

# Reimagining conservation practice: Indigenous self-determination and collaboration in Papua New Guinea

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**Abstract** Here we describe a 14-year collaboration in New Ireland, Papua New Guinea, between an Indigenous NGO, Indigenous scientists and international researchers. New Ireland is a marine province in the Western Pacific region where most residents depend on fishing, marine gleaning and small-scale gardening for their livelihoods. Ailan Awareness is a locally founded and managed NGO that focuses on the strengthening of Indigenous sovereignty regarding biological, cultural and spiritual diversity as well as fostering Indigenous epistemology practices and strengthening biocultural diversity. In partnership with anthropological researchers, Ailan Awareness has designed an approach to marine conservation informed by the growing field of decolonial research practices. By working to empower coastal communities to make decisions about their marine and cultural resources using a mix of Indigenous, anthropological and scientific methods and giving primacy to strengthening Indigenous modes of knowledge production and the role of community Elders, Ailan Awareness addresses a major gap in the efforts of the national government and international NGOs: giving the people most directly affected by declining biodiversity and loss of tradition the support and tools required to design and carry out the strengthening of both biological diversity and traditional social practices. In this paper we describe the methodology

used by Ailan Awareness and the history of collaboration that resulted in these methods.

**Keywords** Biocultural diversity, collaboration, Indigenous epistemology, Indigenous knowledge, marine conservation, Papua New Guinea, Western Pacific

## Introduction

Anthropogenic effects on tropical reef systems are profound, widespread and rapid (Hughes et al., 2017). Approximately 33% of reef-building coral species are at an elevated risk of extinction (Carpenter et al., 2008). Recurrent mass bleaching events are increasing (Hughes et al., 2018) and coral reef cover declined by 50% globally during 1957–2007 (Eddy et al., 2021). The anthropogenic factors driving this include rapid industrialization in coastal areas, global overconsumption of marine products, unregulated international fishing fleets, increased runoff from industrial agriculture, unsustainable logging and mining practices near marine areas, global climate change and the development of destructive and efficient local fishing practices that allow people to meet increasing market demands for marine products and increasing local needs for food (Carpenter et al., 2008; Hughes et al., 2018; Duarte et al., 2020; Dietzel et al., 2021). Although there are non-anthropogenic drivers of coral reef system change such as hurricanes, tidal emersions and altered rainfall from El Niño patterns, reefs tend to recover from these periodic natural traumas, whereas the effects of anthropogenic factors often push systems past the point of recovery.

Papua New Guinea is located in the biologically diverse ecoregion that international conservation organizations have termed the Coral Triangle, which also includes Brunei, Indonesia, Malaysia, the Philippines, the Solomon Islands and Timor-Leste (Hughes et al., 2002). Species richness values for reef fish, corals, bryopsidale macroalgae and multiple groups of gastropods and crustaceans are 2–50 times higher in this region compared to other sites across the Indian and Pacific oceans, a distribution pattern that has the appearance of a bullseye when mapped (Bellwood & Meyer, 2009). The marine environments surrounding Papua New Guinea are some of the healthiest and richest

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Received 19 January 2022. Revision requested 18 May 2022.

Accepted 16 August 2022. First published online 14 March 2023.

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in this region (Huber, 1994), being home to over 1,600 species of reef fish alone (Roberts et al., 2002; Allen, 2007). More than 430 species of corals and 954 species of molluscs have been documented in the southern provinces of Papua New Guinea (Allen et al., 2003), and the north-east coast is a well-documented hotspot for marine benthic invertebrates, where multiple taxa reach their global species richness maxima (Kohn, 2001). Although regional studies of the Coral Triangle estimate that the centre of global reef species richness is probably between north-eastern Indonesia and the Philippines, Papua New Guinea has yet to suffer from the effects of overfishing, industrialization and extensive commercial agricultural runoff that have destroyed nearly 25% of the reefs in neighbouring countries such as the Philippines and Indonesia (Allen, 2007; Asaad et al., 2018). On the islands of New Ireland Province (Fig. 1), one of the 22 provinces of Papua New Guinea, 75% of the population lives adjacent to and relies upon the marine environment and coral reef systems for their livelihood. This pattern of habitation fits with the broader region of Oceania, where 50–90% of people's dietary protein needs are met through consumption of marine species (Bell et al., 2009). New Ireland Province has 243,000 residents, 99% of whom are Indigenous Peoples.

Although Indigenous Peoples consume only 2% of the global yearly commercial fisheries catch, per capita consumption of marine species in Indigenous communities is 15 times higher than in non-Indigenous communities (Cisneros-Montemayor et al., 2016). A complex array of

forces are driving fisheries declines globally, but locally the health of reefs and marine species is crucial for Indigenous life. To date, the dominant methodology for attempting to achieve sustainable harvests for Indigenous communities and for maintaining reef health, both internationally and in Papua New Guinea, has been the creation of marine protected areas (IUCN, 2018; Carr et al., 2019).

Here we, a group of Indigenous scientists from both New Ireland and from other areas in Papua New Guinea, Indigenous Elders from New Ireland and international academics, describe an ongoing collaboration between Indigenous scientists and Elders from New Ireland with internationally based anthropologists to demonstrate an alternative methodology for the maintenance of marine system health and local livelihood sustainability. The methodology presented here is grounded in the traditional cultural practices of the region and focuses on the co-production of knowledge, and the valuing of Indigenous modes of relationality and temporality. Further, it is based on an understanding that for some Indigenous Peoples working towards marine system health, measures of success such as the strength of local spiritual practices and ethical multi-generational exchanges are as important as ecological and socio-economic measures. It grows out of work conducted by Ailan Awareness, an NGO in Papua New Guinea. In Melanesian Tok Pisin, the creole language spoken across Papua New Guinea, a country with over 800 Indigenous languages, *ailan* means island. This paper could appear unconventional in voice, style and presentation of



FIG. 1 New Ireland Province of Papua New Guinea.

data to some readers of this journal. Part of our argument in what follows is that the day-to-day practices that make up the rhythm of life in Indigenous places are important situations for generating sites of conservation-related co-production of knowledge. This means that some of our data are examples of these practices. Additionally, because we rely on the Oceania-wide methodology of storytelling as a form of knowledge-making practice (Tengan, 2008; Rogers, 2018; Tecun et al., 2018; Lilomaiava-Doktor, 2020), our narrative takes the form of a story.

