

NGOS AS BRIDGING ORGANIZATIONS IN THE PLANNING, ADOPTION, AND  
MANAGEMENT OF THE RAJA AMPAT MPA NETWORK

by

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### **Abstract**

Coral reef ecosystems are among the most diverse habitats on earth, providing essential social and ecological services. Raja Ampat, Indonesia - located in the coral triangle, the heart of marine biodiversity - has a rich history of traditional management, which included closures akin to modern marine protected areas (MPAs). Decentralization and restoration of tenure rights in 2001 provided an opportunity for resurgence of these traditional systems. International conservation non-governmental organizations (NGOs), noting the remarkable biodiversity and increasing threats due to destructive fishing practices, worked with local communities to facilitate community based MPAs as a conservation strategy. Here I employed a case study approach to assess the specific bridging strategies utilized by NGOs during the adoption, implementation, and management of the Raja Ampat MPA Network. My results suggest that NGOs played different roles over time in the MPA process, with three distinct phases of engagement. Interviewees identified specific initiatives that occurred during this process, which involved multiple bridging tools. Three of these key initiatives are: the Tourism Entrance Fee System, the Raja Ampat MPA Patrol System, and the Blue Abadi Fund. The specific bridging tools employed included: linking stakeholders, co-producing knowledge, providing access to resources, facilitating community engagement, and building capacity. Recent research has pointed to social and ecological effectiveness of the Raja Ampat MPA Network, which could in part be attributed to the bottom- up approach facilitated by NGOs. This research demonstrates the important role that NGOs can play in bridging conservation initiatives to foster positive social and ecological outcomes.

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## 1.0 Introduction

Marine systems, which provide critical global ecosystem services, have become severely threatened by overfishing, climate change, pollution, and habitat destruction (Burke, 2011; IPBES, 2019; Sala et al., 2021). Coral reef ecosystems in particular provide extensive ecological and social benefits including coastal protection, biodiversity conservation, and food security to coastal communities (Harvey et al., 2018; Hughes et al., 2005; Lester et al., 2009; Sala et al., 2021; Sala & Giakoumi, 2018), however these ecosystems are highly threatened by anthropogenic activities and climate change (Burke, 2011; Harvey et al., 2018). Given their benefits to biodiversity and communities alike, conserving marine areas – including coral reef systems – is of critical global importance.

Marine protected areas (MPAs) have become an increasingly popular management tool among national governments for conserving marine ecosystems (Ban et al., 2011; Hoegh Guldberg, 2011; Lester et al., 2009; Lubchenco & Grorud-Colvert, 2015; Sala et al., 2021). MPAs can protect and conserve biodiversity, provide resilience to environmental change, and enhance fisheries management (Sala et al., 2021; Sala & Giakoumi, 2018). Over the past few decades, international institutions (e.g., IUCN, CBD) have drawn attention to growing threats to marine habitats, calling on national governments to designate protected areas (CBD, 2021; IUCN, 2021; Wells et al., 2016). While these calls resulted in the creation of new MPAs in both developed and developing countries, the use of MPAs as a conservation tool is not novel. The practice of seasonally closing and limiting human activity in marine areas can be traced back at least hundreds of years to communities in Oceania and Southeast Asia, including Indonesia (Carr et al., 2019; Johannes, 1978, 2002). Communities utilized closures to manage, harvest, and equitably distribute resources, however colonization and related socio-economic pressures led to



a decline in these traditional resource governance systems (Carr et al., 2019; Johannes, 1978; McLeod et al., 2009).

MPAs can provide ecological benefits by conserving biodiversity and providing environmental resilience and can provide social benefits by improving food security and providing alternative sources of income through tourism (Bennett & Dearden, 2014; Christie et al., 2017; Harvey et al., 2018). Governments originally utilized MPAs for positive ecological outcomes (Folke et al., 1996; Mascia, 2003) because of their range of ecological benefits such as increasing fish biomass, coral cover, and species diversity (Edgar et al., 2014; Sala & Giakoumi, 2018). While often ecologically effective, many MPAs are commonly 'socially ineffective'; lacking socio-economic and cultural consideration (Ban et al., 2011; Christie, 2004; Christie et al., 2017; White et al., 2001, 2014). Many MPAs implemented in the 1970s and 1980s were created at the state or national level, where a lack of resources, capacity, and funding resulted in the creation of top-down, centralized 'paper parks' which have no community engagement or buy-in (Berdej & Armitage, 2016b; De Santo, 2012). Case studies from the Philippines and Indonesia suggest that top-down control can result in ineffective conservation measures in MPAs (Christie, 2004; Christie & White, 2007; Green et al., 2011; Wells et al., 2016; White et al., 2001). When conservation initiatives are established instead from the bottom up, starting with establishing a link between conservation and livelihoods, communities are more likely to participate and feel ownership over resources; further, they are more likely to benefit from the conservation initiatives (Berkes, 2007).

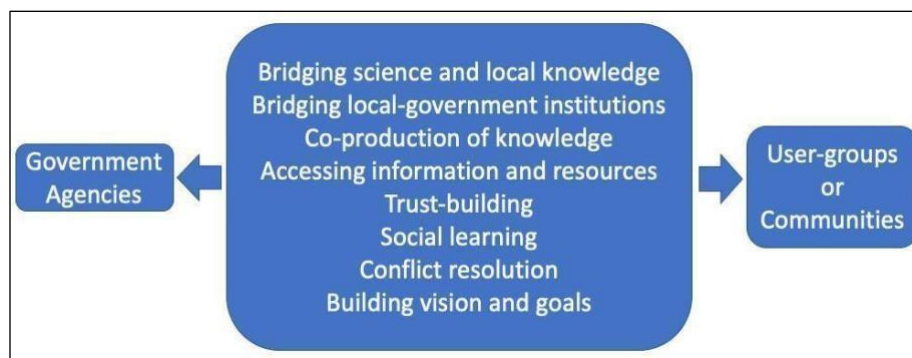
Social-ecological systems are complex, integrated systems in which humans are part of nature (Berkes & Folke, 1998). These systems contain various actors that depend upon a resource (or resources) within an ecosystem and are difficult to govern because of the various

spatial and temporal layers (Cox et al., 2010; Ostrom, 1994, 2009). In coastal environments with social and ecological domains, MPAs can be used as a management tool for improving livelihoods and ecosystems (Armitage et al., 2017; Berkes, 2015; Pomeroy et al., 2005). MPAs are often managed from an ecological perspective, however the links between the social environment and the biological environment are plentiful (Armitage et al., 2017). These linkages may consist of knowledge diversity, various governance arrangements, stewardship values, and rules and norms (Armitage et al., 2017). Examining MPAs through a social-ecological lens has become more common in recent decades and can help to consider possible trade-offs between social acceptance and ecological success (Ban et al., 2013; Berkes, 2015). Best practices for implementing MPAs with attention to both social and ecological outcomes are emerging in the literature and in practice, and include empowering local communities through ownership, reinvigorating traditional resource management practices, and ensuring local communities retain access to their property (Christie & White, 2007; Sternlieb et al., 2013; White et al., 2001).

Bridging organizations can act as an intermediary between local communities and governments to meet both social and ecological objectives and help prevent top-down conservation measures (Berdej & Armitage, 2016b; Berkes, 2009; Crona & Parker, 2012; Sternlieb et al., 2013). The term ‘bridging organization’ appeared in the 1990s as an expansion to the possible roles played by boundary organizations. Boundary organizations exist in between the science and policy spheres (Berkes, 2009), whereas bridging organizations “provide an arena for knowledge production, trust building, sense making, learning, vertical and horizontal collaboration, and conflict resolution (Berkes, 2009, p. 1695).” Where boundary organizations act primarily at the science and policy nexus, bridging organizations can connect a range of stakeholders at a variety of levels through forms of ‘strategic bridging’ (Crona & Parker, 2012)

and enable actors to connect with stakeholders that they might have not been able to connect with alone (Sternlieb et al., 2013). Bridging organizations have worked to connect stakeholders in a variety of systems, including governing water management and ecosystems services in watersheds in Montreal, Canada (Rathwell & Peterson, 2012), working with communities to implement MPAs in Bali (Berdej & Armitage, 2016b, 2016a), and in a wetland biosphere reserve in Sweden (Hahn et al., 2006).

Organizations can ‘bridge’ a variety of governments, users, and stakeholders through a variety techniques, roles, and behaviors (Berkes, 2009; Crona & Parker, 2012; Sternlieb et al., 2013). Some of these tools include: facilitating connections between different communities, governments, and stakeholders at various levels of governance; building capacity of local communities through meaningful participation; integrating customary knowledge with 21st century conservation theory (Berdej & Armitage, 2016b); improving access to information and resources, co-producing knowledge; and building local-government institutions (Berkes, 2009) (Figure 1).



**Figure 1.** Bridging organizations facilitate interaction between government and user-groups or communities. Center column highlights some of the many possible roles that bridging organizations can play in the management of natural resources (reproduced from Berkes, 2009).

