, it is difficult to disentangle the purely technical from the legal. An appreciation of the legal framework is therefore essential to an understanding of the technical challenges and legal issues will also be considered here, albeit from a technical perspective."[136]

The precision of baseline measurement has been significantly improved by technological progress in satellite imagery, GIS software's, global positioning systems (GPS) and hydrographic surveying.[137]Data sources for baseline delineation has been mainly through historical navigational charts and large scaled topographic charts.[138]

While GIS may not be a one stop shop for every application and analysis per se, it encompasses a combination set of tools that enhance the organization and analysis of information.[139]One such tool is RS technology, which is the use of sensors in the form of orbiting satellites to handheld GPS systems and real time kinetic (RTK) equipment's to obtain information of an object or area remotely.[140] In the context of maritime boundary delineation, GIS presents upon

[135] Kastrisios, C., and Tsoulos, L., *A cohesive methodology for the delineation of maritime zones and boundaries*, 2016.
[136] Carleton C. and Schofield, C., Developments in the Technical Determination of Maritime Space: Delimitation, Dispute Resolution, Geographical Information Systems and the Role of the Technical Expert, 2002.
[137] Artack, E., and Kruger, J., Status of maritime boundaries in Pacific Island countries, 2015.
[138] Above n 109.
[139] Arsana, Andi., Rizos, Chris., & Schofield, Clive., *The Application of GIS in Maritime Boundary Delimitation, A case study on the Indonesia-East Timor Maritime Boundary Delimitation*, 2023. See also, SPC, The Pacific Geospatial & Surveying Council Strategy 2017 – 2027.
[140] Kupfer, J, A., & Emerson, C, W., Remote Sensing, 2005.

cartographers and surveyors the capability to accurately document coastal characteristics, calculate distances, and visually depict maritime limits.[141]

Early use of GIS & RS in the Pacific has been mainly applied for monitoring of forest cover and land use based off aerial photograph analysis.[142]The launch of the first commercial satellite; IKONOS advanced the GIS & RS techniques in the Pacific for various applications including coastal changes with the natural band combination and improved spatial resolution as compared to the black and white aerial imagery.[143]

Subsequent launch of sub-meter resolution satellites thereafter within 30 to 60 centimetres range further improved quality control measures and the baselines extracted from old backdrops are overlayed onto the geo-rectified imagery as an additional verification step.[144]Satellite constellations developed by DigitalGlobe Inc such as QuickBird-2 and World-View's changed the scene of digitizing and verification of the maritime limits. With its improved graphics and the ability to view in natural colour combination the features along the coast for baseline definition was more apparent and consistent with field surveys.

As sensor technology increased, the use of unmanned aerial vehicle (UAV) or commonly known as drones and Light Detection and Ranging (LiDAR) imagery became increasingly popular in the Pacific. Countries like Samoa, Vanuatu, Tonga, Nauru, Tuvalu, and parts of Fiji have access to LiDAR datasets of their countries through external partnerships and donor.[145]

Country	**Backdrop Used**	**Resolution/Scale**
Cook Islands	Hydrographic Charts, WorldView-2	2 meters, 0.6 meters
Federated States of Micronesia	QuickBird-2	0.6 meters

[141] Above n 109.
[142] Fiji User Group, *High-resolution satellite image data for Pacific Island Countries*, GIS And Remote Sensing News, 1993.
[143] Pacific Island GIS & RS news, The Newsletter of the GIS/Remote Sensing Users in the Pacific, Issue 1, 2001.
[144] Artack, E., Pacific Islands Regional Maritime Boundaries Project: Future Directions, 2006.
[145] SPC, Lidar Imagery for Vanuatu and Tonga, 2023. https://www.spc.int/updates/blog/2023/08/lidar-imagery-for-vanuatu-and-tonga

Fiji	Topographic Maps, Aerial Photos, Hydrographic Charts	1:50,000 1:10,000
Kiribati	WorldView-2	0.6 meters
Marshall Islands	WorldView-3 Ortho-photos	0.6meters Unknown
Nauru	LiDAR WorldView-2	0.6meters
Niue	Charts	
Palau	WorldView-3, Ortho-Photos	0.5meters
Papua New Guinea	Charts	
Samoa	Charts, IKONOS-2, QuickBird-2, WorldView-2, LiDAR.	
Solomon Islands	Charts	
Tonga	Charts, Aerial Photos, IKONOS-2, QuickBird-2, WorldView-2, LiDAR	
Tuvalu	LiDAR,	
Vanuatu	Charts	1:250 000

Table 3: Shows dataset utilized to verify baseline for some PICs. [146]

Source: Gaunavou, L., (2019). Pacific Community Stocktake of the Bathymetry and Topographic Datasets, Hazard Risk Analysis and Geospatial Data for Decision Making.

[146] DigitalGlobe, Core Imagery Products Guide, n.d.

External support rendered by the GA has been instrumental in the provision of technical support in the areas of software provision and training in the Pacific on the Maritime Zone boundary (MARZONE) software.[147] Developed by the University of Melbourne with a rigorous geodetic computation, MARZONE was designed to meet Australia's complex maritime boundaries mapping.[148] Included in its capacity is the delineation of the boundaries of all zones (3NM, 12Nm, 24NM, 200NM, and 350NM) in strict adherence to the applicable UNCLOS provisions requires consideration of various maritime features like the Normal baselines, encompassing bay and river closing lines, Straight baselines, Low-tide elevations, Islands and Rocks and this ensures compliance to UNCLOS provisions.[149]Typical calculations required under extractions of maritime limits are defined by the developers are:

"Defining arcs on the surface of the reference ellipsoid by a locus of points equidistant from the circle centre, calculating the intersection point between such arcs, offsetting lines from straight baselines defined as geodesics, intersecting geodesics with arcs and computing geodesic azimuths and distances over very long lines (up to 350 nm)."[150]

In the case of the PICs, the MARZONE was used to generate all maritime limits as requested by countries under the support of the Pacific Maritime Boundaries Project.

Remote Sensing Methods

While GIS and remote sensing offer numerous advantages, they come with their share of challenges. One primary concern revolves around ensuring data accuracy.[151] Optical and LiDAR measurements must undergo meticulous validation and correction procedures to account for factors such as atmospheric noise and variations in water properties.[152]

Furthermore, the presence of cloud cover can impede data collection, particularly in the micro-climate of the Pacific. To overcome these challenges and generate dependable results, calibration techniques and advanced image data pre-processing are applied to the raw image before distribution to the users.[153]

[147] Collier, P., A. et al, The Automated Delimitation of Maritime Boundaries – An Australian Perspective, 2002.
[148] Ibid.
[149] Above n 119.
[150] Above n 120.
[151] Above n 113.
[152] SPC, Tuvalu Coastal Adaptation Project (TCAP) Report, 2019.
[153] Gaunavou, L & Rokotuiwakaya, L., Exploring Open-Source Alternatives for Satellite Data Pre- Processing, 2021.

Pre-processing done primarily aims to eliminate the atmospheric noise caused by terrain reliefs. Other processes that follow compensates includes Haze removal, Pan-sharpening and Ortho-correction that has the digital elevation models included. Software capabilities can also be attributed to significant image analysis and as time progressed, so have software capabilities in the enabling environment that it is today for data analysis. These advancements have had a notable impact on the technical aspects involved in creating and verifying baselines. [154]

Towards an improved Data Management Systems

An integral portion of GIS & RS is data and the management of datasets. Resilient data storage systems are crucial in maintaining sustainable GIS & RS procedures and eliminates reinventing the wheel years down the project line. As SIDs, technical support is often lacking and reliance on support from donor countries requires consistent training and exposure with turnover in staff and changes in government ministries.

Fortunately, majority of the countries have set up an ocean team that handles issues relating to maritime boundaries and efforts. The team is a spread of technical, legal, and political offices within the countries all with ocean mandates in their areas of work. This is essential in maintaining longevity of the work and eliminates re-invention of processes which took years of development.

In the context of information systems, countries like Vanuatu, have developed Microsoft Access based databases, developed by CSIRO and ORSTOM: Institut De Recherché Pour Le Development (now IRD).[155] The Vanuatu Natural Resources Information System (VANRIS) was built primarily for land use planning data storage back in the 1960's. Similarly, Fiji under the Fiji Lands Information System (FLIS) had collection of datasets from various ministries during the startup of its GIS in the 1990's.[156]

In the absence or lack thereof of national storage systems, GA developed the Pacific Islands Regional Maritime Boundaries Information System (PIRMBIS).[157] This was built with similar

[154] Above n 118.

[155] Ganileo, P., GIS Backdrop for VANRIS, 2001. See also, SOPAC, Sustainable Integrated Water Resources and
Wastewater Management in Pacific Island Countries, National Integrated Water Resource Management Diagnostic Report -Vanuatu, 2007.

[156] Masikerei, K., FLIS News, 1993.

[157] Contains all maritime boundary information that can be updated through querying and is UNLOS proofed. Lal, A., & Artack, E., Pacific Islands Regional Maritime Boundaries Information System [PIRMBIS], Technical Instructions Manual, 2006.

specifications to the Australian Maritime Boundaries Information System (AMBIS). Unlike the MS based data storage systems, the PRIMBIS is a collection of fundamental attributes that facilitate data manipulation within GIS such as basepoints and geographic features like islands and turning points of baselines, lines (representing baselines), and polygons (encompassing features like islands and mainland regions).[158]

More recent and current systems built on open-sourced platforms such as PacGeo and Drupal has proven to be cost efficient. To date, all maritime boundaries in the Pacific are available through the Pacific Data Hub (PDH) and is currently the regions most consolidated web-application for data dissemination to PICs.[159]

Technical Institutional Support

As previously mentioned, channelling GIS into the work of maritime boundaries delimitation and developments is an integration of various datasets and requires specialized skillsets. However, rendering a support system that is fully functional and one that will not require replication is of importance to PSIDs. Realizing the need for a consolidated approach in the organization and future for geospatial action, the Pacific Geospatial and Surveying Council (PGSC) was formed.[160]

PGSC has acted as a support for geospatial technicians around the Pacific in surveying and looking into upgrading local datums to international reference frames such as International Terrestrial Reference Frames (ITRF).[161]So far, only Samoa, Fiji and Tonga have re-surveyed and are now incorporating ITRF in their mapping. Improving local datum to ITRF will reflect accurate mapping of the baseline data for maritime boundaries work. Other PICs are expected to follow soon provided funding and technical assistance is available by regional actors and donors.[162]

Establishing collaborations with global forums has further strengthened the initiatives undertaken by the PGSC. The work of the United Nations Integrated Geospatial Information

[158] Ibid.

[159] Refer https://pacificdata.org/

[160] PGSC, 2014. https://pgsc.gem.spc.int/
Surveyors and GIS specialist from Australia, New Zealand, Cook Islands, Fiji, Federated States of Micronesia, Kiribati, Marshall Islands, Nauru, Niue, Papua New Guinea, Palau, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu are part of this council.

[161] Lal, A., & Kumar, S., Positioning in the Pacific Islands, 2016.

[162] PGSC, Regional workshop on Strengthening National Geospatial Information Management, Rapporteur Summary Report, 2022.

Framework (UN-IGIF) has been reflected in Tonga and Fiji's national geospatial information management action plan.[163]The UN-IGIF was adopted by the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) under the United Nations Economic and Social Council (ECOSOC) resolution 2011/24.[164]

The UN-GGIM is a member led intergovernmental mechanism established to tackle worldwide issues concerning the utilization of geospatial data, both in developmental frameworks and as a platform for international policymaking in geospatial data management.[165]

Collaborating with the PGSC's associates in the Pacific, UN-GGIM seeks to facilitate discussions and alignment of geospatial initiatives on a national scale with the support of the PGSC. This entails making collective decisions and establishing guidelines for the application of GIS within national, regional, and global frameworks.[166]

Developments – Improving marine geospatial data standards – IHO - S121

The concept of an enhanced GIS deposit system was requested by the United Nations General Assembly (UNGA) to the SG through the endorsement of resolution 59/24, thereby:[167]

"…to improve the existing Geographic Information System for the deposit by States of charts and geographical coordinates concerning maritime zones, including lines of delimitation, submitted in compliance with the Convention, and to give due publicity thereto, in particular by implementing, in cooperation with … the International Hydrographic Organization, the technical standards for the collection, storage and dissemination of the information deposited, in order to ensure compatibility among the Geographic Information System, electronic nautical charts and other systems developed by these organizations."