### Origin stories

The collaboration we describe began in 2007 when two of the authors, JA and PW, were introduced to each other by the principal of the National Fisheries College. As of that year JA had been directing Ailan Awareness, which for 14 years, since its inception, had been focused on facilitating community-based resource management workshops for large international NGOs. He, Miller Aini and MLP co-founded Ailan Awareness in 1993 after JA had worked for the Papua New Guinea Fisheries Department for a decade, conducting assessments of local fish stocks and facilitating community-based resource management awareness campaigns for national and international organizations. The three believed that community-based resource management could be more effective if awareness campaigns were designed and run by local Indigenous people (Aini & West, 2014; West & Aini, 2021).

During 1993–2007 they built the NGO and worked towards local marine conservation using models provided by the national government and external organizations. By 2007, however, JA and MLP had become frustrated with the mismatch between external conservation goals and the multifaceted nature of local needs. In 2007, PW, who had been doing anthropological research on conservation in the Highlands of Papua New Guinea since 1997 (West, 2006), visited New Ireland. At the time, most of her scholarship focused on critiquing conservation and development from an anthropological standpoint. She had argued that many external conservation ideologies and practices failed to work to conserve species or habitats in Papua New Guinea. Rather, her research had shown that they often exacerbated existing social conflicts in ways that were detrimental to the original goals of the conservation organizations (West, 2003, 2006). Since 2005, she had also been working with the Papua New Guinea Institute of Biological Research to try to shift the conditions of terrestrial conservation in the country by supporting more people from Papua New Guinea to study and earn degrees in ecology and environmental anthropology (West & Kale, 2015; West, 2016, pp. 63–86).

In 2007, Ailan Awareness maintained a small office next door to the offices of a large international NGO in a building owned by the National Fisheries Authority. Each day, when

the heat in the cinderblock building became unbearable, after a morning of e-mails, staff meetings and report writing, the entire Ailan Awareness staff would move their office chairs outside and sit under the building's awning. Here they would drink coffee, chew betelnut, smoke cigarettes and talk with people as they arrived at the wharf to drop their catch at the small adjacent fish factory, to refuel the open-water skiffs they used to travel between islands, to visit the National Fisheries Authority offices located nearby or to wait for relatives to collect them from the dock. The first introduction of PW to Ailan Awareness was when a non-Papua New Guinean conservation ecologist of European descent who worked at the international NGO complained about it to her. The NGO worker found this practice to be an example of laziness, of local NGO failure and of the need for capacity-building in the conservation NGO sector in Papua New Guinea (West, 2016; Douglas-Jones & Shaffner, 2021; Macintyre, 2021). What went unnoticed by this NGO worker was that what looked like laziness, dereliction of duty and leisure was actually the Ailan Awareness staff talking with islanders about fish catch, conditions at sea, reef health, community health and needs, and a range of other topics pertinent to marine conservation. The conservation ecologist did not recognize that these conversations were a key part of the local methodology for knowledge production. PW noticed this and, after meeting JA, began a conversation with him about conservation practice in the province and the role that international NGOs played in it. Based on this initial conversation and several more that took place in 2007, they produced a draft of a written plan for what conservation could look like when driven by community interests and needs, Indigenous knowledge-making practices, science-based research on the health of marine biodiversity and reef ecosystems, the growing field of decolonial research practices and anthropological attention to in situ epistemology and ontology. Since 2008, they have worked together with people from 22 villages around New Ireland and an increasing network of Elders from across the region to bring this shared vision into reality through the creation of Indigenous epistemology-based marine resource management plans or *Vala* areas (Aini & West, 2014).

In Tungak, the Indigenous language spoken by the founders of Ailan Awareness, *Vala* describes a form of socio-spiritual ecological practice whereby people with deep ritual knowledge and experience call on that knowledge, their relationships with their ancestors, their ecological knowledge and their relationships with certain marine species in the work they do to create favourable conditions on a reef. These favourable conditions are both material, insofar as they increase the abundance of desirable and useful species, and social, insofar as they smooth relations between living persons, spirits and ancestors. This smoothing of relations maintains the health of people and the environment by

acknowledging the ongoing social relationships between the living and the dead. The practice of *Vala* is both this socio-spiritual practice and the practice of placing a marker made of the branch of a tree onto the reef to indicate to others that the area has been ritually enhanced and protected and that there is a taboo against using it. Because of the socio-spiritual work of *Vala*, anyone who fails to adhere to the restrictions that were placed on the reef by the ritual expert is in danger of falling ill or dying. Areas or places become *Vala* areas through this combination of practice, demarcation and the local understanding that an area has been 'worked on' by a ritual expert. Although *Vala* is a Tungak term, the process described above and in what follows transcends different language groups in New Ireland Province and is understood widely.

Indigenous epistemology-based marine resource management plans are custom-made through a collaborative community effort, each designed uniquely to address the problems identified by the community, with near-unanimous approval of solutions. These plans draw on a combination of the *Vala* practices described above and research conducted by Ailan Awareness staff and outside researchers. Ailan Awareness uses a comprehensive multi-stage process to ensure that Indigenous epistemology-based marine resource management plans and *Vala* areas will effectively protect the marine ecosystem, the people who use it and the cultural traditions that allowed the dynamic between the two to flourish. This process ensures the feasibility and sustainability of the measures for the future. We next describe the socio-ecological context in which Ailan Awareness works today, the methods they engage to create *Vala* areas and the ethical guidelines to which they adhere.

