The dichotomous perceptions of marine debris in Miyako, Okinawa Prefecture, Japan

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Abstract

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Marine debris is an issue with global implications that cannot be managed within a single sector or disciplinary field. Small islands in particular are vulnerable to disproportionate impacts from marine debris, whether they are social, economic, or cultural. Although a growing number of governmental bodies and civil society organizations are mobilizing to tackle marine debris on both global and local scales, there is often a disconnect between the work of a few impassioned groups with the rest of the population. To determine why this dichotomy exists, this paper explores different perceptions of marine debris through semi-structured interviews in Miyako, Okinawa Prefecture, Japan. While there are NGOs and residents who are involved with activities to mitigate the impacts of marine debris to Miyako, this sentiment is not shared across the island.

To address marine debris issues on Miyako, there is a need to acknowledge underlying political, economic, and social factors that contribute to an individual's decision to participate in activities, including joining beach clean-up events or reducing consumption of single-use plastics. Engaging the local population with marine debris activities therefore requires a more holistic consideration of Miyako's evolving political, economic, and social landscape. When the various perceptions of urgency, actions, and priorities are taken seriously, Miyako can better engage the general public with marine debris. Doing so can then prepare Miyako to contribute to the marine debris discourse at a national and international scale. Results of this study can be applied in other locations by acknowledging those underlying factors that may drive how a community prioritizes, implements policies, or enforces actions to mitigate marine debris.

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1 CHAPTER 1: Introduction

Marine debris refers to “any persistent, manufactured or processed solid material discarded, disposed or abandoned in the marine and coastal environment” (UNEP, n.d.). It is a nonpoint source pollution that typically begins as land-based waste that is discarded into the environment and carried to the ocean through rain, wind, and river systems or direct human disposal. Once in the ocean, the generally lightweight nature of debris allows for wide dispersion, allowing it to travel thousands of miles away from its source.

With no notion of national or political boundaries, marine debris pressures the global community to develop new management and mitigation strategies (Kripa et al., 2016). Some of the commonly cited international treaties that address waste to marine environments include the United Nations Convention on the Law of the Sea and the International Convention for the Prevention of Pollution from Ships. Holding particular weight in recent years is the latest amendment to the Basel Convention adopted in May 2019. Plastic waste is separated by three categories: hazardous waste is under Annex VIII, other wastes with special consideration are under Annex II, and non-hazardous wastes are under Annex IX. Once listed, plastic waste is under extensive control and those handling it are expected to comply with obligations such as environmentally sound management and proper labelling when exporting. The Basel Ban Amendment also prohibits the transboundary transportation of hazardous or unclean waste by Annex VII (i.e., Basel parties, OECD members, the EU, and Liechtenstein) countries to non-Annex VII countries (Khan, 2019; UNEP, 2018).

Considering this global scale, marine debris is not an issue that can be managed within a single sector or disciplinary field. Neither is it a problem that can be efficiently addressed by different parties independently, due to varying objectives and degrees of acceptable risks. As

such, there is a need to approach marine debris under a polycentric governance approach (Ostrom, 2009; Ostrom et al., 1961). While marine debris is a growing area of concern for various civil society and government parties, there is a need for a collaborative management process that fully considers multiple values, goals, and concerns. Good governance can be defined as the ability of members of society to participate and collaborate with one another to collectively manage aspects of their lives (Dóchas, 2001). The term civil society has evolved to encompass a wider scope of entities that are found in both organized sectors, such as non-governmental organizations (NGOs), and unorganized communities, networks, and movements. This evolving body of civil society represents an assortment of societal statuses, ethical values, and underrepresented communities, which incorporates a new dynamic in power shifts at the public and private sector levels. Creating a forum for these parties to discuss, collaborate, and build trust is an essential aspect in making governance decisions that serve society as a whole while also holding public and private sectors accountable for any costs they impose upon society (Stanley Foundation, 1999).

Small islands can offer insight into the practicability of a truly global action against marine debris. Islands are usually characterized by their low population density, small land mass, limited access to resources, lack of management capacities, economic instability, and their exceptionally high attraction as tourist destinations. Although a considerable proportion of debris is carried by ocean currents to those islands, internal generation of waste typically comes in the form of derelict fishing gear, waste produced by tourists, and local dumping to avoid disposal costs (UNEP, 2016). As isolated bodies of land, islands face challenges in adapting to and mitigating the rapid rate of debris washing ashore by ocean currents.

