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**A Sea of Voices:
Deep Sea Mining and the Solwara 1 Project in Papua New Guinea**

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of

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Abstract

Deep sea mining is a new and increasingly important part of the capitalist exploitation of the world's oceans. Situated off the coast of New Ireland Province, Papua New Guinea, Solwara 1 is expected to become the world's first deep sea mining project. Developments in late 2018, however, suggest that the project might not go ahead. If Solwara 1 does proceed, it shall occur in a country with a long history of mining developments that have produced widespread social and environmental harm. The aim of this thesis is to critically analyse the discursive articulations of four key stakeholder groups: the mining company, the government, local communities and the fourth estate, the latter taken to include NGOs, the scientific community, as well as media. In order to discover how each of these groups portrays and reacts to the Solwara 1 project, this thesis will examine bureaucratic artefacts, such as reports, media releases and social media. It is evident that each party has constructed its own unique discourse regarding the project and its interrelationship with the surrounding communities and marine environment. The mining company claim that local people do not have a tangible or intangible relationship to the sea, which is also echoed by the national government, who are shareholders in Solwara 1. Local communities dispute this however, and argue they are deeply connected to the sea. The fourth estate are primarily concerned with the environmental impacts that deep sea mining may cause. Ultimately, this 'sea of voices' presents a situation whereby each stakeholder ultimately constructs a discourse that best serves and advances their own interests, and does so on a highly uneven playing field.

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Ehara taku toa, he takitahi, he toa takitini

My success should not be bestowed onto me alone, as it was not individual success, but success of a collective

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Abbreviations

APEC	Asia-Pacific Economic Cooperation
ABG	Autonomous Bougainville Government
AROB	Autonomous Region of Bougainville
BBC	British Broadcasting Corporation
BCA	Bougainville Copper Agreement
BCL	Bougainville Copper Limited
BHP	Broken Hill Proprietary
BRA	Bougainville Revolutionary Army
BRG	Bismarck Ramu Group
CAB	Coastal Area of Benefit
CCZ	Clarion Clipperton Zone
CEO	Chief Executive Officer
CSR	Corporate Social Responsibility
DEC	Department of Environment and Conservation
DSM	Deep Sea Mining
DSMC	Deep Sea Mining Campaign
DSMF	Deep Sea Mining Finance
EBSA	Environment and Social Benchmarking Analysis
EEZ	Exclusive Economic Zone
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ISA	International Seabed Authority
LLG	Local Level Government
LNG	Liquefied Natural Gas

MRA	Mineral Resources Authority
NBC	National Broadcasting Corporation
NGO	Non-Governmental Organisation
NZ	New Zealand
OLPGLLG	Organic Law on Provincial Governments and Local Level Governments
OTML	Ok Tedi Mining Limited
PL	Prospecting Licence
PNG	Papua New Guinea
PNGSDP	Papua New Guinea Sustainable Development Programme
SMS	Seafloor Massive Sulphides
SPTs	Seafloor Production Tools
TOML	Tonga Offshore Mining Limited
UNDP	United Nations Development Programme
UPNG	University of Papua New Guinea
USA	United States of America
WWF	World Wildlife Fund
PJV	Porgera Joint Venture

Preface

Going Under: The Demise of the World's First Deep Sea Mine

Throughout the preliminary phases of the Solwara 1 project, the mining company, Nautilus, has been hamstrung by a series of financial problems. These issues reached their zenith in 2018 and early 2019, which in turn has led to a series of events that has ultimately put the future of the Solwara 1 project in jeopardy. Due to failure of payment, the company building Nautilus' purpose-built ship terminated their contract. This is a crucial development in the future of the project as the specialised ship was required to be able to carry out the extractives processes and, in particular, have the ability to lower and raise machinery in and out of the water. Without the ship, Nautilus is unable to begin extraction. Although Nautilus has remained outwardly positive about the future of Solwara 1, they have recently suggested through their press releases that there is now no guarantee that the future of the project is secured. The situation is also reflected in the price of Nautilus' shares on the Canadian Stock Exchange, which in early 2019 dropped to a low of \$0.055 dollars. The company was then delisted from the exchange in March 2019.

The maturity date of Nautilus' multimillion-dollar loan was due at the beginning of 2019, however this was extended through to March 2019. Since these arrangements were made, Nautilus has obtained protection from its creditors, and the company has maintained that it is not bankrupt but simply restructuring its business. It is evident, however, that Nautilus is not currently in a position to repay the agreed amount, as its Solwara 1 project has not yet commenced production, and thus no revenue has been generated. As Nautilus is unable to repay its debt, the future of the project is in jeopardy. Developments in April 2019 further confirm this uncertainty, as the company's CEO tendered their resignation, along with four of the total five executive members.

While Solwara 1 may not become a practical reality, this thesis demonstrates how the *prospect* of a project can set in motion a series of

competing discourses where different stakeholders manoeuvre and position themselves in various ways. In addition to this, while Solwara 1 may not eventuate, it seems highly likely that deep sea mining will be pursued by other mining companies with either greater technological or financial resources at their disposal. The race to the riches at the bottom of the ocean is still on, it is just a matter of who gets there first, and at what cost.

1. Introduction: Solwara 1 and the New Frontier

In 2019, Solwara 1, the world's first deep sea mining (hereafter referred to as DSM) project, is scheduled to begin off the coast of New Ireland Province, Papua New Guinea (hereafter referred to as PNG). This thesis undertakes an anthropological analysis of the emergent project and argues that the interested stakeholder groups each construct the project and its relation to the surrounding people and seascape through a range of unique, politically saturated, and deeply polarised discourses.

Solwara 1 is led by Nautilus Minerals Inc., a Canadian mining company headquartered in Vancouver. The company has named their project 'Solwara' after the term that Melanesian peoples use to refer to the ocean in neo-Melanesian pidgin. The extraction site will be 30 kilometres off the west coast of Namatanai, New Ireland Province, at a depth of 1600 metres. Gold and copper are to be extracted from sea floor sediments and hydrothermal vents, known informally as 'black smokers'. Purpose-built machinery referred to as seafloor production tools (SPTs) are required to carry out such an operation. All three SPTs are deployed to the seafloor, where two cut into the rock while the remainder collects mined material, pumping it above water to a ship that is also built for purpose. These machines (see figure 1 below) have been described by some as 'monsters' of the deep (Filer & Gabriel, 2018a, p. 11).

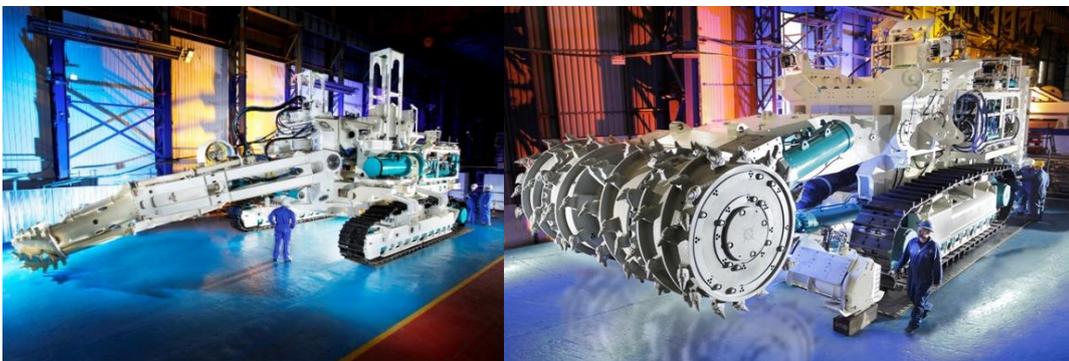


Figure 1: Nautilus' Seafloor Production Tools for the Solwara 1 Project

(Source: nautilusminerals.com/irm/content/seafloor-production-tools)

Once collected, mined material will be shipped to China for processing. Required mining licences and environmental permits were granted by the state of PNG in 2009 and 2011 respectively, though the start date for extraction has been delayed several times due to issues in financing technology required to achieve such a trailblazing feat. Before the unfolding of recent events, Nautilus had announced a start date of mid-2019 (Nautilus Minerals Inc., 2014).

The Barok and Mandak people live closest to the Solwara 1 site, and, as I will show, are largely against the Solwara 1 project. As the situation currently stands, the Barok, Mandak and other coastal Papua New Guineans living in proximity to the project site, do not stand to gain compensation; ownership of minerals in the seabed is vested in the state, and any cultural or traditional claims to the seabed are not recognised by either the government or Nautilus. In order to understand this complexity, it is necessary to consider the socio-political context of Solwara 1.

PNG has a longstanding history of mining developments, a legacy that Solwara 1 is mooted to extend. Gold was first discovered in PNG in 1852, and prospectors began to arrive from Australia in the 1870s, before formal colonial administration was established (Corbett, 2005, p. 9). It was during this period that Papua New Guineans had their first encounters with miners and mining, some of which were positive, but most of which were negative and violent (Nelson, 1976, p. vi). Driving the colonisation of PNG was the knowledge and promise of gold; indeed the southern half of what is today's PNG became British New Guinea in 1888, one month after the presence of gold was confirmed (Nelson, 1976, p. xix). The Australian administration of PNG was also fuelled by gold mining (Corbett, 2005, p. 12). A few years before gaining independence in 1975, Panguna, situated on the island of Bougainville, at the time the world's largest copper mine, began production, with little attention paid to enforcing measures ensuring environmental protection. Panguna copper mining and the history of mining in PNG in general, arguably set the precedent for mining in PNG after independence, contributing to environmental and social ruin across many sites. In this context, PNG became attractive to multinational corporations, not

only because of the abundance of its mineral resources, but also because of its history of weak governance and a failure of the state to penalise mining companies for environmental and social destruction. This history of mining in PNG, established through colonisation, has created a legacy of poorly managed mining projects, which continues to influence the development of new projects, such as Solwara 1.

With its 'world first' status, Solwara 1 signposts the ocean becoming a 'new frontier' of resource extraction (Tsing, 2005; Jacka, 2015; McCormack, 2018). Frontier is an applicable concept in my analysis. First, DSM represents a new frontier in mining, and second, it has the potential to theoretically extend scholarship on frontiers from terrestrial to ocean spaces. Anna Tsing's discussion of 'resource frontiers' suggests that these at first appear as discoveries of 'new' natural resources with wealth generating extractive potential. Upon closer examination, however, resource frontiers result in the destruction of cultural and environmental landscapes, in the end becoming another facet of "out-of-control interstitial capitalist expansion" (2005, p. 28). This suggests that resource frontiers are both a zone of potential prosperity and of destruction, threatening the social, cultural and environmental landscape. Tsing claims that the landscape in which a resource frontier occurs is an important piece of the overall picture. As a "lively actor...landscapes are simultaneously natural and social, and they shift and turn at the interplay of human and nonhuman practices" (2005, p. 29). In the case of Solwara 1, the seascape is a 'lively actor' in the sense that some stakeholders view the sea as being a natural or a capitalist domain, whereas others see it as a space imbued with cultural and cosmological meaning. This contestation over human connections to the sea represents a conflict between a traditional Western perspective, where the sea is completely separate to land, and a Pacific perspective, where the sea is an extension of the land as well as of human sociality (Hau'ofa, 1993).

The concept of frontier is also useful when considering the scientific and technological advancement required to proceed with Solwara 1. Not only has the ocean and DSM been explicitly described as a new frontier, but its exploitation has also been labelled ‘the new gold rush’ (Howard, 2016). In this sense, Solwara 1 marks an important early stage of this next new gold rush. Although Solwara 1 has potential to be the first DSM project in the world, it is not the only one on the horizon. There are several corporations that are becoming invested in projects and these are focussed mainly in the Pacific, for example in the Cook Islands and Nauru. It is evident that the Pacific Ocean will be the stage on which the burgeoning DSM industry will play out, as mineral deposits are centralised in the region more so than in any other area, as shown in figure 2.

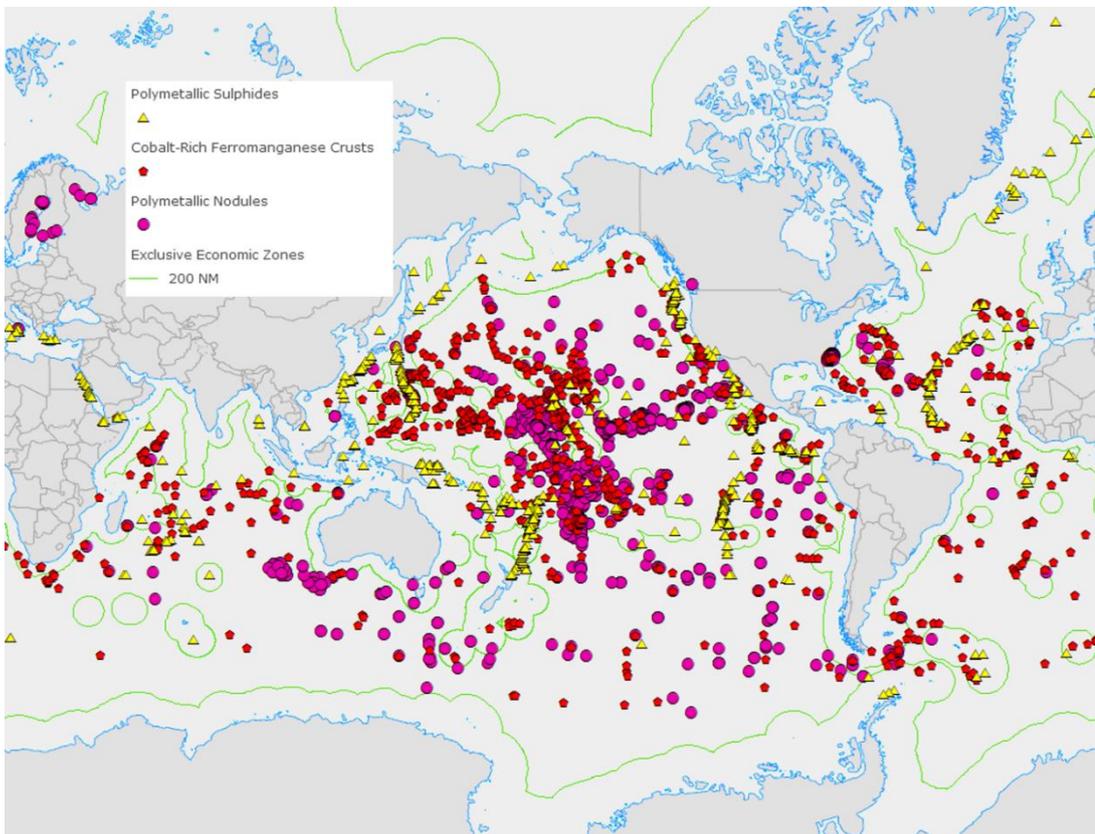


Figure 2: Global distribution of the three main types of deep sea mineral resources

(Source: United Nations Environment Programme)

When considering the future of either Pacific or global DSM projects, it is important to consider the impetus behind them. Globally, the demand for

minerals and the development of technology are the key drivers of this type of ocean extraction. DSM does not only promise the extraction of gold and copper, but also rare-earth metals. These are seldomly commercially viable in terrestrial mines and are thus some of the world's most expensive minerals. These minerals are vital components for devices such as smartphones, as well as "green technology, such as wind turbines and fuel efficient cars" (D'Arcy, 2013, p. 3354). The increasingly popular Toyota Prius, for example, requires over nine kilograms of the rare-earth element Lanthanum to construct its battery (D'Arcy, 2013, p. 3354). As well as the substantial financial gain of individual companies, those who stand to benefit from the mining of deep sea mined minerals are those from Western societies, where there is a greater demand for green technology. Additionally, while these rare-earth elements may ultimately contribute towards less environmental strain in the global North, the environments of countries in the South, from which these elements are extracted, will likely be worse off. In this sense, DSM can be described as 'neo-colonial' as it marks the "re-imposition of Western power" (Gough, 1968, p. 16)

In addition to rare-earth elements, scientists have estimated there is enough gold on the global seafloor to give every person in the world nine pounds (Howard, 2016). Further, this gold is of a significantly higher grade than the terrestrial variety. Given the desire for new wealth and the riches at the bottom of the ocean, it is arguable that one factor has centrally impacted on the development of DSM: the technological ability to extract minerals from the seabed at such depths. It is the case that, "even with all the technology that we have today - satellites, buoys, underwater vehicles and ship tracks - we have better maps of the surface of Mars and the moon than we do the bottom of the ocean" (Stillman, 2009). However, with Nautilus leading the way in the development of technology to create an extractive industry at the bottom of the oceans, a boom in DSM in the future seems imminent.

The Solwara 1 project is a part of the burgeoning "Blue Economy". There are, however, different perspectives and no generally accepted definition of what the Blue Economy is. For example, the World Bank defines the Blue

Economy as the “sustainable use of ocean resources for economic growth, improved livelihoods and jobs, and ocean ecosystem health” (2017). Meanwhile, the World Wildlife Fund states that “for some, Blue Economy means the use of the sea and its resources for sustainable economic development. For others, it simply refers to any economic activity in the maritime sector, whether sustainable or not” (2015). Tensions surround whether treating the world’s oceans as ‘development spaces’ (Winder & Le Heron, 2017, p. 5) or as new ‘trading environments’ (Winder & Dix, 2015) is environmentally sustainable, or whether this exploits and destroys the marine environment. The Blue Economy also references the ocean as a new frontier, that is, as an “underdeveloped space” that could be “better used” (Choi, 2017, p. 39). This suggests that the Blue Economy is inextricably related to the capitalisation and marketisation of the world’s oceans, a highly relevant process within the context of the Solwara 1 project.

A key premise underlying Blue Economy discourse, and one that is also pertinent to an understanding of Solwara 1, is the concept of sustainability. Portney claims that “the basic premise of sustainability is that Earth’s resources cannot be used, depleted, and damaged indefinitely. Not only will these resources run out at some point, but their exploitation actually undermines the ability of life to persist and thrive” (2015, p. 4). To act sustainably can be defined as “how to ensure a future liveable earth” (Brightman & Lewis, 2017, p. 3). Studies of sustainability, however, acknowledge a tension between economic benefits and environmental strain, fuelled by capitalist expansion.