Henceforth, the UN together with the International Hydrographic Organization (IHO) have been leading facilitations on the exchange of maritime limits and boundaries data in a structured and interoperable format.[168] Entering an era in e-Navigation, IHO established the

[163] United Nations Economic and Social Council (ECOSOC), Strengthening institutional arrangements on geospatial information management, Resolution 2016/27, Agenda item 18 (i), 15 August 2016.
[164] United Nations Economic and Social Council (ECOSOC), Committee of Experts on Global Geospatial Information Management, Resolution 2011/24.
[165] UNSD — UN-GGIM. (n.d.). Ggim.un.org. https://ggim.un.org/
[166] PGSC, Plenary Meeting Report, 2022.
[167] UN GA Resolution A/RES/59/24, 2004.
Yearbook International Tribunal for the Law of the Sea, Volume 8, 2004.
[168] Beaupré, J.-F., Lévesque, S., Ahola, R., Durand, S., O'Brien, C. D., Pritchard, J., & Alcock, M., Development of S-121 for Maritime Limits and Boundaries, 2022. See also IHO S121 Feature Model for Maritime Limits and Boundaries, 2016.

standard framework of the S-100 Universal Hydrographic Data Model aligned with the geospatial standards formulated by the International Organization for Standardization, Technical Committee 211 (ISO/TC211) geographic information/geomatics.[169] The efforts of the ISO/TC211 is to align with relevant information technology and data standards whenever feasible, and establish a structure for the creation of industry-specific applications utilizing geographical data.[170]

Within this S-100 standard is the Maritime Limits and Boundaries Product Specification, S121 and its purpose is to facilitate the encoding and sharing of digital information related to maritime boundaries, encompassing maritime limits, zones, and boundaries defined by UNCLOS.[171]

The standards created by ISO/TC 211 significantly contribute to well-informed, fact-based decisions in any domain involving geographic or location-related content. These standards serve as a foundation for fostering innovation.[172] For the most part, S121 would indirectly aid in depicting limits and boundaries on IHO S-57 (IHO, 2000) or IHO S-101 (IHO, 2018b) Electronic Navigational Charts. [173] Furthermore, embracing standards promotes international collaboration and openness in maritime boundary affairs. [174]

The fusion of GIS and remote sensing in maritime boundary mapping yields profound effects. Firstly, it elevates the precision of boundary delineation, diminishing uncertainties and potential conflicts. With accurate maps at their disposal, PICs have effectively overseen their EEZs, safeguarding marine resources and promoting sustainable development. Secondly. the capacity to overlay disparate datasets contributes to informed decision-making, allowing governments to make well-founded choices concerning their maritime jurisdiction and allocation of resources.

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[169] Ibid.
[170] ISO/TC211 "Geographic information/Geomatics", ISO_TC211_Strategic_Business_Plan_2023, 2022.
[171] IHO S-101 to S-199 | IHO. (n.d.). Iho.int. Retrieved November 7, 2023, from https://iho.int/fr/iho-s-101-to-s-199
[172] Beaupré, Jean-François, Lévesque, Serge, Ahola, Ryan, Durand, Sébastien, O'Brien, C. Douglas, Pritchard, Jonathan, Alcock, Mark: DEVELOPMENT OF S-121 FOR MARITIME LIMITS AND BOUNDARIES. International Hydrographic Review (28), 94-107 (2022). https://doi.org/10.58440/ihr-28-a07
[173] Powell, J., The world of S-100: Updated framework of maritime data standards to be released in 2018, 2018.
[174] Alcock, M., IHO-S121 Maritime Limits and Boundaries, N.D. See also Government of Canada, Leveraging ISO 19152 Land Administration Domain Model (LADM), 2017.

Subsection B.2: Monitoring technologies

Operationalizing GIS derived Maritime Boundaries Data in the Vessel Monitoring System (VMS)

Location-based technology idealized into graphical interface and associated contents are progressively integrating into daily life and becoming more universal.[175] The mechanism of the VMS involves the use of satellite technology to track and transmit real-time data on the positions and activities of vessels to the designated monitoring authorities. This data is typically relayed at regular intervals, allowing for effective surveillance of the maritime activities.[176]

Playing a vital role in monitoring, control, and surveillance (MCS) activities, VMS became an instrumental fisheries management tool when UNCLOS 1982 expanded national maritime boundaries from 12NM to 200NM. In practicality, this meant restricted and limited vessel monitoring and compliance within the EEZs.[177]The realization of overfishing in this period triggered the development of the Food and Agriculture of the United Nations (FAO) Code of Conduct for Responsible Fisheries which enforced MCS activities.[178]

The Western and Central Pacific Fisheries Commission (WCPFC) oversees the establishment of the standards, specifications, and procedures (SSP) of VMS western and central Pacific Ocean. This responsibility is detailed in article 24(8) of the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western Central Pacific Ocean, marking it one of the initial regional fisheries agreements to be ratified after the adoption of the United Nations Fish Stocks Agreement (UNFSA) in 1995. [179]

[175] Above n 148.

[176] Kavadas, S., et al, Common methodological procedures for analysis of VMS data, including web-based GIS applications related to the spatial extent and intensity of fishing effort, 2014.

[177] Smith, A., R., History and Future of MCS,

[178] Food and Agriculture of the United Nations, Code of Conduct for Responsible Fisheries, 1995. See also: Doulman, D., The Code of Conduct for Responsible Fisheries: The Requirement for Structural Change and Adjustment in the Fisheries Sector, 1998.

[179] Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, 5 September 2000.

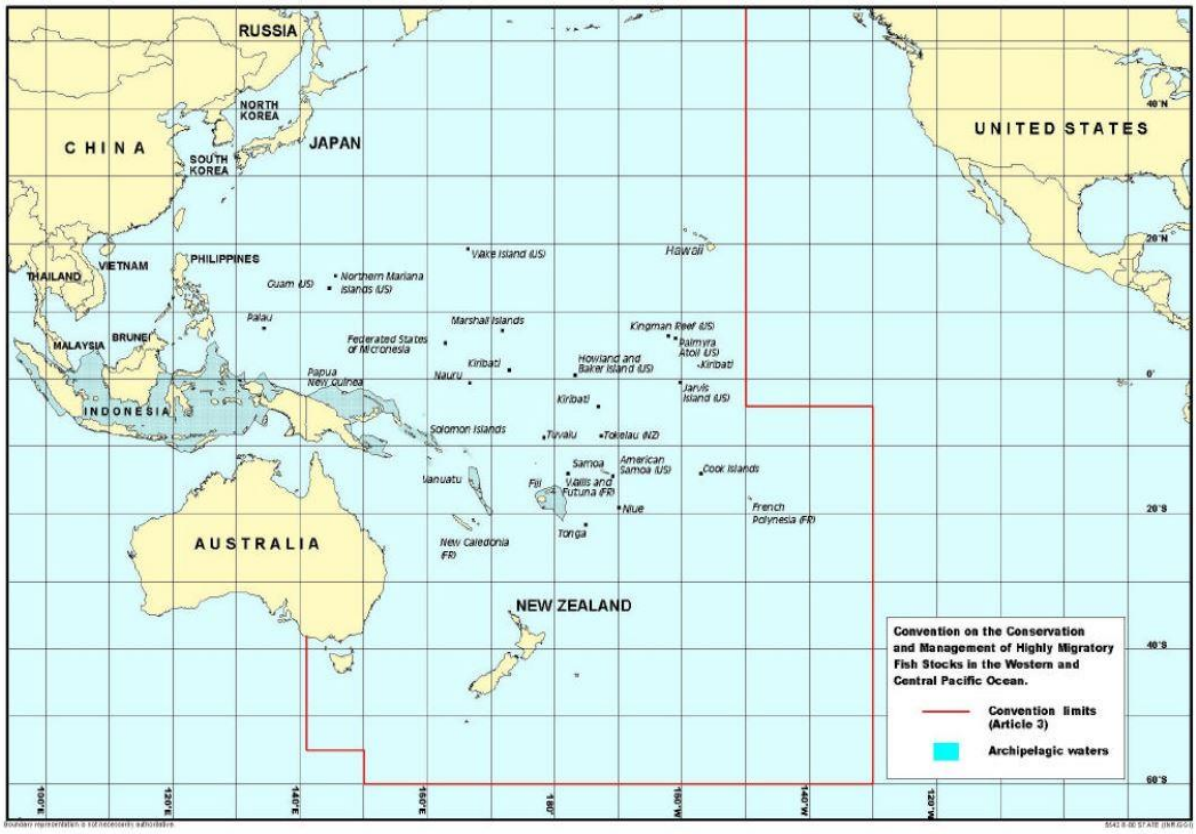

Figure 4: WCPFC areas of jurisdiction in the South Pacific Ocean. Source: WCPFC

Countries covered under WCPFC are Australia, Canada, China, Cook Islands, Federated States of Micronesia, Fiji, France, Indonesia, Japan, Republic of Kiribati, Republic of the Marshall Islands, Republic of Nauru, New Zealand, Niue, Republic of Palau, Independent State of Papua New Guinea, Republic of the Philippines, Republic of Korea, Independent State of Samoa, Solomon Islands, Kingdom of Tonga, Tuvalu, United Kingdom of Great Britain and Northern Ireland in respect of Pitcairn, Henderson, Ducie and Oeno Islands, United States of America and Republic of Vanuatu.[180]

[180] Vessel Monitoring System | WCPFC. (n.d.). Www.wcpfc.int. Retrieved November 8, 2023, from https://www.wcpfc.int/vessel-monitoring-system

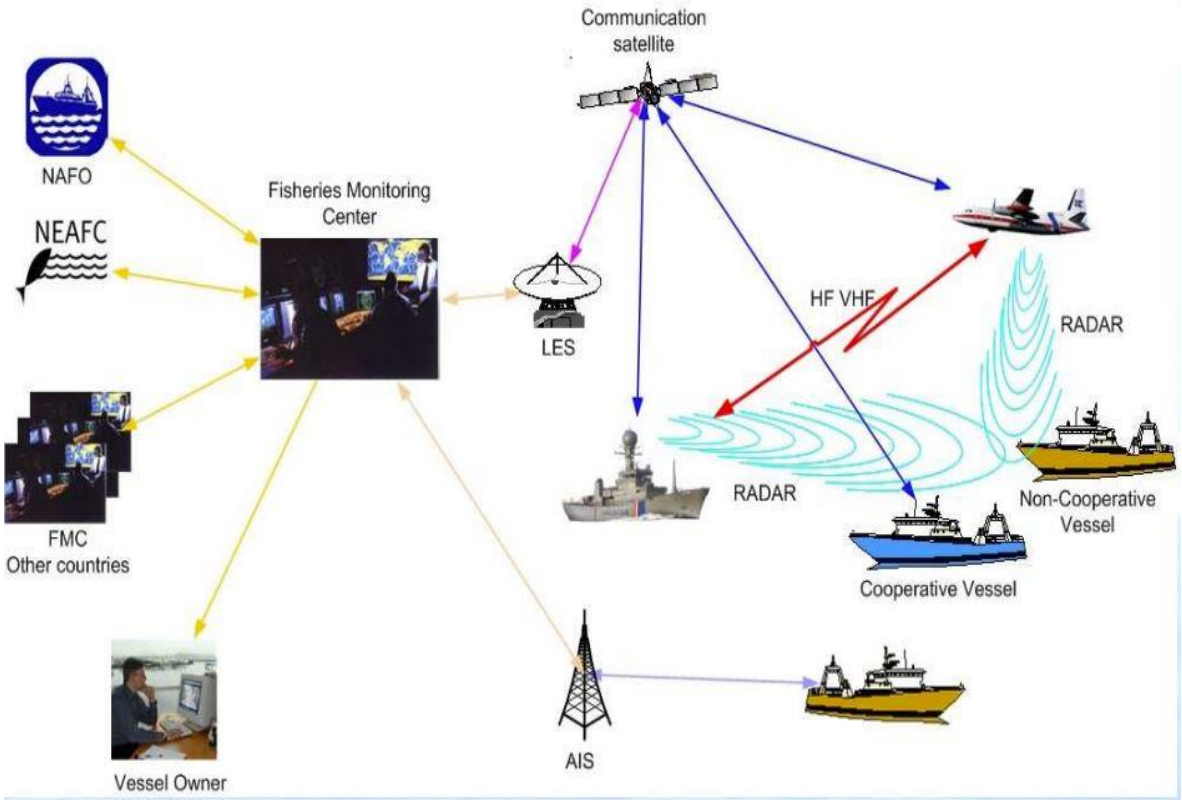

Figure 5: VMS Cycle

Source: Trackwell[181]

In 2009, the Pacific VMS was operative under a Service Law Agreement (SLA) between FFA and WCPFC as pressures from distant water fishing nations (DWFN) and overexploitation of tuna stock became evident.[182] The Pacific VMS would permit vessel to submit reports to the WCPFC through two methods: i) directly to the WCPFC VMS, or ii) through the FFA VMS to the WCPFC.[183]

In 2015, the Forum Fisheries Committee (FFC), the governing body of FFA, recognized the need to update VMS maps following the update of maritime boundaries coordinates into national legislation and deposit by FFA members to the UN-DOALOS.[184] Members also acknowledged the importance of using a uniform dataset among stakeholders deemed it necessary to authorize SPC to provide authoritative maritime boundaries for the updates of the

[181] TrackWell VMS Presentation in Barbados. (2008). https://sustainabledevelopment.un.org/content/documents/3342fisheries_gunnarsson.pdf

[182] Richards, A., Application of the FFA member countries Fishing Vessel Monitoring System to track live reef fish transport vessels, 1999. See also:

[183] WCPFC, Commission VMS Standard Operating Procedures (SOPs), 2022.