Small islands are also home to many of the world's endemic species, making their biodiversity another area of sensitivity, placing them at risk from increasing anthropogenic, environmental impacts. They also foster diverse cultures and knowledge about how humans interact with one another and the environment (Kueffer and Kinney, 2017; Lachmann et al., 2017). For some islands, particularly those of the Eastern and Central Pacific, Mediterranean, and Atlantic Ocean, historical strife with colonization and Westernization has contributed to their current dependence on foreign economies and influences from which they had once sought to distance themselves (Kueffer and Kinney, 2017). Such historical and geographical contexts make small islands sensitive to change, whether those forces are intentionally or unintentionally incited.

Yet, growing threats of climate change and increasing marine debris rapidly impinging upon small islands worldwide have consequently positioned many communities in a state of emergency, with lives directly at risk (UNCTAD, 2019). With the existential threat of environmental challenges, recognition of the value of islands as rich sources of biological diversity and cultural heritage has heightened global efforts to conserve these environments (Kueffer and Kinney, 2017). As international entities are increasingly focusing their attention on small islands worldwide, much uncertainty remains in how much time islands have before reaching the tipping point, after which period islands will have difficulties in mitigating and recovering human and diverse ecological systems.

With a growing polycentric trend in marine debris management, there have been solutions proposed and implemented at different levels of government, from local community efforts to international treaties. How can these solutions be applied to small islands in a way that 1) reduces the burden of marine debris, 2) addresses socioeconomic needs, and 3) establishes a

monitoring and evaluation program that holds major producers in developing countries accountable for persisting harm?

1.1 Research questions

Further narrowing the scope of the aforementioned questions, I developed my research questions as follows:

1) What are the underlying factors (i.e., political, economic, and sociocultural) needed to better understand how an island (whether through internal means or external support) ought to address marine debris?

2) How can solutions be developed in a way that incorporates those underlying factors into the larger decisions of marine debris management?

3) To provide perspective on questions 1 and 2, what are the perceptions of marine debris in Miyako, Okinawa Prefecture, Japan?

Central to developing strategies and activities are human elements of behavior, choice, and autonomy, which are themselves complex concepts to which to address. With life history, values, societal pressures, and many other factors influencing decision-making for a given individual, engagement of a local population with marine debris cannot be fully understood without examining underlying motivations (Huntington et al., 2017; Kaskaya and Calp, 2017; Klope et al., 2009; Nash et al., 2019). The extent of the problem of marine debris on Miyako and details of the inputs and outputs of waste to the island are therefore not the focus in this paper. Rather, this study extends beyond the observable evidence of debris on the shores or the city's declarations for adaptive measures. I delved into the prevailing cultural practices, changing distribution of wealth, and the intensifying limelight shone on the island by tourists, developers,

and national agencies. Doing so reveals a deeper understanding of the political, economic, and sociocultural landscape, which shapes the way marine debris is discussed and acted upon by the city and local residents of Miyako. Based on the perceptions and suggestions I have compiled from my interviewees; I propose that the solution to addressing marine debris on Miyako begins with a deeper understanding of the existing and transforming ways of life for the local population. Considering the range of sociocultural factors that contribute to how locals on the island react to the issue, it is necessary to consider the larger wellbeing[1] and livelihood of the population to promote long-term change.

In Chapter 1, I introduce the problem and state my research questions. In Chapter 2, I provide background on the current state of marine debris actions and governance in Japan and Miyako. I also delve into four thematic contexts through which I will be discussing marine debris response in Miyako. In Chapter 3, I provide my methods for interview design, data collection, data analysis, and field observations. In Chapter 4, I provide responses to my interviews based on the overarching thematic context of Miyako. I also analyze the responses based on a matrix of urgency and activities. In Chapter 5, I discuss persisting issues, potential solutions, and global implications of this study. In Chapter 6, I conclude this study with a summary of findings and recommendations moving forward.