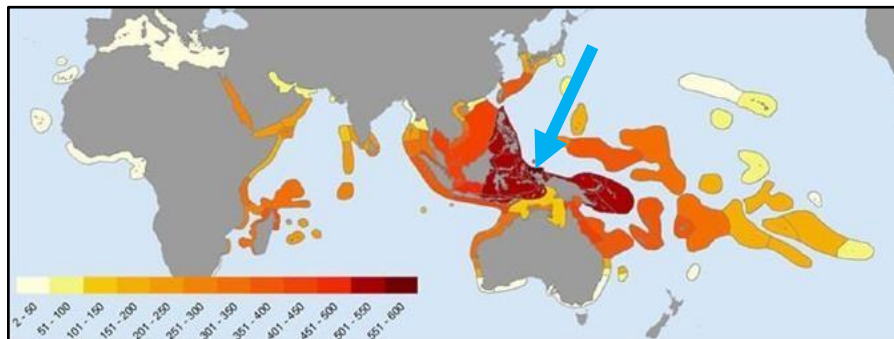
Many institutions can act as bridging organizations, including non-governmental organizations (NGOs), science institutions, local stewardship groups, and other relevant

stakeholder groups (Crona & Parker, 2012). These organizations can employ a variety of bridging tools (Figure 1) to help facilitate social-ecological systems to be resilient and adaptable to unpredictable change (Hahn et al., 2006). Specific NGOs (e.g., Conservation International Indonesia, the Coral Triangle Center, and Reef Check Indonesia) have acted as bridging organizations in Bali to help communities to establish MPAs through bottom-up approaches (Berdej & Armitage, 2016a, 2016b). This has thus more effectively integrated local actors into the planning for an MPA and led to stronger social outcomes (Berdej & Armitage, 2016a; Christie & White, 2007; White et al., 2001). In Raja Ampat, Indonesia, a global biodiversity hotspot highly threatened by human activities, NGOs have worked as bridging organizations between multiple levels of government and local communities – which were recently granted autonomy over their resources – to facilitate the creation of a network of MPAs, with focused attention on integrating social and ecological objectives (Agostini et al., 2012; Leisher et al., 2012; Purwanto et al., 2021).

### 1.1 Case Study: Raja Ampat, West Papua

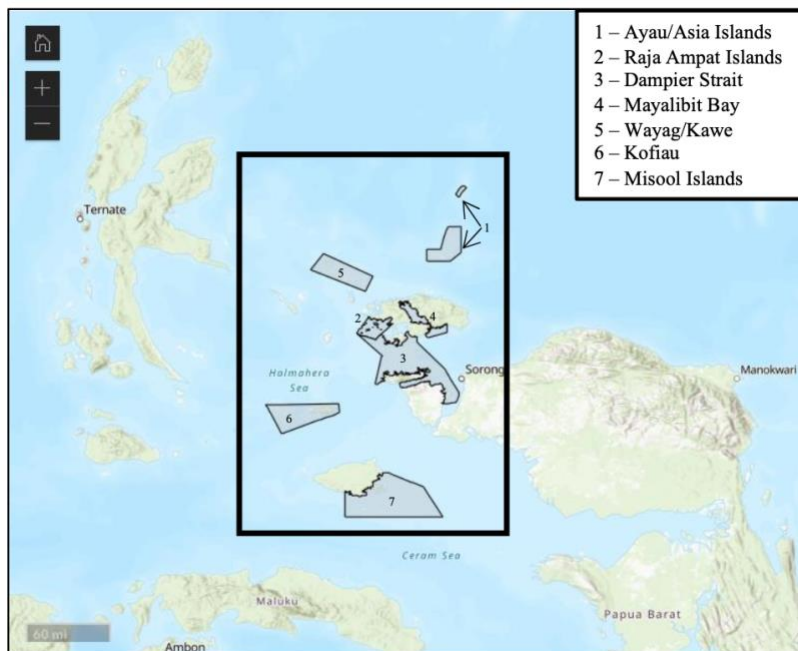
Raja Ampat is located within the Coral Triangle, an area that spans from the Philippines to the Solomon Islands and contains the highest levels of marine biodiversity found in the world (Mangubhai et al., 2012; McKenna et al., 2002; Veron et al., 2009). The Raja Ampat Islands ecoregion is the ‘bullseye’ of the Coral Triangle, containing 52% of the world’s reef fishes and roughly the highest number (553) of coral reef species found in the world (G. Allen & Erdmann, 2009; McKenna et al., 2002; Veron et al., 2009), making it a globally important marine ecosystem (Figure 2). For centuries, the remarkable biodiversity in the region was maintained by Raja Ampat’s remote location and adherence to customary resource management, but the

biodiversity and customary practices became highly threatened by globalization and colonization (Mangubhai et al., 2012).



**Figure 2.** Map illustrating the biodiversity of hard corals in Southeast Asia; blue arrow points to Raja Ampat (Adapted from Veron et al., 2009).

Raja Ampat, or the *four kings*, is named after the four main islands Batanta, Misool, Salawati and Waigeo, and is located in the westernmost section of the Province of West Papua (Agostini et al., 2012; McKenna et al., 2002) (Figure 3). Similar to other communities in Oceania and parts of Eastern Indonesia, communities in Raja Ampat have been practicing a traditional resource management system known as *sasi* for hundreds, if not thousands of years (Harkes & Novaczek, 2000; Johannes, 2002; Lam, 1998; McLeod et al., 2009). Both *sasi* and *hak adat*, the marine tenure system utilized in Raja Ampat, have been practiced since at least the 16<sup>th</sup> century as a way to sustainably harvest natural resources, akin to 21<sup>st</sup> century ecosystem-based management (Harkes & Novaczek, 2000; McLeod et al., 2009). *Hak adat* focuses primarily on the tenure and associated responsibility of territorial waters and is used in conjunction with *sasi* to manage both terrestrial and marine resources (McLeod et al., 2009).



**Figure 3.** Map illustrating the Bird's Head Seascape. The Regency of Raja Ampat is located within the rectangle. Each of the MPAs constituting the Raja Ampat MPA Network (as of 2008) are labelled 1-7.

The traditional management systems used across Eastern Indonesia, including *sasi*, were complicated by colonization and the associated disruption of socio-economic systems (McKenna et al., 2002; Persoon et al., 2003). Indonesia was colonized by the Dutch in 1602, and the Dutch retained power until 1942 (Yusran Halmin, 2006). In many parts of Indonesia, centralized government control eroded *sasi* and other traditional practices (Persoon et al., 2003).

When Holland granted Independence to Indonesia in 1949, they retained control over the region of current day West Papua, previously called Irian Jaya, and it wasn't until 1969 that West Papua became an official province of Indonesia (Yusran Halmin, 2006). In 1997, the Asian Financial Crisis created economic and political mayhem across Asia, resulting in Indonesian's President Suharto to resign. Two years later, Abdurrahman Wahid came to power in Indonesia and after approximately 50 years of authoritarian control, the Indonesian government entered a new era of reform (*reformasi*) where it shifted towards a more

decentralized state by granting all provinces, including West Papua, regional autonomy (Patlis, 2007; Patlis et al., 2001; Wiadnya et al., 2011).

In 2001, Irian Jaya was granted ‘Special Autonomy’ by Law No. 21/2001 and created the new province of West Papua (Yusran Halmin, 2006). This special autonomy law granted the government of West Papua stronger control over their natural resources, development strategies, and financial decision making. The special autonomy was particularly important for West Papua because it restored the resource rights to the province, which allowed for more community ownership of natural resources and revitalized traditional resource governance and customary tenure (Yusran Halmin, 2006). In 2002, a new regency level of government was established in the Raja Ampat region, which was situated under the provincial government (Agostini et al., 2012; McLeod et al., 2009). Every regency, including Raja Ampat, is led by an elected regent, or *Bupati*, who manages all of the districts within the regency.

Amidst the restoration of rights among the communities in Raja Ampat, the region had been experiencing an increase in threats to their marine resources (Mangubhai et al., 2012). The Regency of Raja Ampat comprises almost 1,500 islands spanning approximately 43,000 km (Agostini et al., 2012; McKenna et al., 2002) (Figure 3) and had historically maintained a relatively small population (McKenna et al., 2002), which allowed the communities of Raja Ampat to effectively conserve their natural resources for hundreds of years. However, under a centralized government Raja Ampat’s resources technically belonged to the state. Remoteness and small population sizes insulated the region temporarily, but by the 1980s, fishermen from outside of Raja Ampat realized the incredible biodiversity and started to travel to the region to harvest the rich resources. Main threats to the marine biodiversity stemmed primarily from

overfishing and illegally capturing sharks and finfish for the live reef fish trade, as well as unsustainable development from exploitation of resources (Mangubhai et al., 2012).