[184] Yaya, Filimoni., 2020, FFA-SPC SLA Project & Maritime Boundary Handover Report. See also: FFA, 93rd FFC Official Meeting, 2015.

FFA VMS.[185]Hence, an SLA was established between FFA and SPC in 2019 to support this milestone agreement as maritime data used previously did not accurately reflect PICs maritime boundary deposited under UNCLOS.[186] Today, the integration and utilization of authorized geospatial information concerning maritime boundaries has been integrated in the Pacific VMS and forms an integral component of MCS in the fisheries department of FFA.[187]

FFA VMS Operations

An Automated Alert Notifications can be generated when fishing vessels are close to or are inside a particular EEZ or the maritime protected area (MPA). The system can set up a proximity alert notification that can be generated when a vessel exits or enter a zone. Close activity monitoring is conducted if a vessel has already entered the zone and will be continuously monitored before its exit.[188]

Information sharing through VMS has enabled FFA members to monitor over one thousand vessels registered on the FFA Vessel Register with the number of vessels increased by 5900 vessels inclusive of the use of the Automatic Identification System (AIS).[189]

The use of RADAR satellite imagery has been instrumental in tracking of IUU activities when the GPS transponders are intentionally switched off by the vessel operators.[190]

Data Dissemination

Securing regional acknowledgment and approval of VMS-incorporated maritime boundaries necessitates effective communication and data exchange among Pacific nations. This is performed through the PDH which is an information management system alluded to in the previous section. FFA members can access and download GIS based layers in shapefile and kml formats for use or revision by their technical officers. Each member has independent page on the under FFA as a parent organization as per PDH schema. In addition, the Pacific Maritime Boundaries Dashboard, hosted on the PDH has been developed for member's benefit. It as an interactive online tool providing access to the regional maritime boundary dataset. Funded by

[185] SPC, Exchange of maritime boundaries data to boost fisheries monitoring, control and surveillance in region, 2020.
[186] SPC, User Guide, Service Law Agreement, 2023.
[187] Chand, R., Operationalising maritime boundaries data for fisheries management, 2022.
[188] SPC, Maritime Boundaries, High Level Dialogue Report, 2021.
[189] Ibid.
[190] Griffin, P., The tech helping tackle illegal, unreported and unregulated fishing, 2023.

the Government of Australia, it provided timely data dissemination during the COVID -19 era as most regional workshops rendered face-to-face halted. [191]

The cooperation between the broader WCPFC with FFA and at the regional scale between FFA and SPC serves as a model for the effective adoption of monitoring technologies in the Pacific region. In situations involving shared maritime boundaries, adjacent countries can collaborate and align their VMS systems, establishing a unified strategy for boundary enforcement. This collaborative approach strengthens mutual confidence, reduces boundary disputes, and promotes collaborative resource management.

Want to also discuss the topic of AI as future of monitoring depending on the final page number. Refer to FFA – programming of work. VM using radar datasets.

[191] https://uatweb.spc.links.com.au/dashboard/maritime-boundaries

Chapter 2: Challenges and Opportunities in Managing Maritime Boundaries in the Pacific

Section A: Overview of the challenges facing Pacific Island Countries (PICs) in the maritime boundaries management.

Subsection A.1: Limited resources for enforcement

The effectiveness of maritime boundary enforcement hinges on a nation's ability to enforce its laws at sea. Surveillance and monitoring represent a significant hurdle when it comes to enforcing maritime boundaries in the Pacific due to resource constraints. In the Pacific region, remote island nations often lack the financial means to fund the port infrastructure, harbors, and communication systems necessary for efficient enforcement efforts.[192]

Inadequate resources for enforcing maritime boundaries can give rise to security challenges as well. The expansive and secluded expanse of the Pacific renders it an appealing corridor for illicit activities, including drug trafficking, human smuggling, and piracy.[193] Insufficient surveillance and law enforcement capacities heighten the susceptibility of these nations to security hazards, potentially leading to instability.

The region is reportedly a target for "Blue Boats" illegally invading the EEZs and at times, reached the territorial seas of most PICs for high-valued beach-de-mer.[194]Such boats between 10-15 metres in length and carrying a small fleet have appeared to have travelled from Vietnam with little to no GPS on board, allowing it to move undetected through the waters of Palau, Federated States of Micronesia, Papua New Guinea, Solomon Islands, Vanuatu, and New Caledonia.[195]

As challenging as this dilemma can be for the Pacific, multi-agency collaboration has proven effective, with swift eradication of sightings in the Solomons ending in harsh deterrent

[192] PIFS, The Pacific Security Outlook Report, 2022-2023.
[193] United Nations Office on Drugs and Crime, Transnational Organized Crime in the Pacific, 2016.
[194] Song, A.M., et al, *'Blue boats' and 'reef robbers': A new maritime security threat for the Asia Pacific?* 2019.
[195] Ibid. See also ARC Centre of Excellence for Coral Reef Studies, Call for cooperation as 'blue boats' rob Pacific reefs, 2019. https://phys.org/news/2019-12-cooperation-blue-boats-pacific-reefs.html

methods.[196]These types of operations are successful upon timely rely of information to the proper authority's and communication channel is open for search teams to be deployed.

The restricted capacity to enforce maritime boundaries poses substantial economic challenges for Pacific Island nations. Fisheries represent a fundamental pillar of income and food security for a considerable portion of these countries. When IUU fishing operations continue unhindered due to enforcement constraints, they can deplete fish populations, damage marine ecosystems, and rob local communities of their means of subsistence.

The availability of formalized maritime boundaries datasets in FFA's VMS discussed above has greatly assisted the team to confidently apprehend offenders and impede such operations.[197]However, vessels are still invading despite clear boundary definitions. These maybe be subject to geopolitical and the imbalance of power that still exists post-colonial.[198]

Greenpeace has written strongly about neocolonialism in the Pacific and the power play from developed countries in existence until today, overlooking boundaries and conducting faults that disregard environmental issues and the effects on SIDS.[199]Some articles have highlighted the renewed interest from China and the United States in PIF developments and raises the questions if the Pacific is yet another playing field for their hidden agendas.[200]

Timely reminder and recommendations for increased regional cooperation has already been developed through the Boe Declaration for improved security.[201] The Niue Treaty and the new mandate for FFA to patrol inshore areas is also likely to address fishing crimes in Pacific coastal zones.

Enforcement obstacles in securing the maritime boundaries in the Pacific puts the island nations at risk in terms of their economy, security, environment, and diplomacy. To address this problem, it's important for regional and global partners to work together and offer technical,

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[196] Above n 139. See also, Radio New Zealand, Sinking illegal 'blue boats' not enough of a deterrent – advisor, 2017. https://www.rnz.co.nz/international/pacific-news/322590/sinking-illegal-'blue-boats'-not-enough-of-a-deterrent-advisor

[197] SPC, FFA and SPC Technical Team Meeting Minutes, 2022.

[198] Nature, The hypocrisy threatening the world's ocean, 2023.

[199] Morunga, A., M., (2023, October 13), Neocolonialism in the Pacific: Fukushima radiation and deep sea mining, Pacific News Service, GREENPEACE NZ/PACNEWS, https://pina.com.fj/2023/10/13/neocolonialism-in-the-pacific-fukushima-radiation-and-deep-sea-mining/

[200] Taylor, M., Pacific Led Regionalism Undermined, 2023.

[201] PIFS, Boe Declaration Action Plan, 2018.

Niue Treaty on Cooperation in Fisheries Surveillance and Law Enforcement in the South Pacific Region, entered into force, 20 May 1993.

financial, and legal help. By cooperating and building their abilities, Pacific Island nations can protect their maritime borders and manage their marine resources responsibly for the benefit of present and future generations.

Subsection A.2: Impact of climate change through seal level rise

Modern day dilemma such as climate change (CC) driven by anthropogenic forcing has led to major coastal changes around the globe with sea-levels rising (SLR).[202] Reports by the United Nations Intergovernmental Panel on Climate Change (IPCC) shows global mean sea level (GMSL) increment of 19 cm since 1901.[203] Comparatively, the rate is not uniform due to geographic location and the Pacific region is reported to have experienced four times more than the global average.[204]

According to Oppenheimer, these statistics are anticipated to rise.[205] Low-lying atoll islands, many of which are situated at an elevation of less than 2 meters above mean sea level, are particularly vulnerable to submersion, posing a significant threat to their status as states.[206]. Baselines have three important roles as alluded to in the previous section, and they are:

(1) division of territory/internal waters from territorial sea, (2) delineation of outer limits of maritime jurisdictional zones, and (3) delimitation of boundaries dividing one state's maritime area from another state's maritime area[207]

Territorial loss concerning baseline reduction due to SLR poses a legal challenge on the law of baseline as written under UNCLOS.

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[202] Gordon, M., 2021. The Impacts of Climate Change on maritime Boundaries in the Western Pacific, s.l.: e Sea Power Centre.
[203] IPCC Report – AR6, https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf, 2023.
[204] Caron, D. D. (1990). When law makes climate change worse: rethinking the law of baselines in light of rising sea level.
[205] Oppenheimer, M.& Glavovic, B, Chapter 4: Sea Level Rise and Implications for Low Lying Islands, Coasts and Communities. IPCC SR Ocean and Cryosphere, 2019.
[206] Lal, K., Legal Measures to Address the Impacts of Climate Change-induced Sea Level Rise on Pacific Statehood, Sovereignty and Exclusive. *Auckland University Law Review, 23*, 235 – 268, 2017. Seel also Montevideo Convention. (1933). *Montevideo Convention on the Rights and Duties of States.* Montevideo: Convention on Rights and Duties of States. Refer https://www.ilsa.org/Jessup/Jessup15/Montevideo%20Convention.pdf.
[207] Sofia Conference, 2012.

What does this mean for PICs?

Sovereignty for many LOS will be challenged as certain geographical features considered during negotiations will be altered.[208] For instance, under Article 121 on the regime of islands; small islands which have earned the right of generating its maritime zone and have contributed to an archipelagic States basepoints are now vulnerable of being inundated.[209] In the event of such a scenario, a loss of a basepoint dependent on the smaller outer islands will jeopardise the validity of the requirements stated in Article 47, compromising a State's archipelagic claim.[210]

Archipelagic atoll islands like Tuvalu, Kiribati, Marshall Islands and Tokelau are already experiencing reduction in freshwater reserves, vegetation loss and at the extreme's loss of lives due to distant source swells and storm surges.[211] Even sizable volcanic islands are not exempt, as Tropical Cyclones (TC) are anticipated to strengthen, amplifying wave activity and paving the way for coastal flooding.[212]

This will significantly devastate the revenue sources from the ocean and in the Pacific, where tuna fishing generates billions in revenue; a decrease in maritime zone would negatively affect its offshore fishery economic state.[213]

International Law Community Actions

Legal clarity for CC events were not foreseen by drafters of UNCLOS and raised questions relative to legal basis for statehood by CC effects.[214] The exemptions are stated in Articles 7 (2) and 76 (8 & 9) of UNCLOS pertaining to straight baseline surrounding deltas and the final continental shelf outer limits respectively.[215]

Wide ranging concerns coming out of this issue became the subject of consideration of the International Law Association (ILA) Committee on *Baselines under the International Law of*

[208] Scott, K. N., Davor Vidas, David Freestone and Jane McAdam, eds., International Law and Sea Level Rise. Report of the International Law Association Committee on International Law and Sea Level Rise, 2021.
[209] Article 121, UNCLOS 1982.
[210] Schofield, C., & Freestone, D., Archipelagic Atoll States and Sea Level Rise, 2022.
[211] Wandres, M., Aucan, J., Espejo, A., Jackson, N., De Ramon N'Yeurt, A., & Damlamian, H., Distant-Source Swells Cause Coastal Inundation on Fiji's Coral Coast, 2020.
[212] Tu'uholoaki, M.; Espejo, A.; Wandres, M.; Singh, A.; Damlamian, H.; Begg, Z. Quantifying Mechanisms Responsible for Extreme Coastal Water Levels and Flooding during Severe Tropical Cyclone Harold in Tonga, Southwest Pacific, 2023. See also: Knutson, T.R.; Chung, M.V.; Vecchi, G.; Sun, J.; Hsieh, T.L.; Smith, A.J. Climate change is probably increasing the intensity of tropical cyclones, 2021.
[213] Parties to the Nauru Agreement, PNA, 2011.
[214] Vidas., D., & Freestone, D. (2022). The Impacts of Sea Level Rise and the Law of the Sea Convention: Facilitating Legal Certainty and Stability of Maritime Zones and Boundaries.
[215] Article 7 (2) & Article 76 (8 & 9), UNCLOS 1982.