2 CHAPTER 2: Background

2.1 Marine debris

[1] For the purpose of this paper, wellbeing will be defined based on the definition by Kloep et al. (2009) in which "each time an individual meets a challenge, the system of challenges and resources comes into a state of imbalance, as the individual is forced to adapt his or her resources to meet this particular challenge" (p. 337).

2.1.1 Marine plastic pollution

Among the categories of marine debris, plastic pollution is especially potent due to its abundance in the marine environment and slow degradation. Since the start of mass production in the 1950s, there has been an estimated total of 6.3 billion tons of plastic produced. Global production of plastics has now reached a steady 320 million tons a year (UNEP, 2018). Approximately 4.8 to 12.7 million metric tons, or 80%, of plastics that enter the ocean annually are from land-based sources, while the remaining 20% comes from marine sources (Jambeck et al., 2015; Li et al., 2016). However, it has been projected that of the total plastics generated, a staggering 91% has not been recycled (Parker, 2018). Thus, efforts to address plastic pollution target various stages of the plastic lifecycle, its production, consumption, and disposal.

Also referred to as macroplastics, larger pieces of plastic are over five millimeters in size and can take around 400 years or more to degrade (Parker, 2018). What adds to the hazard of plastic debris is its changing composition with physical and chemical degradation. Most people may be familiar via social media platforms with the symbolic imagery of a monk seal entangled by derelict fishing gear or a sea turtle asphyxiated by a floating plastic bag. However, there is also growing literature on risks of plastics as vectors of toxicants, such as polychlorinated biphenyls, which are undetectable to the casual observer (Dauvergne, 2018).

Beyond these iconic representations of harm by large debris that are fairly identifiable, smaller pieces of plastics are raising alarms due to their ubiquity on land, in the ocean, and in the digestive tracts of marine organisms and commercially prepared seafood (Rummel et al., 2016; van Cauwenberghe and Janssen, 2014). Emerging studies are also discovering the prevalence of microplastics in bottled water (Mason et al., 2018), tap water, and groundwater (Mintenig et al., 2019). These microplastics are generally characterized as particles from one to five millimeters

in size, with two classifications: primary and secondary. Primary microplastics are intentionally manufactured for use in products such as cosmetics (e.g., exfoliating face scrubs), synthetic clothes (e.g., polyester), and tires (e.g., synthetic rubber) (Boucher and Friot, 2017; Graney, 2016; Kole et al., 2017). In their virgin spherical or cylindrical form, they are distributed as resin feedstock to create other plastic products (GESAMP, 2015). These primary microplastics enter into water bodies through inland rivers, coastal and urban runoff, and groundwater and wastewater streams (Dauvergne, 2018; Koelmans et al., 2019). Secondary microplastics are the result of macroplastics that have broken down into smaller pieces through weathering or fragmentation (GESAMP, 2015). Even smaller are nanoplastics, which are characterized to be less than one micrometer (Koelmans et al., 2019). Despite their small size, they retain properties that absorb chemicals that may biomagnify through the food chain. However, as uncertainties remain in the degree of absorption, variable concentrations in the environment, lack of a standardized measurement for analysis, and risks toward human and environmental health are yet to be ascertained (Mintenig et al., 2018).

2.1.2 Courses of action

Several useful products that seek to better understand the root issue and curb land and sea-based inputs of marine debris have been developed by international interdisciplinary working groups. One that is most often referenced is the Honolulu Strategy, which is a deliverable from the 2011 Fifth International Marine Debris Conference, organized by the National Oceanic and Atmospheric Administration and the United Nations Environment Programme. Scientists, managers, private sector, and practitioners worldwide participated in developing this framework (Shevealy et al., 2012). Shortly after came the Ha Noi 3R Declaration of 2013, which set ten-

year goals and monitoring indicators toward reducing waste outputs through improved resource efficiency, green economy, and implementing the 3Rs; or reduce, reuse, and recycle. This was produced through collaboration of Asia-Pacific countries, research institutions, waste management professionals, and other agencies and organizations (UNCRD, 2013). These strategies have promoted the value of expanding stakeholder partnerships in addressing the multifaceted nature of plastic pollution and including international, national, and local levels of action.