Capitalism can be understood as “a machine whose primary product is economic growth” (Baumol, 2004, p. 1) and one that is fundamentally organised around the principle of gain (Polanyi, 2001, p. 31). It is, therefore, no surprise that the mineral wealth at the bottom of the oceans has attracted corporations seeking a high return on capital invested. While there are pre-existing capitalist exploitations of the sea and its contents (e.g. fisheries), the new frontier of DSM represents a novel way in which “the environment has become just another vehicle for capitalist accumulation” (West & Brockington, 2012, p. 2). In

considering the interplay between capitalist ventures and the environment in which it occurs, Schultz argues that “capitalism does not facilitate ecological sustainability or social justice” (2014). Capitalist rationality, therefore, values maximum economic return over environmental or social harm (Schultz, 2014).

1.1 The Anthropology of Mining: Corporations, Governments, Communities and the Fourth Estate

According to Banks and Ballard (2003), in any given mining project there are four main stakeholder groups; corporations, governments, communities, and also the “fourth estate”, taken to include non-governmental organisations (NGOs), the media, and the scientific community. The fourth estate is a recent inclusion within the analyses of mining projects as it is clear these actors play an increasingly important role in monitoring mining developments. The accuracy of labelling the additional group as the ‘fourth estate’ has been questioned however, as it may wrongly assume that the different actors within the fourth estate share similar motivations, perspectives and values (Filer & Le Meur, 2017, p. 20). In addition to this tension, I also acknowledge that the fourth estate may not traditionally include groups such as the scientific community. For the purposes of this thesis, I shall refer to Banks and Ballard’s inclusive definition of the fourth estate as “a wide variety of NGOs, financial intermediaries, lawyers, business partners, and consultants. Most enter the broader mining community by virtue of connections to or alliances with (rather than membership of) one of the three principal stakeholder categories” (2003, p. 304).

I employ this four-fold stakeholder framework as the basic matrix organising my discussion. Banks and Ballard acknowledge that while the stakeholder model has its uses, it often struggles to capture the complexities within and between each stakeholder group (2003, p. 289). I aim to demonstrate that this model does, however, provide a robust framework for examining the complexities of, and between, each stakeholder group’s discourses. I also recognise that each group’s ‘voice’ is not monolithic and has instead many internal intricacies.

In this thesis I bring previous anthropological literature on mining to bear on this new marine context, a task which is important due to a lack of pre-existing ethnographic and anthropological studies on DSM. In the process I also draw on a growing body of literature that is focused on both the scientific and environmental aspects of DSM (Turner, et al., 2019; Durden, et al., 2018; Van Dover, et al., 2018; Hoagland, et al., 2010).

Banks and Ballard argue that each stakeholder group possesses certain characteristics (2003). The corporation, while central as the instigator and operator of the mining project, is often ignored in anthropological analysis, which instead tends to focus on the response of 'exotic' local communities. Paying attention to the structure and dynamic of a corporation, the authors argue, leads to a greater understanding of the mining project and challenges simple portrayals of mining companies as monolithic (2003, p. 290), a line of thinking I follow in this thesis.

Concerning the second key stakeholder, states that possess a wealth of mineral resources are often labelled as suffering from the 'resource curse' (Auty, 2006). This is generally characterised as a dependency on mineral resources that, when coupled with weak regulatory frameworks and an absence of political accountability, often lead to issues such as poor social conditions (e.g. poverty) and national conflict, such as those that have occurred in PNG in the past (Banks & Ballard, 2003, p. 295; Auty 2006, pg. 627). Further, Mansoob Murshed states that the resource curse will only appear in nations with weak political governance (2008, p. 8). Similarly, one of the main critiques directed at the PNG national government in response to their handling of Solwara 1 is that of weak policy (Rosenbaum, 2011; Rosenbaum, 2016). It is important to recognise that PNG was dependent on natural resource extraction industries long before Solwara 1 emerged. Solwara 1 does, however, continue a pattern of resource dependency, despite the PNG government's rhetoric of sustainability as outlined in documents such as Vision 2050.

Banks and Ballard argue that the resource curse in PNG is, at least partly, due to poor financial management of economic returns from mining. They note, critically, that states with mineral resources typically perform worse than those without (2003, p. 295). Within PNG there is a tendency for mining projects to benefit the national government and corporations more than citizens or the natural environment (Gilberthorpe, 2013, p. 468). It is, therefore, typically the citizens of PNG, particularly those on whose land development takes place, that suffer the most in the wake of mining, whether it be due to environmental effects or a questionable distribution of material benefits. As I will demonstrate in later chapters, it seems likely that the key benefactors of Solwara 1 will largely be Nautilus, and to a lesser extent, the PNG national government. This also raises the question as to what is more valuable, whether it be economic gain through resource extraction, the preservation of the cultural landscape, or ideally a combination of both. The discourse of each respective stakeholder is the key mechanism through which these value positions are articulated.

The thrust of most anthropological studies of mining concern the often complex relationships that exist between mining projects and the local communities on whose land they take place, the third key stakeholder in Banks and Ballard's model (Golub, 2014; Weiner, 2004). The totality and complexity of these relationships can be understood as a zone of entanglement (Bainton & Owen, 2018). Bainton observes that local communities in PNG which are suddenly greeted with a mining development on their doorstep "tend to undergo dramatic social, economic, political and cultural change, which includes the transformation of the landscape, new ways of understanding land and resources" (2010, p. 5). Gilberthorpe adds to this notion, arguing that mining developments are a transformative force of sorts. She writes that when indigenous groups in PNG are confronted with a mining project, they are often forced to "consciously acknowledge their historical connection to the place they live in order to be recognised as landowners" (2009, p. 123). This is echoed by Banks and Ballard, who state that landowners "are only summoned into being or defined as such by the presence or the potential presence of a mining project"

(Banks & Ballard, 2003, p. 297). This is a factor in the Solwara 1 case, as local communities' have suddenly had to consciously articulate longstanding traditions in order to demonstrate a connection to the sea, something they never had to 'prove' before the existence of the Solwara 1 project. There also exists contestations around the definition of landholder or owner groups within marine environments, a central premise of tensions in the Solwara 1 project.

Weiner discusses what qualifies local people as 'stakeholders' in a mining project and how far this label can be applied. He notes that the connectiveness of environmental phenomena, such as river and land pollution, suggests that "no single mining project can be considered to have an exclusively "local" placement – they are all regional in their impact, involvement and consequences" (Weiner, 2004, p. 6-7). This is indicative of the nature of mining developments to affect more than simply the immediate geographic locale, as is evident historically in mining developments in PNG (Golub, 2014; Jacka, 2015), particularly the Ok Tedi Mining Disaster, which devastated communities along several hundred kilometres of the Fly River (Kirsch 2014). In the case of Solwara 1, many people outside of the immediate locale have invested in resisting the project, due to the national importance ocean health and wealth is perceived to have. Acknowledging this fact, Jacka writes that 'cultural and environmental change is inextricably linked' (2015, p. 6). In the perspective of the local communities affected by the Solwara 1 project, the Barok and Mandak peoples, the change to their natural environment as a result of DSM will ultimately lead to a change in cultural practices and traditions.

As regards the final stakeholder group, the fourth estate are increasingly recognised as an important and vocal stakeholder, and typically hold a relationship with at least one of the three other groups (Banks & Ballard, 2003, p. 304). In cases where they are aligned with local communities, NGOs oppose mining and work in a role that supports the voice of local people and the conservation of the environment (Banks & Ballard, 2003, p. 304). As I show in my thesis, such critical voices are often joined by those from social media and the scientific community to mount a largely unified collective discourse that criticises

the perceived short sightedness of both the company and the national government and also their inclination to reproduce erroneous and deliberately misleading 'facts' that drastically downplay the ecological impacts of DSM.

Although this thesis joins a large collection of work that focusses on mining in Melanesia, it is unique in the sense that it is among the first to examine the relatively new industry of DSM from an anthropological viewpoint. As Solwara 1 is yet to commence production, I deal with the *prospect* of a mine, and for this reason discourse is taken as a productive lens through which to make observations and gain an understanding of Solwara 1's complexities.

1.2 Plural Realities: The Discursive Construction of Solwara 1

The theoretical framework I employ in this thesis to understand the political interplay of the four stakeholder groups mentioned above is that of discourse, a concept I borrow from French theorist Michel Foucault. Foucault viewed discourses as ways of "constituting knowledge, together with the social practices, forms of subjectivity and power relations which inhere in such knowledges and the relations between them" (Weedon, 1987, p. 108). Therefore, discourse is a way of thinking, talking and knowing about a certain issue, topic or phenomenon that is constructed in particular ways to support different subjectivities and power relationships (Foucault, 2002).

Power is intrinsic to discourse. Hannigan notes that "contemporary discussions of discourse inevitably link it to the exercise of power" (2016, p. 5). Further, "discourse takes the form of an ongoing cultural contest in which some players possess more resources than others" (Hannigan, 2016, p. 5). This suggests that the playing field of discourses will often, if not always, be uneven. One or more discourses will ultimately be 'stronger', or carry more political weight, than the others, and exert more influence over the way 'the game' is played. Espinosa builds on this, stating that "discourses influence people's engagement with each other and the environment, legitimise or ridicule certain systems of knowledge, encourage or belittle different political actions, and

appraise or degrade specific social identities” (2014, p. 394). Despite these varying levels of power and influence, Foucault argues that no discourse is necessarily true, false, or more accurate than others, but is merely the perspective of that particular group (Miller, 1990, p. 117), a position that informs my own perspective on Solwara 1. I will not argue for the veracity of one particular discourse, but am rather interested in exploring the unique characteristics, interrelationships, and political consequences of each.

To help interpret the interaction between competing discourses, I will use the concepts of ‘cartographies of power’ and ‘zones of entanglement’. Stead’s concept of ‘cartographies of power’ refers to the collision of ways that people talk about land and power. This mirrors the discursive situation of Solwara 1 and can be extended to the ocean. In a customary or indigenous sense, power is embedded in people and the land. With increased globalisation, however, indigenous people “are drawn into cartographies within which they are positioned as marginal, where the sites, agents and processes of modern power are located elsewhere” (2017, p. 3). As this thesis will highlight, there is a similar collision of ways in which different groups discuss and treat the ocean as well. Bainton and Owen’s concept of a ‘zone of entanglement’ can also be linked to cartographies of power. This refers to the complexity of a large-scale mining development and acknowledges the varying relations and dialogues between different actors and institutions (2018, p. 1). Thinking further about the issue of these entanglements and complexities, Dryzek notes that “the more complex a situation, the larger the number of plausible perspectives upon it” (2013, p. 9) This perspective vividly exemplifies my own approach.

I argue that each key stakeholder group articulates its own unique discourse on Solwara 1 and its relationship to the surrounding people and environment. While avoiding essentialising each group, the way in which each group constructs their discourse is strategic and aims to advance particular interests and objectives. I also acknowledge that each discourse has its own complexities and varying internal diversity.

First, Nautilus advances a discourse of a marine environment that humans do not have any cultural or economic connection to. In so doing, Nautilus sidesteps the issue of potential local claims to ownership over the Solwara 1 site, making the development of the mine seemingly straightforward. Nautilus have consulted with local communities who have voiced their varying concerns about the project and their connection to the seascape, and yet they still maintain the position that no local communities have a meaningful connection to the project site. The way in which Nautilus has constructed their discourse ensures that no compensation is required, a strategic reason for adopting this particular stance.

The discourse of the national government is centred on economic gain, which is framed as an opportunity for national development. This position avoids the needs and demands of its citizens as well as the impact upon the natural environment. Like Nautilus, the national government also has much to gain by refusing to acknowledge any cultural connection its citizens have to the Solwara 1 site. The national government, I argue, is following an historical pattern of negligence in terrestrial mining that prioritises economic gain over environmental loss and dire social impacts. This runs the risk of creating similar impacts that have occurred in mining developments in the past, though this time these will take place in the marine environment and among coastal communities. Filer and Gabriel are critical of the PNG national government, stating that citizens labelling Solwara 1 as a criminal or illegal project is reflective of a government that has failed to align its own legislation and policy with that of international DSM standards (2018a, p. 9). While the position on Solwara 1 is strong and united at a national governmental level, discursive expressions at a lower, local level of government do not emulate higher powers, but rather that of their constituents. Perhaps this too is strategic, and local political officers are aligning themselves with their local communities in order to gain popular political support.

The discourse of local communities is ultimately a voice of protest and resistance. While being wary of homogenising Papua New Guineans as sharing

one uniform view on mining, this discourse echoes the positions commonly held by Melanesian communities that have been affected by mining developments in the past (e.g. Kirsch, 2007). While communities affected by terrestrial mines may have been welcoming of projects in their early stages, by the final stages of mining, locals often became frustrated or aggrieved by broken promises or degraded environments. The attitudes surrounding the Solwara 1 project are different in the sense that local people are aware of the impacts of terrestrial mining and have resisted the project from the outset, an attitude that can be explained as much by their exclusion from being recognised as resource owners (and thus beneficiaries of the development) as it can from a simple valorisation of cultural tradition.

The discourse of resistance is characterised by pleas for better information, concern over the experimental nature of Solwara 1 and the likely negative impact it will have on the ocean and local cultural traditions. I explain the local discourse using Ingersoll's concept of "seascape epistemology" (2016). At a basic level, this refers to the connection that coastal peoples have to the sea: "It is an approach to knowing presumed on a knowledge of the sea, which tells one how to move through it, how to approach life and knowing through the movements of the world. It is an approach to knowing through a visual, spiritual, intellectual, and embodied literacy of land and sea" (Ingersoll, 2016, pp. 5-6). A seascape epistemology is what, I argue, informs the local discourse and response to the Solwara 1 project. This is particularly evident in the way that people perceive the project as interfering with the seascape and threatening their ocean-based lifeworld.

NGOs and the scientific community are an increasingly important part of the stakeholder model, and form a discourse of opposition to the Solwara 1 project. While this discourse parallels that of local communities, it is important to remember that the motives of these groups are different. In particular, while local communities are advocating for the protection of their natural environment and cultural traditions, the fourth estate tends to take on the role of 'speaking up for the little guy' while holding Nautilus and the national government

accountable for their actions. This dovetails with Kirsch's opinion that NGOs have an increasingly dominant role in informing affected communities and challenging corporations on various problems caused by mining (2014, p. 2). Similarly, Banks and Ballard note that NGOs have the ability to create negative publicity for mining companies and projects (2003, p. 304).

1.3 Methodology: Capturing Talk

The aim of this thesis is to gain insight into how the stakeholders of Solwara 1 have constructed their own unique discourse of the project in anticipation of its commencement. I argue that each stakeholder serves their own interests and benefits by advancing their particular stance on Solwara 1. To illuminate each discourse, I conducted a literature search to obtain data on how these stakeholder groups discuss the project, peoples' relationships to the sea and the exploration area, as well as how each group relates and reacts to other stakeholders' perspectives.

While no ethnographic fieldwork informs this thesis, access was gained to discursive constructions mainly through obtaining bureaucratic artefacts, such as Nautilus reports and media releases, media reports, and social media. I have also supported my analyses with regular references to relevant pieces of Melanesian ethnography. Through its documents, Nautilus maintains a firm position on the advantages of the project and attempts to discredit the discourse of local communities. Media reports tend to be the key way in which government officials communicate their perspective on the project, and increasingly social media is used by local communities to mobilise and protest against the Solwara 1 project. In the absence of a large body of ethnographic studies in the locations nearest to the extraction site, wider Melanesian ethnography is used to inform an understanding of the ways in which coastal Melanesians have shown to connect and relate to the sea.

The essence of the methodology used in undertaking this thesis is therefore focused on 'capturing talk'. I am concerned with distilling the various

statements, comments and actions of the four different stakeholder groups into four unique discourses. For the purposes of this project, I will refer to discourses synonymously with the word 'voices'. The title of this thesis, *A Sea of Voices*, aims to encapsulate my presentation of the main stakeholders' perspectives, but also suggests that while I have chosen four groups to focus on for analytical clarity, there is ultimately an extensive and complicated network of actors and groups involved in the Solwara 1 project. This draws upon Hau'ofa's influential piece 'Our Sea of Islands' (1993), which argued that islands in the Pacific are a complex and interconnected sea of islands, rather than merely isolated islands in the sea. While my methodology has focused on capturing talk, I will also explore the political and social effects of these discursive statements.

1.4 Structure and Overview

Following this introduction, chapter two focuses on the company behind Solwara 1, Nautilus Minerals Inc. Chapter three examines the role of the PNG government, in the process drawing particular attention to the contrasting levels of support different levels of government have for the project, as well as the potential for Solwara 1 to contribute to a long legacy of governmental mismanagement of mining activity. Ultimately, this chapter will communicate that the voice of national government is characterised by support for the project and Nautilus, but neglects legislative, environmental and social responsibilities.

Chapter four centres on the voice of local communities and their response to Solwara 1. It begins with an overview of their resistance to the project, followed by a discussion of comparative ethnographic material from the Pacific, Melanesia and PNG that emphasises coastal peoples' longstanding and deep connection with the seascape. The stakeholders of the Solwara 1 project clearly perceive the marine environment as having different cultural and ontological potentials, which is the basis for the conflicts between the discourses of locals and the mining company.

Chapter five examines the fourth estate in the Solwara 1 project. Their response is aligned with that of local communities, and can be characterised as a strong critique of the mine as well as supportive of the message local people are trying to communicate. This continues a long standing and important role the fourth estate has played in the development of terrestrial mining, and suggests that NGOs in particular will remain critically involved as DSM progresses.