In the early 2000s, just as the Special Autonomy Law passed, conservation organizations took notice of the tremendous biodiversity in the waters of Raja Ampat along with the increasing threats to the region. In 2001, Conservation International (CI) conducted a 15-day rapid ecological assessment in Raja Ampat and assessed the marine biota on 45 sites in the area. The next year, The Nature Conservancy (TNC) funded an additional ecological assessment to assess the biological and social dimensions of Raja Ampat (Donnelly, 2003). The assessments depicted an area with magnificent biodiversity, but high levels of threats from shark finning, turtle hunting, overfishing, and illegal fishing practices including cyanide fishing and dynamite fishing. Most of these threats were coming from outside fishermen traveling to Raja Ampat, however some community members had begun engaging in illicit activities (M. V. Erdmann & Pet, 2002; McKenna et al., 2002). The reports highlighted a range of conservation actions that could benefit the region, including promoting community engagement and awareness campaigns, developing alternative economies to replace reliance on illegal fishing, and establishing long-term monitoring programs (McKenna et al., 2002). Given the opportunity presented by the new autonomy to Raja Ampat, these findings prompted NGOs to work with the communities of Raja Ampat, and by 2008, a network of seven MPAs had been adopted (Agostini et al., 2012). This study will largely focus on the original network of seven MPAs including the Ayau/Asia Islands, Raja Ampat Islands, Dampier Strait, Mayalibit Bay, Wayag/Kawe, Kofiau, and Misool Islands MPAs (Figure 3).

Raja Ampat presents a compelling case of a global biodiversity hotspot, which is highly threatened and where resource rights have been restored to communities; yet tools and resources



to manage growing threats had not been provided. Thus, NGOs can potentially provide a powerful bridge between government and communities, facilitating rights, enabling resource access, and connecting modern scientific tools with traditional practices regarding MPAs.

Studying the role of NGOs in the Raja Ampat MPA process as a case study in environmental governance, I ask the following question: What specific bridging organization tools did CI and TNC use in the planning, adoption, and management of the Raja Ampat MPA Network?

Further, I seek to infer if these techniques built a socially and ecologically successful MPA Network.

## 2.0 Methods

To evaluate if and how NGOs acted as bridging organizations in the design, adoption, and management of the Raja Ampat MPA Network, I used an explanatory case study approach. Case study methodology is commonly used to answer questions that ask how or why a specific phenomenon occurs (Yin, 2018). Case studies can be useful when evaluating real-world scenarios that are highly dependent on various contextual factors with the goal of finding probabilistic causality. My case consisted of the broader process around establishing the seven original MPAs in the Raja Ampat MPA Network from approximately 2001 to present (2021).

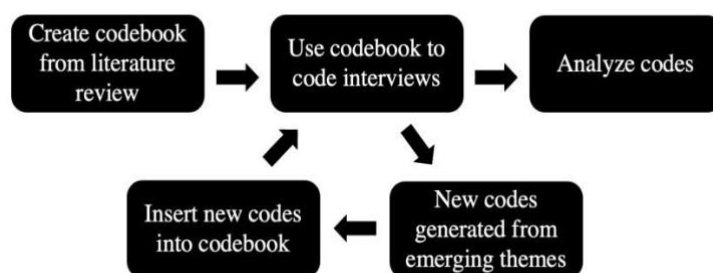
To perform this case study, I conducted a series of interviews to collect information pertaining to the design, adoption, and management of the Raja Ampat MPA Network. In-depth, semi-structured interviews were conducted with six individuals who were extensively involved in the creation of the Network. I targeted individuals from the two main NGOs (CI and TNC) that had been involved in the Raja Ampat MPA Network. The first interview was held with an essential key informant who was involved with all stages of the implementation of the MPA Network across the entire duration of the process (2001-present). This key informant provided an in-depth oral history through a series of interviews (14 hours total). The additional five interviewees were identified from the key informant. Names and titles of all interviewees can be found in the appendix. The additional five interviewees were each involved in some aspect of the design, adoption, and management of the Network as well, but for a shorter time period than the first key informant. Each of the five additional interviews spanned approximately one hour.

Interviews were conducted from October 2020 through May 2021 and were held over Zoom or WhatsApp. Prior to each interview, participants were briefed on the scope of the interview and were asked to provide their consent to record. The sole WhatsApp interview was

not recorded, however almost verbatim notes were taken to ensure an accurate record of the interview. All interviewees were asked questions relating to the planning and design, adoption, and implementation as well as management aspects of the MPA Network. These questions included but were not limited to: how the MPA Network was initiated; social and ecological factors that went into the design; the process of adoption and implementation across levels of governance (local to regional to national); management of the MPA Network; and the various roles that NGOs played throughout this process. To supplement interview data, secondary sources were reviewed and analyzed. These sources included peer-reviewed literature, popular media, internal NGO monitoring reports, and management and zonation plans. These sources were used to provide supplementary information to my interviews.

My analysis consisted of assessing all interview transcripts by coding in NVivo Version 12.0. I used a mixed grounded theory approach (Corbin & Strauss, 2008; DeCuir-Gunby et al., 2011) and coded the transcripts using theory-driven and data-driven codes (DeCuir-Gunby et al., 2011). To create the theory-driven codes and generate a codebook, I reviewed relevant literature by Berkes (2009) and Berdej and Armitage (2016b) to identify key theories on bridging organizations and factors important for NGOs engaging in bridging situations (Bazeley & Jackson, 2013). Four papers were highly relevant to my research: Berdej and Armitage (2016b) examined the impact of bridging organizations on community-based MPAs in Bali, Indonesia; Berkes (2009) and Crona and Parker (2012) provided a foundational bridging organizations overview; and Brown (1991) examined the various types and roles of bridging organizations. Thus, my original theory driven codes came largely from these four resources. Themes identified from the literature became my first set of codes in the codebook. Next, I employed open coding, where I analyzed my transcripts line- by-line and created new, data-

driven codes for concepts that emerged from my data (Corbin & Strauss, 2008; DeCuir-Gunby et al., 2011; Saldaña, 2021). Throughout my coding process, all new codes were added to my codebook with a brief definition, a full definition, and a description of the importance of the code. The second phase of coding employed axial coding, where I began looking for relationships within codes to identify possible categories or themes (Simmons, 2017). These new codes and themes of bridging organization roles and practices were refined and compared against other interviews and peer reviewed literature using the constant comparison method (Corbin & Strauss, 2008; Saldaña, 2021). The last step of coding was selective coding or theoretical coding, where I refined the codes that were related to my larger core category of bridging organization roles and actions (Urquhart, 2012) (Figure 4).



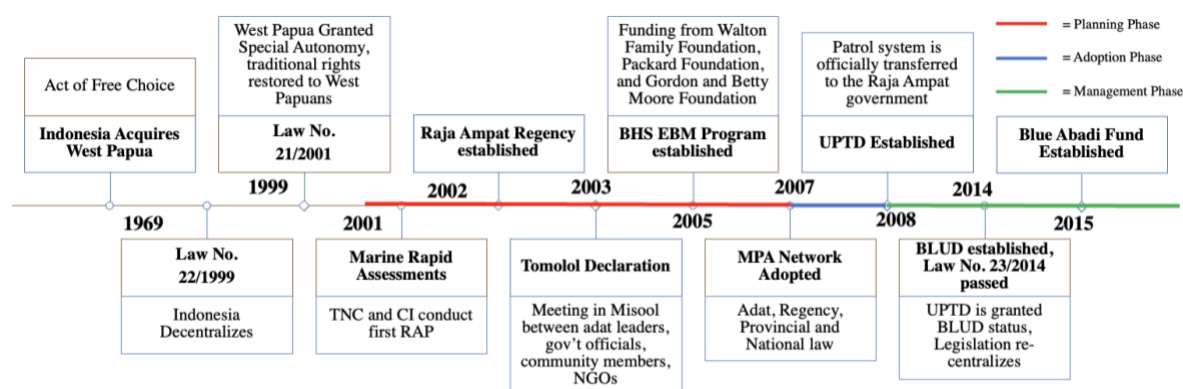
**Figure 4.** Overview of the methodological process used for creating, categorizing, and analyzing codes in this study.

The covid-19 pandemic limited University-sanctioned travel, prohibiting travel to Indonesia to collect additional interviews with MPA managers and local community members and leaders, and limiting our sample size of interviewees. My ability to only conduct interviews in English and over Zoom also limited this study, other limitations include potential biases from lack of additional interviewees, and from my sole key informant interview which spanned approximately 14 hours, whereas the additional five interviews only covered five hours.

### 3.0 Results and Discussion

#### 3.1 Process and timeline

Bridging organizations played different roles over time in the process regarding the Raja Ampat MPA network, with three distinct phases of engagement (Figure 5; based on case study interviews and document analysis): The planning phase, adoption phase, and management phase. Each of these phases are discussed below.



**Figure 5.** Timeline illustrating key events in the planning, adoption, and management of the Raja Ampat MPA Network. The planning phase occurred from 2001 through 2007, up to the adoption of the MPAs. The adoption phase spanned one year from 2007 to 2008, and was followed by the management phase, which began in the latter part of 2008 and is still ongoing (timeline based on case study interviews and document analysis).