On a regional level, many countries, states, cities, and businesses have turned to banning single-use plastics as a solution. From straws and cutlery to styrofoam containers and plastic bags (Howard et al., 2019), these bans have targeted the macroplastics that have become the face of mortality for the charismatic marine creatures that often find their ways onto magazines, social media, and anti-single-use plastic campaigns.

International treaties, regional bans, and national policies have also been proposed and implemented worldwide, and yet plastic inputs into the marine environment continue and are expected to exacerbate in the future. Even with a central authority implementing strategies, how are these applied or enforced on a local level? This may be particularly important to consider in countries with less economic, infrastructural, and political structures to support such implementation.

2.1.3 Current marine debris governance in Japan

In Japan, while there is no specific legislation targeting marine debris reduction and removal, the most relevant piece of policy may be the Third Basic Plan on Ocean Policy. This plan was approved on May 15, 2018 by Prime Minister Shinzo Abe at the 17th Meeting of the

Headquarters for Ocean Policy. During this meeting, cabinet members discussed improvements to strengthen Japan's maritime security (i.e., capacity in Maritime Domain Awareness), utilization of the ocean for industrial interests, and the further development of marine resource growth in the Arctic (Shusō Kantei, 2018). There were also six measures drawn up for this plan, one of which mentions marine debris. The measure to "maintain and protect the maritime environment" includes a goal to respond to and reduce marine debris and microplastics in the ocean. To accomplish this task, the government proposes to monitor, collect, and prevent debris at its source while also participating in international cooperation (Cabinet Office, 2018b).

Since 2010, the Okinawa Prefectural Government has been evaluating marine debris along its shorelines. This effort has been led by the Environmental Waste Management Division of the Department of Environmental Affairs with the purpose to develop educational resources, recycling strategies, and debris retrieval plans (Japan Environmental Action Network, 2016). Okinawa Prefecture has also made strides to address marine debris through local and international actions. In 2014, the governments and NGOs of Okinawa and Taiwan came together to establish the Okinawa-Taiwan Marine Debris Workshop, where they discussed various strategies and policies concerning cross-border marine debris. In attendance were 20 participants from Okinawa Prefecture's Department of Environmental Affairs and Okinawan NGOs as well as 13 participants from Taiwan's New Taipei City and Hualien Environmental Protection Departments, Taiwanese NGOs, the Tainan Community University, and others. During this gathering, the focus was on marine debris research, education, beach clean-up activities, and controlling land-based trash (Japan Environmental Action Network, 2016). With a strong understanding of international and local sources of marine debris, it is clear that the Okinawa Prefectural Government has been and will continue to pursue collaborative and creative

efforts to minimize its input of debris into the ocean for future prevention and persist with beach clean-up activities to reduce what is visible on the shorelines.

Solutions and policies to address marine debris are currently being implemented on international, national, and regional levels. While various tools, strategies, and partnerships are emerging throughout Japan and in Okinawa, stakeholders in Miyako have yet to participate in these forums, as they are struggling to adapt them into their local political, economic, and cultural context. To understand this struggle, it is helpful to consider some contextual information on the history, socioeconomic conditions, and culture and traditions of Miyako.

2.2 Context on Miyako

Miyako is an island in the subtropics of Japan, located southwest of Okinawa (Figure 1), with an area of 61.34 square miles (Dijitaru Daijisen, 2012). With a population of roughly 55,525 people, Miyako is one of the more populous islands of Okinawa Prefecture, with increasing rates of immigration, from both mainland Japan and abroad (Miyakojima City, 2020). With this growing amalgamation of people calling Miyako their home, social interaction among people on the island is evolving, with emerging questions of how best to balance changing circumstances while incorporating strategies to addressing a local and international issue such as posed by marine debris.

Figure 1: Map of Miyako Island (Commerce and Tourism Section, n.d.).

Marine debris is a problem that has emerged from decades of political, economic, and social, and cultural factors that have created and aggravated the situation worldwide. The task of perceiving the issue and considering solutions to address marine debris is therefore also emphatically intertwined with those factors, with regional variations. When discussing marine debris in Miyako, the four overarching themes that have shaped those factors are 1) history, 2) socioeconomics, 3) sustainable development and the environment, and 4) culture and tradition.