### The socio-ecological context

Some of the greatest concerns facing marine biodiversity in New Ireland and Papua New Guinea in general include the overexploitation of marine fisheries by commercial and international fishing fleets, pollution, climate change and the development of industries such as logging and oil palm cultivation (Government of Papua New Guinea, 2015). Overfishing by small-scale, artisanal fisheries is also a growing concern: fisheries data show that parts of Papua New Guinea with larger human populations have marine habitats with lower species richness, and this is more marked for fished species than non-fished species (Drew et al., 2015). A long-term study on Karkar Island, just off the mainland north-east coast of Papua New Guinea in the southern Bismarck Sea, showed fish stocks declining consistently over 16 years despite the implementation of rotational fisheries closures (Cinner et al., 2019). Recent counts of catch per unit effort of fisheries in New Ireland show that catch rates are lower than in similar fisheries in the Pacific, suggesting that overfishing pressure could already be affecting

the availability of fish (Booth, 2019). Large indicator species such as sharks and rays and large fish such as groupers are at particular risk as fishermen preferentially select larger fishes (Drew et al., 2015). Larger-scale fisheries to the south of Papua New Guinea also threaten sharks and rays as bycatch of non-specific prawn fishing gear (Baje et al., 2021). Furthermore, studies show that changes in terrestrial habitats have serious impacts on the health of marine habitats (Huber, 1994). For example, the presence of upstream oil palm plantations, even those that are said to be sustainably managed, have degraded coral reefs in New Ireland, putting up to one-third of corals in Papua New Guinea in danger as oil palm development expands (Tulloch et al., 2016). In addition, the widespread practice in the regional logging industry of dredging coral reefs to open up shipping ports and obtain logging road construction materials has damaged reefs locally. Finally, the effects of climate change on the ocean and atmosphere will continue to harm reefs, potentially causing the coral reef fisheries in Papua New Guinea to decline by 20% by 2050 (Bell et al., 2013). Declines of this magnitude, combined with a growing population, could mean that even well-managed fisheries will soon be unable to feed the people of Papua New Guinea (Bell et al., 2013).

Despite a lack of strong, cohesive national policy for marine conservation, international NGOs and other outsider groups have advocated for fisheries management in Papua New Guinea through the use of marine protected areas (Foale & Manele, 2004; Booth et al., 2019; Collins, 2021). The government of Papua New Guinea aims to set aside 10% of coastal waters by 2025 as marine protected areas, although the mechanisms they intend to implement to reach this goal are unclear (Government of Papua New Guinea, 2015). Even with the national and international focus on marine protected areas, some scientists are concerned that although in the short-term marine protected areas increase fish biomass and decrease fish wariness, it is unclear whether or not short-term fishery closures can have a sustained impact on the reefs of Papua New Guinea (Cinner et al., 2019). There are also concerns that the effectiveness of marine protected areas will be challenged by local conflict and lack of compliance (Cinner et al., 2019).

Although fishers in Papua New Guinea are more likely than fishers in other countries to confront people fishing illegally, customary tenure systems create complications in enforcing marine protected areas (Bergseth et al., 2018; Cinner et al., 2019). In Papua New Guinea all reef systems are owned by extended family groups; such ownership is well-known and use by non-group members is policed locally by family members. There are also social concerns about marine protected areas and their potential effectiveness. Previous anthropological research has shown that differences in expectations for projects and understandings of marine conservation have sometimes caused tensions between the people of Papua New Guinea and external

conservationists and researchers focused on marine protected areas. In the past, external conservation has tended to work towards an idealized value of a pristine seascape that is not utilized by people for resources (Foale & Macintyre, 2005). However, data show that most fishers in Papua New Guinea are interested in maintaining sustainable usage of marine habitats (Jupiter, 2017). In other words, external conservation has tended to prioritize minimizing human use of a site, whereas Papua New Guinean fishers tend to prioritize usage of sites in a manner that will be sustainable for their communities in the long term. Artisanal fishers in Papua New Guinea draw on multiple sources of income, do not take all of their catch to market and spend time fulfilling social obligations that require marine resources (Barclay & Kinch, 2013). Although temporary closure of fisheries is a custom in Papua New Guinea, they often reopen in less than a year, and the inhabitants of the islands often then fish the waters for a feast even during periods of closure (Foale & Manele, 2004). In summary, marine protected areas may or may not work towards long-term external conservation goals and they may or may not fit with local social practices.

In addition, externally demarcated marine protected areas are often driven by the interests of outsiders and organized and facilitated with a focus on the social use of reefs and species that assumes purely instrumental relations between people, plants, animals and entire ecological systems. Although there has been an acknowledgement in the past decade that people living in Papua New Guinea depend on their reefs for subsistence and livelihoods, which is crucial for conservation success (Jupiter, 2017), people in New Ireland have deeper relations with their biophysical surroundings and the other beings that inhabit them than can be captured within the concepts of subsistence and livelihoods (Otto, 1998; Collins, 2021; Rubel & Roseman, 2021). Although many outsiders assume these deeper relations have been eroded completely by missionization, colonialization and capitalism (Billings & Peterson, 1967), it has been shown that, since the first incursion into what is now New Ireland in the early 17th century, New Irelanders have been maintaining socio-spiritual relations with their surroundings and their ancestors (Kaiku & Kaiku, 2008; Rubel & Roseman, 2021). In New Ireland, external interventions must recognize the socio-spiritual connections between local Indigenous people and their natural environments if marine protected areas are to function successfully.

### The Ailan Awareness approach

After JA and PW's initial meeting, they spent a year writing collaborative grant proposals to fund a simple idea: before anyone, even a national actor, carries out environmental conservation in rural Papua New Guinea, they should

understand the broad range of local concerns in the area where they plan to work. Although the Ailan Awareness staff and leadership were, and are, all from New Ireland, their prior work had always been dictated by the conservation concerns of external organizations. Eventually, PW and JA received funding from The Christensen Foundation to undertake a multi-year project working to understand the social and ecological changes that Indigenous residents saw and were concerned about across New Ireland Province.