The planning phase occurred from 2001 through 2007, where NGOs demonstrated the highest levels of engagement. Ecological and social assessments conducted from 2001-2003, resulted in a series of recommendations of conservation actions for the Raja Ampat region including identifying potential MPA sites, promoting community engagement in conservation planning, building capacity of field staff and local community members, and implementing policies to enforce traditional tenure (Donnelly, 2003; McKenna et al., 2002). Following the ecological and social assessments conducted by CI and TNC from 2001-2003 (Figure 5), TNC then convened a meeting in Tomolol on the island of Misool in 2003 and brought together

community members, traditional leaders, government officials and other relevant stakeholders. The objective of the meeting was to gain a stronger understanding of the social environment of Raja Ampat and evaluate any perceived threats (Rudyanto et al., 2015). The meeting resulted in the ‘Tomolol Declaration’, a social contract between the communities, local governments, and NGOs, and declared that Raja Ampat was a biologically and socially important region that required protection.

Following the social and ecological assessments, CI and TNC sought funding to pursue work in Raja Ampat. The first source of funding for conservation work in Raja Ampat was granted by the Gordon and Betty Moore Foundation in 2004, followed by significant contributions from the Walton Family Foundation and the Packard Foundation. This funding allowed both CI and TNC to begin surveying communities regarding the social dimensions of the region, to create capacity building programs, and to conduct community meetings. When the communities decided that MPAs could be a viable option for protecting their natural resources, the NGOs worked with the communities to delineate boundaries that worked with the community ownership and tenure that had been practiced for centuries, reinvigorating their local institutions and practices.

*“The actual MPA design process [and creating the] borders was remarkably fast because all of this other work had happened before [because] when the idea of MPAs came up, it was presented as a way to reinforce Papuan law and rights and tenure. The borders [matched] tenure boundaries, rather than government administrative boundaries, so it was the community tenure boundary and those communities with tenure who were going to make a decision about that area. And I think that was a really important distinction because it spoke to that rights issue,*

*and they were presented to be a solution for food security and a solution for autonomy and maintenance of rights” (L. Katz, personal communication, 2021).*

This high level of engagement during the planning phase helped lead to the eventual adoption of the MPA Network.

The adoption phase occurred between 2007 and 2008, when the MPAs were officially adopted by traditional *adat* law, the Raja Ampat Regency Government, the West Papua Provincial Government, and the Indonesian National Government. In addition to the preexisting ‘Raja Ampat MPA’, six new MPAs were adopted to form a network of seven MPAs. Each MPA in the Network was established to fit the social and biological needs of the community and ecosystem. While some of the MPAs were prioritized for their biological significance (*i.e.*, Ayau, Kawe, SE Misool, Kofiau), others were prioritized for their social importance (*i.e.*, Mayalibit Bay, Dampier Strait). CI worked primarily in the northern regions of Raja Ampat with the Asia-Ayau, Dampier Strait, Mayalibit Bay and Kawe MPAs, while TNC worked in the southern regions with the Kofiau and SE Misool MPAs.

The social and ecological dimensions of each of the seven MPAs were distinct. The Asia-Ayau Islands MPA, the northernmost MPA in the Network, hosts the largest grouper spawning aggregation site in Eastern Indonesia, and is critically important for reseeding the expansive reef systems in Raja Ampat. The Kawe MPA, located in the northwest corner of Raja Ampat, has been under the tenure of only two villages, each adhering to *sasi* and customary management practices. The low density of people and commitment to *sasi* has historically maintained much of the biodiversity leading to a healthy and diverse marine system. The Mayalibit Bay MPA hosts mangroves and murky waters with crocodiles; vastly different biodiversity from the coral reef ecosystems that Raja Ampat is known for. Further, the area is known as the cultural heart of Raja

Ampat, home to the Maya – the original communities of Raja Ampat. Dampier Strait is the ecological heart of the region; the MPA harbors the most biodiverse reefs in all of Raja Ampat (BLUD UPTD, 2020) and sits adjacent to the capital city of Raja Ampat, Waisai. The Kofiau MPA is located in the southwest part of the network and hosts healthy coral reefs and a migration corridor for whales and dolphins. The Misool Islands MPA is the largest and southernmost MPA in the Raja Ampat MPA Network, home to mangrove forests, coral reefs, and turtle nesting beaches, as well as the Misool Eco Resort.

The management phase, which occurred from 2009 through present (2021), is characterized by the official implementation of the Raja Ampat MPA Network, plus various programs including the Raja Ampat Management Authority, the Blue Abadi Fund, and the Tourism Entrance Fee system. These three initiatives are discussed in Section 3.3, including the specific bridging roles that NGOs played in these initiatives.

### 3.2 Bridging actions

Interviews with representatives from CI and TNC revealed a wide range of bridging actions in the planning, adoption, and ongoing management of the Raja Ampat MPA Network. Nine categories of bridging tools were derived from my analysis (Table 1). Below I present these categories, followed by key initiatives which cross-cut multiple categories.

**Table 1.** Final nine categorical themes derived from interviews, with a description of the category and an example quote. In this specific case, reference to NGOs refers to TNC and/or CI; reference to communities refers to the local communities of Raja Ampat.

Code	Code Description	Exemplary Quote
<i>Advising</i>	When NGOs advise between governments and communities regarding conservation initiatives and decision making	“The [government was constructing] their development platform, reflecting on the existing development program and income and budget from which was from mining and logging and capture fisheries. So TNC and CI together discussed with [the government] about sustainably developing the area ... and a



		potential long term sustainable income source – non-destructive income – like tourism.” (M. Mongdong, personal communication, 2021)
<i>Community engagement</i>	When NGOs interact with communities through conversations, engaged listening, focus group discussions, outreach, and media	“CI did a schoolkids jamboree, we produced community tabloids, a newsletter circulating to communities, talking about biodiversity and how important the place is, everything.” (M. Mongdong, personal communication, 2021)
<i>Access to resources, financial and physical</i>	When NGOs provide financial resources (access to funding, creating funding mechanisms) and/or physical resources (providing boats, building materials, and educational materials)	“We put a lot of energy into a lot of education work there... we put more energy into some medical-type things and health care which, in general, we didn't have a lot of money to do but [we] felt like we needed to because it was really probably needed - that was clear.” (M. Erdmann, personal communication, 2020)
<i>Co-production of knowledge</i>	When NGOs collaborate with local communities and/or stakeholders to produce context specific knowledge through a dynamic and iterative process	“And the important thing we wanted to do is to actually keep track of exactly how [many sea cucumbers] they caught. So, by having the buyers right there with their scales, every day, people are coming in, here's my 30 sea cucumbers, they weigh in, get paid, ... [and] what was beautiful about that is now we actually had detailed records of exactly how many kilos of sea cucumbers, crayfish and trochus were pulled out of the water there.” (M. Erdmann, personal communication, 2020)
<i>Capacity building, education, and training</i>	When NGOs build capacity of communities and government officials; this includes education and training in 21st century MPA management	“... if these sites were going to be 1) not paper parks and 2) co-managed and really led by communities, there was going to need to be some serious skill building around MPA management. So we partnered with NOAA in the US and their International MPA capacity building program and designed a targeted multi-year capacity building program on various aspects of MPA management.” (L. Katz, personal communication, 2021)
<i>Exposure</i>	When NGOs expose communities to new political, economic, scientific and educational processes and systems;	“In 2009 we published a book, 'Diving Raja Ampat'... and the idea ... this was again part of our looking forward to mass tourism, we want to make sure that everyone knows there's 100+ dive sites in Raja Ampat. And those are just the

	and/or expose outside communities (e.g., scientists, recreational divers) to the social and ecological elements of Raja Ampat	ones that we've explored in the recent past, you could easily find another 200 dive sites. So we published a book that sold like wildfire. It sold so well that we then published in 2012 a follow on called 'Diving Indonesia's Bird's Head Seascape'." (M. Erdmann, personal communication, 2020)
Knowledge diversity	When NGOs facilitate integrating different knowledge systems and perspectives (including regarding social or biological dimensions)	"...it basically was a yearlong conversation in which we had a team of really well-trained extension officers who went village to village, to 100 villages, and spent days in each one forming relationships, understanding and really listening to what communities were struggling with, what their aspirations were, what their struggles with marine resource use and poaching and whatnot." (L. Katz, personal communication, 2021)
<i>Adaptation</i>	When NGOs facilitate communities and governments in adapting to the unique circumstances of Raja Ampat and/or during unexpected changes	"...you have to adapt to the individual situations in the villages and that [was] a way into the hearts and minds of the people of Ayau. They were pretty happy to be able to grow pigs, because they reckoned that pork is better than turtle meat anyway." (M. Erdmann, personal communication, 2020)
<i>Linking across scales</i>	NGOs connecting the local communities to external organizations (e.g., Starling resources, NOAA, State University of Papua, local NGOs, Vulcan)	"We also selected a team of five mentors, and [then] we had these are more experienced MPA practitioners from Indonesia, and there was a Professor from the State University of Papua, there were two people from The Nature Conservancy, I had a person reporting under me who led the capacity building program who was also a mentor, and all of them translated for the NOAA leaders..." (L. Katz, personal communication, 2021)