Chapter six concludes the thesis and touches on recent developments in the Solwara 1 project. I consider how my findings reflect upon the main currents within the anthropology of mining, particularly in terms of how local communities are politically positioned in relation to state and corporate interests. I also point out that recent developments suggest that Nautilus is increasingly entering 'hot water' instead of deep water, and that the future of the Solwara 1 project could be in jeopardy.

2. The Voice of the Mining Company

This chapter begins by exploring the company behind Solwara 1, Nautilus Minerals Inc. (to be referred to as 'Nautilus'), and examines what its interests are in the wider Pacific and specifically PNG. This shall be followed by a discussion of Nautilus' environmental impact statement (EIS) as well as other reports commissioned by the company. It is the goal of this chapter to demonstrate that through these reports, Nautilus creates a discourse that separates culture from the sea, and minimises the totality of relationships that local New Ireland communities have with their marine environment. Additionally, the voice of the company also presents a picture of local communities being supportive of the project, and as a development that will have a minimal impact on the environment, a process Bowen (2014, p.2) calls 'corporate greenwashing', that is, the appropriation of the language of sustainability by mining corporations (Bowen, 2014, p. 2). In simpler words, a project that organisers purport as being 'green' or 'eco-friendly' may use public relations to hide a dirtier reality (Beder, 2000, p. 30).

In relation to their four fold model of stakeholders, Banks and Ballard refer to the corporation as the central element in a mining project and ultimately the factor that 'unites the field' (2003, p. 290). Additionally, they state that paying "closer attention to the internal structure and politics of mining companies", which anthropologists have found difficult to penetrate, "has the potential to offer rich insight into the anthropology of multinational capital and its global processes and local entanglements more generally" (2003, p. 290). It is therefore important to include a discussion of the company at the heart of Solwara 1. I have approached this through an examination of Nautilus' written and commissioned documents that are designed to support the project or inform shareholders.

2.1 Nautilus Minerals Inc.

Nautilus is a Canadian company that is endeavouring to become the world's first successful DSM multinational corporation (Jamasmie, 2016). The company was founded in 1987, yet no information can be found of Nautilus' interests or operations prior to the beginnings of Solwara 1 in the early 2000s. Nautilus has two major shareholders, MB Holding Company LLC and Metalloinvest Holding (Cyprus) Limited, who respectively hold 30.4% and 19.2% shares (Nautilus Minerals Inc, 2018). It is unclear exactly what groups constitute the remaining minor shares of the company, however Anglo American, one of the world's largest multinational mining corporations, were former shareholders. They withdrew their share in May 2018, citing that their investment in the project "was inconsistent with its commitments to sustainability, human rights and environmental stewardship" (Radio New Zealand, 2018b). This is an absolutely crucial point to consider, and begs the question as to why a mining corporation is more concerned with the environmental risks of Solwara 1 than either Nautilus or the national government.

The two main shareholders of Nautilus have formed Deep Sea Mining Finance (DSMF), which is tasked with securing the funding for Solwara 1 (BankTrack & Deep Sea Mining Campaign, 2017). As of June 2018, Nautilus had borrowed a total of US\$11,250,000 with a further US\$22,750,000 available under the loan agreement with DSMF (Nautilus Minerals Inc., 2018).

Due to the nature of Solwara 1 as being a 'world first' venture, it is sensible to examine the history of Nautilus Minerals and whether the corporation's past can help predict the outcome of this particular mining project. In particular, it is important to observe that many members of management have previously been involved in mining projects that caused environmental and social harm in PNG such as Lihir, Porgera and Panguna (Nautilus Minerals Inc., 2015, p. 66-67).

2.2 Nautilus in the Pacific

In addition to PNG, Nautilus is also interested in other areas of the Pacific. The company holds exploration licenses in Fiji, Tonga, Vanuatu, Solomon Islands and the Clarion-Clipperton Zone (CCZ) in the eastern Pacific off the coast of Mexico (see figure 3 next page). In all of these locations (including PNG), Nautilus is concerned with extracting the same type of mineral, seafloor massive sulphides (SMS) (Jankowski, 2012, p. ii).



Figure 3: Nautilus' Areas of Interest in the Pacific

It is unclear exactly how Nautilus is currently involved in these Pacific nations, as for the majority of these projects, the most recent information accessible is from 2012. As of 2012, Nautilus had applied for a total of 17 prospecting licences (PL), for the purposes of locating, evaluating and sampling mineral material in Fiji and were granted 14 (Jankowski, 2012, p. 14). The company also held 41 PL in Vanuatu (Jankowski, 2012, p. 23), and 92 PL in Solomon Islands (Jankowski, 2012, p. 16). In Tonga, Nautilus held 16 PL and has applied for a further 30 (Jankowski, 2012, p. 11). In this case, however, it is known that Nautilus began its exploration during 2008 (Matangi Tonga Online, 2008) and employs a country manager

(Nautilus Minerals Inc., 2015, p. 67). In relation to prospective mining in Tonga, a report prepared for Nautilus explicitly states that the “tenements do not include any habitable land or coastal waters; there is no requirement to negotiate access rights with local landowners” (Jankowski, 2012, p. 31). This mirrors Nautilus’ stance regarding Solwara 1, and will be discussed further below. From the information available, it would seem that Nautilus has a solid grip on DSM operations in the Pacific, and will be a big player in the industry going forwards.

There is greater detail available surrounding Nautilus’ involvement in the CCZ, which is likely due to the level of importance and mineral potential the area holds for the company. The CCZ venture is not being operated through Nautilus itself, but its subsidiary, Tonga Offshore Mining Limited (TOML). TOML is ‘sponsored’ by the Tongan government (note there is no information that details their involvement any further than this) (Nautilus Minerals, n.d.-b), and perhaps foreshadows the direction the Tongan government will take in DSM within their own country. This move also demonstrates the willingness of the Tongan government to participate in transnational capitalism, which values economic gain over environmental or social damage (Schultz, 2014).

Nautilus has projected that the CCZ has a mineral resource base of 685 million wet tonnes (natural state of extracted material before processing) (Jamasmie, 2016). Due to its significant mineral wealth, the CCZ has attracted a lot of world interest. Other companies who hold various licences in the CCZ are from Germany, Korea, Russia and the United Kingdom amongst others (Nautilus Minerals, n.d.-b). Unlike Solwara 1 and other potential DSM project sites, the CCZ is unique in the sense that it falls outside of Exclusive Economic Zones (EEZ) and is thus bound by different regulatory bodies and frameworks. The International Seabed Authority is the body that has the authority to govern and issue licences in this area (Vella, 2015).

Nautilus has also applied for an exploration licence along the Kermadec Arc within New Zealand’s EEZ, an area totalling 50,000 square kilometres (Clark, 2015). No comment can be found on the state of the application. In past years,

New Zealand's Environmental Protection Authority (EPA) has declined applications for DSM due to the significant environmental threats posed (Jamasmie, 2015). The EPA have, however, granted an application for the mining of iron sand off the Taranaki coast, which will still be permissible irrespective of a recent decision to ban offshore oil and gas exploration in NZ (Young, 2018). The ban does not include DSM for minerals. The area that Nautilus is interested in is also the proposed site of the Kermadec Ocean Sanctuary, which would render 620,000 square kilometres of sea as one of the world's largest marine reserves (McCormack, 2018), and prohibit mining activity.

2.3 Nautilus in Papua New Guinea

Solwara 1 is the primary focus of Nautilus (Nautilus Minerals Inc., 2015, p. 5), but the company has a wider interest in PNG. Solwara 1 is effectively only a small part of a greater area within which Nautilus holds, or have applied for, a large number of exploration licences (Lipton, 2012, pp. 1-2). The map above (see figure 4) demonstrates that Nautilus' sights are not only focused near the coast of New Ireland, but almost the entire expanse of the Bismarck Sea. Within this area are a further 18 sites of interest, which the company has labelled Solwara 2 through to 19 (Lipton, 2012, p. 2). Exploration and testing has occurred in all of

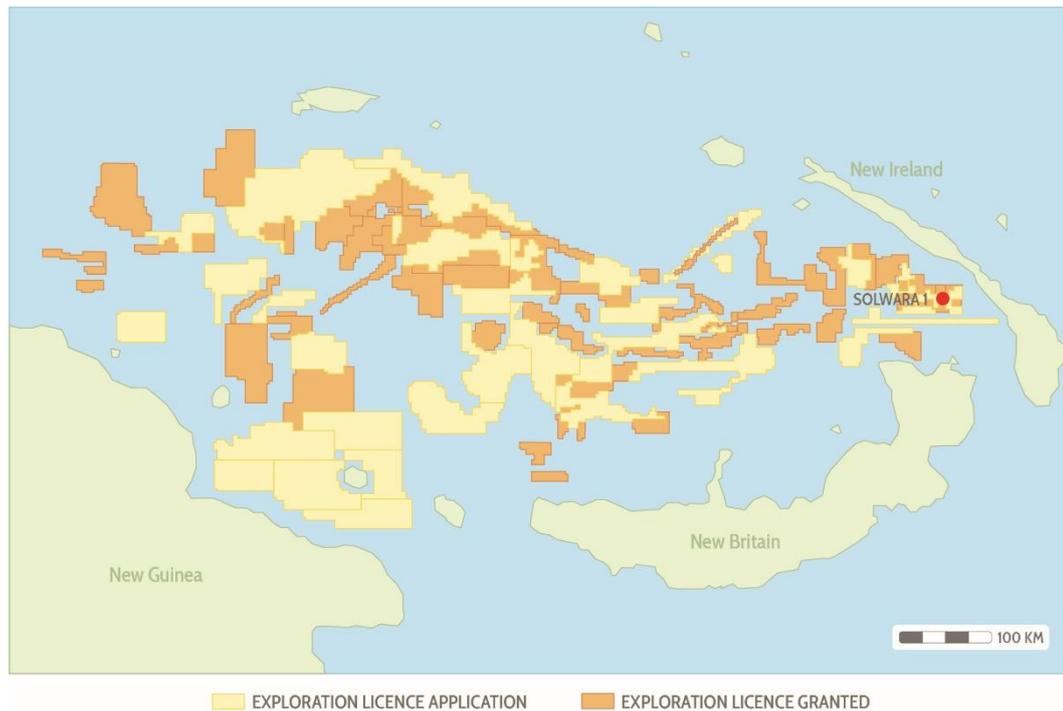


Figure 4: Extent of Nautilus' Exploration Licences within the Bismarck Sea, as of 2012

these sites, with Nautilus directing particular attention towards Solwara 12 due to promising levels of mineral deposits (Lipton, 2012, p. 7).

One of the main reasons Nautilus cite for their interest in PNG is the high grade of minerals found during exploration. The average grade of Solwara 1 gold deposits is four times higher than terrestrial deposits, and the copper grade is ten times higher (Clark, 2015). High grades of minerals result in less effort required in extraction as the mineral percentage in each tonne of ore is greater (Lioudis, 2018). The high grade of minerals found at the bottom of the Bismarck Sea, as well as the numerous licences held by Nautilus to explore this area, suggests that Nautilus will likely maintain its presence in PNG long after the mining of Solwara 1, should it go ahead successfully.

2.4 Nautilus and Solwara 1

Nautilus have produced a range of reports and documents that are designed to support their Solwara 1 venture and also to comply with the relevant regulatory

frameworks of PNG. This section examines a key document, the Environmental Impact Statement (EIS), which is legally required by the Environment Act (2000), as well as the company's third party and annual reports. These documents and other media demonstrate that Nautilus maintains an unequivocal stance that completely separates culture from sea, and thus posits that there are no direct local owners of the area being developed. This is of strategic significance to Nautilus. Having no local claims to the area under development constructs an easily accessible site with no compensation payments attached.

2.4.1 Environmental Impact Statement: “No Landowner Issues”

The Nautilus EIS was undertaken by Coffey Natural Systems in 2008. The document provides an overview of the Solwara 1 project in addition to an assessment of its viability, the consultation undertaken by Nautilus, the timeline of completion, and the existence of potential hazards. It also discusses the relevant legislative frameworks within PNG as well as environmental and socio-economic factors. This section focusses on how the EIS frames Nautilus' compliance with the Environment Act (2000), Mining Act (1992) and PNG Constitution (1975), as well as engagement with local communities

Most importantly, from a legal standpoint, Nautilus have satisfied a crucial part of the Environment Act (2000) by submitting an EIS to the Department of Environment and Conservation (DEC) in September 2008. Within the EIS, emphasis is placed on showing how Nautilus will fulfill the requirements of the Environment Act (2000) by completing an Environmental Impact Statement (Coffey Natural Systems, 2008, s.3.1). The acceptance of the statement, by DEC means that the director is satisfied with the EIS and is convinced that all measures to minimise any environmental harm have been addressed. This is, of course, a dubitable decision when seen against the withdrawal of Anglo American from the project on environmental grounds.

The EIS states that Solwara 1 is unique in the sense that, unlike terrestrial projects, there are perceived to be “no direct landowner issues” and thus “no direct impacts” on people (Coffey Natural Systems, 2008, s.1.4). The report goes on to say that “the Project has necessarily shifted the consultative focus from landowner issues (as there are no direct impacts) to the more international scientific input” (Coffey Natural Systems, 2008, s.1.4). This is a discursive manoeuvre by Nautilus that achieves much in terms of sidelining local people. By actively removing local communities from the environment, Nautilus seek to disqualify their claims of resistance and also abolish any potential rights to compensation. Within their discourse, the only possible category that people can fit into is that of ‘landowners’; they outrightly exclude the idea that local communities may not only be owners of land but also have deep connections to marine spaces. Nautilus have upheld this position, which can be demonstrated in the overarching theme of the documents used as supporting studies for the EIS. All of the 15 titles are scientific reports (Coffey Natural Systems, 2008, s.1.7-s.1.8) and do not consider social or cultural impacts in any detail. This global scientific trajectory also connects to a theme that emerges across the entirety of the EIS, whereby Nautilus seems to emphasise its efforts with Solwara 1 as setting a scientific precedent for the rest of the world.

Despite the claim that Solwara 1 does not have any impact on local people, public consultation must be included as part of the application process. Within the Environment Act (2000), consultation includes making the EIS available to the public, which Nautilus has done on its website, with versions in both English and Tok Pisin, a *lingua franca* in PNG (Coffey Natural Systems, 2008, s.4.1). A comprehensive table of stakeholder engagement is detailed in the EIS. Participants in this process included various state actors, provincial governments, communities, NGOs, industries and academics (Coffey Natural Systems, 2008, s.4.2-4.3). The stakeholder engagement process included roughly 3,000 people during 40 various events (such as town hall style meetings and sessions intended to educate local communities about the project) between March 2007 and July 2008. While the majority of people involved are from New Ireland, and PNG

more broadly, these participation figures also represent people from the United States and Australia (Coffey Natural Systems, 2008, s.4.5-s.4.6). In summarising meetings in Namatanai, New Ireland, which attracted over 2,000 people, the report states that “the majority of attendees were generally positive while not expressing full support” (Coffey Natural Systems, 2008, s.4.7), a highly ambiguous description of local attitudes. To say that local people are ‘generally positive’ is a rhetoric that is not supported in reality, as local communities are largely against the Solwara 1 project (BRG Films, 2015; Nithi, 2016; Davidson & Doherty, 2017).

The primary concerns voiced at these meetings are also listed in meeting summaries and include impacts to traditional practices such as sharkcalling as well as environmental impacts including the degradation of fish and marine life (Coffey Natural Systems, 2008, s.4.7). The EIS does not demonstrate whether or how Nautilus responded to these concerns at the meetings, nor are they addressed within the report. This, perhaps, suggests that they are considered irrelevant by Nautilus, or that Nautilus have downplayed their significance within the report. By doing so, Nautilus effectively expunge local people and their culture from social reality, in turn demonstrating how the process of discourse results in social effects.

The EIS concluded that stakeholder engagement demonstrated ‘good support’ for Solwara 1 (Coffey Natural Systems, 2008, s.1.3). In complying with EIS standards, Nautilus also stated that it will maintain regular contact with various stakeholders in government agencies at all levels (Coffey Natural Systems, 2008, s.1.5).

A further method of consultation is also required by the Mining Act (1992), before a lease is granted. This requires the Minister to convene a Development Forum “to consider the views of those persons whom the Minister believes will be affected” by the granting of a mining lease (s.3.1). It is at the Minister’s discretion to invite those whom he feels fairly represent the company, landholders and national and provincial governments (s.3.2). Filer and Gabriel

note that the two forms of consultation (Development Forum and Stakeholder Engagement as part of the EIS) are not connected nor are they strictly enforced (2018b, p. 396). There is no information available to confirm whether or not the full Development Forum processes went ahead before the granting of the mining licence for Solwara 1.

The discussion of Papua New Guinea's Mining Act (1992) within the Nautilus EIS focusses on the right that Nautilus has to enter into agreements with the national government concerning the development of Solwara 1. It is stated that, within the Act, ownership of minerals is vested in the state and also that the extraction of minerals on the seafloor within PNG waters is permissible (Coffey Natural Systems, 2008, s.3.1). This state ownership is recognised by Nautilus' agreement to pay a royalty. Two percent of all mineral income is to be paid by Nautilus to the PNG government, as well as an additional 0.25% to the Mineral Resources Authority (Lipton, 2012, p. 20). Because of their distance from the project area, local communities are excluded by Nautilus from any claims of ownership and will therefore not benefit directly from Solwara 1, a discrimination which fuels their discursive resistance. Fundamentally, the granting of Nautilus' mining licence in 2011 demonstrates that the Minister for Mining of the time, John Pundari, viewed Solwara 1 as a viable development, and that the company would comply with good industry standards and cause minimal harm to the environment.

In the EIS, Nautilus also refer to the constitution of PNG. This document offers somewhat of a different perspective to the Mining and Environment Acts and created a challenge for Nautilus to address. A greater emphasis, for example, is placed on conservational goals and the accruing of benefits to current and future generations, as displayed in an excerpt quoted by the EIS from the fourth national goal:

“We declare our fourth goal to be for Papua New Guinea's natural resources and environment to be conserved and used for the

collective benefit of us all, and be replenished for the benefit of future generations” (1975).