the Sea since 2008 to 2012.[216]Established under the ILA Executive Council with the mandate to clarify the legal ambiguity surrounding Article 5 of UNCLOS, as CC effects were projected to affect SIDS.[217]

The report of the ILA Baseline Committee concluded that the nature of the normal baselines covered in Article 5 of UNCLOS is ambulatory as a matter of further clarification under international law.[218] In its view the report stated:

"…*that the existing law of normal baseline applies in situation of significant coastal changes caused by both territorial gain and territorial loss. Coastal states may protect and preserve territory through physical reinforcement, but not through the legal fiction of a charted line that is unrepresentative of the actual low-water line."*[219]

Further statement under ILA Resolution No. 1/2012 that followed the Sofia Conference reported:

"…that substantial territorial loss resulting from sea-level rise is an issue that extends beyond baselines and the law of the sea and encompasses consideration at a junction of several parts of international law including such fundamental aspects as: elements of statehood under international law, human rights, refugee law, and access to resources, as well as broader issues of international peace and security." [220]

Given the significant interest in this subject by coastal states beyond SIDs, this issue became a topic in the Long-Term Programme of Work of the International Law Commission (ILC) in 2018.[221]Supported by fifteen delegations during the 72nd session of the U.N. General Assembly and reinforced by superseding Baseline Committee's recommendations, the Sea Level Rise Committee (SLR Committee) was formed. The Baseline Committee's concluding recommendations paved the inception SLR Committee with a two-part mandate:[222]

[216] International Law Association, Sofia Conference, Baselines under the International Law of the Sea, 2012.
[217] Lathrop, C. G., Roach, J. A., & Rothwell, D. (Eds.). Baselines under the international law of the sea : reports of the International Law Association Committee on baselines under the international law of the Sea, 2019.
[218] Above n 185.
[219] Ibid, 2012.
[220] Vidas, D., Freestone, D., & McAdam, J., International law and sea level rise: the new ILA committee, 2015.
[221] Strating, R. & Wallis, J. (2021). Climate change and maritime boundaries: Pacific responses and implications for Australia
[222] International Law Association, Sydney Conference, 2018.

- *to study the possible impacts of sea level rise and the implications under international law of the partial and complete inundation of state territory, or depopulation thereof, in particular of small island and low-lying states; and*
- *to develop proposals for the progressive development of international law in relation to the possible loss of all or of parts of state territory and maritime zones due to sea level rise, including the impacts on statehood, nationality, and human rights.*

In 2018, the SLR Committee reported in the Sydney Conference that towards the path of legal clarification,

"...if a coastal or archipelagic state has correctly set the baselines and outer limits of its maritime zones according to the 1982 Law of the Sea Convention, there shouldn't be a need to redo these calculations due to changes in sea levels affecting the coastline." [223]

The report concluded that:

*"**prima facie** initial evidence of the development of a regional State practice in the Pacific islands – especially those highly vulnerable to territorial losses and shifts in baseline points due to rising sea levels... The emergence of a new customary rule will require a pattern of State practice, as well as **opinio juris**."*[224]

Legal Options and Practice so far by the Pacific

Pre-conditioned to the ILC proposal above, Pacific States have been in depositing their baseline and outer limits of the maritime zone since the early 2000's as mandated by the Pacific Oceanscape.[225] In 2021, the PIF leaders yet again strengthened their climate change related SLR campaign, initiated during their 19th Leaders meeting in Funafuti, by the launch of the *Declaration on Preserving Maritime Zones in the Face of Climate Change related Sea-Level Rise*[226]

While not constituting as a treaty, the document spanning two pages explains the PIFs leaders view on the effects of SLR associated with CC on maritime zones. It further outlines the

[223] Sydney Report of the Committee on International Law and Sea-Level Rise (2018), p. 18, 30.
[224] Ibid.
[225] Pacific Oceanscape – Ibid.
[226] DECLARATION ON PRESERVING MARITIME ZONES IN THE FACE OF CLIMATE CHANGE-RELATED SEA-LEVEL RISE, 2021 - Ibid

leader's commitment on maintaining its deposited maritime zones to the UN-SG without reduction due to CC effects. [227]

National implementation of the Declaration has already been established for Fiji, in its 2021 Climate Change Act on section 80.[228] Some States have practiced making relevant observations as well as provide technical information concerning the coordinates deposited and accompanying material to UN-SG. The FSM have incorporated the permanency of boundaries and use of the term "observations" which so far have minimalize pushback from other UNCLOS States Parties.[229]The Republic of Marshall Islands have made submitted "Declaration of Baselines & Maritime Zones Outer Limits and its Schedule, dated 18 April 2016" together with its Maritime Zones Declaration Act 2016.[230]

As a matter of international law, there is growing support for a presumption that SLR cannot be invoked as a fundamental change in circumstances by a Party to terminate or withdraw from a maritime boundary treaty.[231] Article 62 of the Vienna Convention on the Law of Treaties directly address this issue of fundamental change. Paragraphs 1 and 2 are cited below. [232]

1. A fundamental change of circumstances which has occurred with regard to those existing at the time of the conclusion of a treaty, and which was not foreseen by the parties, may not be invoked as a ground for terminating or

[227] PIF, CONTRIBUTION TO THE REPORT OF THE SECRETARY-GENERAL ON "OCEANS AND THE LAW OF THE SEA" PURSUANT TO RESOLUTION 76/72 OF 9 DECEMBER 2021

[228] Refer to 2021 Climate Change Act – Fiji.

[229] Observations by the Federated States of Micronesia and the Cook Islands in connection with the official deposit of its lists of geographical points of coordinates, accompanied by illustrative maps, for maritime baselines and maritime zones in accordance with the 1982 United Nations Convention on the Law of the Sea https://www.un.org/depts/los/LEGISLATIONANDTREATIES/PDFFILES/DEPOSIT/communicationsredeposit/FSM_Observations.pdf
https://www.un.org/depts/los/LEGISLATIONANDTREATIES/PDFFILES/DEPOSIT/04ObservationsEng.pdf

[230] Declaration of Baselines & Maritime Zones Outer Limits and its Schedule, dated 18 April 2016, adopted pursuant to the Republic of the Marshall Islands Maritime Zones Declaration Act 2016 (Nitijela Bill No. 13) of 18 March 2016
https://www.un.org/depts/los/LEGISLATIONANDTREATIES/PDFFILES/DEPOSIT/mhl_mzn120_2016_2.pdf
Other Pacific States that have already deposited charts and coordinates are open to consider making 'observations' like the model text in a Note Verbale to the UN-SG.

[231] Árnadóttir, S., Termination of Maritime Boundaries Due to a Fundamental Change of Circumstances, 2016.

[232] Article 62, Vienna Convention on the Law of Treaties.

withdrawing from the treaty unless: (a) the existence of those circumstances constituted an essential basis of the consent of the parties to be bound by the treaty; and (b) the effect of the change is radically to transform the extent of obligations still to be performed under the treaty.

2. A fundamental change of circumstances may not be invoked as a ground for terminating or withdrawing from a treaty:

(a) if the treaty establishes a boundary

(b) if the fundamental change is the result of a breach by the party invoking it either of an obligation under the treaty or of any other international obligation owed to any other party to the treaty.

The substantial change must have a considerable impact on the fulfillment of existing obligations. Moreover, treaties establishing boundaries are not subject to termination by virtue of a change of circumstance because of its exclusion in paragraph 2(a) of Article 62.[233] However, as stated on the Report of the International Law Commission by the co-chairs of the ILC's Study Group, maritime boundaries enjoy the same regime of stability as any other boundaries.[234] The international jurisprudence is clear in this respect and that is, a bilateral maritime boundary treaty can generally be presumed to be permanent.[235]

The 2021 Pacific Islands Forum (PIF) Declaration Contribution is a significant document that marked a crucial moment in the ongoing cooperation and development efforts within the Pacific. Remarkably, it marked an era of change in the international law making and the possibility of State practise that could impact edits of the UNCLOS or an addition of an agreement much like the BBNJ.

[233] Ibid.

[234] United Nations, Report of the International Law Commission, Seventy-second session, A/76/10 (26 April–4 June and 5 July–6 August 2021), Official Records.

[235] Ibid, pp 167 under (b) Maritime delimitation practice of African States. See also for more in-depth and background: United Nations General Assembly, International Law Commission Seventy-third session, Sea-level rise in relation to international law, Second issues paper by Patrícia Galvão Teles * and Juan José Ruda Santolaria **, Co-Chairs of the Study Group on sea-level rise in relation to international law, A/CN.4/752 (18 April–3 June and 4 July–5 August 2022).

Section B: Overview of the opportunities that Pacific Island Countries in the Maritime Boundaries management.

Subsection B.1: Sovereignty

Globally, the governance of sovereign rights is shaped by a network of laws that delineate the rights and responsibilities of nations.[236] Concurrently, on a domestic level, individual countries create their own sets of laws and policies to administer and regulate resources within their specific geographic boundaries or jurisdiction. The recognition of permanent sovereignty over natural resources occurred in the mid-20th century and was adopted as an UN-GA resolution 1803 (XVII) titled *"Permanent sovereignty over natural resources"* in 1962.[237]

The resolution 1803 (XVII) acknowledged the right of sovereign nations to exercise full control over their natural resources and emphasized that the use and disposal of these resources should be in the best interests of the people of the sovereign state. [238]This resolution culminated from the United Nations Commission on Permanent Sovereignty over Natural Resources under resolution 1314 (XIII) of 12 December 1958.[239]

The first paragraph of the resolution 1803 (XVII) states the task of the Commission which is:

"to conduct a full survey of the status of permanent sovereignty over natural wealth and resources as a basic constituent of the right to self-determination, with recommendations, where necessary, for its strengthening, and decided further that, in the conduct of the full survey of the status of the permanent sovereignty of peoples and nations over their natural wealth and resources, due regard should be paid to the rights and duties of States under international law and to the importance of encouraging international cooperation in the economic development of developing countries…"[240]

As the examination of States sovereignty gained importance and expanded into the maritime realm, so too the equitable allocation of resources.[241] One of the notable regimes of UNCLOS

[236] Bilder, R., B., International Law and Natural Resources Policies, 20 Nat. Res. J. 451, 1980.
[237] General Assembly resolution 1803 (XVII) of 14 December 1962.
[238] Ibid.
[239] Matsika, S, R., Sovereignty over Natural Resources, Munich, GRIN Verlag, https://www.grin.com/document/414677, 2017
[240] "Material obtained on [8th December, 2023] from the website of the United Nations Audiovisual Library of International Law, located at http://www.un.org/law/avl "
[241] Redrawing the map – Ibid. For an in-depth analysis on the fishing agreements relations in the Pacific and the United States (US Tuna Treaty), refer to Indu, F., REGIONAL FISHERIES POLICY IN THE PACIFIC; A case study on the Treaty between Certain Pacific Islands States and the United States on Fisheries, United Nations – Nippon Foundation Fellow, 2012 – 2013.

lies in Article 56 in delineating the rights, jurisdiction, and responsibilities of the coastal state within the EEZ. It states:

1. In the exclusive economic zone, the coastal State has:

"(a) sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the waters superjacent to the seabed and of the seabed and its subsoil, and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds;

(b) jurisdiction as provided for in the relevant provisions of this Convention with regard to:

(i) the establishment and use of artificial islands, installations and structures;

(ii) marine scientific research;

(iii) the protection and preservation of the marine environment;

(c) other rights and duties provided for in this Convention.

2. In exercising its rights and performing its duties under this Convention in the exclusive economic zone, the coastal State shall have due regard to the rights and duties of other States and shall act in a manner compatible with the provisions of this Convention.

3. The rights set out in this article with respect to the seabed and subsoil shall be exercised in accordance with Part VI."

Newly founded nations in the Pacific gained extensive control, limiting distant waters fishing nations areas to fish, and increasing the economic opportunities for the region.[242] The New York Times in its May 17th, 1987, article wrote *"...South Pacific countries are entering the contentious world of superpower rivalries"* when the Republic of Kiribati with the highest EEZ area in the Pacific gave access to the Soviets to fish in its waters for the highest price.[243] Similar case for Vanuatu after being newly independent in 1980, signed with Soviet fishing vessel to

Ya Qin, J., Reforming WTO Discipline on Export Duties: Sovereignty over Natural Resources, Economic Development and Environmental Protection, 2012.

[242] Young, M., A Quiet Revolution: The Exclusivity of Exclusive Economic Zones, Cass, D. Z., & Rubenstein, K., *Traversing the Divide: honouring Deborah Cass's contributions to public and international law*. Australian National University Press, pp 62, 2021.