### 3.2.1 Advising

Bridging organizations can facilitate trust and leadership, which provides the opportunity for advising (Berkes, 2009). Additionally, bridging organizations can lean on their expansive networks to find the best possible expertise and information to offer to communities (Armitage et al., 2017). NGOs advised communities and governments on conservation initiatives and specific

tourism planning and best practices. One of the most critical instances of advising occurred at the very beginning of CI and TNC's engagement with the local Raja Ampat government. The Bupati of Raja Ampat had originally intended for the economic development plan of the region to be focused on extractive industries. The NGOs advised the new regency government to engage in sustainable tourism instead of mining and forestry:

*“The initial economic development plan for Raja Ampat was ‘let's cut down all the forests and we'll mine all the nickel’ so we were able to very gently suggest ‘hey, if you look at all of the angst which is surrounding Papua, it's all because of illegal forestry and big mines ... look, you've got this amazing marine wonderland at your doorstep, the communities don't need mines, what they want is just basically standard food security of their fisheries.” (M. Erdmann, personal communication, 2020)*

Importantly, NGOs acted in advising between communities and governments, helping to communicate local community needs and desires while also advising the government on how to potentially meet those needs.

### 3.2.2 Community Engagement

Bridging organizations can coordinate meaningful engagement with communities and relevant stakeholders to foster acceptance and collaborative decision making for conservation initiatives (Berdej and Armitage, 2016a). When communities are engaged in the planning and decision-making process for MPAs, they are more likely to take ownership of the MPA, accepting and following the rules as well as participating in management activities (Christie, 2004; Christie et al., 2017). The Special Autonomy Law offered communities greater ownership over local natural resources. The law also

provided NGOs an opportunity to work alongside communities in Raja Ampat towards establishing a bottom-up, community-implemented MPA network (M. Erdmann, personal communication, 2020; Katz et al., In Prep.).

In the planning phase, social assessments were conducted to understand the marine tenure and social perceptions of the region, and the boundaries of the MPAs were drawn as a joint effort between communities and NGOs (M. Erdmann, personal communication, 2020).

*“We want the communities to stand in front of us [the NGOs], not us in front but the community in front of us, and we can back up the community. The communities are willing to talk to the government [about their MPAs], and if there are some technical things, we can help explain those [to the government]. So, we [the NGOs] come together with the communities, and then we come together to meet with the local government, so the establishment of MPAs is not coming from TNC, or CI, but coming from the local communities. It’s their need, not our need” (L. Rumetna, personal communication, 2021).*

During the adoption phase, NGOs worked with communities, including traditional leaders, and government officials to facilitate establishment of the MPA Network. The MPAs were supported by communities, then adopted by the Raja Ampat Regency, the West Papua Provincial Government, and the Indonesian National Government (M. Erdmann, personal communication, 2020). The NGOs in Raja Ampat then worked closely with various government agencies and the local communities to implement these MPAs.

### 3.2.3 Access to Resources

Bridging organizations can connect communities to financial support and resources that would not have otherwise been present (Berdej & Armitage, 2016a; Berkes, 2009). In Raja Ampat, NGOs were able to contribute significant time and resources because of key long-term funders including the Packard Foundation and the Walton Family Foundation, who both contributed to the project for more than a decade (M. Erdmann, personal communication, 2020; Katz et al., In Prep.). Interviewees emphasized the importance of access to external funding: “This program is unusual, and a lot of the things that we can say, and the lessons that we have, and the role the NGOs played is only possible and only enabled because we had very significant funding on a long-term basis” (L. Katz, personal communication, 2021). Donors, which were brought in by TNC and CI, were a significant part of the planning, adoption, and management of MPA Network, and also contributed towards the above mentioned Blue Abadi Fund which now contributes a large amount of funding towards local and national NGOs in the Bird’s Head and Indonesia (M. Erdmann, personal communication, 2020; L. Katz, personal communication, 2021).

In Raja Ampat, CI and TNC further supplied the communities of Raja Ampat with physical resources for MPA management and community well-being. The NGOs, funded by the large donors previously mentioned, provided educational materials, building materials, and patrol boats for the patrol stations (M. Erdmann, personal communication, 2020; L. Rumetna, personal communication, 2021). Working with the unique social and ecological circumstances of each MPA community, additional resources were sometimes provided. For example, in the Mayalibit Bay MPA (Figure 3), the people living in the villages surrounding the bay were highly marginalized and needed dedicated resources supporting health and wellness. Beyond assisting with the MPA process, CI and TNC invested in building toilets and septic tanks, and supplying

the communities with improved access to medical care (M. Erdmann, personal communication, 2020; Katz et al., In Prep.).

### 3.2.4 Co-producing knowledge

Bridging organizations can co-produce knowledge with communities (Berkes, 2009; Hahn et al., 2006), which refers to a participatory approach to generating new knowledge between researchers, community members, and users, bringing together a variety of knowledge sources (McLeod et al., 2009; Nel et al., 2016). The communities in Raja Ampat practiced traditional *sasi* operating on an open and closed *sasi* timeline each year for certain parts of their territorial waters (M. Erdmann, personal communication, 2020). The open *sasi* period for the communities of Raja Ampat previously occurred for approximately one month every year, meaning for 11 months out of each year, harvesting invertebrates was off limits (closed *sasi*). However, for the open *sasi* period, communities were able to harvest invertebrates including trochus, sea cucumber, and lobster. In the Kawe region, community members would harvest these species each year and sell them to buyers for a profit. Shortly after the Kawe MPA was established, the NGOs organized a controlled extraction during the open *sasi* period where data on the species type, total weight, and price was collected for the first time, resulting in foundational data on these species. Allowing these animals to mature for the majority of the year aligned well with the biology of the invertebrates, however the NGOs and communities explored the idea of closing *sasi* for a longer period of time, giving species more time to spawn and reseed the waters.

To measure the impact of closing *sasi* for three years rather than one year, the NGOs and community members organized another controlled extraction and again recorded data on biomass and price. After three years, the organisms had higher biomass and sold for more than

they had previously, which again contributed to new data on these three species. This new data helped both NGOs and communities monitor and evaluate the health of these organisms over time. New knowledge is continuously being co-produced on these three types of invertebrates (M. Erdmann, personal communication, 2020).

### *3.2.5 Capacity Building, Education, and Training*

Bridging organizations can build local capacity by educating and training community members, a crucial component of creating capable leaders (Armitage et al., 2017). Long term sustainability and management of the network required a blend of 21st century MPA techniques and traditional management to strengthen the long-term sustainability and management. To build additional capacity of the local communities, the NGOs worked with the U.S. National Oceanic and Atmospheric Administration (NOAA) and the West Papuan Provincial government under the Ministry of Marine Affairs and Fisheries to create a comprehensive MPA Management Capacity Building Program (Katz et al., In Prep.). This program included modules and curriculum that focused on six key areas: MPA 101, Management Plan and Zoning, Sustainable Fisheries in MPAs, Sustainable Tourism in MPAs, Enforcement of the MPAs, and Stakeholder Engagement (Katz et al., In Prep.; M. Mongdong, personal communication, 2021). The program was originally used to educate the MPA managers that had been selected by the CI and TNC teams, with the intention that these managers would be able to pass along the information amongst community members. This led to widespread capacity building and facilitated both vertical and horizontal knowledge sharing, which is a key feature of bridging and effective governance (Berkes, 2009).

### *3.2.6 Exposure*

Bridging organizations can facilitate engagement between local and outside communities, providing exposure to new ideas and knowledge (Berkes, 2009). In Raja Ampat, there was two-

way exposure: communities of Raja Ampat were exposed to new political and educational experiences while the wider world became familiarized with Raja Ampat's globally important coral reef ecosystems. When CI and TNC were working on strategic planning for the region long-term sustainability of the network was incredibly important (M. Erdmann, personal communication, 2020; L. Katz, personal communication, 2021). Because NGOs knew they wouldn't be able to provide support in the region indefinitely, the NGOs focused efforts on creating a profitable and sustainable tourism destination that could be managed and run by local communities and regional government officials. To expose the magnificent biodiversity of the region, they published two different diving guidebooks: the first in 2009 (Jones & Shimlock, 2009), and the second in 2011 (Jones & Shimlock, 2011).

The exposure of Raja Ampat's coral reefs was far-reaching; tourism became lucrative for the Regency of Raja Ampat and exposure of the communities to the outside world was equally valuable. Many of the individuals that actively participated in the patrols continued working in conservation, including in the Raja Ampat region as MPA managers. Others have pursued graduate degrees outside of Indonesia or work in Parliament (M. Erdmann, personal communication, 2020).