This goal is included in the Nautilus EIS which states that Solwara 1 is consistent with the Constitution as the project “presents a potential new source of income and growth for PNG from a resource that has yet to be utilised” (Coffey Natural Systems, 2008, s.1.3). The language in the above quote can also be described as the terminology of ‘greenwashing’, employed to present an image of Solwara 1 and DSM as more sustainable than terrestrial mining.

Although Solwara 1 will not result in any compensation for local communities, the report emphasises collective economic benefit. It lists the ways in which Nautilus will achieve this, including the provision of opportunities for training, education, employment and local business growth, as well as various monetary benefits. The report, however, is not clear about what level and to whom these benefits will accrue. Additionally, it claims that Solwara 1 will contribute towards an “ongoing generation of human and financial capital in PNG, which will underpin further economic and social development in PNG” (Coffey Natural Systems, 2008, s.1.3).

While it is emphasised throughout the EIS that Nautilus has been compliant with the fourth goal, the full description of the goal has not been discussed. When seen in its entirety, the fourth goal conflicts with Solwara 1, and states that:

“WE ACCORDINGLY CALL FOR—

(1) wise use to be made of our natural resources and the environment in and on the land or seabed, in the sea, under the land, and in the air, in the interests of our development and in trust for future generations; and

(2) the conservation and replenishment, for the benefit of ourselves and posterity, of the environment and its sacred, scenic, and historical qualities; and

(3) all necessary steps to be taken to give adequate protection to our valued birds, animals, fish, insects, plants and trees” (1975).

Upon reading this section, it is perhaps clear as to why this part is omitted from the Nautilus EIS. This second half of goal four conflicts with the aims of a successful EIS as it reveals how Solwara 1 could contradict part of the constitution. One might also question why Nautilus did not choose to include what is the only mention of the seabed in the three important pieces of legislation relevant to the project. These factors reflect an emerging theme: environmental harm is downplayed or systematically erased in order to push economic gain. This will be discussed further in later chapters, particularly in relation to the government’s history with regard to terrestrial mining, which reflects a similar historical neglect.

2.4.2 Earth Economics Report

Nautilus commissioned the Earth Economics report (carried out by employees Batker and Schmidt) as an ‘independent’ assessment of the environmental and social dimensions of Solwara 1. Earth Economics is a non-profit organisation based in Washington D.C., U.S.A., that works with clients to “identify and place a dollar value on what nature provides” (Earth Economics, n.d.). This description neatly encapsulates the financialisation of nature, and is the epitome of a capitalist logic that seeks maximum economic return from whatever can be capitalised (Clark & Hermele, 2013; Baumol, 2004; West and Brockington, 2012). These notions are also reflected in the name of the company, ‘Earth Economics’.

The bulk of the report compares known or potential impacts between Solwara 1 and three terrestrial mines. These include the Intag mine, situated in Ecuador, Prominent Hill in South Australia, and Bingham Canyon in the Oquirrh

Mountains of Utah. The choice of these particular mines to use as a comparison to Solwara 1 is questionable, as they each have widely variant environmental, social, and political factors. Some of the features compared include medicinal and 'ornamental' resources (referring to resources used to produce medicines and clothing, items of worship, jewellery), climate stability and pollution. The report also discusses impacts to 'cultural services' under headings including 'natural beauty', 'cultural and artistic inspiration' plus 'spiritual and historic' (Batker & Schmidt, 2015, pp. 64-66). Under cultural and artistic inspiration, the report states that there are no such values at the site and no intangible connections, as "Solwara 1's location on the deep seabed means that no indigenous cultures have developed a connection to this area" (Batker & Schmidt, 2015, p. 64). This statement is crucial to the Nautilus discourse as it flatly denies any cultural connection that local communities have with the sea.

Such comments are disputed by local communities, who oppose the Solwara 1 project largely due to their asserted connection to the sea. They also conflict with Nautilus' stakeholder engagements and meetings, wherein it was acknowledged that local communities were concerned over the impacts of Solwara 1, particularly regarding the tradition of sharkcalling (Coffey Natural Systems, 2008, s.4.7). Despite this awareness, Nautilus have purposefully dismissed local perspectives. In doing so, the mining company is further advancing their own interests, as actively dismissing any claims local people have to the sea ensures their operations will sidestep what has historically been the Achilles heel of multinational mining corporations in Melanesia, landowners.

The Earth Economics Report acknowledges that Solwara 1 is located in the same region as one of the world's most biologically diverse marine areas known as the Coral Triangle. This area comprises only 2% of the world's seafloor but contains 37% and 76% of the world's fish and coral populations respectively (Batker & Schmidt, 2015, p. 25). While highlighting this fact, the report concludes that Solwara 1 will have no impact on this area as "the proposed Solwara 1 mine site is not near the coral reef area" (Batker & Schmidt, 2015, p. 25). All reports obtainable, however, include PNG and the Solwara 1 area as undoubtedly part of

the Coral Triangle (World Wildlife Fund, n.d-a; Pavid, 2018; Asian Development Bank, 2014). Further, this region is claimed to sustain and support the livelihoods of over 120 million people, and is referred to as “the world’s centre of marine biodiversity” (World Wildlife Fund, n.d.-a). Due to the uncertain impacts of DSM, it is in Nautilus’ best interests to portray Solwara 1 as existing outside of this diverse ecological area due to the public relations disaster that any environmental damage may produce.

2.4.3 Coastal Area of Benefit

On their sister website, ‘Nautilus Cares’, the company reiterate their stance that “there are no directly affected communities” (Nautilus Minerals Inc., n.d.-d) in the case of Solwara 1; which according to Nautilus “sets it apart from traditional mining” (Nautilus Minerals Inc., n.d.-d). Despite this, the company states that it will keep communities informed, and create an area called the Coastal Area of Benefit (CAB) (Nautilus Minerals Inc., n.d.-d). The CAB covers the local level government (LLG) ward in closest proximity to the Solwara 1 site and three adjacent wards in each direction along the coast (Nautilus Minerals Inc., n.d.-d). Nautilus does not give more detailed information regarding the names of these wards, however Filer and Gabriel state that the ward closest to the project site and thus the centre of the CAB is Rasirik (see figure 5 next page), in the Namatanai Rural LLG (2018b, p. 398). Despite being labelled a Coastal Area of Benefit, Nautilus do not actually confirm what this benefit shall consist of. They only say that the CAB area “covers the communities who have the greatest interest in understanding the project and this will be where many of our CSR

(corporate social responsibility) programs will be implemented” (Nautilus Minerals Inc., n.d.-d).



Figure 5: Location of Rasirik, the centre of the Coastal Area of Benefit

Despite Nautilus’ purported engagements with local communities, no singular or clearly defined community arose that could be identified as being ‘mine affected’ or a ‘project land owners’ group emerge from which a social licence could be obtained (Filer & Gabriel, 2018b, p. 398). Filer and Gabriel state that in order to gain a “social licence to operate...the solution to this particular problem was to produce an artificial community that has come to be known as the “coastal area of benefit”” (2018b, p. 398). The idea of mining corporations obtaining a social licence was first introduced by the World Business Council on Sustainable Management as a benchmarking measure of ensuring sustainable development that also accounts for social factors (Filer & Gabriel, 2018b, p. 394).

There has been much discussion surrounding what group of people should be involved in determining the social licence, whether civil society or local communities (Filer & Gabriel, 2018b, p. 394-395). Filer and Gabriel suggest, however, that there is no clear answer to this as the social licence is only meaningful for corporations (2018b, p. 395) and ultimately, corporate actors are

able to manipulate the social licence in order to suit their own needs (Filer & Gabriel, 2018b, p. 398). Further issues can be seen in how the CAB is categorised, as Nautilus made the decisions regarding how the area was defined (Filer & Gabriel, 2018b, p. 398). Filer and Gabriel are critical of Nautilus' overall negotiations and what standard they may set for future DSM projects. The authors state that "even if some sort of settlement can be negotiated in respect of the world's first deep sea mine, it may still fail to constitute a precedent that will make it any easier to prove the existence of 'community support' for those that follow" (Filer & Gabriel, 2018b, p. 399). There is clearly a tension within the Nautilus discourse between there being no landowner issues and yet claiming a responsibility towards people, as demonstrated in the creation of the CAB. Nautilus erases claims to ownership but simultaneously constructs the 'coastal area of benefit' in recognition that there are, indeed, people in the area with strong interests in the project.

2.4.4 Annual Report 2015

The most recent Nautilus Annual Report available is from 2015. The reports are a method of addressing and informing shareholders, and thus reveal how the company presents itself and Solwara 1 to its investors. The chairman of Nautilus stated that the company would mine the deep sea in an "environmentally sensitive fashion" (Nautilus Minerals Inc., 2015, p. 3), that "Solwara 1 has the potential to significantly reduce social and environmental impacts compared to terrestrial copper mining" (Nautilus Minerals Inc., 2015, p. 3) and also that "Nautilus believes that the development of the seafloor mining industry is part of the solution to meet the world's increasing demand for metal resources in an environmentally and socially responsible manner" (Nautilus Minerals Inc., 2015, p. 22). Through their annual report, Nautilus thus place a concerted emphasis on being socially and environmentally responsible, which is a claim that has been heavily criticised by environmentalists (Slater, 2018). Perhaps Nautilus is also attempting to justify any damage that may occur, arguing that the damage shall be less than terrestrial mining, and inferring that this project is ultimately for the

good of the 'community'. There is a strategic interest in Nautilus claiming that Solwara 1 is comparatively safer and more advanced than terrestrial mining; in doing so, it distances itself from mining disasters of PNG's past.

2.5 Analysis

Through various reports and media releases, Nautilus consistently maintain a distinct discourse that Solwara 1 will have no impact on local people. These particular forms of knowledge act to marginalise others, notably the local people, and allow them to advance their economic interests. First, they believe that there is a complete separation of culture from the sea. This argument is based on a deeply rooted ontological dichotomy central to Western culture. The crux of this is that, due to the distance from shore and the immense depth of the seabed, there is no way humans can have a meaningful relationship with the seascape in questions. Banks and Ballard state that the introduction of mining corporations and projects "commonly result in a variety of assaults on local understandings of community sovereignty, including the dispossession of resources and lands" (2003, p. 301). In the case of Solwara 1, Nautilus are implicated in this, as they have actively dismissed any connection local communities have to the Solwara 1 area. This discourse of disconnection is not a one-off comment from the company, but is a stance replicated across multiple forms of media and documentation.

This, among other actions from Nautilus, could be described as a form of 'corporate greenwashing', which Bowen describes as a demonstration of "merely symbolic green solutions, disconnected from the underlying environmental impacts of corporate activities" (2014, p. 5). In the case of Solwara 1 and Nautilus, this is a dual process as it can be extended to social impacts as well, and can be seen in the appearance of the company's Nautilus Cares website. The homepage is fronted by imagery of smiling children, labelled with the words 'Community Accountable' (Nautilus Minerals Inc., n.d.-a). In comparison to the main website of dark blues and somewhat ominous machinery, Nautilus Cares is a gentle lime green and overall has a softer appearance. This is an appropriation

of the language and imagery of sustainability, manipulated by the company to present a rhetoric that may depart from reality. Ultimately, it could be said that the reason for Nautilus appropriating this language and imagery of sustainability is to transform negative views of mining into a positive public image for the company, a challenge faced by all mining corporations around the world. This creates an image of Solwara 1 being more sustainable and technologically advanced than terrestrial mining.

To borrow a term used by West (2016, p. 5), Nautilus is creating a 'representational rhetoric' wherein local communities are perceived as completely separated from the deep seabed. There are explicit power inequities in this rhetoric. Nautilus clearly have more power and resources than local communities, and therefore more opportunity to shape a self-interested discourse.

Solwara 1 could be described as the jewel in Nautilus' crown, however it is evident that the company has wider sights and ambitions. The project in PNG is clearly what Nautilus would like to be the beginning of a DSM empire in the Pacific. Perhaps this desire to be the world's first has blurred Nautilus' vision when it comes to acknowledging a range of potential impacts upon local people. Regardless, Nautilus actively creates a discourse that minimises and ignores local peoples' connection to the sea. They have much to gain in doing this, as the company avoids all resource ownership issues that could complicate the path to Solwara 1's commencement and operations; by removing local communities from the equation, Nautilus' deep sea mining venture becomes much easier.

2.6 Conclusion

Nautilus is supported by powerful financiers, and is gearing towards being the first company to operate a successful DSM operation. While the company have a vested interest in the Solwara 1 project, it is also interested in further tenements in the same vicinity of the Bismarck Sea, in addition to multiple areas across the Pacific. The company have displayed their compliance with relevant PNG

legislative frameworks through their EIS, which has been backed up with further independent and supposedly objective reports. These have emphasised a strong discourse in which local communities will not be affected by DSM as operations are based offshore and at a significant depth, thus making it impossible for local communities to hold a connection to the sites. In a somewhat contradictory fashion, however, Nautilus have created a tokenistic Coastal Area of Benefit, perhaps in absence of a social licence. It is not clear what the CAB area explicitly is, and what benefits people will receive from it. If Nautilus have denied the possibility of local communities having a tangible or intangible connection with the sea and emphasised that people will not be affected by Solwara 1, why then have they chosen to create the CAB? The creation of this imagined group tends to imply that local communities will, in fact, be affected by Solwara 1. It could also be that Nautilus anticipated a heavy fallout to their statements regarding an absence of landowners, and the CAB is a way of quelling dissent. In the context of Banks and Ballard's analytical matrix, it is clear that Nautilus is a central stakeholder and that it has already engaged in discursively constructing the dispossession of local communities from their connection to the sea, even before mining has begun.

The next chapter examines how the government of PNG has portrayed the project. In the context of a country with an extensive colonial and post-colonial history of mining, I examine how the national government is closely involved in the project, and how this reflects in a discourse that is often ignorant of its coastal citizens' concerns and is instead supportive of Nautilus.

3. The Voice of the Government

In addition to the mining corporation, nation states have a central involvement in mining development projects for two main reasons. First, the state is responsible for regulating the entry of corporations and their workers. Second, the state sets the financial, environmental and labouring regulations that such corporations must abide by (Banks & Ballard, 2003, p. 294), in addition to granting prospecting and mining licences. The PNG national government, however, has a share in Solwara 1 and thus possesses an obvious interest in the project proceeding. With such a conflict of interest or entanglement, one might ask how a government can act objectively in regulating the corporate conduct of Nautilus. This chapter will demonstrate how the national government has crafted a discourse that is supportive of Solwara 1 at a national level. I also argue, however, that this must be seen against opposition at lower, local levels of government, thus showing how discourses may contain significant amounts of internal complexity and variation. I will briefly outline the history of mining in PNG and the government's role within this, particularly in the cases of Ok Tedi, Panguna, Porgera and Lihir. Further, I will examine the relationship between the national government and Nautilus, and present the voices of governmental actors who have shaped a discourse that is focussed on Solwara 1 proceeding. In doing so, they have seemingly ignored their legislative duty towards the environment and coastal peoples.

The government of PNG is a constitutional monarchy with a democratic parliament (United Nations, 2004, p. 2). There are three arms of government which include parliament, the executive, and the judicial system, all of which function separately in relation to their respective powers (Constitution of the Independent State of PNG, 1975, s.99). Parliament consists of members elected from open electorates and the 22 provinces, including the Autonomous Region of Bougainville and capital Port Moresby (National Capital District) (United Nations, 2004, p. 5).

3.1 History of the Government and Mining in Papua New Guinea



Figure 6: Location of Ok Tedi, Panguna, Porgera, Lihir and Solwara 1 Mines

PNG has a long history of mining, and the extractives industry has been central to development of the nation. While some may label PNG as being blessed with an abundance of mineral resources, others argue that it may instead be labelled as a 'resource curse'. Auty first used the term, arguing "not only may resource-rich countries fail to benefit from a favourable endowment, they may actually perform worse than less well-endowed countries" (1993, p. 1). If one examines the history of mining in PNG, in particular the litany of mining projects with disastrous ecological and human rights records, such as Panguna, Porgera, and Ok Tedi, it is clear that this resource curse exists. Due to this pattern, it is essential to look at the role of the government, as it is not only a key stakeholder but also possesses the power to police and scrutinise various mining projects.

The following section will use the Ok Tedi, Panguna, Porgera and Lihir mines (see figure 6 above) to show an overall theme of government mismanagement and mishandling. It is important to remember that all of these mines, with the exception of Lihir (which began in 1997) began production

before the introduction of the Mining Act 1992 and the Environment Act 2000. In most instances, all mining companies involved were not held to existing legislation such as the Environmental Planning Act, but were instead bound by their own agreements passed by the Papua New Guinea Parliament (Banks, 2001, p. 36). It is crucial to question whether such legislature would have contributed towards the government taking different courses of action.

3.1.1 Ok Tedi Mine

The Ok Tedi mine is located in the Star Mountains of Western Province. Ok Tedi Mining Limited (OTML) began mining for gold in 1984. OTML was a joint venture of Broken Hill Proprietary (BHP), the PNG government, and Inmet, a Canadian mining corporation (Banks, 2001, pp. 16-17). Despite the intention to extract gold, it soon became one of the world's biggest copper mines, producing over 400 million tonnes of ore by 1996 (World Wildlife Fund, n.d.-b).

A condition of the mining agreement with the government stated that a tailings dam was to be built to filter the waste material. Although this was met by BHP, a landslide destroyed the dam and the company successfully negotiated to continue operations without a new dam (World Wildlife Fund, n.d.-b). This led to toxic mine waste being pumped into the nearby Ok Tedi River (Hettler, Irion, & Lehmann, 1997, p. 280), a tributary of the greater Fly River.