2.2.1 History

When examining any of the Okinawa Islands, it is vital to first understand the history of Okinawa Prefecture and the deep-seated reverberations of the Okinawan people's experiences to

their livelihoods and identities. Once referred to as the Ryukyu, or Lewchew, Kingdom, the islands were forcibly absorbed into the Japanese government by 1879 through military force (Matsushima, 2010; Rabson, 2012). What followed from this Japanese colonialism was a period of assimilation to rid Okinawans of their so-called primitive way of life. From language and religious rituals to food and music, racially discriminatory practices were forcibly implemented to establish Okinawa Prefecture as a unified, homogenous part of Imperial Japan. Nevertheless, Okinawans were still viewed as exotic others. This characterization was evidently displayed during the Fifth Industrial Exposition of 1903, when Okinawans, along with native individuals from other lands deemed as exotic or savage, were held in cages as part of the Human Pavilion (Matsushima, 2010; Ziomek, 2014).

Come World War II, Okinawans paid with their lives, as 25% of the population, an estimated 150,000 people, were either killed in the line of war or compelled to commit mass suicide by the Japanese military force (Matsushima, 2010; Pike, 2016). What followed was a second wave of foreign control, under the U.S. Military High Commissioner from 1952 until 1972, at which time Okinawa once again fell under Japanese rule (Aoyagi, 2016; Inoue, 2004; Matsushima, 2010). While this return to the motherland painted Japan as the guardian that freed Okinawans from military dictatorship, the discrimination and exploitation of the islands and its people continued. This is exhibited to this day by the disproportionate pressures of both Japanese and U.S. military forces on Okinawa Prefecture compared to other prefectures throughout Japan. However, as political compensation for the continuous presence of military bases, Tokyo began funneling hundreds of billions of yen to Okinawa, significantly improving living standards for the once impoverished region (Inoue, 2004). Economic support from Tokyo thus comes with conditions to accept national and international military bases.

Despite such economic deliverance, the benefits were not felt equally across Okinawa. While Okinawans had historically endured sociopolitical oppression as a united entity, social fragmentation with the inequitable distribution of wealth had shifted this unified intra-island identity. Financial aid and development projects in Okinawa were concentrated in south-central cities that were occupied by U.S. bases, while northern towns remained largely underdeveloped (Inoue, 2004). As Okinawa became further commercialized and transformed into a hotspot of foreign tourists and settlers, along with the ever-present American military personnel, the ethnic and social landscape of the island changed dramatically.

Divisions were made between self-identified old and new Okinawans. Locals of the island, generally the elderly who retain their memories of prejudicial treatment and traumas from war, maintain their distinct ethnic identities as Okinawans. This group continues to view outside forces with hostility over the ongoing exploitation of their people, land, and resources. Another defining characteristic of this group is their economic stability that has enabled them to continue to reject external imposition (Aoyagi, 2016; Inoue, 2004). In contrast, a new pro-diversity group of Okinawans emerged. With less economic stability, these new Okinawans see the U.S. bases as a means of financial opportunities. Demographically, this group is generally comprised of a younger generation that has grown with the tide of the Okinawa boom throughout mainland Japan, which had come to celebrate, albeit romanticize, Okinawa's distinct culture (Inoue, 2004; Rabson, 2012). They also welcomed the influx of Japanese settlers as a source of support and insight to empower local communities amidst mainland Japan's plans for mass commercialization and development on the island (Aoyagi, 2016). In the centuries that followed the fall of the Ryukyu Kingdom, the Okinawan identity had gone through phases of purging, rediscovery, and now reinvention.

Island cultural is evolving in Miyako as well, as more migrants from mainland Japan and other countries have made the island their new home. Growing military presence in Miyako is another recent development on the island, and inhabitants have been fervent in their opposition to the recent activities by the Japan Ground Self-Defense Force (JGSDF) (Bosack, 2019). Amidst strategies put in place for the expansion of the JGSDF on Miyako, the Residents' Liaison Association Against the Missile Base filed a petition to the Okinawa Defense Bureau. This is targeted not only to the deployment plan but pushed toward the removal of their ammunition storage facilities, over which citizens have raised safety concerns (Ryukyu Shinpo, 2019). As local residents continue to protest against increasing military activities, uncertainty remains in whether the Okinawa Defense Bureau will ease citizen concerns or move forward with promoting domestic and foreign militarization. Further questions remain in how these societal shifts will reinforce or shape the identity of the people of Miyako.