### *3.2.7 Knowledge Diversity*

Bridging organizations can aid in linking various knowledge and resource systems to facilitate two-way learning (Berdej and Armitage, 2016a; Berkes, 2009; Folke et al., 2005). These organizations can facilitate restoration of traditional knowledge systems, access to existing knowledge, and produce new knowledge with and for communities (Berkes, 2009; Schultz et al., 2007). In Raja Ampat, the NGOs focused in part on working with communities to revitalize customary management and traditional law (M. Erdmann, personal communication, 2020; Katz



et al., In Prep.). The traditional community, or *adat community*, holds a great deal of power in decision making, and with the Special Autonomy Law passing, the NGOs saw an opportunity to investigate prosecuting illegal fishermen under traditional *adat* law rather than the formal legal system (M. Erdmann, personal communication, 2020; M. Mongdong, personal communication, 2021). In doing so the NGOs reinforced the importance of their traditional knowledge system and worked to empower communities and governments in different ways of thinking. Further, NGOs brought training and knowledge regarding 21st century ecosystem-based management practices which could be blended with *sasi* to strengthen long-term sustainability and management.

### 3.2.8 Adaptation

With increased connections to various networks and ways of thinking, bridging organizations can also aid in adaptation and improve resiliency when unexpected situations arise (Armitage et al., 2017; Berkes, 2009; Sternlieb et al., 2013). When Indonesia was decentralized by Law No. 22/1999, marine resources came under the jurisdiction of the regency, so the MPA boundaries were created with the regency guidelines (M. Erdmann, personal communication, 2020). In 2014, by Law No. 23/2014, the government recentralized the jurisdiction back to the Provincial level, creating a rift between the regency and provincial levels, and confusion amongst the patrol teams (S. Vulpas, personal communication, 2021). The NGOs, given their connections to both the regency and provincial governments and outside consultants, were able to help alleviate the situation:

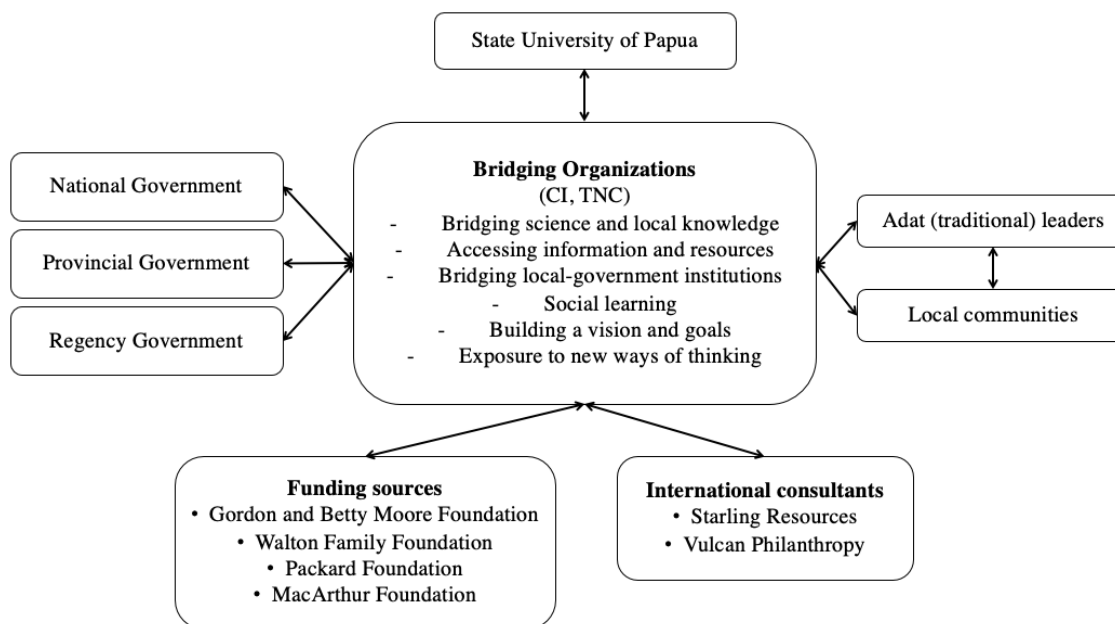
*“In 2016, basically the whip cracked about this transfer, and we had to get very serious. We had been working in the background, speaking with the Provincial level already, but now we had to massively ramp the whole thing up. So, we did,*

*and through a lot of work, TNC put a huge amount of effort in this, Starling [Consulting] put a bunch of effort into it, and we managed to get the regulations in place to transfer the whole [MPA] unit over to the province” (M. Erdmann, personal communication, 2020).*

Adaptation was not only facilitated in times of change, but also in other ways throughout the Raja Ampat MPA process. For example, NGOs worked with communities to adapt to each individual situation unique in each area and MPA was developed and adopted (see, e.g., Table 1).

### *3.2.9 Linking across scales and levels*

Connecting relevant stakeholders can be one of the most effective bridging strategies for fostering better conservation outcomes (Berkes, 2007b). NGOs in the Raja Ampat MPA Network facilitated connections between a wide variety of stakeholders in government, science, education, and private sectors, forming linkages between at least 12 different institutions (Figure 6). This included connections between multiple levels of government and between communities and government as well as direct connections to funding sources, international consultants, and the State University of Papua. These linkages increased knowledge diversity, provided access to alternative funding sources, and built capacity in communities. The connections facilitated by the NGOs specifically facilitated co-management, which refers to sharing of power and responsibility between government and local resource users, but typical bridging organization connections can also include other broader networks (Berkes 2015). Co-management between the multiple levels of government and local communities facilitated by NGOs, and the support by the other linked institutions (Figure 6), has been clearly demonstrated in the case of Raja Ampat.



**Figure 6.** Key connections between institutions established by bridging organizations (NGOs CI and TNC) in the planning, adoption, and management of the Raja Ampat MPA Network. Core bridging actions are listed in the center of the figure.

### 3.3 Key Projects and Initiatives

Interviewees identified specific initiatives that occurred throughout the process of the MPA network, many of which involved multiple bridging tools. Three of these key initiatives are: the Tourism Entrance Fee System, the Raja Ampat MPA Patrol System, and the Blue Abadi Fund, each of which are discussed in detail below.

#### 3.3.1 Tourism Entrance Fee System

Bridging organizations have been instrumental in helping communities establish and build capacity towards ecotourism initiatives, by building capacity, empowering communities, and fostering improved collaboration (e.g., in the forests of Paraguay, Jamal et al., 2007; and the MPAs of Bali, Berdej & Armitage, 2016b, 2016a). Together, TNC and CI employed various bridging tools – including connections, access to resources, and advising – to build a sustainable

tourism industry and associated entrance fee system which employed local community members and contributed to the newly established economy. Focusing the economic development plan on tourism, rather than extractive industries like mining and forestry, was advised to local government officials as a way to sustainably contribute to the economy:

*“We said, look, [mining and forestry is your own business but] the reality is that it’s very unsustainable. And if you look everywhere else in Papua where that’s going on, the communities aren’t really happy about that. And, by contrast, the asset that you have not recognized is that this is potentially one of the world’s greatest ecotourism destinations, this place is so spectacularly beautiful, that you just can’t imagine what you have and that if you manage that properly the value will only grow over time” (M. Erdmann, personal communication, 2020).*

By 2004, the regency implemented an economic development plan focused on tourism and sustainable fisheries. The tourism industry and associated entrance fee system for Raja Ampat was modelled off of a tourism system in Bunaken, Sulawesi and adapted to fit within the Raja Ampat communities’ norms and traditions. The entrance fee system was officially launched in 2007 and in the first year of operation, the fee system generated \$74,000 USD (M. Erdmann, personal communication, 2020). While revenues from the tourism entrance fee were originally set to cover costs of the patrol system, the revenues in the first year were not sufficient. Thus, initially the cost of the patrols was covered by the NGOs, and the money generated from the fee system in the first year went directly to the community. To decide where the money should be dedicated, the NGOs consulted a small community stakeholder group, who illustrated the high rates of infant mortality and malnutrition in the region. The revenues were then put directly back

into the communities by implementing prenatal and postnatal health clinics in all Raja Ampat villages (M. Erdmann, personal communication, 2020; Katz et al., In Prep.).

After the first year, enough revenues were generated by the entrance fee system to support the patrol system. By 2012, the tourism entrance fees reached \$370,000 USD, and hit \$2 million USD by 2019 (M. Erdmann, personal communication, 2020; Katz et al., In Prep.). The fees are now supporting the Raja Ampat MPA Patrol system, and the Blue Abadi Fund, both of which are discussed in Sections 3.3.2 and 3.3.3.

### *3.3.2 Raja Ampat MPA Patrol System*

Bridging organizations can act as a conduit between local communities and various layers of government (Berdej & Armitage, 2016b; Berkes, 2009), and can generate innovative approaches to bringing various organizations together (Brown, 1991). Together, the NGOs worked with communities, government officials, and various stakeholders to create a patrol system for the network, and in doing so, utilized bridging tools of capacity building, innovation, and linkages/connections.