It is estimated that 90 million tonnes of waste rock, tailings and other particles were released into the river during each year of production, resulting in a range of severe ecological impacts on the river and surrounding land (United Nations Environment Programme, n.d.). The amount of waste disposed, for example, has exceeded the carrying capacity of the river and led to the width between the river banks increasing by over ten metres. Additionally, suspended materials are said to be carried down hundreds of kilometres of river systems, including the Fly River, and can be traced in the Gulf of Papua (Hettler, Irion, & Lehmann, 1997, p. 280). Studies have reported a dramatic loss of fish stock and the dieback of rainforests along the river's edge (Bice, 2013). As a result, over

30,000 people that are estimated to live along the river are no longer able to harvest from their gardens or catch fish from the river because of health hazards, thereby drastically impacting their way of life (World Wildlife Fund, n.d.-b). In an ethnographic interview conducted by Stuart Kirsch and a discussion of the impact on local quality of life, one person pleaded that “we are hungry, we are angry, and we are not happy about the pollution” (Kirsch, 2007). Many have noted that the overtly regional impact of Ok Tedi presents a different case to mines that simply affect the communities within close proximity to the area. This is due to the mass pollution of the river system, and thus the scope for those affected becomes far wider and more difficult to address (Banks, 2001, p. 25).

3.1.2 Panguna Mine

The Panguna copper mine is located in the Autonomous Region of Bougainville (AROB). Operated by Bougainville Copper Limited (BCL, owned by Australian company Conzinc Rio Tinto), Panguna began in 1972 and was the world’s largest copper mine at the time (Agnew, 2018, p. 1). The financial success of Panguna was crucial in funding the Independence of PNG in 1975 (Havini, 2013, p. 43).

Earlier in 1964, before mining began, rights to the mining site traditionally held by the Nasioi people were stripped away by the Australian government, which was still in colonial administrative control of PNG at the time (Phillips, 2015). The Bougainville Copper Agreement (BCA) states that the Australian government were to assist the Company in carrying out mining activities and also intervene with anything that may hinder the mining process (1976, p. 8). There are also policies in the BCA for BCL to dispose of tailings and other waste in a method that is efficient and viable for the overall operation (1976, p. 25). Roughly 50 million tonnes of tailings were dumped into rivers during each year of the mining operation, destroying the ecology and surrounding land (Phillips, 2015).

In November 1988, due to many grievances concerning a lack of compensation for ecological and social harm, the Bougainville Revolutionary

Army (BRA) began their crusade against the mine and BCL by disrupting operations in any possible manner. Less than four months later, the PNG government sent in PNG Defence Force troops in an attempt to eliminate the BRA and reclaim an important state asset. After operations stopped due to the violence, the BRA continued their stronghold and showed no signs of backing down, mainly due to none of their demands being met. The BRA were also seeking the secession of Bougainville from PNG. In early 1990, the PNG government attempted to stop the rebellion, including implementing a blockade, only to withdraw a few weeks later on the grounds of an unstable ceasefire (Filer, 1990, p. 1)

Former Prime Minister Michael Somare has claimed that Rio Tinto were driving many of the actions and decisions of the government, particularly in imposing the blockade (Thomson, 2011). In a sworn affidavit Somare states that the government was controlled by Rio Tinto due to its financial presence in PNG and that BCL played an active role in Bougainville military operations by supplying many of the weapons, supplies and transport for troops. Somare argues that if it were not for Rio Tinto's involvement, the government would not have been involved in any warfare or bloodshed (Thomson, 2011).

The Panguna mine disaster has been described as the worst political and economic crisis since PNG's independence (Filer, 1990, p. 1). One could also argue that it is the biggest social crisis to occur in the country, as over 20,000 people lost their lives in the civil war (Radio New Zealand, 2018c). Despite such a violent past, current Prime Minister Peter O'Neill has made it clear that the mine could still be reopened in upcoming years and that ultimately, the national government will override any prohibition made by Bougainville (Radio New Zealand, 2018c).

3.1.3 Porgera Mine

The Porgera Mine is situated in the Porgera Valley, Enga Province. It began production in 1991 and is owned and operated by the Porgera Joint Venture

(PJV), of which the mining company, Barrick, is the majority shareholder. The remainder of shares are held by the national government, provincial government and local landowners (Golub, 2014, p. 5). Like the other mining projects mentioned in this section, Porgera has been one of the most productive mines in the world (Golub, 2014, p. 5). The project not only shares this similarity with other mines, but also its method of waste disposal. More than 95% of the collected ore is discharged as tailings into the Pongema River, a tributary of the Strickland and Fly Rivers (Golub, 2014, p. 5). Villagers who live along the river system through which tailings are deposited suffer greatly from the impacts of the waste (Coumans, 2006). Somewhat ironically, Barrick warned locals not to use the river due to the high levels of mercury and other toxic elements (Coumans, 2006), thus showing that they knew full well the impact the disposal would have, and yet took no measures to mitigate harm.

Barrick security guards are authorised to use lethal force (O'Malley, 2009) and have admitted to killing people who have wandered into the mine area and taken ore (Coumans, 2006). In 2009, police raided villages and burned down hundreds of houses (Amnesty International, 2010, pp. 3-4). On top of this, the government approved 'Operation Ipili' which involved the deployment of additional police and the heavily armed Mobile Squad in order to quash locals taking ore illegally from the mine (Amnesty International, 2010, p. 5). The mining company supported these troops by providing food, accommodation and fuel (Amnesty International, 2010, p. 5).

3.1.4 Lihir Mine

The Lihir mine is located on Lihir Island, off the northeast coast of New Ireland. Production at the Lihir gold mine began in 1997. It is owned solely by Newcrest Mining. Like the other mining projects discussed, it is also one of the biggest producers of gold in the country (Fitzgerald, 2012). The mine pumps 110 million cubic metres of waste and dumps 20 million tonnes of waste rock into the nearby harbour each year. This conflicts with the London Resolution, signed by the PNG government, which makes the dumping of waste into oceans illegal.

Lihir is also one of the six areas in PNG that is identified as having extremely rich biodiversity (Forest Peoples Programme, 2003, p. 12).

The introduction of the mine has profoundly changed local people's lives. Due to dumping waste in the sea, people have been forced to buy salt to cook with, have had their beaches lost through land reclamation and seen their villages bulldozed to make way for piles of ore (Papua New Guinea Mine Watch, 2015b). Additionally, local people also claim to no longer be able to live a Melanesian way of life as the profits of the mine have made them greedy and self-centred (Forest Peoples Programme, 2003, p. 19).

In comparison to the other mining examples included in this section, the Lihir mine sets a better socio-environmental standard, despite the issues discussed. For example, operations only began after an agreement was made between the community, the government, and the company (Bainton, Ballard, Gillespie, & Hall, 2011, p. 88). At the same time, however, the agreement does not outline any provisions or regulatory frameworks for the preservation of cultural heritage (Bainton, Ballard, Gillespie, & Hall, 2011, p. 89).

3.1.5 Underlying Themes

The examples of Ok Tedi, Panguna, Porgera and Lihir demonstrate that PNG has a troubled history of mining developments. In all cases, the government has acted in a way that puts the interests of the foreign multinational corporation and their own economic gain over that of local social and environmental impacts, which are classic features of a capitalist regime (Schultz, 2014). In some instances, the government has colluded with mining companies to perpetrate violence against aggrieved local landowners, such as in Porgera and Panguna. The repetition of these events and the problems that these cases demonstrate, shows that there has been little active effort to change the way such developments are handled. A good example of this is the Prime Minister's discussions around re-opening the Panguna mine, which ignores the history and devastation that was caused by the project. The Autonomous Bougainville

Government (ABG) led by John Momis, publicly supports this move, but the attitudes of local landowning groups are divided and contentious. Due to the chequered history of PNG mining, it is questionable whether the government's handling of Solwara 1 will be any different to that of Ok Tedi, Panguna, Porgera and Lihir. The following sections critically examine the role of the government in the Solwara 1 project, and how the discourse around DSM development is shaped.

3.2 The Role of the Papua New Guinea Government in Solwara 1

New Ireland is the province of closest proximity to Solwara 1. Its land is set to be used by Nautilus for accessing its ships, while its waters will be used for 'doing business' (Papua New Guinea Mine Watch, 2017). Like other provinces, New Ireland also consists of electoral districts which contain local level governments (LLGs) and wards within those (OLPGLLG, 1998 s.29). The National, Provincial and Local level governments are responsible for the fair allocation of any revenue generated from exploitation of the environment, in addition to ensuring traditional land rights are respected (OLPGLLG, 1998 s.1.5-1.6). Provincial and local governments are only expected to abide by national law if doing so is in the national interest, otherwise they can act autonomously (OLPGLLG, 1998 s.40d). Provincial governments have the ability to make laws over issues such as agriculture and planning, but cannot make any regarding large-scale mining projects (OLPGLLG, 1998 s.42). Therefore, in terms of the legal frameworks governing Solwara 1, provincial and local governments may have no direct involvement in shaping the legislation concerning mining activities as the national government has authority in that respect.

The following sections detail how the project is discussed by various governmental actors. I aim to demonstrate that the governmental discursive construction of Solwara 1 is heterogeneous, with national government being strongly in favour of the project, while local level representatives tending to be more critical of it.

3.2.1 National Government and Nautilus

The PNG government is not only a stakeholder due to Solwara 1 falling within state territory, but it also has a 15% share in the project (ECORYS, 2014, p. 81). ECORYS, one of Europe's oldest economic consulting agencies, argues that this could lead to a problematic conflict of interest, and question whether the government can implement regulatory frameworks in a truly objective manner given their financial interests (ECORYS, 2014, pp. 81-82). Other critics have labelled the government's decision to invest in the project as "high risk and low return" and "silly investments best left to the private sector" (Davidson & Doherty, 2017). The 15% share held by the government was, however, initially meant to be greater. In relation to a prior agreement between the two parties, the government failed to complete the purchase for a 30% share in November 2011. Nautilus then launched arbitration methods, eventually resulting in an order for the government to pay the agreed stake, plus interest (Nautilus Minerals Inc, 2013). Both parties eventually settled on 15%. This share was financed by a loan from the Bank of the South Pacific (Davidson & Doherty, 2017). This is a common practice of the PNG state, for instance, it recently borrowed 305 million kina (roughly 140 million NZD) to fund its participation in the Liquefied Natural Gas project (PNG LNG), which has made PNG a major international supplier of liquefied natural gas (PNG LNG Project 2013) Act 2012).

3.2.2 Ministers for Mining

There have been three Ministers for Mining since Nautilus was issued their mining lease. John Pundari held the portfolio between 2007 and 2011, and while not commenting on the project during his tenure, he became vocal in his following term as Minister for the Environment. Pundari stated that although the project marked a 'new frontier' and comes with environmental risk, such risks have been assessed by a range of scientists and will be monitored and managed in a satisfactory manner (Nalu, 2012).

The second minister to hold the mining portfolio was Byron Chan, son of Julius Chan and Namatanai District Member. Chan is proud that PNG will be leading the new frontier of DSM (Papua New Guinea Mine Watch, 2015a). He is strongly supportive of Solwara 1 and has avoided discussing its negative effects, mentioning these only briefly while acknowledging that the project is somewhat 'controversial' (Oxford Business Group, n.d.). From early on in the project's history, Chan has declared that there are no customary rights to the sea in PNG, and due to this, the only party to receive the benefits of Solwara 1 shall be the national government and Nautilus. In a contradictory fashion, he also encouraged landowners to support the project while emphasising their non-existent rights (Act Now PNG, 2014).

The current minister, Johnson Tuke has continued the stance of his predecessors, stating that the project shall certainly proceed, and the government has acted diligently in regards to Solwara 1 and Nautilus (Vari, 2018). Tuke has claimed that the project will cause no harm as it occurs at a depth where no life exists, where it is too dark for photosynthesis to occur and therefore is incapable of sustaining life (Radio New Zealand, 2017). However, not only is there evidence that life does exist in the depths of the ocean, there is also a probability that organisms could exist up to 10km beneath the sea floor (New Scientist, 2017). This evidence shows that little is known or fully understood about the deep sea bed, and perhaps a greater degree of caution should be exercised when dealing with this relatively unknown environment. While critiques of Solwara 1 may focus on the unknown impacts the project may have on local people or the ocean itself, it is important to consider that damage may also be done to unique species and ecosystems that humankind is yet to discover.

The attitudes of the mining ministers are unsurprising, and constitute the core of the national government's discourse around the Solwara 1 project. What is interesting is the use of bold, unscientific claims to dismiss concerns about Solwara 1. While these facts may be incorrect, it must be held in mind that such statements are part of an overall discursive effort designed to advance Solwara

1. Byron Chan echoes Nautilus' stance of there being no customary connection to the sea, which is a fundamental part of the national government discourse as well. Like Nautilus, maintaining people have no cultural connection to the sea advances the interest of the government, who stand to profit from Solwara 1.

3.2.3 Mineral Resources Authority

The Mineral Resources Authority (MRA) of PNG is a government agency established in 2005 and which is responsible for the administration of the Mining Act (1992) (Mineral Resources Authority, n.d.). The MRA has actively shaped how the response of landowners and citizens is portrayed in the media. Most brazenly, representatives of the MRA have stated that local communities are strongly supportive of Solwara 1, however this is completely denied by local landowner groups (Radio New Zealand, 2016). The agency also claims that local landowners have a full comprehension of what the Solwara 1 project entails and ultimately believe that it shall be successful (The National, 2017). Additionally, the MRA has also stated that no communities will be directly affected by the Solwara 1 project (Nautilus Minerals Inc., n.d.-d).

This position presented by the MRA arguably conflicts with its own vision and mission statements. It states that 'all Papua New Guinean lives are to be improved by the responsible management of mineral resources' and that its intention as an organisation is to create an environment where mining opportunities are maximised in order to bring about the greatest benefits for Papua New Guineans (Mineral Resources Authority, 2008). The actions of the MRA, however, do not paint a picture of an agency concerned with Papua New Guinean lives, but one wherein, once again, mining is valued at the cost of the environment and its people.

This can be further demonstrated by examining the MRA website. On the homepage, a narrative is created that portrays mining in PNG as inclusive of indigenous ways of life and ultimately positive for the nation and its people. The history of mining in PNG, for example, is framed as beginning first through

indigenous trade, while the mining sector is described as being “vibrant and progressive” (Mineral Resources Authority, n.d.). The impacts of past and contemporary mining, however, have had devastating impacts on local communities in mining areas, and the nation’s modern history is arguably anything but vibrant and progressive, as discussed in previous sections. As a governmental agency, the discourse perpetuated by the MRA must be seen as directly contributing to and strengthening the national government’s discourse.

3.2.4 Kavieng and Namatanai Districts

Ian Ling-Stuckley is the Member of Parliament for the Kavieng District of New Ireland, and also the opposition spokesman on treasury and finance. He has been particularly critical of the government’s investment in Solwara 1, referring to it as a “silly investment” (Davidson & Doherty, 2017). This perspective aligns more with the voice of local people than that of the national government, however it must also be acknowledged that there may be ulterior motives for doing so. His comment, for example, may simply reflect his position as opposition spokesman on treasury and finance, which naturally might be critical of the national government’s involvement in Solwara 1.

The voice of the member for Namatanai District should be considered particularly important due to the district’s proximity to Solwara 1. The current member, Walter Schnaubelt, takes a more carefully thought out approach than his counterpart in Kavieng. Schnaubelt agrees that the impacts of DSM are unknown and, therefore, a cause for concern and also advocates for greater clarity on the economic benefits of the mine (Radio New Zealand, 2018a) as well as for “keeping an open mind” (Gware, 2018). Schnaubelt has been criticised by local landowners for holding this position, particularly due to the impact Solwara 1 will have on sharkcalling, tuna fisheries and therefore, culture and livelihoods. It has been argued by journalists that Schnaubelt only maintains this open ended, ambivalent view to use it as political leverage or for bargaining (Gware, 2018). Compared to views of higher government officials, while Schnaubelt has not stated he is against the project, he is rationally concerned about potential

unknown impacts. This contributes towards an internal complexity within the government discourse where lower level officials are not strongly in support of Solwara 1.

3.2.5 Voices of Local and Provincial Government Actors

A key player in the Solwara 1 political arena is Sir Julius Chan, governor of New Ireland and a former Prime Minister, who holds a somewhat contradictory position on Solwara 1. Chan has described the sea as a 'garden of his people' and is concerned about the environmental impacts of DSM, yet supports the potential economic benefits (Radio New Zealand, 2016). He has been highly critical of the national government's approach to the project, citing a lack of consultation with his province (Radio New Zealand, 2016). In one instance, Chan stated "I have great reservations [about Solwara 1] and I want to tell you that I'm not a friend of Nautilus. They make all kinds of promises" (Papua New Guinea Mine Watch, 2016b). Chan has also discussed the Lihir mine in reference to Solwara 1, noting that 20 years on, New Ireland is yet to reap the full benefits of the mine, and Lihir itself was without the promised sealed ring road until recently (Papua New Guinea Mine Watch, 2016b).

Additionally, Chan has been very critical of the Mining Act (1992), particularly the stipulation that the national government owns all minerals beneath the surface of PNG land and sea. He calls it a "Mining Act that literally steals the wealth from their [local communities'] land" (Papua New Guinea Mine Watch, 2016a). Further, Chan states that the 'rightful owners' of the minerals of the Solwara 1 tenement are the people of PNG, and not the State (EMTV online, 2015b). It is these anti-state sentiments that have provided the impetus for a movement for New Ireland to become an autonomous region of PNG (Radio New Zealand, 2016).

3.2.6 Other Governmental Voices

It is not only the governors and ministers directly affected by Solwara 1 who have been critical of the mining project. One particularly outspoken figure has been

Gary Juffa, the governor of Oro/Northern Province, located on the mainland of PNG. He has described Solwara 1 as illegal, claiming that other members of parliament shared the same view but were worried about upsetting the government if they spoke out (Pacific Islands Report, 2014). Juffa's perspective also helps to highlight that while this thesis focusses specifically on those closest to the project site, Solwara 1 is an issue of national and regional importance.