2.2.2 Socioeconomics

For a subtropical island such as Miyako that is heavily advertised as a tourist location, tourism is one of the largest and most visible sectors shaping the island's socioeconomic condition. Tourists consume both the tangible and the intangible when it comes to vacationing on islands. Tangible products are physical items that tourists purchase, such as souvenirs, hotel accommodations, and the meals they consume throughout their trips. Although in pursuit of the surf, sand, and sun, islands may be primarily desired for their intangible products, such as the climate, natural environment, and distinctiveness of their cultural heritage compared to their own. Consumption of both product types have also been largely perceived as non-rival and non-excludable, as most products are accessible by more than one tourist or local at a time (Berno

and Bricker, 2001). While this may have been true in the past, Miyako may no longer be able to sustain the health of its intangible products.

There has been a steady rise in tourists visiting the island since 2012, having reached an estimated 1.1 million tourists in 2018 (Miyakojima City, n.d.b). Miyako Mayor, Toshihiko Shimoji, has also expressed his next goal of reaching 2 million tourists by 2028. With the second tourism plan in development, the city is working to further improve upon infrastructure, the environment, and the service industry to increase tourist satisfaction and reach $873 million in gross domestic product from tourism (Miyako Mainichi, 2019). With concern growing for this target, citizens are expressing the need for the city to conduct the appropriate risk assessment for the island to best adapt to the changes to come.

Within the nation, consumption is as much a significant cultural aspect of people's lives as it is for their subsistence. Apart from monetary gifts, the exchange of commodities is a significant part of the Japanese culture. Whether it is between family members, friends, or for one's employer, the practice of gifting is all layered with meaning, from the content within to the outer bindings. From their ornate decoration to the specific brand of the gift, much is communicated to the recipient about how valued they are (Daniels, 2009). With various occasions throughout the year and countless social standards to uphold, households send and receive items they may or may not use, wrapped meticulously in layers of paper, plastic, and ribbons. While the contents of the gift may be recirculated among family and friends, the outer layer that once signaled the social value of the gift is discarded.

Food is also a common gift with high social implications. As consumable and perishable materials, food items have been described as gifts that do not leave any traces in the receiver's home. Additionally, just as food is freshly purchased, so are relationships renewed (Daniels,

2009). This practice is just as vital in maintaining relationships with the living as it is with the deceased. For the Ryukyu Islands, after ancestor worship first spread widely in the 17th century, it has continued to be practiced in generations following. Food, beverages, and other items (e.g., newspapers, cigarettes, and other trinkets valued by the deceased) are placed before tombs and on household altars as offerings shortly after death and during ceremonial events throughout the year (Baksheev, 2008; Daniels, 2009). Visitors paying their respect are also treated to an extravagant feast that is prepared by the family in mourning. Hors d'oeuvres have become a staple for large gatherings, which often includes an assortment of fried protein, fish cakes, rolls, sushi, or fruit. These pre-ordered meal sets are a stress-free way for families to prepare more food than they could possibly finish with their guests. Along with the potential food waste, the plastic platter and utensils add to the waste produced during these gatherings.

2.2.3 Sustainable development and the environment

Sustainable development is defined as a means of ensuring "the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). This concept emerged at the forefront in the international realm when the World Commission on Environment and Development issued *Our Common Future*, the Brundtland Report, in 1987. The Brundtland Report emphasizes considerations of disproportionate socioeconomic conditions; prompting participatory decision-making processes that involve citizens, particularly that of the poor; assurance that the path to sustainable development does not lead to continued exploitation; and unequal distribution of resources and affluence. Sustainable development is also framed as an issue in economic activity (Daly, 1990; Kerr, 2005) that inevitably leads to a higher

dependence on the planet's natural resources to keep up with demands in energy, infrastructure, and the consumption of goods and services.