In 2008, directly following the adoption of the Raja Ampat MPA Network, a community-based patrol system was deployed in each of the MPAs. This patrol system was facilitated by the NGOs in collaboration with local communities to be eventually transferred to the government. To build capacity and engagement in preparation of the transfer, the NGOs implemented a bottom-up, rolling patrol system based off of a successful program in Bunaken National Park (M. Erdmann, personal communication, 2020; M. Mongdong, personal communication, 2021). Every two weeks, a new group of community members would visit the patrol post and work with the few permanent staff staged at each post. Patrol boats were typically composed of two law enforcement officers and a few individuals from different villages. This system allowed almost

every community member in each village to experience two weeks at the patrol post with the goal of building community amongst individuals and distributing resources equitably. This empowered local communities to feel ownership and pride over their MPAs, integrated communities with local government officials, and built capacity for the future (M. Erdmann, personal communication, 2020; Katz et al., In Prep.; M. Mongdong, personal communication, 2021).

Management of the patrols was transitioned in 2012 to the Raja Ampat Regency government as the *Raja Ampat MPA Network Management Authority* (known as the UPTD) (M. Erdmann, personal communication, 2020; Katz et al., In Prep.). After a few years at the regency level, the NGOs sought out a legal designation that would allow the patrols to be as financially autonomous as possible and ultimately took an innovative approach to acquiring a special public service status for the UPTD. This status – known as a *Regional Public Service Agency Regional Technical Implementing Unit* (referred to as BLUD) status was successfully granted to the management authority in 2014. This BLUD title and status was traditionally used for hospitals in Indonesia, and allowed them to receive grants and manage revenues separate from the central government. The UPTD/BLUD now works in collaboration with local law enforcement and the Indonesian Navy to patrol all of the Raja Ampat MPAs (BLUD UPTD, 2020).

*“...it's quite a profoundly different way of doing things. And it was the first time this has ever been done in Indonesia. And in fact, I don't even know if it's been replicated, yet we're in the midst of replicating it for the other parts of the Bird's Head” (M. Erdmann, personal communication, 2020).*

### 3.3.3 Blue Abadi Fund

Bridging organizations often have access to large funding sources from international donors (Berkes, 2009). Planning for a sustainable trust fund in the Bird's Head Seascape (the broader region encompassing Raja Ampat) began shortly after NGOs began working in the region. The goal was to implement a fund that could support the conservation initiatives for the entirety of the Bird's Head Seascape, which included the Raja Ampat MPA network (M. Erdmann, personal communication, 2020; L. Katz, personal communication, 2021). In doing so, CI and TNC employed bridging tools related to financial resources, linkages and connections, innovation, and capacity building. The NGOs working in the Bird's Head Seascape used connections to international donors and government entities to establish a fund that was self-financing, could fill funding gaps in the region, and would avoid a long-term dependency on international philanthropy (MPA News, 2017).

In 2015, a preparation grant for the Blue Abadi Fund was approved by the Global Environment Facility and in 2017 the project was approved for implementation (Global Environment Facility, 2021). The Blue Abadi was designed by CI's Global Conservation Fund, TNC, WWF-Indonesia, and local consultant Starling Resources, and established with a few large funders and partners, including the three main NGOs working in the Bird's Head Seascape, Global Environment Facility, the Walton Family Foundation, and the MacArthur Foundation (Bird's Head Seascape, 2020). Administration of the fund is executed by the Indonesian Biodiversity Foundation and supported by the Ministry of Marine Affairs and Fisheries and CI-Indonesia.

The two main objectives of the Blue Abadi were to: 1) support the effective co-management and enforcement of the Bird's Head Seascape network of 12 MPAs (which includes the seven in the Raja Ampat network); and 2) mobilize and empower a network of local NGOs

in the Bird's Head Seascape to complement government-mandated conservation efforts through: environmental education and community outreach; improved monitoring; sustainable development of coastal livelihoods; and stronger networking, coordination and capacity development of Seascape stakeholders (Bird's Head Seascape, 2020).

*“One of the really important things that we were keen on is that we wanted this management unit to be set up in a way that it could be as financially sustainable as we could make it and ... as buffered from governmental vagaries as we possibly could, [which] meant ... we were going to launch a Conservation Trust Fund” (M. Erdmann, personal communication, 2020).*

Those involved in the creation of the trust fund also ensured that large international NGOs like CI and TNC were unable to receive funding from the Blue Abadi, and that grants were focused on local and domestic NGOs. A unique aspect of the Blue Abadi Fund is a dual funding track; one primary grant track and a smaller granting track called ‘*inovasi*’, which funds innovative projects by local NGOs (M. Erdmann, personal communication, 2020; L. Katz, personal communication, 2021), with both tracks operating on an annual basis (MPA News, 2017). In February of 2017, the government of Indonesia, CI, TNC, and WWF initiated the first round of funding for the Blue Abadi. Funding has been ongoing since then. When the trust fund reaches its full capitalization, it will be self-sustaining and will rank among the largest conservation trust funds in the world at \$37 million (Bird's Head Seascape, 2020; MPA News, 2017).

### 3.4 Social-ecological outcomes

Studies have suggested that the Raja Ampat MPA Network is both socially and ecologically effective (Ban et al., 2017; Leisher et al., 2012; Purwanto et al., 2021). By 2010,



initial assessments of MPA familiarity and trust showed that 93% of respondents felt an MPA would be beneficial for their family, and 71% of respondents acknowledged that cyanide fishing, bomb fishing and fish poisoning is illegal (Leisher et al., 2012). Over the period from 2012 through 2019, illegal fishing and destructive fishing decreased overall with the exception of the North Raja Ampat islands which had had an overall slight increase in destructive fishing only. Biomass increased in the Northern Raja Ampat islands in both no-take zones and sustainable use zones, and Southern Raja Ampat islands saw increases in sustainable use zones (Purwanto et al., 2021). Out of the studied social objectives, tourism increased in Raja Ampat as a whole from 2007 to 2019, resulting in higher funding for the area's tourism entrance fee system, patrol system, and Blue Abadi Trust Fund (Purwanto et al., 2021). In part due to the positive social and ecological outcomes of the original Raja Ampat MPA network, three new MPAs have been added to the Network including an expansion to Kofiau (now named Kofiau and Boo Islands MPA), the Fam Islands MPA, and the North Misool MPA.

#### 4.0 Conclusion and Future Implications

This case study of bridging organizations in Raja Ampat presents a unique system where international NGOs were able to work with a newly formed government that regained control over their natural resources and could build upon their traditions of customary natural resource management. Both CI and TNC worked with the communities to reestablish their *sasi* traditions, helped to emphasize the importance of traditional adat law, and facilitated local communities towards building an MPA grounded in *sasi* and supported by 21st century MPA theory. This process resulted in a community accepted MPA Network that fostered collaboration and ownership and led to positive ecological outcomes.

The role of the bridging organizations changed over time from a more active role in the planning phase to an advisory role in the management phase. As of November 2020, both CI and TNC are still working as bridging organizations in the Raja Ampat region. The Covid-19 pandemic has heavily impacted the MPA Network, and resulted in layoffs, decreased revenues from the tourism entrance fee system, and the re-introduction of external threats. CI was able to help lessen the impact by finding emergency funding for the BLUD patrol system through one of their past donors. This demonstrates bridging organization's ability to continuously support conservation development projects through their established linkages and connections and bridging roles and demonstrates how these organizations can lessen the impacts of unexpected changes.

This research aims to contribute to a growing body of literature that demonstrates the important role that NGOs can play as bridging organizations to foster socially and ecologically effective MPAs. Through this case study, we demonstrated how both CI and TNC acted as bridging organizations when working with communities in the planning, adoption, and

management of the Raja Ampat MPA Network. By viewing the coastal environment through a social-ecological lens, bridging organizations can facilitate effective MPA Networks that benefit ecosystems and livelihoods alike.

## 5.0 References

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## 6.0 Appendix

**Table A1:** Codebook from NVivo. Table illustrating codes and associated bridging strategies and definitions as used in NVivo.