[243] Kristof, N, D., Fishing Yields Soviet a South Pacific Toehold, New York Times, May 17, 1987.

access to its ports for maintenance and purchase of baits. [244] Nevertheless, the agreement was purely of a commercial nature, as affirmed by the Foreign Minister of Vanuatu at that time. [245]

As the principle of the "commons" halted, Pacific States have adeptly engaged in the regulation of deep-sea minerals resources and entered joint management regimes for the management of highly migratory and straddling fish stock fish species.[246] Here this research would like to highlight that despite the concerns from other developed countries on the potential intrusion on national security as the Pacific open to the Soviets, UNCLOS through the codification of the EEZ, provided a bargaining chip. PSIDS had to deal with newfound control and negotiating strength that the EEZ provides when addressing the historical fishing activities of affluent nations in the Pacific. In essence, Pacific nations are taking part in diplomatic or collaborative efforts on a worldwide scale to contribute, discuss, or negotiate on matters of global importance.

United Nations Fish Stock Agreement (UNFSA)

One of notable effect is the United Nations Fish Stock Agreement which has become a fundamental agreement in fisheries governance and sustainability. The UFSA was created to assist in regulating the fisheries sector and ensure the long-term conservation and sustainability of highly migratory fish stocks, States have and are obligated to perform duties to co-operate with these organizations and uphold the various conventions and agreements, respectively.[247] Entered into force in 2001, the agreement also lays out regulations relating to registration or vessels, respective authorizations, compliance, and enforcement.[248]

With respect to conservation and managing of straddling fish stocks and highly migratory fish, Article 5 of the UNFSA outlines that States of both coastal and high sea dominated areas are also mandated by UNCLOS to co-operate through:

(a.) adopting measures that will ensure and lead to long-term sustainability of straddling fish stocks and migratory fish. Straddling fish stock refer to stocks of fish like cod or turbot that are occurring within the exclusive economic zone of two or more coastal states or both, coastal

[244] Tsamenyi, M., & Blay, S. K. N., Soviet Fishing in the South Pacific: The Myths and Realities, 1989.
[245] Above n 229.
[246] Above n 230.
[247] UNFSA, 1995.
[248] Haas, B., McGee, J., Fleming, A., & Haward, M., Factors influencing the performance of regional fisheries management organizations, 2020.

areas, and high seas. However, highly migratory fish refers to fish that are often said to travel long distances and across international waters, for example, tuna, swordfish, and sharks.

Article 6 introduces the principle of precautionary approach when: *(c.) assessing the impacts of fishing, other human activities and environmental factors on target stocks and species belonging to the same ecosystem or associated with or dependent upon the target stocks,*

(d.) adopting, where necessary, conservation and management measures for species belonging to the same ecosystem or associated with or dependent upon the target stocks, with a view to maintaining or restoring populations of such species above levels at which their reproduction may become seriously threatened,

(e.) protecting biodiversity in the marine environment, take into account the interests of artisanal and subsistence fishers,

(f.) implementing and enforcing conservation and management measures through effective monitoring, control and surveillance.[249]

Additionally, on the subject of general conservation and management through co-operation, Article 8 outlines that:

(a.) States shall enter into consultations in good faith and without delay, particularly where there is evidence that the straddling fish stocks and highly migratory fish stocks concerned may be under threat of over-exploitation or where a new fishery is being developed for such stocks,

The value of being a member of UNFSA further gives PSIDS control of their marine resources, in particular the tuna stocks.[250] Fish being the primary protein source for the Pacific communities, and for majority rural coastal communities, it functions as a commodity generating weekly income.[251]

[249] Article 5 & 6, UNFSA, 1995.
[250] Aqorau, T.; Sokimi, W. The Pacific Islands Forum Fisheries Agency: 40 Years of Successful Regional Cooperation, 2019.
[251] Hilmi, Nathalie & Bambridge, Tamatoa & Safa, Alain & QUINQUIS, Bran & D'Arcy, Paul., Socioeconomic significance of fisheries in the Small Island Developing States: natural heritage or commodity? 2016. See also: Bell, J. D., Allain, V., Allison, E. H., Andréfouët, S., Andrew, N. L., Batty, M. J., Blanc, M., Dambacher, J. M., Hampton, J., Hanich, Q., Harley, S., Lorrain, A., McCoy, M., McTurk, N., Nicol, S., Pilling, G., Point, D., Sharp, M. K., Vivili, P., & Williams, P. (2015). Diversifying the use of tuna to improve food security and public health in Pacific Island countries and territories.

In hindsight, the Pacific way of living have valued their ocean resources, and the ocean offers significant socioeconomic and cultural values to Pacific people. Having the entitlement under UNCLOS as a signatory LOS, can result in more resources allocated to economic opportunities.

Lots of rooms to write on food security issues, national security, trade and port control.[252] *Part 2 will have marine protection = MPAs and MSP, hence its not in here. Also, dependent on total page number.*

[252] Ya Qin, J., Reforming WTO Discipline on Export Duties: Sovereignty over Natural Resources, Economic Development and Environmental Protection, 2012.

Subsection B.2: Increase regional cooperation.

The Pacific Island States, dispersed across an extensive oceanic territory, encounter distinct challenges and susceptibilities when it comes to overseeing their marine assets. The first regional body was formed under the *Agreement establishing the South Pacific Commission in 1947* during the South Seas Conference in Canberra.[253] The objective was to initiate an advisory forum in the Pacific that would bring stability at the end of World War II to dependent territories governed by Government of Australia, New Zealand, United States of America, Northern Ireland, Kingdom of Netherlands, and United Kingdom of Great Britain.[254]

Renamed to Pacific Community in 1997, the SPC served as a stepping stone for the tiny nations regarded as *quiet backwater isolated from the mainstream of international relations* as described by Fry.[255] Earlier writings described SPC as the development of an era of colonial policy in the region, and its success depends on the support of the participating governments.[256]Derivative from a PhD thesis stated:

"Regional cooperation in the South Pacific was little more than an inchoate concept until manifested through the institution of the South Pacific Commission."[257]

SPC - 1947

Seventy-six years on, the SPC's now boasts twenty-seven member countries, and while its work program has transformed from those of its former colonial set-up, its central function persists in aiding the development of the Pacific and its people.[258]SPC hosts the RMBP, taking over from SOPAC when it merged in 2011. Both organizations have supported the technical operations of the maritime boundaries in the region through capacity building of in-country officials, mapping, and baselines calculations. Success measures has been attributed to regional collaboration with the State actors. [259]

The RMBP has arranged regular working sessions since 2005 to foster partnerships with project countries and to strengthen the provision of technical, legal, and other necessary assistance to these countries. Participants have developed trust for the SPC project team, and the working

[253] Agreement establishing the South Pacific Commission, 1947.
[254] James, R. E., The South Pacific Commission. Pacific Affairs, 1947.
[255] Fry, G. E., Regionalism and International Politics of the South Pacific. Pacific Affairs, 1981.
[256] Andrews, J., Regionalism in the South Seas, 1947.
[257] Herr, R., A., REGIONALISM IN THE SOUTH SEAS: The Impact of the South Pacific Commission 1947 – 1974.
[258] SPC, Strategic Plan 2022 – 2031.
[259] Redrawing – Ibid.

session atmosphere has developed respect and knowledge of other countries interests and needs.

Also, present at each working session are the consortium of partners who complete the expert pool of the project into a comprehensive resource for members, and discussions sparked have often triggered boundaries agreements.[260] The region now has 36 out of the 48 shared boundaries agreed as of July 2022 based off the project design success and value of regional cooperation.

Although these countries may be geographically small island states, they exhibit cooperative spirit there exits some form of maritime disputes that have impede on shared boundary agreements. However, has been mentioned in the earlier sections, the disputes have not reached international court and as Schofield mentioned,

"…such disputes have not served as the major impediments to maritime delimitation that they have elsewhere, for example in Southeast and East Asia."[261]

Insert shared boundaries table here? Need to look up DOALOS website.

PIF – 1971

In 1971, the PIF (formerly South Pacific Forum) was formed by heads of newly independent Pacific States for Tonga, Samoa, Nauru, Fiji, Cook Islands, New Zealand and Australia as a political body to address Pacific issues that were overlooked by SPC.[262] In 1972, PIF established the South Pacific Bureau for Economic Cooperation (SPEC) as its research facility, later renamed to PIFS in 1981. It now serves as the primary international organization in the region, with aims to:

"…stimulate economic growth and enhance political governance and security for the region, through the provision of policy advice; and to strengthen regional cooperation and integration through coordinating, monitoring and evaluating implementation of Leaders' decisions."[263]

[260] The consortium partners are Pacific Island Forum Secretariat, Office of the Pacific Ocean Commissioner, Forum Fisheries Agency (FFA), Department of Foreign Affairs and Trade (DFAT), Geoscience Australia, Attorney Generals Department - Australia, University of Sydney, Ministry of Foreign Affairs and Trade (MFAT), the Commonwealth Secretariat, GRID_Arendal, the British Government, the European Union, and Sweden through the Pacific European Union Marine Programme (PEUMP).

[261] Schofield, The Delimitation of Maritime Boundaries of the Pacific Island States - Ibid

[262] Schimmelfennig, Frank, and others, 'The Pacific Islands Forum', The Rise of International Parliaments: Strategic Legitimation in International Organizations, Transformations in Governance, 2020.

[263] PIF website.

The PIF, consisting solely of Pacific leaders, is now the most influential political and economic authority in the region with eighteen members.[264]Through the PIF Leaders, the CROP was formed with the aim of enhancing cooperation amongst the regional intergovernmental organisations in the Pacific.[265] Based on the member-owned criteria these intergovernmental organizations are an alliance of specialised agencies with regional approach on addressing the shared challenges and embarking on the regionalism strategy.[266]

Three and a half decades after its formation, the CROPS have worked together in establishing a rigid body aiming for a more cohesive and efficient approach to addressing common issues and promoting regional progress.[267] The figure below depicts the interrelated work of the CROP and the PIF leaders.

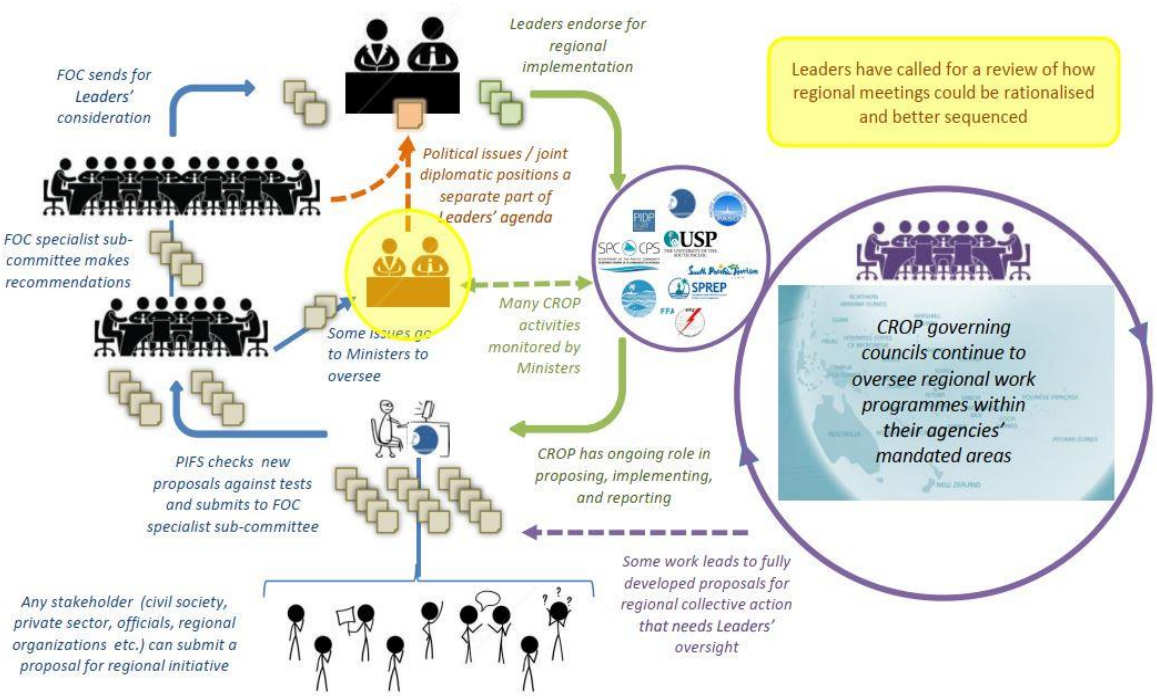

Figure 7: Workflow within the PIFS and CROP Source: PIFS

[264] Members states includes Australia, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Kiribati, Nauru, New Caledonia, New Zealand, Niue, Palau, Papua New Guinea, Republic of Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu. https://www.forumsec.org/who-we-arepacific-islands-forum/

[265] CROP Charter, 2018 – Ibid. Current CROP list consists of Pacific Islands Forum Secretariat (PIFS), Forum Fisheries Agency (FFA), Pacific Islands Development Programme (PIDP), Secretariat of the Pacific Regional Environment Programme (SPREP), South Pacific Tourism Organisation (SPTO), University of the South Pacific (USP), Pacific Power Association (PPA), Pacific Aviation Safety Office (PASO) & Pacific Community (SPC). https://www.spc.int/crop-family

[266] Ibid.