The funding from The Christensen Foundation allowed Ailan Awareness to revise a methodology of community consultation they had used during 1993–2007, called The Awareness Road Show, to incorporate lessons learnt from the scholarly literature on decolonizing research methods (Kabutaulaka, 1997; Denzin et al., 2008; Kovach, 2010; Smith, 2012; TallBear, 2014) and from scholarship focused on Indigenous knowledge-making practices in Oceania (Gegeo & Watson-Gegeo, 2001; Kaiku & Kaiku, 2008). Additionally, it allowed PW, JA, the Ailan Awareness staff, and outside collaborators to conduct a large-scale multi-language ethnographic survey across New Ireland Province to identify local concerns regarding socio-ecological change, gather local explanations for these changes, conduct *talanoa*-style conversations to understand socio-ecological-spiritual practices (Tecun et al., 2018) and develop a new methodology that combines local knowledge-making practices, attention to spiritual practice and anthropological research. These are Indigenous directed collaborative conversations that are similar to roundtable discussions, but that are facilitated by Elders. These conversations prioritize careful listening and dialogue that builds towards consensus, and they draw on storytelling as a methodology for understanding community needs and concerns. Subsequently, Ailan Awareness revised its entire approach to conservation and it now has a number of intertwined initiatives (Aini & West, 2014, 2018; West & Aini, 2018, 2021).

Today, all of Ailan Awareness's Indigenous epistemology-based marine resource management plans and *Vala* work begin with a new kind of road show. Staff working with the organization meet with communities or groups who have contacted them with a problem. Sometimes these communities are multi-lineage groups that could be considered a village, but sometimes they are single-lineage groups comprising related persons living in multiple households. They might have seen, for example, a decline in the numbers and kinds of fish on their reefs or they may have perceived a growing problem with young people not wanting to learn about cultural traditions. People come to Ailan Awareness with any problem they deem related to biodiversity and social practice or spiritual relations. People hear about Ailan Awareness through several channels. New Ireland is a relatively small place, with 243,000 residents, many of whom listen to the radio as their primary source of information. JA and the Ailan Awareness team have been featured on

numerous radio shows and news reports since 1993 and the collaboration between JA and PW has been featured on both local radio shows and the national news. Additionally, JA was previously an elected official and he toured the province in this capacity. Finally, Ailan Awareness has Elder advisors from each region in the province who talk to residents about their work.

After initial contact and a corresponding initial road show, the Ailan Awareness staff organize a revised road show event in the chosen location. The revised road show consists of presentations about Ailan Awareness's previous work, discussions about what the community wishes to understand or change and a clear discussion about the Ailan Awareness methodology, highlighting what they can and cannot do. During the visit, Ailan Awareness focuses on local epistemic practice around causality, trying to understand both what the local community sees as a problem and the possible causes that the community has identified.

After the road show, the community or group spends time discussing the meeting, reflecting on the Ailan Awareness methodology and what they can and cannot provide and deciding how to proceed. Sometimes the community returns to Ailan Awareness and sometimes they do not. It is always made clear during the road show that Ailan Awareness is happy to work with them but that the leadership and staff would understand if they choose not to work with them. If they return to Ailan Awareness and ask for help, the staff work with them to determine what kinds of help they want and need. Ailan Awareness, in partnership with their national and international collaborators, can offer multiple forms of research, such as: combing colonial records or gathering field notes from scholars who worked in the area in the past to understand historical social practices that could have been eroded during the colonial period; conducting a detailed literature review focusing on conservation methods regarding a marine species of concern and producing an annotated bibliography that is written in clear and easy-to-read English and can be translated easily into local vernacular or creole languages; or partnering with marine scientists to conduct research on marine ecosystem change or species decline in the area that a community uses for their livelihood. JA and PW direct this research together. Early in the relationship between Ailan Awareness and a community, the staff walk the community through exactly who and what will be involved in the research. They outline what research means to everyone involved and what research can do (i.e. provide data and solutions) and what it cannot do (i.e. provide funding). These conversations are held repeatedly over the course of the research as the work progresses, and a conversation is set up immediately if the work is to change in significant ways.

After this, the entire group or a set of representatives chosen by the entire group undergoes another round of

consultation. If the group agrees to move forward, the next step is to conduct the research. Ailan Awareness conducts its research through its many partnerships with institutions and individuals in Papua New Guinea, Australia and the USA. The research itself is carried out in close consultation with the community or group. Ailan Awareness researchers, whether local people or outsiders who have been contracted to work on a particular project, check in frequently with the local community and almost always work with members of that community as co-researchers.

After the research has been carried out, the results are returned to the community or group. The findings are presented during another iteration of the road show, in which they are discussed at length with the community. They are presented in multiple forms: in one-on-one discussions, in presentations and in group discussions. Ailan Awareness staff initially present results in the local vernacular language and then in Melanesian Tok Pisin, and throughout these presentations the staff translate from scholarly vernaculars into local languages and idioms. Communities must request presentations in English.

After the results are presented, Ailan Awareness staff allow the group to work through the results on their own, ask any follow-up questions and then decide how to move forward. For each set of results, Ailan Awareness provides a series of plans meant to address the changes that people have identified and their causes. They offer plans that are drawn from scientific conservation methods, plans that are drawn from historical Indigenous conservation and preservation methods and plans that are combinations of the two. If the community decides to move forward, they then move to a series of meetings that are always facilitated by JA, local ritual experts and Elders, who discuss how to implement the plan or plans to ensure that local knowledge is built into them from the beginning. At this step in the process, communities demarcate the reef areas they wish to make healthy or the social practices they wish to strengthen and they identify practices they see as weakening these areas, keeping in mind that all of these areas are owned by the groups with which Ailan Awareness works. This is also the period when Ailan Awareness staff work with Elders in the communities to understand what socio-spiritual protocols must be adhered to in the creation of Indigenous epistemology-based marine resource management plans or *Vala* areas and to draw up a plan to implement them.