	<b>Bridging Strategy</b>	<b>Definition</b>
1	BRIDGING STRATEGIES\concrete actions	Concrete actions conducted by NGOs to facilitate bridging
2	BRIDGING STRATEGIES\concrete actions\B-access\$	Use when NGOs provide funding or access to funding or create funding mechanisms
3	BRIDGING STRATEGIES\concrete actions\B-accessR	Use when NGOs provide physical resources to the communities including boats, building materials, educational materials
4	BRIDGING STRATEGIES\concrete actions\B-adapt	Use adapt any time the NGOs are helping to adapt to changing Network situations and individual MPA situations, as well as advise MPA leaders on how to adapt
5	BRIDGING STRATEGIES\concrete actions\B-advising	Use advising when the NGO employees give local communities advice on how to proceed forward - can be socially, biologically, etc.
6	BRIDGING STRATEGIES\concrete actions\B-advising\B-advocate	Use advising when the NGO employees give local communities advice on how to proceed forward - can be socially, biologically, etc.
7	BRIDGING STRATEGIES\concrete actions\B-BLUD_patrols	Use BLUD when interviewees discuss the importance of setting up the BLUD in terms of bridging only. Not for background information - but the ideas behind setting up the BLUD and the implementation and management of the BLUD.
8	BRIDGING STRATEGIES\concrete actions\B-capbuild	Use when NGOs emphasize capacity building - the sum of efforts needed to nurture, improve, and use the skills and capabilities of people and institutions at all levels, toward a particular goal, e.g., participatory management.
9	BRIDGING STRATEGIES\concrete actions\B-capbuild\B-investment in people	Use this when NGOs make an investment in the people and local communities. Can include financial investment, time investment, all alluding to putting resources behind individuals to ultimately build capacity.

10	BRIDGING STRATEGIES\concrete actions\B-community engagement	Use when NGOs explicitly interact with the communities through conversations, engaged listening, focus group discussions,
11	BRIDGING STRATEGIES\concrete actions\B-community engagement\B-cadre	Use this code when the interviewees discuss the CCO
12	BRIDGING STRATEGIES\concrete actions\B-community engagement\B-conversations	Use this code when the NGOs are holding conversations with the local communities to understand their perspectives
13	BRIDGING STRATEGIES\concrete actions\B-community engagement\B-creative communication	Use this code when the NGOs work to find new ways to allow communities to communicate with each other
14	BRIDGING STRATEGIES\concrete actions\B-community engagement\B-FGDs	Use this code any time the NGOs hold focus group discussions to improve communication with communities
15	BRIDGING STRATEGIES\concrete actions\B-community engagement\B-increased communication	Improved or increased communication by NGOs to communities AND within communities
16	BRIDGING STRATEGIES\concrete actions\B-comT	Use when NGOs take steps to improve trust and communication within the communities
17	BRIDGING STRATEGIES\concrete actions\B-coproduction	Use this code when the NGOs are working with the local communities or stakeholders to gather and report on 'new knowledge' - can be social or biological
18	BRIDGING STRATEGIES\concrete actions\B-coproduction\Bpublications	Use this code when the NGOs help to raise awareness of threats, issues, problems, solutions, etc. in the network through published literature
19	BRIDGING STRATEGIES\concrete actions\access\$\B-donors	Use this code when donors are discussed in terms of funding the EBM project, for CI, TNC, and WWF (Not CI/TNC/WWF money)
20	BRIDGING STRATEGIES\concrete actions/capbuild\B-education	Use this code when NGOs are educating and training communities and stakeholders on the importance of the biological and social dimensions of the seascape.
21	BRIDGING STRATEGIES\concrete actions\B-education\B-raising awareness	Use raising awareness when NGOs help communities become aware of their resources

22	BRIDGING STRATEGIES\concrete actions\B-education\B-repetition	Use repetition when NGOs focus on repeating the importance of conservation through conversations, campaigns, etc.
23	BRIDGING STRATEGIES\concrete actions\B-education\B-sciLK	Use when NGOs work to merge 21st century MPA theory with traditional practices like <i>sasi</i>
24	BRIDGING STRATEGIES\concrete actions\B-education\B-training	Use this code when the NGOs provide training to local communities
25	BRIDGING STRATEGIES\concrete actions\B-exposure	Use this code when the NGOs expose the communities and ecosystems of Raja Ampat to the outside world. Can be: exposure to new ideas, to the scientific process, etc.
26	BRIDGING STRATEGIES\concrete actions\B-innovate	Use this code when the NGOs work within the confines of the system to create new policies, approaches, etc. to fit the unique problems of the Raja Ampat MPA Network
27	BRIDGING STRATEGIES\concrete actions\B-knowledge development	Use this code when NGOs gather information relating to the social or biological dimensions of the area. Includes all social and biological assessments, and any time interviewees explicitly mention understanding the social and biological context.
28	BRIDGING STRATEGIES\concrete actions\B-knowledge development\B-community willingness	Use this code when NGOs mention the importance of working with communities who are willing to manage and accepting of the MPAs
29	BRIDGING STRATEGIES\concrete actions\B-knowledge development\B-knowbio	Use this code when the NGOs make a clear attempt to understand the biological situation of the region. Can include biological surveys, monitoring, reporting, or commenting on the biodiversity of the region (positively or negatively)
30	BRIDGING STRATEGIES\concrete actions\B-knowledge development\B-knowG&C	Use this code when any of the NGOs make a clear attempt to understand the nuances of the gov't and community structure. Ex. <i>so when whenever we do conservation work it's extremely important that we work not only with the formal governance structure, but also with the community or the traditional</i>

		<i>leaders and if you try to make me map how those work</i>
31	BRIDGING STRATEGIES\concrete actions\B-knowledge developement\B-knowledge sharing	Use this to demonstrate the sharing of knowledge across the network - high level result code
32	BRIDGING STRATEGIES\concrete actions\B-knowledge developement\B-knowSD	Use when NGOs use surveys or interviews or obtain knowledge that ultimately leads to social understanding of the system Ex. KAP survey
33	BRIDGING STRATEGIES\concrete actions\B-knowledge developement\B-legislation	Use this code when the NGOs discuss their ability to create or work through legislation with the government and communities
34	BRIDGING STRATEGIES\concrete actions\B-knowledge developement\B-listening	Use this code when NGOs prioritize listening and hearing communities
35	BRIDGING STRATEGIES\concrete actions\B-knowledge developement\B-ownership	Use this code when ownership is discussed as the basis for protection and an understanding of the social dimensions
36	BRIDGING STRATEGIES\concrete actions\B-knowledge developement\B-religMPA	Use this code when NGOs use the religious variables of the region to work with communities to bridge local faith and conservation
37	BRIDGING STRATEGIES\concrete actions\B-knowledge developement\B-sasi	Use when sasi is explicitly mentioned as playing an important role
38	BRIDGING STRATEGIES\concrete actions\B-linkages\B-connect	Use linkages when NGOs can connect the local communities to external organizations. ex. Starling resources, NOAA, State University of Papua, other local NGOs, Vulcan, etc.
39	BRIDGING STRATEGIES\concrete actions\B-linkages\B-faccollab	Use when NGOs facilitate collaboration between communities and governments or any other important stakeholders
40	BRIDGING STRATEGIES\concrete actions\B-linkages\B-link community and government	Use when linkages between communities and governments are created - communities and government can include work with stakeholders, but government is not a stakeholder

41	BRIDGING STRATEGIES\concrete actions\B-linkages\B-link communities	This code should be used when the NGOs make an attempt to link communities together. This should be used when communities are linked through new channels (implementing radio so communities can talk to one another
42	BRIDGING STRATEGIES\concrete actions\B-linkages\B-linkStake	Bridging action - linking stakeholders across scales and levels
43	BRIDGING STRATEGIES\concrete actions\B-linkages\B-local-gov	Use when NGOs enable local communities to connect with government entities - NOT TRUST
44	BRIDGING STRATEGIES\concrete actions\B-planning	Use planning when the interviewees discuss the planning process that went into creating and establishing the MPAs
45	BRIDGING STRATEGIES\concrete actions\B-planning\B-alternative economy	Use this code when NGOs work to find new ways for communities to make an income
46	BRIDGING STRATEGIES\concrete actions\B-pride	Use this code when NGOs work to empower local communities in the importance of their region and have pride in their MPAs
47	BRIDGING STRATEGIES\concrete actions\B-pride\B-empower	Use empower any time the NGOs empower the local communities in their decisions
48	BRIDGING STRATEGIES\concrete actions\Bsurveys_monitoring\knowledge development\B-biological survey	Use this code when NGOs conduct or discuss conducting any survey relating to biodiversity
49	BRIDGING STRATEGIES\concrete actions\B-surveys_monitoring\knowledge development\B-monitoring	Use this code when NGOs discuss monitoring and evaluation for biological and/or social monitoring.
40	BRIDGING STRATEGIES\concrete actions\Bsurveys_monitoring\knowledge development\B-social survey	Use this code when NGOs conduct or discuss conducting any survey relating to socioeconomic status, marine tenure, or any other social survey



**Table A2.** Individuals interviewed for this case study. Dr. Mark Erdmann served as my key informant.

<b>Name</b>	<b>Organization</b>	<b>Role</b>
Dr. Mark Erdmann (Key Informant)	CI	Vice President of CI's Asia-Pacific marine programs
Susie Vulpas	CI	Marine Program Coordinator
Laure Katz	CI	Indonesia Marine Program Coordinator, Seascape Management Advisor
Meity Mongdong	CI	Community and Government Coordinator
Sangeeta Mangubhai	TNC	Portfolio Manager for Bird's Head Seascape
Lukas Rumetna	TNC	Outreach Coordinator for Raja Ampat