[267] PIFS, Council of Regional Organisations of the Pacific (CROP) Strategic Work Agenda, 2021

One of the standing agenda on the PIF agenda has been fisheries, by large due to its economic significance in Pacific States. As the PIF gained new political influence separate from the former colonial governments, underwent changes in managing information and strategically rallied to maintain control over their sovereignty of their marine resources.[268]

FFA - 1979

The FFA was established in 1979 as the PIF broaden its scope and found itself confident in establishing semi-autonomous regional organisations. Initially established by twelve of the PIF members, the FFA now has seventeen member States to which it shares the vision to:[269]

"…*enable the people of our members to enjoy the highest levels of social and economic benefits through the sustainable use" of fisheries*."[270]

Since its inception, the FFA has fostered regional collaboration, exemplified by initiatives like the Parties to the Nauru Agreement (PNA).[271] Together with the Vessel Day Scheme (VDS), the ten member countries of the PNA that are "*tuna-dependent"* created a system for collectively overseeing the purse-seine fishery focused on skipjack tuna across their shared EEZs. [272] The economic value of such partnerships has yielded tremendous revenue for the PNA countries as displayed in the figure below.

[268] Ibid, pp 466 – 468.

[269] FFA members include Marshal Islands, Nauru, Tonga, Vanuatu, Fiji, Samoa, Cook Islands, Solomon Islands, Papua New Guinea, Palau, Federated States of Micronesia, Kiribati, Tuvalu, Nauru, Tokelau, Australia, Niue.

[270] Hanchard, B., SOUTH PACIFIC FORUM FISHERIES AGENCY (FFA), unknown.

[271] Ibid. PNA members include Federated States of Micronesia, Kiribati, Marshall Islands, Nauru, Palau, Papua New Guinea, Solomon Islands and Tuvalu. Tokelau participates based on a memorandum of understanding basis.

[272] Bell, J. D.; Senina, I.; Adams, T.; Aumont, O.; Calmettes, B.; Clark, S.; Dessert, M.; Gehlen, M.; Gorgues, T.; Hampton, J.; Hanich, Q.; Harden-Davies, H.; Hare, S. R.; Holmes, G.; Lehodey, P.; Lengaigne, M.; Mansfield, W.; Menkes, C.; Nicol, S.; Ota, Y. Pathways to Sustaining Tuna-Dependent Pacific Island Economies during Climate Change, 2021.

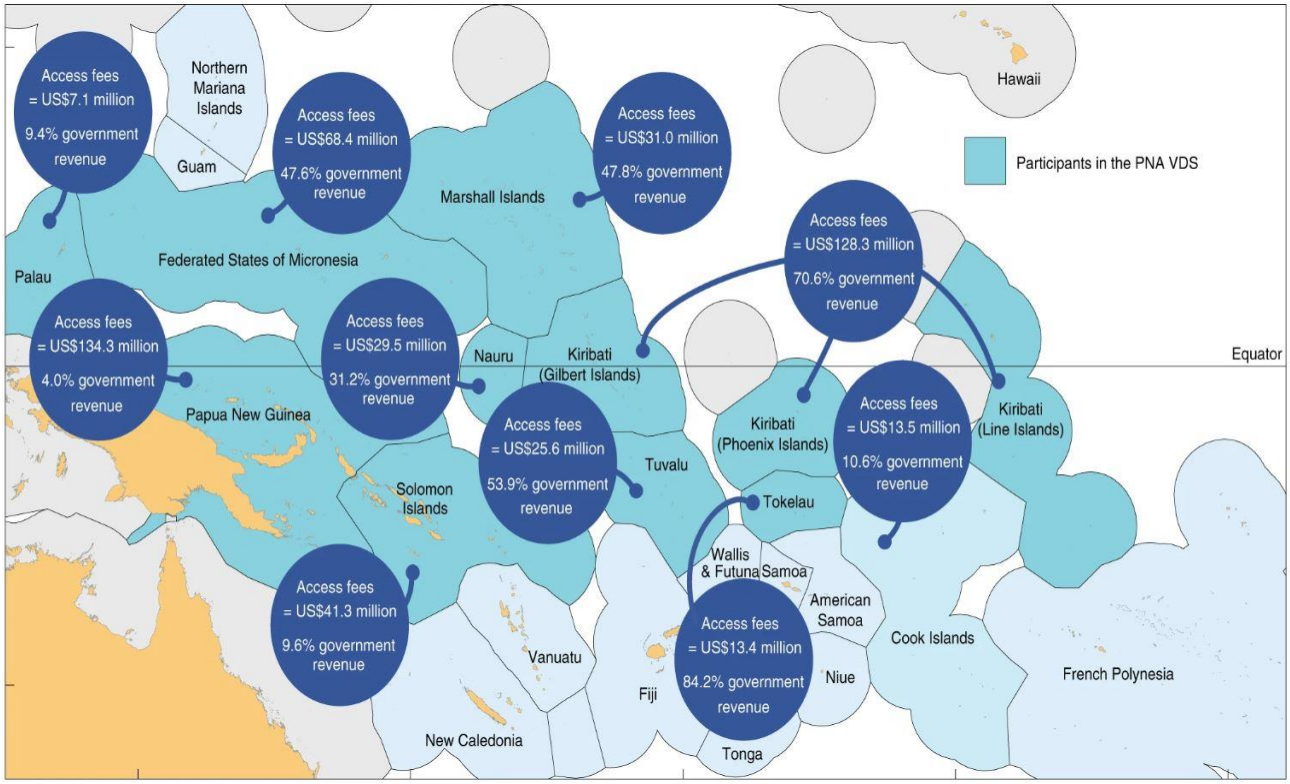

Figure 8: Average tuna-fishing access fees for 2015 -2018

Source: FFA[273]

This essay notes that the PICTs are quite fortunate for the vision of the PIF leaders in moving forward the region's agenda as a group rather than individual State efforts. The regionalism spirit has been mentioned in scholars[274] Thus, regional collaboration in the Pacific region opens a multitude of prospects for the efficient administration of maritime boundaries. Furthermore, the ethos and work culture of these regional organizations still embody the "Pacific Way," as the PIF leaders envisioned.

[273] Economic and Development Indicators and Statistics: Tuna Fisheries of the Western and Central Pacific Ocean (Pacific Islands Forum Fisheries Agency, 2017).
[274] Above n 272, pp 457 – 460

Part 2: Marine Spatial Planning (MSP) in the Pacific – A Way Forward

Part 2 will look at the overview of marine spatial planning (MSP) and how it has developed in the Pacific. This part will also take a deep dive into the role that marine spatial planning has in promoting sustainable development in the Pacific through locally ecosystem-based management systems. In addition, this part will look at how MSP will be the next actions for PICs to take on board after delimiting their maritime boundaries and the benefits of that will also be discussed. This part will also talk about MSP as a tool for PICs to use during maritime boundaries delimitations as it can be an effective and inclusive strategy and first step towards boundary negotiations through fostering collaboration between States.

Chapter 3: Marine Spatial Planning

Section A: Overview of MSP

Subsection A.1: MSP - Pacific Context

MSP in the Pacific region has been characterized by its gradual evolution, shaped by both traditional indigenous practices and modern conservation efforts. Traditional approaches bordering on MSP concept have existed since pre-colonial times, in the form of no-take areas set aside to prohibit fishing and other activities shown during a significant event.[275]One of notable example is the designation of certain areas, known as "tabu" sites, for a specific duration following the passing of a chief.[276]

Apart from cultural beliefs and values, customary marine tenure (CMT) systems as such, have been operational for many years in most PICs, with ownership rights controlled by social groups in villages.[277] As an extension from land tenure systems, these rights have extended into nearshore areas where traditional management methods have contributed to the welfare of both human societies and the marine ecosystems.[278]

These activities have been more of a social and cultural driven by the indigenous communities.[279] The resurrection of no-take zones started in a local community in Fiji, amidst growing decline in marine resources has manifested in the success of Locally Managed Marine

[275] Govan, H., et al, *Status and Potential of Locally Managed Marine Areas in the South Pacific*, Meeting nature conservation and sustainable livelihood targets through wide-spread implementation of LMMAs, 2009.
[276] The Locally-Managed Marine Area Network International, Building Traditional Practices, 2023. https://lmmanetwork.org/our-work-building-on-traditional-practices/
[277] Cinner, J., Socioeconomic factors influencing customary marine tenure in the Indo-Pacific, 2005.
[278] In Fiji, customary fishing zones as such are termed 'I Qoliqoli' and mainly controlled by various clans.
[279] Ibid.

Areas (LMMA) practices in 1997.[280] By 2005, the increasing participation of communities in the revival of this long-overlooked technique, as evidenced by the resurgence in inshore fishery, was officially acknowledged by both the Fiji government and stakeholders, leading to the establishment of the Fiji Locally Managed Marine Areas (FLMMA).[281]Being the first national level operation with high success rate, FLMMA used a community approach to management, property ownership, with the regulation style of 'qoliqoli'.[282] The activities of the network rapidly reciprocated across other Pacific with the mission:

"To advance the practice of community-based marine resource management and conservation by providing a forum for practitioners (communities, traditional leaders, individuals, organisations, and researchers) to share experiences and information."[283]

In rebuilding the community marine resources through temporary prohibition placement of no-take zones, LMMA strategies also focused on other fundamental environmental challenges. Still on the cases for Fiji, assessments of agricultural and forestry practices are frequently conducted, alongside evaluations of susceptibility to climate change and the augmentation of viable livelihood options.[284] In retrospect, Jupiter et al mentioned that LMMA, combined with scientific knowledge, compact governance, is possible to fill the gap in modern day ocean governance dilemma.[285]

It has been argued that communities might be oblivious to the conservation work through the no-take zones as it were more aligned to social and cultural norms.[286]More importantly, the implementation and replication of actions that influence it has in pushing delineation of maritime limits as pressure is called for by communities in the protection of their inshore fisheries, within their 12M radius.[287]

While LMMA has shown to be an enabler for communities to be self-sufficient and be an economical pathway to financial independence, it is limited in scope and areas in which it operates.[288] Similar practice and potential to reach the rest of the maritime limits is of essence

[280] Johnson, K., Cultural tabu: how an ancient ocean custom is saving Fiji's reefs, 2020.
[281] United Nations Development Programme, Fiji Locally-Managed Marine Area Network, Fiji. Equator Initiative Case Study Series. New York, NY, 2012.
[282] 250 LMMA's were set up by 2009, covering 25% of Fiji's inshore areas.
[283] LMMA Network International Social Contract, 2017.
[284] FLMMA, The Way We Work Together, Guidelines for members of the FLMMA Network, 2011.
[285] Jupiter, et al, Locally-managed marine areas: multiple objectives and diverse strategies, 2014.
[286] Ruttan, L. M., Closing the commons: Cooperation or gain or restraint? Human Ecology, 1998
[287] Above n 157.
[288] Above n 256.

in this fast-paced world where space is highly contested even now reaching outwards in the ocean areas.[289] MSP work has been fragmented and has been delivered as a form of tools to address the complex and interrelated challenges faced by Pacific nations.[290]

Investments into MSP in the region started with the Marine and Coastal Biodiversity Management in Pacific Island Countries (MACBIO) project.[291] This was a joint effort between the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Secretariat of the Pacific Regional Environment Program (SPREP) and the International Union for Conservation of Nature (IUCN).[292]

The MACBIO project idealized MSP around the biodiversity conservation in marine and coastal areas. Piloted for Vanuatu, Solomon Islands, Fiji, Tonga, and Kiribati, it aimed to establish these five countries with the necessary tools and information to make better decisions regarding the use and preservation of their marine ecosystems.[293]

Bearing in mind that most Pacific States were amongst the earliest to ratify UNCLOS, logically it would seem reasonable that conservation and protection of the ocean resources would naturally follow. Not until overfishing and IUU activities came into the picture did marine conservation efforts emerged during the early 2000's in the Pacific where land-based mapping was mainly dominate.[294] The need to achieve their CBD national targets prompted these pilot States to embark on a journey to strategize the utilization of their marine resources with the MACBIO project assistance.[295]

Essentially the MACBIO project supported countries in baseline data gathering and analysis for MSP product application national sustainable development planning for their oceans.[296] Due to this successful collaboration, several milestones and regional firsts were developed channelling their national MSP work into:

- National MSP Legislation

[289] Gassner, P., et al, Marine Atlas, Maximising Benefits for Fiji, 2019.
[290] Marine and Coastal Biodiversity Management in Pacific Island Countries (MACBIO), Valuing and conserving the benefits of marine biodiversity in the South Pacific, 2018.
[291] Marine and Coastal Biodiversity Management in Pacific Island Countries (MACBIO), 2018.
[292] MSPglobal 2021 https://www.mspglobal2030.org/msp-roadmap/msp-around-the-world/oceania/vanuatu/
[293] Khaled bin Sultan Living Oceans Foundation, Marine Spatial Planning in the Pacific, https://www.livingoceansfoundation.org/science/scientific-collaboration/marine-spatial-planning-in-the-south-pacific/ 2023.
[294] MACBIO, Valuing and conserving the benefits of marine biodiversity in the South Pacific - Ibid
[295] Ibid, See also CBD, Aichi Target 11.
[296] Ibid.