After a plan has been created, community members involved in its creation work with their communities to ensure the plan has community support. If they obtain that support, the plan is implemented and an Indigenous epistemology-based marine resource management plan/*Vala* area is declared. These plans are formalized through ceremonial practices involving exchanges of pigs and the giving of *mias* (traditional valuables). All of the project implementation is organized and carried out by the community

or group. Although Ailan Awareness facilitates these project discussions and operations, they do not get involved in the day-to-day workings of the community. They do, however, return to the groups or communities periodically to reflect with them on the successes and failures they see and work with them to change the plans if this is required. All communities and groups can request ongoing consultation with Ailan Awareness.

All of Ailan Awareness’s work is focused on facilitating the communities’ enhancement of the ways of life they wish to continue. This enhancement includes strengthening local livelihoods and reviving and supporting socio-spiritual practices that connect people, ecological systems, ancestors and spirits. Ailan Awareness believes that the ideas of conservation and biodiversity are inherently external to New Ireland but that *Vala* expresses the goal of revitalizing the aquatic-terrestrial-

spiritual-social interfaces that facilitate self-determination and sovereignty over both biological and social futures.

The Ailan Awareness approach also follows an ethical guideline that the organization has developed with the Elders who serve as advisors. It is based on three action-based principles and practices: stepping up, mobilizing resources and stepping back (Fig. 2).

*Stepping up* For the Ailan Awareness staff this means they go where they are asked to go when community members invite them to listen to their concerns regarding socio-ecological and socio-spiritual losses. Ailan Awareness does not impose itself on communities who do not invite them. Stepping up also means that when Ailan Awareness staff enter into relationships with communities, they plan to work with them to facilitate the plans and changes they wish to enact. They commit to these communities in a

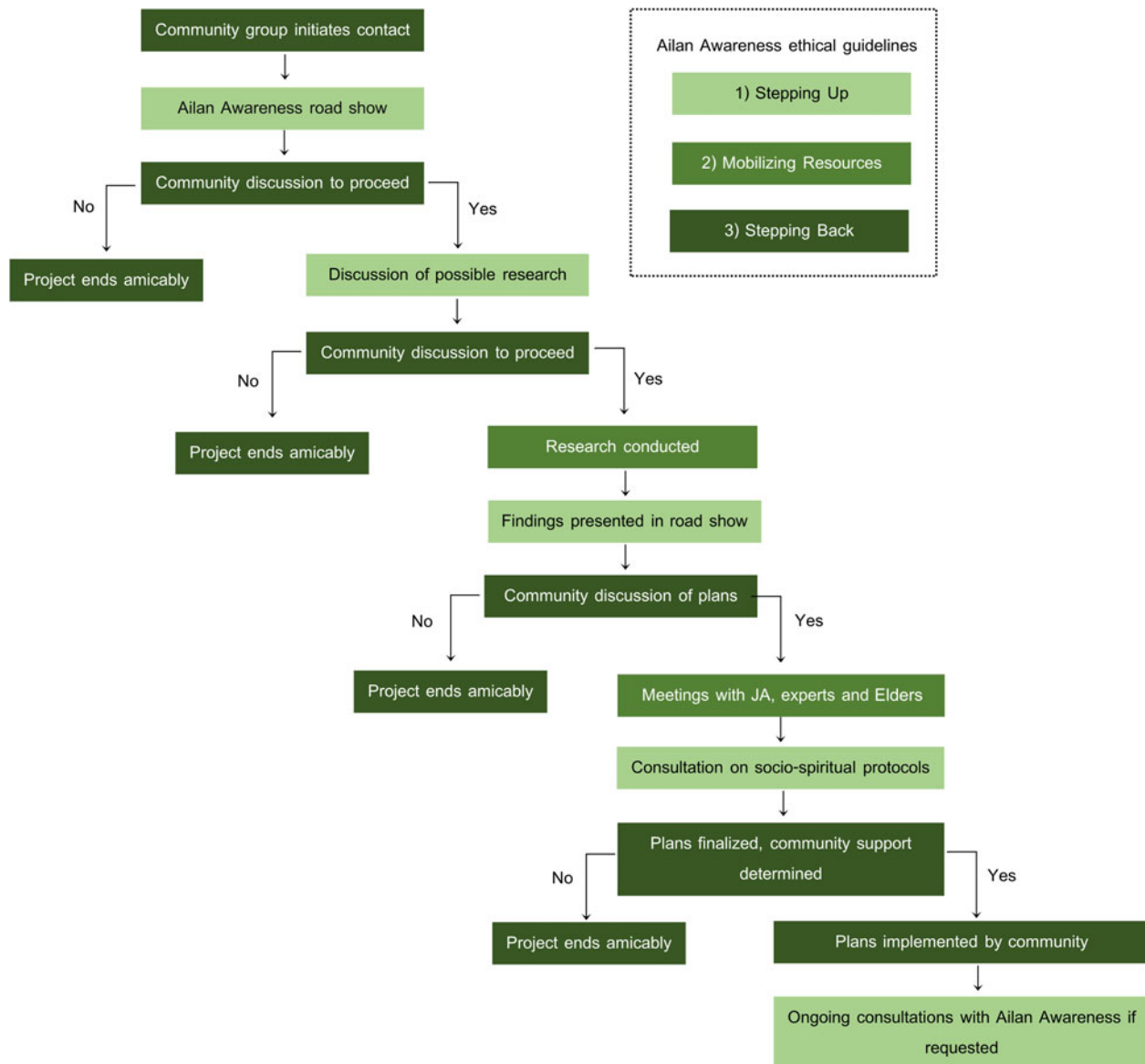


FIG. 2 A flow diagram of the Ailan Awareness methodology (see text for full details).

meaningful way but they never promise financial benefit from the engagements.