The former Attorney General and Minister for Justice, Sir Arnold Amet, has been vocal in his opposition to the project, and has referred to local people as 'Papua New Guinea pigs', a phrase signalling the highly experimental nature of the project. He is also critical of the Minister for Mining, Byron Chan, and Nautilus. He argues that the project should not proceed as the mining lease was issued without suitable legal frameworks (ABC Radio Australia, 2016).

3.3 Analysis

The national government's discourse is similar to Nautilus' in that it actively and vocally supports the Solwara 1 project. They construct the project as something that will be beneficial to PNG and its citizens, has little to no threat to the environment, and will not directly affect local communities. Like Nautilus, their reasons for portraying the project in this light and discursively erasing any human connection to the sea, is so that it will enable a political environment in which Solwara 1 can proceed with greater ease than a terrestrially based project with resident landowners and their associated demands and disruptions. Having a stake in the project further complicates the matter of the government operating in a neutral manner. This can be reflected in the project being given the green light in the first place. Many observers have criticised the national government's decision to approve the mining licence and EIS, as many components of Nautilus' application do not correspond with legislative requirements and constitutional values. In this way, the discourse of the government also neglects local communities and the environment.

It is evident that PNG has long suffered from the 'resource curse', and that the mismanagement and corruption of the national government has been the primary factor in this longstanding condition. The handling of Porgera, Ok Tedi, Panguna and Lihir demonstrates that, in most cases, the national government tends to favour the potential economic gain of mining over the potential environmental destruction that will result. This destruction, of course, is not limited to simply the environment, but encapsulates the livelihoods and traditions of many local groups. While one might expect the national government to have learnt from the past, its discursive positioning in relation to Solwara 1 indicates that history is likely to be repeated

It is important to recognise the internal complexity of the government discourse. There is a clear split in opinions between the national government and local and provincial levels of government concerning the project. While the national government stands steadfastly behind the project, there is general resistance at the local and provincial levels. Opposition at local levels may represent a ploy by politicians to gain the popular support of their constituents. However, it may also be that the opposition of local level politicians is an organic outgrowth of the tensions within the communities of which they are a part.

3.4 Conclusion

There is no doubt that the PNG government has a poor record of mismanaging mining projects, having contributed directly to acts of violence and enabling environmental destruction. This highlights an inclination of the government to ignore legislation or manipulate it to suit its prerogative. In a trade-off between economic opportunity and environmental cost, more value is invariably placed on economic gain, despite a constitution that calls for environmental preservation. Additionally, significant amounts of money are sunk into mining schemes including Solwara 1, which calls into question whether the government can objectively assess the best course of action for the Papua New Guinean economy and society. This decision has been critiqued by some members of the different layers of government, but the main points of contention concern

environmental impacts, limited scientific knowledge, and a fear of the experimental nature of the project. It is from this trepidation that the phrase 'Papua New Guinea pigs' has emerged, which refers to the people of New Ireland (if not all citizens of PNG) in a somewhat sinister way. Over fifty years ago Marshall Sahlins described the Pacific Islands as "laboratories" and a "generous scientific gift" (1968, pp. 157) and, while referring to the now discounted evolutionary work of social scientists, this construction is still apparent today in resource extractive and military industries. It is obvious, for example, in the experimental nature of nuclear testing in the Pacific and in the progression of DSM. The Pacific being treated as a laboratory also suggests that if 'experiments' were unsuccessful, at least the remote location of the Pacific would ensure that such experiments occur at a 'safe distance' away from the homelands of colonial powers, or in this case, the shareholders of multinational corporations.

While the Solwara 1 project marks the beginning of a new frontier, it also represents the likely continuation of a legacy of problematic mining developments in PNG. The discourse that the government constructs in relation to the Solwara 1 project ignores and erases people from the marine environment as well as discounting any suggestion of environmental harm. Although this is similar to the Nautilus discourse, the differences lie in the interest behind this construction and the legacy it extends. The national government stands to make a profit from Solwara 1, which is made easier by supporting Nautilus' erasure of any local ownership claims over the project area. While this mining project is a first for Nautilus, it is quite the opposite for the PNG government. This history and the centrality of the extractive industries to the country's economy, a contributing factor to the 'resource curse', must also motivate the government's construction of Solwara 1.

4. The Voice of Local Communities

In stark contrast to the discourses already discussed, the voice of local communities is largely resistant to Solwara 1. Local people claim that the project threatens and ignores their connection to the sea, which I conceptualise as expressive of a seascape epistemology. As coastal peoples, they are concerned by the risk Solwara 1 poses to the environment in which they live and which forms the basis of their livelihoods and cosmology.

Broadly speaking, Pacific peoples have a deep relationship with the ocean as it forms the basis of many aspects of their lives (Hau'ofa, 1993). To Pacific peoples, particularly those living in coastal areas, the sea is not seen as something that is merely 'used' by them, but something they are inherently connected to and through. It encapsulates cosmological understanding, ancestral links and knowledge, as well as being a basic source of livelihood. It has the power to give as well as take, and contains creatures and objects that serve as totems or metaphors for other aspects of life (Hviding, 1996; Sharp, 2002; Schneider, 2012). I will demonstrate that Melanesian ethnography shows that coastal people have these elements of connection to the sea, and that it is this seascape epistemology that forms the basis of the oppositional discourse of local communities towards the Solwara 1 project. Another crucial idea that I advance in this chapter is that the opposition expressed by local people to Solwara 1 can be seen both as a valorised defence of indigenous tradition against neoliberal capitalism and, instrumentally, as a political lever to gain recognition as resource owners and thus benefit directly from the project; a position that has been expressly denied by the discourses of both the company and national government.

This chapter primarily focusses on how local New Ireland communities employ a seascape epistemology as a discursive tool against the DSM project. Before dealing specifically with the local communities affected by Solwara 1, I first contextualize my discussion in terms of ethnographic literature on coastal people in different parts of Melanesia, including the Solomon Islands,

Bougainville, Northern Australia and New Ireland. In the process I draw attention to relevant themes for understanding Barok and Mandak reactions to the Solwara 1 project. Underlying my discussion is an acknowledgement that the marine environment powerfully shapes the culture and worldview of coastal Melanesians.

4.1 The Culture of Coastal Melanesians

The ethnographic texts I focus on include, first, Edvard Hviding's 1996 book *Guardians of Marovo Lagoon*, which is the product of 28 months fieldwork on Marovo Island and its large saltwater lagoon in New Georgia, western Solomon Islands. The second, *Saltwater Sociality* by Katharina Schneider, is a 2012 ethnography based on the customary marine tenure of the people of Pororan Island, Autonomous Region of Bougainville (AROB), PNG. The third, *Saltwater People*, by Nonie Sharp (2002) focuses on the cultural similarities of saltwater people from northern coastal Australia and their relationship to the sea (see figure 7 next page). I have chosen to include Australian examples in this section as they clearly parallel the cultural patterns of Melanesians. While Sharp talks generally of saltwater people, she also provides specific ethnographic detail from the people of Croker Island, the Yolŋu of Arnhem land, Northern Australia, and also Mer Island, situated in Torres Strait.

Underpinning Hviding, Schneider and Sharp's texts is the notion of a seascape epistemology, a concept I borrow from Ingersoll (2016) and which runs implicitly through the discourse of local communities relative to Solwara 1. The authors discuss peoples who, as Ingersoll states, live by "an approach to knowing presumed on a knowledge of the sea, which tells one how to move through it, how to approach life and knowing through the movements of the world. It is an approach to knowing through a visual, spiritual, intellectual, and embodied literacy of land and sea" (Ingersoll, 2016, pp.5-6). Hviding's comments about Marovo people align with this, such as his claim that the sea is central to cultural and social relations as it serves as the context for practice, interaction, and is the crux of Marovan life, history and material substance (Hviding, 1996, p. xiii, 2-3)



Figure 7: Locations of Guardians of Marovo, Saltwater Sociality and Saltwater People in Relation to Solwara 1

(Hviding, 1996, p. xiii, 2-3; Sharp, 2002, p. xiii). Building upon this concept, Schneider observes that for the people of Pororan Island, the sea is a governing force in all areas and aspects of coastal lives (2012, p. 10). Similarly, Hviding notes that Marovan people feel no need to rely on anything but the ocean, as it is the provider of everything they need as a community (1996, p. 167).

A specific reference to the centrality of the ocean to Marovan people can be seen in the way that their villages are oriented to face the sea (Hviding, 1996, p. 43). Coastal people throughout the region are therefore strongly connected to the ocean, which is clearly not an autonomous natural sphere that is devoid of culture, but rather is saturated in it. Coastal Melanesians have deep cosmological, social, and territorial connections to and through the sea, and all life within it. As I show further on, this framework is crucial for providing an understanding of how local communities construct the Solwara 1 project.

The strong connection coastal Melanesians have to the sea also has a bearing on how they think about land. Interestingly, Hviding notes that the sea is commonly believed to be much safer as it is a space where dangerous spirits cannot dwell, whereas they can roam freely on land (Hviding, 1996, p. 50). Further, Marovans may not see the ocean as being ontologically distinct from the land (Hviding, 1996, pp. 167-168). In Marovo language, *puava* means ground or soil. However, when *puava* is used in relation to guardian figures or leaders within Marovo, its meaning expands to embrace land in the widest sense; to include the sea and reefs as well as dry land (Hviding, 1996, p. 137).

One must also consider the relationship that coastal Melanesians have with marine life, particularly fish. For Marovans, the sea and its contents are visible and knowable. Hviding notes that what is underwater is just as clear and detailed in Marovan minds as dry land or a rainforest, for example (Hviding, 1996, p. 188). Fish are anthropomorphised in the sense that they are seen as having the capacity for thought and are spoken to by humans (Hviding, 1996, p. 198). This suggests that, at least some coastal Melanesian people, perceive themselves to be not ontologically set apart from their surrounding environment but instead deeply embedded in a composite totality of humans and nonhumans, all of whom share analogous cognitive, moral, and social qualities (Descola, 2014, p. 30).

An idea present within both Hviding and Schneider's work and which is central to this chapter is the term customary marine tenure, which is conceptualized as traditional marine resource management (1996, p. xiii). This 'sea tenure' may also refer to the idea of guardianship (Hviding, 1996, p. 3) or conservationism. It is precisely this deeply rooted cultural attitude within coastal Melanesian cultures that the Barok and Mandak people of New Ireland draw upon as part of their oppositional discourse against Nautilus, which I detail below.

In parallel to the work of Hviding and Schneider, Sharp emphasises that a saltwater understanding of rights to the sea is fundamentally different to a

Western perspective. For example, Mer Islanders strongly recognize that sea tenure, as well as knowledge of the sea, is just as important, if not more important, than that of land (2002, p. 6). Further, saltwater ownership is extensive and includes reefs, the foreshore, and importantly for my argument, the seabed (2002, p. 31). This is of crucial importance as it suggests that coastal Melanesians often have a specific connection to the seabed, a relationship which has been constantly denied by Nautilus and the PNG national government.

Coastal Melanesians' traditional religion and cosmology is also often tied to the sea. Both Pororans and Yolŋu people believe that their rights and responsibilities to the sea were bestowed upon them by creator beings who originally shaped the seas (Schneider, 2012, pp. 8-9, Sharp, 2002, p. 11). Similarly, powerful spirits of ancestors and other beings reside in the sea and can influence factors such as the weather for voyaging, or whether fish get hooked (Schneider, 2012, p. 41, Sharp, 2002, p. xvi). Croker Islanders, for example, understand there to be a serpent living on the seabed that holds the power to make the ocean treacherous, should it not be treated with respect (Sharp, 2002, p. 26).

The sea is also a central part of coastal Melanesian death rituals. In pre-colonial times, Pororan chiefs were buried at sea. Since then, their hair is put into a hole in the reef and their possessions are scattered in the surrounding area (Schneider, 2012, pp. 157-158). All bodies are washed in the sea before burial (Schneider, 2012, p. 148), and mourning rituals are also deeply associated with the ocean. At sea, canoes will be paddled with additional vigour (Schneider, 2012, p. 158), and on land, women mimic fishing movements with twigs while singing (Schneider, 2012, p. 159). Further, elderly who are too fragile to go to the sea or beach will be oriented to face towards the sea, while older people who lived further inland for the majority of their lives will often be moved closer to the shores to live out the rest of their lives (Schneider, 2012, p. 25). In sum, these ethnographies clearly demonstrate that the ocean and the life it contains occupy a central position within the lived cultures of coastal Melanesians, whether seen from a spiritual, cosmological, social, symbolic, or economic vantage point. To

argue, as Nautilus and the PNG national government have done, that the people of New Ireland do not have any meaningful relationship to the ocean and the area being developed, is to radically misunderstand and distort a way of life.

4.2 People of the Solwara 1 Area



Figure 8: Barok and Mandak in Relation to Solwara 1

There are two ethnic groups that are geographically closest to the site of Solwara 1, the Barok and Mandak people (P. Bapi, personal communication, July 19 2017), who live along the west coast of New Ireland (see figure 8 above). Recent figures estimate the population of Barok to be around 5,500 (Joshua Project, n.d.-a), and Mandak 7,300 (Joshua Project, n.d.-b). There is little ethnographic research on Barok and Mandak people, and where such studies do exist, the ocean and how people interact with it is rarely mentioned. The only accessible work on Mandak is a linguistic study undertaken in the 1980s (Lee, 1987), which does not examine Mandak culture and society, or people's relationship to the ocean.

There is more literature, however, on the Barok people, which sheds some light on their interactions with the marine environment. Wagner lived with the Barok in the 1980s and studied their ethos, image and social power. He noted that Barok people prefer to fish at sea rather than hunt on land (1986, p. 182), and that they have a deep understanding of seasonal variations associated with the sea (1986, p. 27). The importance of the sea is reiterated in the use of sea water to cleanse bodies during sacred rituals, a practice also described by Schneider among the Pororan Island people, regardless of the availability of fresh water. Perhaps most significantly, clans have a 'characteristic *tadak*', a spirit which may represent a feature of the environment or a shark (1986, p. 114). These *tadak* have the power to change conditions at sea and claim lives (1986, p. 104). The preference of hunting at sea, knowledge of the sea, use of sea water and totemic animals reinforces several points that emerged from my earlier discussion of Melanesian ethnography, and shows that these features are not only central to coastal Melanesian culture in general, but also specifically to the inhabitants of the Solwara 1 area.

More recently, a doctoral thesis focusing on Barok language has given further insight to their relationship with the sea. It states that Barok society is divided into two moieties: the *Malaba*, represented by a white-bellied sea eagle; and *Tago*, a white-headed sea hawk. The characteristics of these birds are said to be similar to the people they represent (Jingyi Du, 2010, p. 9). This naming tradition and the cosmogony within which it figures, once again demonstrates that the sea is absolutely central to local origins and identity.

While published research on those communities closest to the Solwara 1 site may be scarce, Dennis O'Rourke's ethnographic film *The Sharkcallers of Kontu*, located further north of Barok and Mandak, but still proximate to Solwara 1, provides crucial insights. The film, shot between 1974 and 1979, provides an overview of O'Rourke's fieldwork in Kontu (see figure 9 next page). O'Rourke lived in Kontu for six months, focusing on the practice of sharkcalling, a tradition that local people have argued will be significantly impacted by the Solwara 1 project.

Sharkcalling is a sacred form of magic, which requires careful preparation. A fisherman who intends on using the technique must sleep apart from his wife the night before the calling and must ensure not to step on the droppings of flying foxes or pigs. The time one should begin their sharkcalling regime will be revealed in a dream.



Figure 9: Kontu in Relation to Solwara 1

Kontu men spear the reef before journeying into deeper waters in order to rouse the spirits and identify themselves to the shark so that it will follow the canoe. Once in deeper waters, a ring of threaded coconut shells is rattled underwater to replicate the sounds of a startled school of fish, thereby further attracting the shark. If successful, this method will result in sharks surfacing and circling canoes, eventually being caught by a loop of rope used by the fisherman. Sharks are seen as sentient beings and are perceived as being either good or bad. 'Good sharks' are friendly, playful and will approach closely as they have had their spirit captured. 'Bad sharks' are seen as rogue devil sharks and will attack the canoe and eat the fisherman. Capturing a shark's spirit also allows sharks to recognise fishermen.

The Kontu worldview, including how people think about sharks, stems from their understandings of the primordial ancestor Moroa, who not only created sharks and people, but bestowed men with the magic and power needed for calling sharks. Moroa was the first person to catch a shark by the method of sharkcalling. The performance of sharkcalling during O'Rourke's stay at Kontu was thus described as being a replication of the method originally used by Moroa. Sharkcalling is a sacred and longstanding activity for the people of Kontu, and the skills needed for it are passed down intergenerationally.

The people interviewed by O'Rourke in the film emphasised the importance of sharkcalling to their way of life, and stated that in a time of rapid social change, sharkcalling is their strongest link to the ancestral past. At the same time, however, Kontu people were also shown to engage in capitalism by selling shark fins. The fact that the people of Kontu portray sharkcalling as an important and active cultural anchor in times of social change also lends added credence to this aspect of the Barok and Mandak discourse concerning opposition to Solwara 1.

The ethnographic examples discussed above demonstrate that the sea is central to the lives of coastal Melanesians. From the literature, many important themes emerge that are shared by the cultures I have discussed. These include: customary marine tenure, seascape epistemology, boundaries and ownership of the sea, all of which can be seen as aspects of the rich cultural significance of the ocean and its resources. These essential features and values are reflected in the way that local communities have shaped their discourse around the Solwara 1 project; above all else, local people are claiming that they are connected to the sea and they often do so with reference to a wide range of traditional cultural beliefs and practices.