- National Ocean Policies/Ocean Management Plan
- Marine Atlas
- Regional Toolkit

The table below summarizes the activities undertaken by MACBIO.

Country	**National Target Achieved**
Vanuatu	National Ocean Policy National Ocean Atlas
Tonga	700,000 sq km of the EEZ Tonga Ocean Management Plan National Ocean Atlas
Fiji	National Ocean Policy
Kiribati	Ocean Atlas
Solomon Islands	National Ocean Policy 2018 National Ocean Atlas

Table 4: List of MACBIO project countries and their outcomes.

Source: MACBIO & SPC

Other Pacific States undertook sanctioning of large ocean areas within their EEZ as MPAs. The Phoenix Island Protected Area (PIPA) establishment in 2006 as a remedy for lost revenues incurred from fishing licenses.[297] Palau, an archipelago in the western Pacific established the *Palau National Marine Sanctuary (PNMS)* in 2015.[298] The PNMS Act was implemented by 2020 with 80% of the country's EEZ fully protected from all kinds of activities. [299] Driven by the national need to conserve its ocean resources and better their food security adaptations, the PNMS gained global recognition as one of the biggest MPA covering more than 400,000 sq km.[300]

[297] Rotjan, R. D., Jamieson, R., Carr, B. H., Kaufman, L., Sangeeta Mangubhai, Obura, D., Pierce, R., Betarim Rimon, Ris, B., Sandin, S. A., Shelley, P., U. Rashid Sumaila, Taei, S., Tausig, H., Tukabu Teroroko, Thorrold, S. R., Wikgren, B., Teuea Toatu, & Stone, G. S., Establishment, Management, and Maintenance of the Phoenix Islands Protected Area, 2014.
[298] Vaughan, A., Palau approves huge Pacific marine sanctuary, The Guardian, 2015.
[299] Palau International Coral Reef Center and the Stanford Center for Ocean Solutions, Palau's National Marine Sanctuary: Managing Ocean Change and Supporting Food Security, 2019.
[300] The Sasakawa Peace Foundation, Palau Integrated Marine Protected Area Model, 2010 – 2011. See also: Palau International Coral Reef Center (PICRC), New Strategy highlights the scientific priorities of the Palau National Marine Sanctuary, 2023.

In 2022, Palau took a progressive step by launching its MSP initiative which is being implemented under the *Climate Resilient Marine Spatial Planning* project. The aim is to:

"*...provide support to the government of Palau and other Pacific States in the development of MSP plans which would be scientifically informed by accurate datasets encompassing climate change scenarios, paving the way to a sustainable, inclusive, and resilient ocean-based economic development.*"[301]

Still in its early phase, one of the project's outputs that coincides with the context of this research is the to improve regional coordination on MSP activities. On the other hand, the Cook Islands committed its Marae Moana Park objectives in the *2017 Marae Moana Act*[302]while the Pitcairn Islands worked on their MPAs independently in 2015 when the UK government sanctioned the largest *contiguous marine reserve* in its remaining Pacific territory.[303]

Implementation of large ocean MPAs (LSMPAs), has been deemed effective where conservation plans and resources are limited and scarcely produce national goals in managing their ocean space.[304]As Alger and Peter discussed, LSMPAs has become a norm in the Pacific and would continue to contribute to enhanced ocean management. [305] Regional support through NGO's must be supported by member States as they build capacity in-country as evident by the RMBP.

The number of legislations and regional conventions indicates the leader's quest in making the Blue Pacific identify succeed. The responsibility now lies with the leaders to implement these measures within their respective states, ensuring legal adoption and practical implementation.

[301] SPC, Update on PCCOS and the SPC Ocean Flagship, Information paper 10, 2023.
[302] 2017 Marae Moana Act.
[303] Alger, J., & Dauvergne, P., The Politics of Pacific Ocean Conservation: Lessons from the Pitcairn Islands Marine Reserve. Pacific Affairs, 2017.
[304] Magris, R., A., Effectiveness of Large-Scale Marine Protected Areas in the Atlantic Ocean for Reducing Fishing Activities, 2021.
[305] Above n 294, pp 32.

Subsection A.2: MSP - International Context

The practical MSP concept materialized in the zoning of the *Australian Great Barrier Reef Marine Park.*[306] Now MSP approaches are moving towards areas beyond national jurisdiction (ABNJ) as evident in the BBNJ treaty in the form of MPAs.[307]

The Intergovernmental Oceanographic Commission under the United Nations Educational, Scientific and Cultural Organization (IOC-UNESCO) conducted the initial MSP international workshop in 2006. Since then, it has taken the lead globally in the promotion of *"science based integrated, adaptive, strategic and participatory concepts worldwide."*A Step-by-Step Approach toward Ecosystem-based Management [308] This acts as a guide for professionals responsible for the planning and management of marine areas and their resources.

By 2017, the *"Joint Roadmap to accelerate MSP processes worldwide"* (MSProadmap) was adopted with support from the European Commission's Directorate-General for Maritime Affairs and Fisheries (DG MARE). [309]The objective is to maximize the inclusion of maritime areas within national jurisdiction by 2030. The implementation was accomplished together with the MSPglobal Initiative and co-financed by the EU to define priority areas and take the lead in cooperation. [310] By the time of its implementation from 2018 to 2021, twenty countries have developed and approved national MSP plans. [311]As stated in the MSPRoadmap, many examples came from the PSIDS. It emphasizes on the importance of national experts and empowers local knowledge as no one will do it better than them.[312]

Several literature pertaining to MSP has been written for the European region as conflict resolution and transboundary resource protection mechanisms. MSP represents a departure from traditional sectoral management approaches, emphasizing a full circle, ecosystem-based methodology.[313]

[306] Ibid.
[307] Ibid. See also: Zaucha, J., & Jay, S., The extension of marine spatial planning to the management of the world ocean, especially areas beyond national jurisdiction, 2022.
[308] Ehler, C., Marine Spatial Planning: A Step-by-Step Approach Toward Ecosystem-Based Management, 2009.
[309] UNESCO, Joint Roadmap to accelerate Maritime/Marine Spatial Planning processes worldwide (MSP), Conference Conclusions: adoption of a joint roadmap, 2017.
[310] UNESCO-IOC/European Commission., MSPglobal International Guide on Marine/Maritime Spatial Planning, 2021.
[311] Above n 309.
[312] Ibid, pp 17.
[313] Above n 308 pp 7.

Guiding Points for MSP under UNCLOS

In going back to UNCLOS, it does not offer a precise interpretation of MSP, as MSP is a relatively contemporary concept that has developed gradually. Nonetheless, UNCLOS does include provisions and principles that bear relevance to the concept and application of MSP through the promotion of multilateral environmental agreements. [314]

Section B: MSP as Post Boundary Activities for PSIDS

Subsection B.1: Implementing MSP in Post-Boundary Scenarios

Embracing a regionalist perspective, PIF leaders are dedicated to nurturing a common regional identity and strengthening a unified stance through the embodiment of the "Blue Pacific" concept.[315] The forty-ninth PIF leaders meeting in 2018 addressed a range of regional issues and cooperation efforts among Pacific Island nations. Specific themes pointed towards prioritizing the Ocean.[316]Leaders recognized the pressing need and significance of safeguarding the maritime boundaries within the region as a crucial factor in the development and security of the Blue Pacific as a Continent.[317]

In essence, the Blue Pacific serves as the storyline that breathes vitality into Pacific regionalism, and the formulation of the 2050 Strategy for the Blue Pacific Continent encapsulates the essential elements of this narrative.[318] This has seen a grown interest at the international stage and backed up as a priority in the recent *"Enhancing the U.S.-Pacific Islands Partnership".*[319]

However, carrying out this task on the ground can be inherently complex due to the dynamic individual State political organs, the diverse interests of coastal states, and the overlapping claims which some countries tend to ignore or circumvent around the topic.[320] This is evident over the past two decades of the work underpinned by the RMBP.[321]The Pacific has observed

[314] Zaucha, J., & Gee, K. (Eds.)., Maritime Spatial Planning, 2019.
[315] Wyeth, G., Paying Attention to the Blue Pacific. Pacific Island countries want to rebrand as "large ocean states," custodians of large swaths of the Pacific Ocean, 2018.
[316] PIF Leaders Communique, 2018. Ibid
[317] Pacific Island Forum, 2050 Strategy for the Blue Pacific Continent, 2022.
[318] Ibid of Pacific Island Forum, 2050 Strategy for the Blue Pacific Continent, 2022.
[319] The White House, FACT SHEET: Enhancing the U.S.-Pacific Islands Partnership, 2023.
[320] The Delimitation of Maritime Boundaries of the Pacific Island States - Ibid
[321] Above n 76.

multitudes and various forms of policies that only work in one dimension and does not capture the entire use and users of the ocean.[322] This has often led to one-sided agreements and fragmented activities and this research highlights are the contributing factor to continual loss of the Pacific's Blue Pacific resources.

Amidst these challenges integrated ocean management approaches has emerged as a strategic and holistic framework.[323] As policies take shape, the narrative shifts to the dynamic realm of stakeholder engagement and collaboration. The foundation has been laid when the MACBIO assisted the five pilot countries in 2018 and the *Regional Peer-to-Peer Learning Workshop on Marine Spatial Planning* in the Pacific. MSP, as a collaborative framework, necessitates the active participation of governments, industries, and local communities.[324]

Relationship between MSP and Maritime Boundaries

The RMBP designs the value of champions. Frost et al outlined the importance of those on the ground in-country teams with political connections and those go beyond just their technical capacity to complete boundaries.[325]Building on from the boundaries work with the same set of champions or country teams, MSP and its national legal framework can be harnessed properly.

In this context, MSP concepts and areas of work is not entirely new and with the Pacific States that have conducted their MSP work, the same set of professionals or people are involved. Point of contacts that have worked on countries maritime boundaries set up are also sensitizing MSP procedures in their national ocean policy formulations. The success of post-boundary MSP relies heavily on the collaboration of various stakeholders, including governments, industries, and local communities which has been the practise in the Pacific.

Additionally, it explores the dynamics of international collaboration, highlighting the significance of diplomatic efforts and cross-border cooperation in implementing MSP effectively in post-boundary scenarios. The active involvement of stakeholders to create a sense of shared responsibility.

[322] Pratt and Govan - Ibid
[323] MACBIO, Valuing and conserving the benefits of marine biodiversity in the South Pacific - Ibid
[324] Flannery, W., Clarke, J., & Mcteer, B., Politics and Power in Marine Spatial Planning, 2019.
[325] Redrawing - Ibid

Rationale for the shift from boundary delimitation to MSP

An important notion that has surfaced in boundary delimitation, is that countries need to formalize their maritime zones to gain economic dependence from the resource withing.[326] Aside from the benefits that State has under Article 56 of UNCLOS, which permeates from securing of the maritime limits, this part of the research begs the question of what to do within the EEZ now that countries have secured their boundaries. Literature review and real time MSP practises has given the perspective of that balance to economic enhancement and parallel conservation practices through integrated and adaptive management.[327] In addition, given the pattern of sectoral governance of each maritime zones according to individual State's government instructions, MSP activities favour sustainable ocean governance.[328] Fiji for example has a myriad of ocean related policies and national legislations developed by the various Ministries that have ocean mandates. [329]

Now with the majority PSIDS have deposited maritime zones and some are in the process, this section going forth will contemplate on the transition and its value for PSIDS.

[326] Schofield, C., H., Setting limits and boundaries in the Pacific: the essential framework to manage marine resources, 2010 - Ibid

[327] Douvere, F., & Ehler, C., Ecosystem-Based Marine Spatial Management: An Evolving Paradigm for the Management of Coastal and Marine Places, 2009.

[328] Gissi, E., Fraschetti, S., & Micheli, F., Incorporating change in marine spatial planning: A review, 2019.

[329] Insert – Ocean Matrix for Fiji.