*Mobilizing resources* Once Ailan Awareness staff have established a relationship with a community and understood what the needs and desires of the community are with regards to socio-ecological and socio-spiritual revitalization, they work to find the resources and tools that allow them to support community needs. They utilize their in-house expertise, draw on the expertise of their international colleagues, work with interns from Barnard College, USA, and Columbia University, USA, and from colleges in Papua New Guinea, and seek funding from foundations to conduct research and bring community plans into being.

*Stepping back* Ailan Awareness believes that once its staff have provided their expertise and resources, communities must maintain sovereignty over their own projects. The founders and staff of Ailan Awareness have watched too many NGOs micromanage community-based projects in a way that seems to indicate that the project belongs to the NGO and not the community. Although Ailan Awareness provides ongoing consultation for plan revisions and refinement, at a fundamental level Ailan Awareness believes these Indigenous epistemology-based marine resource management plans/*Vala* areas belong to their partners, not to them. Ailan Awareness relies significantly on the work of community Elders in this part of the process. The Ailan Awareness staff believe that entrusting these plans to Elders both creates conditions for their longevity and strengthens local respect for Elders.

## Discussion

Part of the critique of conservation practice that JA and MLP developed during 1993–2007 focused on the failure of any external conservation organization to understand three fundamental truths in New Ireland. Firstly, people's relationships with the sea, reefs and marine creatures rely on the combination of experiential knowledge connected to the use of these resources, and spiritual knowledge connected to listening to and learning from Elders and ancestors. Secondly, New Irelanders build trust and agreement through slow processes of consultation, discussion, re-consultation, more discussion and eventually exchanges of valuables that seal agreements and cement long-term relationships. Thirdly, the spiritual and ritual work that experts and Elders do to bring balance and regulation to human–nature relations was being overlooked in the creation of marine protected areas and community-based conservation areas. This set the conditions for failure of these projects, and eroded the status and power of Elders. JA and MLP had witnessed marine conservation projects fail repeatedly and they attributed some of these failures to the lack of attention paid to these truths. Their findings

paralleled those of PW's scholarship about conservation across terrestrial sites in Papua New Guinea.

The storytelling opening to this paper illustrates part of the critique that JA and PW developed of conservation as practiced in Papua New Guinea generally. That critique resulted in their recommendations for conservation in the country. Firstly, outsiders working towards conservation must understand what local NGOs do, why they do it, how they do it and the pace at which they work. The impulse should never be to see their work through external eyes, viewing these practices as lazy, demonstrating a lack of capacity or as leisure. Outsiders must take the time to understand what is happening locally and then listen to local NGOs. Secondly, we need collaboration across different knowledge-making domains: Indigenous a posteriori observation-based practice, social scientific research, scientific research and Indigenous a priori knowledge of the spiritual realm. Thirdly, local descriptions of biophysical change and local methodologies for understanding and explaining change must be attended to in any research agenda focused on generating results connected to conservation. Finally, collaborations happen organically and they take years to cement.

It is our contention that externally designed marine protected areas, because they do not attend to spiritual and ritual practice and because they are not attended to by Elders and ritual experts, often lack the social strength to do what they are intended to do. Although they could be beneficial in terms of the short-term health of a system, their longevity in New Ireland/Papua New Guinea is almost always in question. The work conducted by Ailan Awareness pulls together the best of the science and methodology of marine protected areas with a deep understanding of and respect for the spiritual and ritual practices that must ensue for Indigenous communities to respect and maintain the negotiations and restrictions that are put in place in conservation areas. We have outlined why attention to day-to-day practices matters, what an alternative methodology for creating sustainability looks like and how partnerships between Indigenous scientists, Indigenous Elders and outside researchers can bring about positive biodiversity futures and help us all to reimagine conservation practice.

**Acknowledgements** We thank our funders: The Christensen Foundation, The National Geographic Foundation, and the current funder for Ailan Awareness, who wishes to remain anonymous; Dakota Straub for editorial support; Stephanie Ratté for her help with Fig. 2; Brett Avea for Fig. 1; Jeff Kinch and Nick Bainton for additional help with the text and Nusa Island Retreat for ongoing logistical support.

**Author contributions** Writing initial draft: JA, PW, MLP, CG, AEB; comments and revision: YA, RSJ, JSR, PN. During the writing of this paper CG left our shared world as a result of Covid-19.

**Conflicts of interest** None.



**Ethical standards** The work described in this article adheres to the ethical standards set out by Papua New Guinea regarding international research as well as the standards set out by the American Anthropological Association, and otherwise abided by the *Oryx* guidelines on ethical standards.