4.3 Response to the Solwara 1 Project

The response of Barok and Mandak people to Solwara 1 has been strong and unified. Coastal communities are opposed to the project and are highly critical of both the National government and Nautilus Minerals. As with most development

projects, however, not all local people will hold the same perspective, and it should be noted that there are some community members who are in favour of Solwara 1 going ahead. My research, however, reveals that the vast majority of local coastal New Irelanders and Papua New Guineans do not wish for the project to proceed.

The key themes that emerge in the local response to Solwara 1 are: frustration with the national government; a lack of information accessible to the public; environmental and ecological concerns; as well as the threat the project poses to cultural practices. The concerns of local people are, as noted, pre-empted by Nautilus and the national government's strategic discursive manoeuvring. Through their reports and media statements, both claim that there will be no harm to the environment, that people are well informed, and perhaps most importantly, that local people cannot have a connection to the area being developed and, on those grounds, are excluded from being seen as resource owners and thus direct beneficiaries of the mining production. This represents a salient tension of values. Seen from a discursive perspective, one group is not necessarily more right or wrong than the other, but is simply portraying the project in a way that advances their interests and agenda as effectively as possible. In the context of Solwara 1, discourses take on the form of 'power plays' and are always instrumental, calculated, constructed, and designed narratives.

New Ireland local communities are critical of the steps the government has taken in granting Nautilus Minerals access to mine the seabed. William Bartley, a member of local landowner organisation group, West Coast Central People of New Ireland, states that important steps in the approval process have been ignored, such as the consultation and involvement of coastal people. On behalf of the group, Bartley claims that they have not been informed as to the benefits or impacts of Solwara 1 and have been 'left in the dark' and not "factored into this particular exercise. We have been pushed aside" (BRG Films, 2015). Not only do local communities claim that there is inadequate information

available, they are also concerned with the government's close relationship with, and investment in, the project (Davidson & Doherty, 2017).

One of the main objections expressed by local communities is the potential for negative environmental effects. This environmental threat is also directly tied to a concern over the experimental nature of Solwara 1. There is great concern that there has been a lack of background research undertaken by both Nautilus and the government, and a worry that the country does not have the policy frameworks or political will required to adequately address and cope with such a complex operation. This is a view not only held by local people but by scholars and scientists as well (Nithi, 2016), as will be discussed in the following chapter.

Locals believe that because of this lack of knowledge and the resulting uncertainty over environmental harm, their communities and marine environments are being used as scientific guinea pigs (BRG Films, 2015). This critical comment builds on the experimental quality of the project but also captures the fact that the full environmental, social, and cultural impacts of Solwara 1 have been ill-considered or drastically downplayed. Throughout PNG's history, few mining projects have had positive outcomes. It seems likely that this dark past is also influencing the grave concerns of the country's citizens as well as the oppositional position being adopted by local people to Solwara 1.

It is important to recognise that local people have actively voiced their concerns over the Solwara 1 project, which have been ignored or remain unresolved. In recent years, local communities have sought legal measures to hold the PNG government accountable for releasing more detailed information surrounding the project and its environmental impacts (Hosie, 2017). The Port Moresby based Centre for Environmental Law and Community Rights Inc (Celcor), is representing local communities of the Solwara 1 project. In late 2017 Celcor put an application into the national court which demanded the public release of original documents and evidence of adequate studies into the range of impacts Solwara 1 could have on local people (Davidson & Doherty, 2017). Other local coastal landowner groups, such as the Alliance of Solwara Warriors, have

made multiple submissions to the Mineral Resources Authority (MRA) detailing their reasons for rejecting the project. These objections include that the Solwara 1 location is within traditional fishing and ceremonial grounds and that the project will ultimately “bring disruption to our communities and the lives of our people who depend on the sea” (Kora, 2018). Various religious figures and groups have also expressed support of local communities’ resistance to Solwara 1. A central figure in PNG’s Catholic Church, Cardinal Ribat, for example has recently condemned Solwara 1 and any deep sea mining across the Pacific. His reasoning includes scepticism over Nautilus’ plans, which, he states, would cause significant destruction to the natural environment and would negatively impact people’s lives (Pacific Media Centre Editor, 2017).

The local response to Solwara 1 has been projected across a range of platforms. A large, and increasing, number of protest groups have formed since the project was first announced. The majority of these groups operate through social media, mainly Facebook, and address the issue at a global level. The Alliance of Solwara Warriors is one of these groups, and consists of people from the Bismarck Archipelago, including New Ireland, who aim to ban DSM in PNG and the rest of the Pacific (Alliance of Solwara Warriors, n.d.). The Alliance of Solwara Warriors have critiqued Nautilus’ account of the number of people who have participated in Nautilus’ outreach and education programmes, stating that the high number they claim is falsified (Kora, 2018). In relation to current events that suggest Solwara 1 may fall through, a spokesperson for the Alliance of Solwara Warriors stated that “it will be good news for my people if Nautilus goes bankrupt, instead of bankrupting our sea,” adding that the community would “fight this project to the very end” (Radio New Zealand, 2018d).

This perceived threat to the culture and livelihoods (e.g. fishing) of New Ireland coastal peoples is clearly evident in the local response to Solwara 1. Bartley states that they are deeply concerned about the impact the project will have on their sacred tradition of sharkcalling. He also highlights the fact that his people have clan-based ownership of certain areas of the sea, and attached to it are important cultural values (BRG Films, 2015). A statement made by NGO

Bismarck Ramu Group highlights the different conceptualisations of sea use and ownership held by the parties involved. “The Government and Nautilus Minerals Inc say “YOU ARE MERELY SEA USERS”. However, thousands of years of New Ireland Aboriginal heritage teaches us that the people of New Ireland are STEWARDS of the sea” (BRG Films, 2015). This response to Solwara 1 can be understood on a far deeper level when considering the complexity and importance of relationships that local people have with the ocean, as it starkly reveals that local people feel the national government and Nautilus have superficially and inaccurately assessed the ways in which they relate to and with the sea. The ethnographic evidence provided above attests to the fact that Melanesians do far more than simply ‘use the sea’ and are in fact connected to it deeply and in manifold ways. Understanding the people of New Ireland as stewards of the sea mirrors the customary marine tenure or guardianship echoed in other Melanesian ethnography, including that of the New Ireland province.

This discursive, and ontological, difference echoes what was discussed in chapter two. Nautilus have consistently claimed that there is no genuine environmental threat to local communities, as due to the distance of the project from shore (30km), there can be no fishing or landowner rights. The CEO’s response to local people’s claims to both tangible and intangible connections is that it is merely “a publicity stunt” (Hosie, 2017), a statement from the head of the company that is not only wildly inaccurate but also incredibly disrespectful towards the local communities in the project’s orbit. This schism in attitudes clearly signals the constructed nature of discourse and how different groups will take measures in order to advance their own agendas. It also signifies the deep chasm that separates the Nautilus and local community discourses. Again, one might question why Nautilus consistently refuses to acknowledge the importance and significance that the ocean has to people of the Solwara 1 area, and the immense impact the project could have on all aspects and understandings of their lives. As conveyed within the local discourse, the Solwara 1 project clearly challenges the essence of what it means to be a coastal person.

The key ethnographies I have discussed, as well as what information is available on the Barok and Mandak people, all demonstrate that the sea is a vivid and central part of coastal Melanesian lives, which is the discourse local communities are advancing in relation to Solwara 1.

4.4 Conclusion

Using ethnography as a contextual platform for locating the discourse of Barok and Mandak people, this chapter suggests that people across Melanesia and New Ireland have an ancient, deep and complex connection to the sea. The sea shapes all aspects of daily life and has importance in ancestral, spiritual, and cosmological spheres. It is these kinds of knowing the ocean, or seascape epistemology, that local peoples of the Solwara 1 project area claim to have and it is the total denial of this way of being by the company and the government that has motivated their opposition to the project. To a somewhat lesser extent, other factors feed into the local discourse, such as the government failing to inform coastal peoples about the project's details and a concern over the experimental 'guinea pig' nature of Solwara 1.

It should, of course, always be held in mind that such overt opposition to the mine may not only reflect a legitimate defence of cultural tradition against the perceived threats posed by the project but may also be seen instrumentally as resistance against the lack of monetary benefits that being denied ownership of the resource entails. Making a claim to the area being developed is not only to say one is 'cultural' it is also to say that they have a right to a share of the profits generated by the mine. One might ask whether their discourse would be different if local communities did stand to profit directly from Solwara 1.

5. The Voice of the Fourth Estate

The term 'fourth estate' commonly refers to "the conceptualisation of journalists as quasi-constitutional watchdogs acting on behalf of a society's citizens" (Harcup, 2014). First coined by Edmond Burke in the 18th century, the phrase was used as an extension of the United Kingdom's three estates of the Lords, the House of Commons and the Church (Harcup, 2014). Contemporarily, the fourth estate is sometimes used in reference to a group of actors that are central to contemporary political discussions and developments such as Solwara 1. The involvement of the fourth estate in mining developments is representative of a shift away from the corporation, government and local communities as the only central stakeholders of a mining project. This marks a change from a triangular to a rectangular model of stakeholders, and this additional group may also be referred to as 'the fourth corner' (Filer & Le Meur, 2017, p. 20). For the purposes of this thesis, I shall refer to the fourth estate as encompassing NGOs (non-governmental organisations), media, and the scientific community, as supported by Banks and Ballard's inclusive definition. While the scientific community may not typically feature in traditional conceptions of the fourth estate, I argue that this group should be central to a discussion of the fourth estate in the context of Solwara 1, particularly as the project represents a new frontier of scientific and technological 'progress'. The fourth estate also crafts a discourse that portrays the project in a negative light, thus becoming the only other discourse that aligns with the voice of local communities. It is, however, important to recognise that these positions are not synonymous, as both groups hold different reasons for opposing Solwara 1.

Thinking of NGOs as "global watchdogs of sustainability" (Larsen & Brockington, 2018, p. 1) is useful when considering their role in the debates around Solwara 1, as they tend to have an environmental focus. Like NGOs, the media is often referred to as a 'guard dog' that has the ability to keep "government honest and watching out for the interests of people" (Kovach & Rosenstiel, 2001 in Whitten-Woodring & James, 2012, p. 114). It is, however,

important to recognise that the press is not always free from bias. According to Transparency International, an international anti-corruption NGO, PNG is one of the most corrupt countries in the world (2017). It should be expected that the media is also influenced by this corruption in some way, and that their neutrality and social conscience cannot be assumed. Ultimately, in an arena where the voice of local communities is often drowned out by that of the national government and Nautilus, the fourth estate provides an opportunity for a perspective that is aligned with local people and challenges dominant discourses.

This chapter focusses on how the fourth estate create a discourse relative to Solwara 1 that is, for the most part, fundamentally opposed to the project. This is largely due to their reporting upon the serious threat Solwara 1 poses to local communities and the surrounding environment. The chapter begins with a discussion of the typical role adopted by NGOs as activists. I will identify the main NGOs that are involved in the Solwara 1 project and detail key points of concern raised in relation to the DSM project. This is followed by another salient branch of the fourth estate, the media. The media has typically served an integral function of communicating information to the public, which the national government and Nautilus often fail to do. Then I discuss how the scientific community holds an important position in providing further strength to the argument of the other actors in the fourth estate. Finally, to conclude the chapter, my analysis will show that there is substantial overlap between the three groups I place under the fourth estate umbrella, which collectively amounts to a unified discourse.

5.1 Non-Governmental Organisations

NGOs seek to 'fill the gaps' left unaddressed by the government (Aras & Crowther, 2010, p. xiv). NGOs are non-profit organisations and therefore possess different motivations and decision-making standards from capitalist organisations whose *raison d'être* is profit making (Aras & Crowther, 2010, p. xv). One of the main moral corollaries of this is that "it is often thought that if an organisation exists for a public or charitable purpose, then it must be a socially

responsible organisation” (Aras & Crowther, 2010, p. xv). While it cannot be assumed that all NGOs act responsibly, it should be recognised that due to their non-governmental status, they are not typically faced with the same issues that may disrupt government agencies.

Many NGOs have voiced opposition to the Solwara 1 project, representing a variety of different groups ranging from mining, humanitarian and conservation organisations to universities. The main way in which NGOs have campaigned against Solwara 1 and Nautilus is by scrutinising the various reports Nautilus has produced or commissioned, and, in turn, producing their own counter reports. Rather than ‘filling the gaps’, in this instance, NGOs critique the gaps. This section focusses on the most dominant and active NGO opposing the Solwara 1 project, the Deep Sea Mining Campaign (DSMC), as well as the University of Papua New Guinea (UPNG) and the United Nations Development Programme (UNDP).

The Deep Sea Mining Campaign is a project of the Ocean Foundation, run in conjunction with NGOs from a number of different countries, including Canada, USA, and various Pacific Island nations. The DSMC is clearly against the Solwara 1 project as demonstrated through their website and a series of commissioned scientific reports that critique Nautilus and the national government’s approach to Solwara 1.

Their first report, published in 2016, is titled *The Socio-Political and Regulatory Context for Sea Bed Mining in Papua New Guinea*. While Nautilus emphasise the strengths and viability of the Solwara 1 project, DSMC say otherwise. They claim that there are “significant technological and financial uncertainties which may result in the company reducing or terminating its proposed operations” (Rosenbaum, 2016, p. 38). The author of the report stresses that “Nautilus is yet to demonstrate that seafloor resource development is commercially viable and environmentally sustainable” (Rosenbaum, 2016, p. 38), a reality which undermines the overwhelmingly positive tone of their discourse. DSMC, like many others, are also critical of the national government

for investing in a project with a weak business model that ignores the rights local people have to the sea (Rosenbaum, 2016, pp. 38-39). Rosenbaum points out that the mining minister who first issued Nautilus' operating licence, John Pundari, is the current Minister for the Environment (Rosenbaum, 2016, p. 6). This suggests that Pundari as mining minister will have no environmental concern regarding Solwara 1. Pundari's perspective reflects the national government's view of the project, which is influenced by the capitalist logic of favouring economic gain over potential damage to the natural and social environment. The report concludes that the three sectors most threatened by Solwara 1 are customary rights, fisheries, and tourism (Rosenbaum, 2016, p. 39), with the latter two having now become key contributors to PNG's national economy (Rosenbaum, 2016, pp. 35-36).

The key claim of the DSMC *Accountability Zero* report published in 2015 is that there has not been adequate research (on behalf of both Nautilus and the government) to properly assess the impact of the Solwara 1 project (Rosenbaum & Grey, 2015, p. 5). This is particularly in relation to pollution, disaster management, exposure to toxic heavy metals, destruction of hydrothermal vents and impact to the food chain and cultural practices (Rosenbaum & Grey, 2015, p. 5). Secondly, the *Accountability Zero* report scrutinises Nautilus' Environmental and Social Benchmarking Analysis (ESBA), produced by Earth Economics (as mentioned in Chapter 2). They claim that "the absence of an economic analysis of Solwara 1's likely impacts on sea water quality, marine ecosystems, other marine values and their associated social impacts is astonishing in a study purporting to be a ground-breaking natural capital analysis of deep sea mining" (Rosenbaum & Grey, 2015, p. 8). Dr Helen Rosenbaum, co-author of the report and key figure in the DSMC stated that

"the ESBA is not fit for its intended purpose. It fails to provide a framework to assist decisions about the advisability of Solwara 1 or of any other deep sea mining project. Indeed, the use of the ESBA for decision-making purposes would lead to very poor public policy outcomes. The risk of unexpected costs

and losses due to unpredicted environmental and social impacts is high and could leave coastal and island communities carrying the brunt of the burden into the long term” (Earthworks, 2015).

Earthworks, an NGO that often works alongside DSMC, is also critical of the EBSA. It states that the report fails to acknowledge the value of the marine environment and its cultural importance to local communities. Further, it critiques the scope and style of the report, saying that “comparing the impacts of Solwara 1 to selectively chosen land-based mines is like comparing apples to oranges” (Earthworks, 2015), a point made in the introduction of this thesis.

While not an NGO, UPNG is also firmly against Solwara 1. The university held a public lecture addressing the key concerns of the project, such as the standard of scientific testing carried out, consultation with local communities, and also environmental threats and impacts (UPNG School of Natural and Physical Sciences, 2017). Scientific experts from the university claim that neither Nautilus nor the government followed legal requirements and, further, that they failed to conduct health and social impact assessments (Rosenbaum, 2016, p. 35). Professor Chalapan Kaluwin, head of the environmental science and geography division at UPNG, claims that the Solwara 1 project will be a “long term disaster for PNG and the health of its people” (Wuri, 2012).

The United Nations Development Programme (UNDP) is also very wary of the potential impacts of DSM. In a recent report, the UNDP note that DSM will inhibit progress towards 11 out of the 17 Sustainable Development Goals (Gankhuyag & Gregoire, 2018, p. 25). Specific to PNG, a spokesperson has recently commented on the threat Solwara 1 poses to the ecosystem, claiming that “one sixth of the tuna in the whole world comes from the Pacific and this one country. Huge numbers of people’s lives depend on fisheries, and this project potentially will jeopardise all of that” (Shukman, 2017).

5.2 Media

The global role of the media as a ‘watchdog’ of governmental activities dates back to at least the 18th century (Franklin, 2009, p. 89). This implies that “governments and institutions of the state ‘are constantly faced with the risk of loss of legitimacy’ and ‘can have their institutional personal authority deconstructed by the media” (Ericson, 1991, p. 233 in Tumber, 2001, p. 99). In other words, this branch of the fourth estate could be described as exposing the irregular and myopic governmental and corporate machinations regarding the Solwara 1 project.

Although this section will focus on online and social media, it is important to acknowledge the value and importance other forms of media play in the lives of Papua New Guineans. For example, the National Broadcasting Corporation (NBC) centred around radio and television “is generally seen as an essential service necessary to engage citizens in important issues that directly affect their way of life” (Butuna, Hane-Nou, & Dickson-Waiko, 2014, p. 5). The NBC also sees itself as having a role in addressing social issues within PNG and promoting good governance (Butuna, Hane-Nou, & Dickson-Waiko, 2014, pp. 4-6). It must be acknowledged, however, that all forms of media are increasingly controlled by corporate interests (Wright & Rogers, 2010).