Subsection B.2: MSP as a Tool for Adaptive Governance

Facilitation of Economic Activities and Strengthening of Maritime Security Through MSP Integration

For decades, humans have been extracting from the ocean without duly recognizing the consequential impacts.[330] Contrary to popular beliefs, the ocean ecosystem has changed and will continue as pressures and environmental uncertainties escalate globally.[331]Addressing the diverse array of human activities in the oceans, along with their accompanying impacts, calls for coordinated management efforts across local, national, regional, and international scales.[332] With time, MSP has evolved and now stands at the forefront of existing efforts to address the challenges associated with sustainable marine resource management.[333]

While boundary delimitation is a crucial and serves as the cornerstone in the management of a State's maritime space, concluding it in the form of a treaty between States and deposit to UN-SG is not necessarily the end of the process. Post-boundary activities present a unique set of challenges that demand sustained attention and collaborative efforts. From the previous sections, as boundaries are established, new issues emerge, such as transboundary resource management, environmental conservation, and the need for continued cooperation among neighbouring states.

MSP has been proposed in this research as that tool which Pacific SIDS can use to utilize efficiently and sustainably, transcending political boundaries. By incorporating MSP into post-boundary activities, nations can navigate the complexities of shared resources, fostering cooperation and mitigating potential conflicts.[334]

[330] Check with paragraph in Part 1 – feel like it has been duplicated. Otherwise use; Jungblut, S., Liebich, V., & Bode-Dalby, M., The Oceans: Our Research, Our Future, 2020.
[331] Above n Hassan, D.
[332] Cormier, R., Elliott, M., & Borja, A., Managing Marine Resources Sustainably – The "Management Response-Footprint Pyramid", 2022.
[333] Douvere, F., The importance of marine spatial planning in advancing ecosystem-based sea use management, 2008.
[334] Daaud - Ibid

Mitigating Cross-Border Environmental Impact

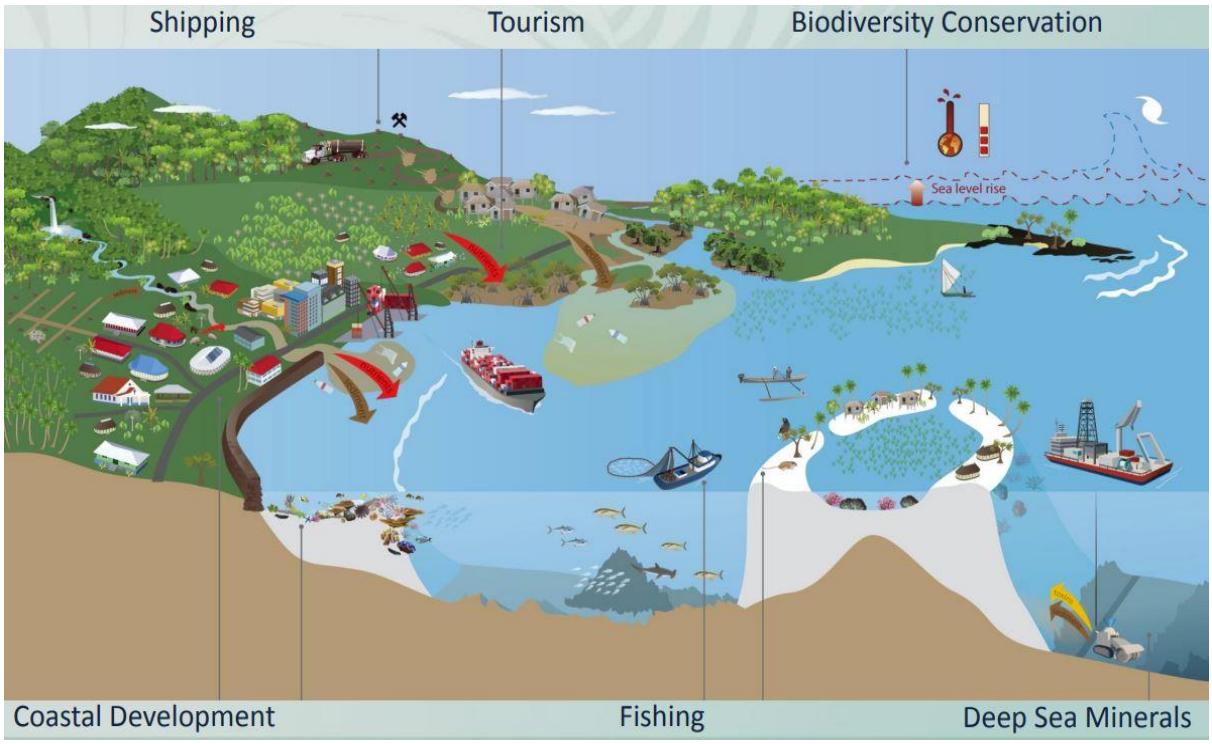

Figure 6:

Source: Jane Thomas, Integration and Application Network (ian.umces.edu/media-library)

Chapter 4: Potential Role of MSP in Maritime Boundaries Delimitation

Section A: Utilizing MSP as an alternative to delimitation

Subsection A.1: Blended MSP Approach – Provisional Arrangement

The Pacific region has significantly progressed with maritime boundary cooperation when compared to neighbouring Southeast Asia region.[335] Of the forty-eight overlapping boundary claims, thirteen remains. While the PIF leaders have demonstrated political support and communicated a regional commitment to an improved maritime delimitation regime, it is evident that challenges persist in addressing the remaining boundaries.

Therefore, this research proposes a blended MSP approach as an alternative to the traditional maritime boundary delimitation. Governments recognize the value of collaborative agreements as viable options when negotiations reach a dead end, allowing parties to navigate around seemingly unsolvable maritime disputes.[336]MSP, can be seen as more of a cooperative approach for deadlock delimitation the management of shared marine spaces. In contrast to the traditional boundary delimitation, which often focuses solely on fixed geographical limits, MSP integrates a variety of factors, including ecological, economic, and social considerations. This approach acknowledges the dynamic nature of marine environments and recognizes that effective governance requires a more comprehensive strategy. MSP facilitates the collaborative and sustainable use of marine resources while accounting for the diverse needs and interests of stakeholders.

A blended maritime boundaries delimitation approach using marine spatial planning refers to an integrated and multifaceted method for establishing maritime boundaries. This approach combines traditional boundary delimitation methods with the principles and processes of marine spatial planning (MSP). Unlike conventional approaches that focus solely on legal and geopolitical considerations, the blended approach incorporates ecological, economic, and social factors. By integrating MSP, which emphasizes sustainable and collaborative marine resource management, into the boundary delimitation process, this blended approach aims to address a broader range of issues, promote stakeholder engagement, and achieve more comprehensive and balanced outcomes in maritime boundary negotiations.

[337]

[335] South China sea case between Philippines and China which took four years to contemplate by the tribunal.

[336]

[337] Tuda, A. O., Stevens, T. F., & Rodwell, L. D., Resolving coastal conflicts using marine spatial planning, 2014.

"MSP is acknowledged as a valuable tool for enhancing collaboration across borders and promoting better ocean governance, aiming to prevent various conflicts."[338]

Realizing practical and existing challenges stemming from the unsettled boundary disputes is essential to stimulate motivation of the countries to beef up negotiation efforts aiming for the peaceful settlements with counterclaimants.[339]

This necessitates innovative and collaborative approaches to boundary management through co-management using MSP during maritime boundaries negotiations as this research aims to demonstrate. This part of the research seeks to unravel the layers of MSP's potential contributions to maritime boundaries delimitation, examining how it can foster collaboration, provide decision-makers with comprehensive data for informed choices, and establish a foundation for sustainable and adaptive management of marine spaces.

Addressing legal implications and establishing cooperation agreements among neighbouring states are essential steps in creating a robust foundation for the implementation of MSP in post-boundary activities.

See the transboundary journals here.

Cross Boarder Collaboration in MSP

Compared to Maritime Joint Development

[338] Towards the operational implementation of MSP in our common Mediterranean Sea,

[339] Mon, S., The practical implications of unresolved maritime boundaries: special reference to the Malaysian position, 2022.

Subsection A.2: MSP as a Conflict Mitigation Tool in Cross-Border Settings

Examples of resolving maritime disputes through the application of MSP

One notable example can be observed in the Baltic Sea region, where multiple nations, including Sweden, Finland, and Estonia, have successfully implemented MSP to address overlapping claims and conflicts related to fisheries and shipping lanes. [340]

Through extensive stakeholder engagement and the integration of scientific data, these nations have established coordinated MSP frameworks, facilitated the sustainable use of maritime space while mitigated potential conflicts. This approach not only fosters regional cooperation but also sets a precedent for addressing complex jurisdictional issues through a comprehensive and inclusive planning process.

In the South China Sea, a region historically fraught with territorial disputes, the application of MSP has shown promise in managing conflicting maritime claims. Countries like Vietnam and the Philippines have taken steps to implement MSP as a means of promoting cooperative governance and sustainable resource management in contested waters. By engaging in multilateral discussions and incorporating MSP principles, these nations aim to balance economic interests with environmental conservation, fostering a more stable and collaborative maritime environment. The use of MSP in the South China Sea exemplifies how a forward-looking planning approach can contribute to the resolution of longstanding maritime disputes by promoting transparency, dialogue, and shared responsibility among neighbouring states.

Overcoming Political and Diplomatic Hurdles

Diplomatic sensitivities can complicate cross-border cooperation, requiring careful negotiation and diplomacy to foster an environment of trust and collaboration.

Balancing Delimitation Needs with National Interests

Case Studies on Overcoming Sovereignty Challenges

In the JMZ examples (Clive articles on this)

[340] Backer, H., Transboundary maritime spatial planning: a Baltic Sea perspective, 2011.

Section B: Strategies for Effective Implementation of MSP in Addressing Maritime Boundary Issues in the Pacific

Subsection B.1: Regional Collaboration and Governance

Subsection B.2: Integration of Traditional Knowledge

Hilmi et al, referred to many Pacific society's cultural heritage entwined with the oceans and traditions covering fishing, fishing methods, protection of certain marine creatures are often passed down through generations, fostering a deep connection with their marine environment.[341]

[341] Hilmi, Nathalie & Bambridge, Tamatoa & Safa, Alain & QUINQUIS, Bran & D'Arcy, Paul., Socioeconomic significance of fisheries in the Small Island Developing States: natural heritage or commodity?., 2016.

Conclusion:

These features play a crucial role as they enable coastal States to establish derivative title to maritime areas. Therefore, baselines constitute an essential cornerstone of coastal State maritime jurisdiction.

UNCLOS introduced a comprehensive set of rules and principles governing the use of baselines, including provisions for straight baselines, bay closures, and the treatment of archipelagic states. The convention aimed to promote stability and predictability in maritime relations, preventing conflicts over territorial claims. UNCLOS has since served as a cornerstone for nations seeking to establish baselines, facilitating the peaceful negotiation and resolution of maritime boundary disputes around the world. The historical development of baseline-making reflects the international community's commitment to fostering cooperation and avoiding conflicts in the use of the world's oceans. Consensus was mainly on the need to balance between the coastal and maritime States on issues of maritime states' interests in high seas navigation, encompassing both commercial and security considerations, as well as resource utilization.

One of the main drawbacks for PICTs is the stability of the coasts in relation to the effects of sea level rise. It is essential to note that maritime boundaries established in accordance with UNCLOS are typically dependent on the uninterrupted presence of the baseline.[342] Should the baseline shift, the boundary will shift accordingly. Similarly, if a baseline feature vanishes, the corresponding boundary defined by that feature will also cease to exist. This nature will be explored deeply in the upcoming sections.

The escalation of sea levels presents a multitude of intricate issues for coastal nations in the Pacific region. The main issue is the disruption to their territorial assertions which would escalate to bigger challenges around statehood and welfare of their populations. Confronting these complexities entails a coordinated approach involving legal, diplomatic, environmental, and economic initiatives aimed at adapting to and alleviating the consequences of the rising sea levels. These are issues which the PIF leaders have noted and reaffirmed their commitment to conclude negotiations on all outstanding maritime boundaries claims and zones.[343]

On the other hand, Article 56 of the United Nations Convention on the Law of the Sea (UNCLOS) delineates the entitlements and obligations of coastal states within their exclusive

[342] Schofield, C., & Freestone, D., Archipelagic Atoll States and Sea Level Rise, 2022.
[343] PIF leaders Communique, 2019.

economic zones (EEZs). In straightforward language, it affirms that coastal states possess sovereign rights to explore, exploit, conserve, and oversee natural resources within their EEZs. These resources encompass marine life, including fish, and hold the potential for energy and mineral exploration. Nevertheless, other states retain the right to conduct specific activities, such as navigation and overflight, in the EEZ. Furthermore, there exists a duty to collaborate in the preservation and management of shared or migratory fish stocks. The primary objective of the article is to strike a balance between the rights of coastal states and the interests of other states, ensuring the sustainable utilization of marine resources.

By adopting comprehensive and responsible maritime boundary management practices, PICs can ensure the long-term viability of these resources, after delimitation and hence can enhance promoting environmental sustainability and the well-being of their communities.

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