## References

- AINI, J. & WEST, P. (2014) Learning through doing: the story of Ailan Awareness's partnerships with coastal communities. In *Resilience Sourcebook: Case Studies of Social-Ecological Resilience in Island Systems* (ed. G. Cullman), pp. 103–124. American Museum of Natural History, New York, USA.
- AINI, J. & WEST, P. (2018) *Communities Matter: Decolonizing Conservation Management*. Plenary Lecture, International Marine Conservation Congress, 24–29 June, Kuching, Malaysia.
- ALLEN, G.R. (2007) Conservation hotspots of biodiversity and endemism for Indo-Pacific coral reef fishes. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 18, 541–556.
- ALLEN, G.R., KINCH, J.P., MCKENNA, S.A. & SEETO, P. (2003) A rapid marine biodiversity assessment of Milne Bay Province, Papua New Guinea – survey II (2000). *RAP Bulletin of Biological Assessment*, 29, 1–172.
- ASAAD, I., LUNDQUIST, C.J., ERDMANN, M.V., HOODONK, R.V. & COSTELLO, M.J. (2018) Designating spatial priorities for marine biodiversity conservation in the Coral Triangle. *Frontiers in Marine Science*, 5, 400.
- BAJE, L., CHIN, A., WHITE, W.T. & SIMPFENDORFER, C.A. (2021) Ecological risk assessment of elasmobranchs caught in the Gulf of Papua prawn fishery. *Aquatic Conservation*, 31, 3100–3110.
- BARCLAY, K. & KINCH, J. (2013) Local capitalism and sustainability in coastal fisheries: cases from Papua New Guinea and Solomon Islands. *Research in Economic Anthropology*, 33, 107–138.
- BELL, J.D., GANACHAUD, A., GEHRKE, P.C., GRIFFITHS, S.P., HOBDAV, A.J., HOEGH-GULDBERG, O. et al. (2013) Mixed responses of tropical Pacific fisheries and aquaculture to climate change. *Nature Climate Change*, 3, 591–599.
- BELL, J.D., KRONEN, M., VUNISEA, A., NASH, W.J., KEEBLE, G., DEMMKE, A. et al. (2009) Planning the use of fish for food security in the Pacific. *Marine Policy*, 33, 64–76.
- BELLWOOD, D.R. & MEYER, C.P. (2009) Searching for heat in a marine biodiversity hotspot. *Journal of Biogeography*, 36, 569–576.
- BERGSETH, B.J., GURNEY, G.G., BARNES, M.L., ARIAS, A. & CINNER, J.E. (2018) Addressing poaching in marine protected areas through voluntary surveillance and enforcement. *Nature Sustainability*, 1, 421–426.
- BILLINGS, D.K. & PETERS N.J. (1967) Malanggan and Memai in New Ireland. *Oceania*, 38, 24–32.
- BOOTH, J.R., NAGOMBI, E. & BOSLOGO, T. (2019) *Fisheries Catch-and-Effort Report*. Wildlife Conservation Society, Kavieng District, Papua New Guinea. [library.wcs.org/en-us/doi/ctl/view/mid/33065/pubid/DMX389480000.aspx](https://library.wcs.org/en-us/doi/ctl/view/mid/33065/pubid/DMX389480000.aspx) [accessed January 2023].
- CARPENTER, K.E., MUHAMMAD, A., AEBY, G., ARONSON, R.B., BANKS, S., BRUCKNER, A. et al. (2008) One-third of reef-building corals face elevated extinction risk from climate change and local impacts. *Science*, 321, 560–563.
- CARR, M.H., WHITE, J.W., SAARMAN, E., LUBCHENCO, J., MILLIGAN, K. & CASELLE, J.E. (2019) Marine protected areas exemplify the evolution of science and policy. *Oceanography*, 32, 94–103.
- CINNER, J.E., LAU, J.D., BAUMAN, A.G., FREARY, D.A., JANUCHOWSKI-HARTLEY, F.A., ROJAS, C.A. et al. (2019) Sixteen years of social and ecological dynamics reveal challenges and opportunities for adaptive management in sustaining the commons. *Proceedings of the National Academy of Sciences of the United States of America*, 116, 26474–26483.
- CISNEROS-MONTEMAYOR, A.M., PAULY, D., WEATHERDON, L.V. & OTA, Y. (2016) A global estimate of seafood consumption by coastal Indigenous peoples. *PLOS ONE*, 11, e0166681.
- COLLINS, M. (2021) 'The Big Fish Hide'. Frictions between perceptions of marine life on Lavongai Island (Papua New Guinea). *Journal de la Société des Océanistes*, 153, 337–352.
- DENZIN, N.K., LINCOLN, Y.S., & SMITH, L.T. (2008) *Handbook of Critical and Indigenous Methodologies*. Sage Books, Thousand Oaks, USA.
- DIETZEL, A., BODE, M., CONNOLLY, S.R. & HUGHES, T.P. (2021) The population sizes and global extinction risk of reef-building coral species at biogeographic scales. *Nature Ecology & Evolution*, 5, 663–669.
- DOUGLAS-JONES, R. & SHAFFNER, J. (2021) *Hope and Insufficiency: Capacity Building in Ethnographic Comparison*. Berghahn, New York, USA and Oxford, UK.
- DREW, J.A., AMATANGELO, K.L. & HUFBAUER, R.A. (2015) Quantifying the human impacts on Papua New Guinea reef fish communities across time and space. *PLOS ONE*, 10, e0140682.
- DUARTE, C.M., AGUSTI, S., BARBIER, E., BRITTON, G.L., CASTILLA, J.C., GATTUSO, J. et al. (2020) Rebuilding marine life. *Nature*, 580, 39–51.
- EDDY, T.D., LAM, V.W.Y., REYCONDEAU, G., CISNEROS-MONTEMAYOR, A.M., GREER, K., PALOMARES, M.L.D. et al. (2021) Global decline in capacity of coral reefs to provide ecosystem services. *One Earth*, 4, 1278–1285.
- FOALE, S. & MACINTYRE, M. (2005) Green fantasies: photographic representations of biodiversity and ecotourism in the Western Pacific. *Journal of Political Ecology*, 12, 1–22.
- FOALE, S. & MANELE, B. (2004) Social and political barriers to the use of marine protected areas for conservation and fishery management in Melanesia. *Asia Pacific Viewpoint*, 45, 373–386.
- GEGEO, D.W. & WATSON-GEGEO, K.A. (2001) 'How we know': Kwara'ae rural villages doing Indigenous epistemology. *Contemporary Pacific*, 13, 55–88.
- GOVERNMENT OF PAPUA NEW GUINEA (2015) *National Marine Conservation Assessment for Papua New Guinea*. Conservation and Environment Protection Authority, Port Moresby, Papua New Guinea.
- HUBER, M.E. (1994) An assessment of the status of the coral reefs of Papua New Guinea. *Marine Pollution Bulletin*, 29, 69–73.
- HUGHES, T.P., BARNES, M., BELLWOOD, D., CINNER, J.E., CUMMING, G.S., JACKSON, J.B.C. et al. (2017) Coral reefs in the Anthropocene. *Nature*, 546, 82–90.
- HUGHES, T.P., BELLWOOD, D.R. & CONNOLLY, S.R. (2002) Biodiversity hotspots, centres of endemism, and the conservation of coral reefs. *Ecology Letters*, 5, 775–777.
- HUGHES, T.P., KERRY, J.T., BAIRD, A.H., CONNOLLY, S.R., DIETZEL, A., EAKIN, C.M. et al. (2018) Global warming transforms coral reef assemblages. *Nature*, 556, 492–496.
- IUCN (2018) *Applying IUCN's Global Conservation Standards to Marine Protected Areas*. IUCN, Gland, Switzerland. [issuelab.org/resources/33035/33035.pdf?download=true](https://issuelab.org/resources/33035/33035.pdf?download=true) [accessed January 2023].
- JUPITER, S. (2017) Culture, *kastom* and conservation in Melanesia: what happens when worldviews collide? *Pacific Conservation Biology*, 23, 139–145.
- KABUTLAUKA, T. (1997) I am not a stupid native: decolonising images and imagination in Solomon Islands. In *Emerging From Empire? Decolonisation in the Pacific* (ed. D. Denoon), pp. 165–171. Division of Pacific and Asian History, Research School of Pacific and Asian Studies, Australian National University, Canberra, Australia.
- KAIKU, P.K. & KAIKU, T.W. (2008) Indigenous knowledge for community benefit: examples from Lavongai (New Hanover) Island in the Pacific region. *Contemporary PNG Studies*, 9, 56–68.