One of PNG’s national newspapers, *The National*, is owned by Malaysian company Rimbunan Hijau (which in Malay translates to ‘green leaf’), which also owns PNG’s largest logging corporation. Although Rimbunan Hijau may often act as a mouthpiece for logging interests, *The National* reports on Solwara 1 in a relatively neutral light. In 2018, however, the newspaper’s coverage presented the project more critically, with headlines such as “Solwara 1 Needs More Funding” (Mauludu, 2018) and “US Firm Leaves Solwara Project” (The National, 2018). Interestingly, there have been no articles posted on *The National* website (which could differ in print version) since May 2018, despite a range of events pertaining to Nautilus that fall within the scope of what the newspaper has previously reported. One of PNG’s popular television stations, EMTV, holds a

similar position to that of *The National*. As well as regular broadcasts on television, EMTV's coverage of Solwara 1 also extends to written stories on their website and YouTube videos. The videos, in particular, offer a wide range of information about Solwara 1, predominantly on issues that have received only cursory treatment by the government or Nautilus. For example, coverage has included Nautilus meetings with government officials providing updates on the progress of the project and the development of the purpose-built machinery (EMTV Online, 2018). Other types of broadcast have included conference presentations made by the Nautilus country manager discussing details of the project and potential start dates (EMTV Online, 2015a). The online blog, PNG Mine Watch, has also played an important role in the discussion and dissemination of the Solwara 1 project. The site publishes current events and happenings with the project that are otherwise difficult to access, such as the comments and stances of political figures (2017).

It is important to recognise the contribution of global media to the world's growing awareness of the first deep sea mine. In December 2017, the British Broadcasting Company (BBC) broadcast a story covering the Solwara 1 project with a reporter on the ground in PNG. As part of the coverage, Sir David Attenborough, the world-famous English broadcaster and natural historian, was shown footage of the machines Nautilus will deploy to mine the sea floor and hydrothermal vents. He responded by saying: "It's heart-breaking. That's where life began, and that we should be destroying these things is so deeply tragic, that humanity should just plough on with no regard for the consequences, because they don't know what they are" (Shukman, 2017)

Arguably, this was an important moment for global coverage of the Solwara 1 project, due to the celebrity status of Attenborough. What is more important, however, is that Attenborough's view coincides with the two discourses that are against Solwara 1, namely, local communities and the fourth estate. Since this story was initially reported by the BBC, it has been picked up by news agencies across the world, including New Zealand (Radio New Zealand, 2018a), Fiji (Kuusa, 2017), and the United States (Hunt, 2017).

The internet and social media serve as powerful mechanisms to disseminate information while erasing geographical location as a barrier to civic engagement. This is highlighted in the following quote:

“The development of the Internet has provoked further debate about whether the World Wide Web enhances the public sphere or disperses public discourse. Some argue that the new electronic technologies are empowering citizens to participate in new democratic forums not only between government and the governed but also amongst citizens themselves. This communitarian view argues that the Internet is creating new ‘virtual’ as opposed to physical social formations providing a basis for a new politics and greater political participation by citizens” (Tumber, 2001, p. 101).

An increasing number of PNG citizens are joining the Solwara 1 debate through social media, while also using it as a source to stay informed of the latest developments. As the quote above suggests, the internet has the potential to become its own ‘democratic watchdog’, holding governments and corporations accountable for their often questionable actions (Hampton, 2010, p. 10).

An example of the effectiveness of social media can be seen through the Bismarck Ramu Group (BRG), mentioned earlier. BRG is an NGO based in PNG “dedicated to the support and organization of rural Papua New Guineans engaging in the fight against illegal land-grabbing and development by foreign corporations” (Bismarck Ramu Group, n.d.). While BRG has an established website, their Facebook page is a domain of intense activity, where multiple posts are made each day (both about Solwara 1 and other topical issues in PNG) and citizens react, interact and share their views. BRG also posts media releases on Facebook, most recently labelling Solwara 1 as part of the ‘backdrop of failure’ in which the 2018 APEC summit was set (Bismarck Ramu Group, 2018). Other Facebook pages that are specifically focussed on DSM and the Solwara 1 project include *Nautilus the Protector – Solwara Em Laif* (Solwara Em Laif, n.d.)

and Ban Experimental Seabed Mining in the Pacific (Deep Sea Mining Campaign, n.d.), which is run by the DSMC. Both attract thousands of followers not only from PNG but internationally too. With increasing interest in the risks of DSM in the rest of the Pacific, the page is starting to reflect a wider regional concern with DSM, rather than a focus exclusively on Solwara 1.

5.3 Scientific Community

While the scientific community may not be typically thought of as a part of the fourth estate, it is crucial to the arguments against Solwara 1 made by NGOs, the media and local communities since it is as an actor that provides verifiable evidence. The scientific community plays an important function in being able to expose fraudulent claims present within the discourse of other stakeholders about the environmental impacts of Solwara 1 and it can also provide guidance as to what is likely to happen in the event of the mine proceeding.

Oceanographic expert John Luick conducted a critique of the Nautilus EIS for DSMC. Luick also critiqued the Ramu Nickel EIS in 2001, and arrived at the same conclusion for the Nautilus EIS over a decade later, claiming it to be a “great data set, shame about the analysis” (2012, p. 3). Expanding upon this further, Luick states that “the modelling is completely unacceptable by scientific standards. Moreover, every error and every omission in the analysis downplays the risk” (Luick, 2012, p. 3). Reflecting on the approval processes and scientific studies that have informed the EIS, Luick concludes that, “The people of PNG deserve better...The EIS fails to provide the basic information needed to assess the risk of pollution of the environment or the risk to local communities” (Luick, 2012, p. 4)

A key concern of the scientific community is the destruction of hydrothermal vents, or black smokers. Hydrothermal vents will be mined by Nautilus for the Solwara 1 project, and are home to one of the world’s most unique ecosystems. Unlike all other animals, those that live in the vent environment exist without sunlight and in extreme temperatures and acidity

levels (Rosenbaum, 2011, p. 11). According to Sir David Attenborough hydrothermal vents could be the starting point of life on Earth, a claim backed by a number of scientists (Rosenbaum, 2011, p. 11).

There is unanimous agreement within the scientific community that DSM will cause some form of environmental damage (Letman, 2018). University of Hawai'i oceanographer, Craig Smith, says "deep-sea mining could end up having the largest footprint of any single human activity on the planet in terms of area of impact" (Letman, 2018). It is important to remember that more is known about the surface of Mars than the seabed, hence why DSM is referred to as the new frontier. Further, the lack of sea bed regulatory frameworks also make the area somewhat of a "wild west" (Oberhaus, 2017). The main concern of scientists, therefore, revolves around a wariness of technology meddling with, and potentially harming, what is yet to be discovered in the deep sea. This puts scientists in a race against time to discover, document and conserve the flora, fauna and environment of the sea floor before it is damaged by ventures such as DSM (Oberhaus, 2017).

5.4 Analysis

It is evident that each group of the fourth estate opposes the Solwara 1 project to varying degrees and intensities. Collectively, the opposition of the fourth estate can be categorised into four distinct critiques. First, there is concern over a lack of regulation governing Solwara 1, at the same time as scepticism that existing regulatory frameworks are being followed. Second, there is consensus that the experimental nature of the project poses unforeseen problems. There are no rigorous scientific studies that prove the viability of DSM in general or that the Solwara 1 project is low risk or risk free. This relates to the third issue, that of the significant threat Solwara 1 poses to the environment. The project threatens some of the world's most diverse ecosystems and could also have a detrimental impact on PNG fisheries. Lastly, the fourth estate is concerned with the impact Solwara 1 will have on local people and their multifaceted connection to the sea.

The similarities in the critique of the various groups making up the fourth estate comprise a cohesive discourse which argues that the Solwara 1 project is fundamentally flawed on multiple levels. The fourth estate voice tends towards a doomsday-esque stance on the project, claiming that DSM will spell the end of a wide range of important ecological and cultural phenomena. In addition, the consensus of the fourth estate works to empower and support local communities. This is of critical importance as the government and Nautilus have largely ignored local voices and disavowed any relationship or connection that they claim to the sea. More broadly, the media, NGOs and the scientific responses discussed in this section are representative of a far wider discourse. Greenpeace International, for example, shares the same view as the DSMC, UNDP and UNPNG (Greenpeace International, 2018).

The fourth estate entities have more than just one method of projecting their critique of Solwara 1. For example, the DSMC ensures that its own reports and articles are published elsewhere in PNG and in international media outlets. The DSMC have also backed up their claims with their own 'expert' scientific evidence. Incorporating elements from each of the three branches of the fourth estate presents a robust argument to the government, Nautilus and the rest of the world and strengthens the voice of local communities. Despite this, there has been no acknowledgement from Nautilus, or moves from the national government to draft legislation that is DSM specific.

5.5 Conclusion

It is evident that the discourse of the fourth estate is a crucial part of the Solwara 1 model of stakeholders. NGOs oppose the project for a variety of reasons, combining media and science to strengthen their case. The media hold an important role in keeping citizens informed about Solwara 1, whether through national newspapers or through social media. The response of the scientific community is of grave concern as it suggests that the scientific findings presented by Nautilus thus far are flawed. The unified voice of the three branches of the fourth estate challenges the hegemonic discourse of Nautilus

and, at the same time, projects the perspective of local communities onto platforms that are easily accessible to PNG citizens and the rest of the world. The power of the fourth estate therefore lies in its ability to hold the government and Nautilus accountable for their actions, or at the very least, expose their misinformation.

6. Conclusion

Central to the Solwara 1 project are the different discourses that reflect the various interests of each group of stakeholders. Using Banks and Ballard's model of stakeholders as a basic matrix for organising my discussion, this thesis has argued that each stakeholder group constructs a discourse that distils and politically advances their subjectivities and collective interests. I have also shown how these discourses are saturated with different levels of power, and how each group possesses resources which may strengthen their position. Despite the contestation between the different discourses, it is important to remember that no discourse is necessarily more true or accurate than the others, but is simply the perspective of that particular group (Miller, 1990, p. 117), a key idea that I have advanced in this thesis.

Ultimately, the crux of the discursive relationship between stakeholders of the Solwara 1 project is well reflected in an argument put forward by Espinosa: "Discourses influence people's engagement with each other and the environment, legitimise or ridicule certain systems of knowledge, encourage or belittle different political actions, and appraise or degrade specific social identities" (2014, p. 394). Consider Nautilus, for example. My interrogation of their discursive artefacts has clearly shown how they have systematically undermined and marginalised the deep cultural connections that local people have to the sea. For Nautilus, the Bismarck sea is a 'development space' (Winder & Le Heron, 2017, p. 5) or new 'trading environment' (Winder & Dix, 2015), devoid of any potential cultural importance to humans. At the same time as essentially erasing local claims to the immediate project area, I have also shown how a key part of the Nautilus discourse surrounds the construction of local communities as supportive of Nautilus' endeavours in their waters, a claim which powerfully distorts local cultural reality. It was seen how the subjugation of local knowledge and the entrenchment of a cultureless natural space has also been legitimated by the discourse of the national government, whose main concerns surround the economic profitability of the project as opposed to the ecological

and social welfare of communities living in its orbit, a pattern of governmental action that directly contributes to a longstanding legacy of the resource curse in Melanesia.

With the power of transnational capital, national legislature, the media, and also the legitimate use of force at their disposal, Nautilus and the national government are in a privileged position to implement their anti-cultural discourses and achieve their respective economic aims, thus revealing the social effects that flow from discursive constructions. Without the means to challenge such a formally instituted political-economic configuration and only relatively limited channels through which to advance their own discourse, local communities are far less likely to achieve a desired result. My thesis has demonstrated that they have been thrust into a situation where their traditional connection and rights to the sea have been ignored and invalidated. It is important to acknowledge that they argue the sea is central in all aspects of their life, informing their identity, livelihoods, and worldview; it is a comprehensive seascape epistemology (Ingersoll, 2016), and it is this that influences their reaction to the Solwara 1 project. It is their seascape epistemology that constitutes a radically different perspective on the project area and which also forms the core of their discourse against the capitalist extractive nature of DSM. My thesis thus confirms the broader idea that for corporate companies, nature is something to be financialised or banked (Bigger, Johnson, & Ouma, 2018, p. 501), while for local communities, nature is perceived and valued as an intrinsic and fundamental aspect of a holistic lifeworld.

The lens of discourse has thus proved a particularly fruitful means of exploring the interrelationships between the four stakeholder groups defined by Banks and Ballard (2003) as it has provided a way of interrogating the political machinations of a project that has yet to begin. My analysis has revealed how each group, anticipating the commencement of Solwara 1, draws upon their respective discourses to construct the project, the marine environment, and the local communities living near it, in ways designed to execute certain political motives. What complicates this stakeholder model is the location of the project

at sea, which, as my research has shown, complexifies traditional notions of 'landownership' associated with terrestrial mining. In the case of Solwara 1, the cultural and cosmological relationship of local people to the area being developed is not as obvious as a terrestrial mine, and thus opens up a wide political space for the competition of discourses designed to portray it in a given way. Being a remote area of ocean has allowed Nautilus to effectively advance their claim of there being no landowner issues, while the prospect of being consequently excluded from the direct benefits that typically accrue to landowners has compelled local people to passionately defend their attachment to this oceanic space. The discursive environment surrounding a project perceived to be imminent has thus clearly illustrated the notion of zones of entanglement (Bainton & Owen, 2018), a crucial part of which is the process whereby local groups are forced to reimagine their society in terms of the demands and impositions of transnational capital and Western culture (Golub 2014, Weiner 2004).

6.1 The Outcome

The history of mining in Melanesia is replete with examples of indigenous communities who have had their land and waterways polluted and compromised, their social structures fractured, as well as their collective lives ravaged by new social ills and inequalities (Bainton, 2010; Gilberthorpe, 2009; Jacka, 2015). From the above discussion, it seems likely that, should Solwara 1 move forward into production, this deeply fraught pattern will continue. Relating back to the concept of 'cartographies of power', coastal peoples of the Solwara 1 area "are drawn into cartographies within which they are positioned as marginal, where the sites, agents and processes of modern power are located elsewhere" (Stead, 2017, p. 3). In relation to the Solwara 1 project, local communities have not only been positioned as marginal, but are erased from the playing field by the discourses of the mining company and national government, rendering them somewhat powerless. It is a modern or Western process that does not value or acknowledge culture and tradition.

Ironically however, the potentially negative social effects flowing from this cluster of discursive construction looks unlikely to happen. From a scenario within which the company and national government prosper to the exclusion of local people, it now appears that Solwara 1 is destined to go under and that local people's opposition, even if seen as a cultural instrument to lever royalties from the project, will, in a strange twist of fate, eventually triumph. All recent circumstances indicate that the Solwara 1 project will fail due to financial pressures. When considering the position Nautilus have maintained, this is somewhat surprising. They have staunchly argued that the project is viable, environmentally friendly, and will not have any social or cultural impacts. In comparison to other stakeholders, the mining corporation has a monopoly over resources and is by far the most dominant stakeholder, flexing its might at the national government when required and portraying local communities as in support of the project, despite heavy resistance. Ultimately, it is the lack of financial resources that is leading to grave uncertainty over the world's first deep sea mine. Material reality can thus topple even the most robust of social constructions such as discourses.

6.2 The Future of Deep Sea Mining in the Pacific

A final point I wish to make is that although Solwara 1 may not proceed, it is still important to recognise that DSM poses a significant threat to Pacific peoples in the near future. The world's seabed mineral deposits are largely concentrated within the Pacific, and as technological capacity increases, so does the ability to access these riches at the bottom of the sea. This 'new gold rush' (Howard, 2016) therefore places people of the Pacific not just on the brink of the resource frontier, but at the centre of it. I argue that unless significant changes are made to legislation, the availability and quantity of the high grades of mineral resources on the seabed, as well as the demand for mining machinery (which these minerals are main components of), will lead to a race to the bottom of the sea; a very real problem for people of the Pacific.

Perhaps the reference to Nautilus' DSM machines being seen as 'monsters of the deep' also offers a metaphor for DSM itself, as a monster of the deep. One can easily imagine that a similar discursive contestation that has played out in the Solwara 1 arena will likely be extended to each Pacific nation that is thrust into the DSM industry. Of course, tensions will differ depending on the approach of governments and how the DSM venture is perceived by local people. Solwara 1 demonstrates the complexity of such a situation. It may also be premature to assume that the Solwara 1 project will be completely abandoned, as it may present a good opportunity for another mining corporation to obtain the rights to mine the Bismarck seafloor. Therefore, although Nautilus' Solwara 1 may be reaching its end, the promises of DSM suggest that Solwara 1 is only the troubled start of a bigger enterprise.

The Solwara 1 project presents a highly complex web of discourses and multifaceted reasonings for being for or against the project going ahead. The now troubled mining company has led the way in clearing a path for Solwara 1, discursively by subjugating the totality of relationships local communities have to the sea. The national government of PNG has been supportive of the project and continues an historic trend of reliance on extractives industries at whatever cost to the environment and citizens. Struggling to be recognised as the customary owners of the marine space being developed, coastal communities have maintained a strong opposition to the project informed by a seascape epistemology which posits that the sea and its resources are integral aspects of their lifeworld. The fourth estate echoes the resistance of local communities and has worked assiduously to expose fraudulent scientific claims made by Nautilus and the national government. My research has revealed that the sea of voices swirling around this DSM project is bathed in complexity. Moreover, I argue that the project can not only be labelled as a zone of entanglement, but a zone of prosperity, contention, cultural claims, environmental diversity and uncertainty. Although the likelihood of Solwara 1 eventuating is doubtful, it must be assumed that DSM will be a reality in the future, and that the race to the bottom of the sea is still well and truly on.

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