- KOHN, A. (2001) Maximal species richness in *Conus*: diversity, diet and habitat on reefs of northeast Papua New Guinea. *Coral Reefs*, 20, 25–38.
- KOVACH, M. (2010) *Indigenous Methodologies: Characteristics, Conversations and Contexts*. University of Toronto Press, Toronto, Canada.
- LILOMAIAVA-DOKTOR, S.I. (2020) Oral traditions, cultural significance of storytelling, and Samoan understandings of place or fauna. *Native American and Indigenous Studies*, 7, 121–151.
- MACINTYRE, M. (2021) Verbal sophisms and problems with capacity building. In *Hope and Insufficiency: Capacity Building in Ethnographic Comparison* (eds R. Douglas-Jones & J. Shaffner), pp. ix–1. Berghahn, New York, USA, and Oxford, UK.
- OTTO, T. (1998) Resource management in Lavongai and Tigak islands: changing practices, changing identities. In *Pacific Answers to Western Hegemony: Cultural Practices of Identity Construction* (ed. J. Wassmann), pp. 229–252. Berghahn, New York, USA and Oxford, UK.
- ROBERTS, C.M., MCCLEAN, C.J., VERON, J.E., HAWKINS, J.P., ALLEN, G.R., McALLISTER, D.E. et al. (2002) Marine biodiversity hotspots and conservation priorities for tropical reefs. *Science*, 295, 1280–1284.
- ROGERS, J. (2018) Photostory and relatedness methodology: the beginning of an Aboriginal–Kanaka Maoli research journey (part one). *Australian Aboriginal Studies*, 2, 3–16.
- RUBEL, P. & ROSEMAN, A. (2021) *Aliens on Our Shore: An Anthropological History of New Ireland, Papua New Guinea, 1616 to 1914*. Development Resources Press, Pasadena, USA.
- SMITH, L.T. (2012) *Decolonizing Methodologies: Research and Indigenous Peoples*. Zed Books, New York, USA.
- TALLBEAR, K. (2014) Standing with and speaking as faith: a feminist–Indigenous approach to inquiry. *Journal of Research Practice*, 10, N17.
- TECUN, A. (HERNANDEZ, D.), HAFOKA, I., 'ULU'AVE, L. & 'ULU'AVE-HAFOKA, M. (2018) Talanoa: Tongan epistemology and Indigenous research method. *AlterNative: An International Journal of Indigenous Peoples*, 14, 156–163.
- TENGAN, T.P.K. (2008) *Native Men Remade*. Duke University Press, Durham, USA.
- TULLOCH, V.J.D., BROWN, C.J., POSSINGHAM, H.P., JUPITER, S.D., MAINA, J. & KLEIN, C. (2016) Improving conservation outcomes for coral reefs affected by future oil palm development in Papua New Guinea. *Biological Conservation*, 203, 43–54.
- WEST, P. (2003) Knowing the fight: the politics of conservation in Papua New Guinea. *Anthropology in Action: Journal for Applied Anthropology in Policy and Practice*, 10, 38–45.
- WEST, P. (2006) *Conservation Is Our Government Now: The Politics of Ecology in Papua New Guinea*. Duke University Press, Durham, USA.
- WEST, P. (2016) *Dispossession and the Environment: Rhetoric and Inequality in Papua New Guinea*. Columbia University Press, New York, USA.
- WEST, P. & AINI, J. (2018) *Critical Approaches to Dispossession in the Melanesian Pacific: Conservation, Voice, and Collaboration*. Keynote Lecture, POLLEN18 Political Ecology Network Biennial Conference, 19–22 June 2018, Oslo, Norway.
- WEST, P. & AINI, J. (2021) 'I will be traveling to Kavieng!': work, labor, and inequality in New Ireland, Papua New Guinea. In *The Transformation of Inequality in the Western Pacific* (eds N. A. Bainton, D. McDougall, K. Alexeyeff & J. Cox), pp. 47–75. Australian National University Press, Canberra, Australia.
- WEST, P. & KALE, E. (2015) The fate of Crater Mountain: forest conservation in the Eastern Highlands of Papua New Guinea. In *Tropical Forests of Oceania: Anthropological Perspectives* (eds J.A. Bell, P. West & C. Filer), pp. 155–178. Australian National University Press, Canberra, Australia.