This interdependence of environmental, economic, and social systems was packaged in the United Nation's Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs). As the MDGs targets had not been achieved during its 15-year duration (2000-2015), the SDGs are the next wave of global initiatives seeking to ameliorate environmental health and human wellbeing using a more holistic approach that considers poverty, culture, gender, and human rights (Connell, 2017; Mensah, 2019). Since its adoption in 2015, the 2030 Agenda for Sustainable Development lists 17 SDGs that have become widely recognized by governmental and non-governmental bodies worldwide and framed as the guideline for a growing number of programs, projects, and initiatives that seek to bridge the balance in sustaining both the natural and social landscape (UN, 2019).

Despite the tangible goals and outcomes emerging to meet the 2030 timeline, there is still much ambiguity as to whether the concept of sustainable development is desirable. Often portrayed as a call to action for humankind, the pursuit of sustainability can have the effect of drawing accountability away from the major consumers of natural resources who do not directly bear the consequences of their unsustainable practices. Thus, sustaining their identified needs cannot reduce social inequalities and problems should not be sustained but rather eliminated (Marcuse, 1998). With the globalization of sustainable development, the term has come to embody a slew of meanings, slogans, and experiences. Furthermore, the concept has been shaped to be used under various contexts, which is where the ambiguous definition of sustainable development gives way for the term to be associated with activities that are designed to promote development that do not necessarily have long-term benefits to the local community or

environment. Grydehøj and Kelman (2017) uses the term conspicuous sustainability to describe this phenomenon as "a community or organization [undertaking] an initiative that gains much of its value from its visibility, iconicity and symbolism (rather than from the environmental benefits it produces)".

Islands are especially prone to becoming the token embodiment of conspicuous sustainable development. One such example is the growing moniker of islands as "eco-islands" and in doing so, there is typically a proclamation of an island's commitment to renewable energy, conservation, and reductions in greenhouse gas emissions. The small scale of islands makes these goals easier to address and achieve as compared to the mainland (Connell, 2017; Grydehøj and Kelman, 2017). As eco-islands are praised as models for sustainable development, the next logical step would be to then apply the successes and lessons from these models to the mainland, to promote large-scale changes with more significant, global implications. The reality is that sustainability then runs the risk of becoming a commercialized marketing tool that draws accountability away from unsustainable practices by developed nations or wealthier mainland areas (Grydehøj and Kelman, 2017). As a consequence, no matter how sustainable or self-sufficient islands worldwide become, the benefits they procure will not be able to outperform the pollution and consumption by the world's wealthiest nations that remain unchecked. Disproportionate environmental burdens will therefore continue to exist on islands, while affluent and politically powerful counterparts on the mainland maintain a secure distance from direct threats (Baldacchino and Kelman, 2017). This will occur regardless of whether their intentions are genuinely concerned for the environment and the wellbeing of their people or whether they are using the concept as a branding mechanism to attain other socioeconomic or political favors.

With the boost in tourism, there comes the need for more infrastructure, construction workers, and service industry employees to adapt the island to those changes. With rapid development sweeping Miyako and its neighboring islands (i.e., Kurima, Ikema, and Irabu), now all accessible to vehicles via bridges and consequently drawing in more visitors, Miyako is experiencing an economic bubble. The latest bridge constructed, the Irabu-Ohashi, was completed in 2015 and cost approximately $359 million. At 3,540 meters in length, this is the longest toll free bridge in Japan, making it yet another promotional attraction for the island (Azuma et al., 2015). These high expenditures, however, are nothing new for Okinawa Prefecture. In 2018, Okinawa received the most funding per capita (i.e., approximately $2.8 billion) in the nation, from the Development and Promotion Fund of the Japanese government (Cabinet Office, 2018a). For decades, this spending has been funneled to countless building projects throughout the islands, more so in Miyako in recent years, as the island continues to draw domestic and foreign tourists.

The influx of temporary workers and new residents on the island has created a shortage of housing, thereby raising local rent considerably higher than mainland Okinawa or Japan. Currently, monthly payments for rent in Naha, Okinawa ranges between $505 and $550. In Miyako, the same square-footage can cost as high as $730 to $918 per month. Not only are costs rising, competition to find housing, amidst the shortage of apartments, is forcing employees to scramble for a place to live. Despite delays in construction projects and the unrelenting demand for service workers, this housing instability has given some workers no choice but to bounce between guest houses or even commute from mainland Okinawa (Okinawa Times, 2019). With no end in sight for this rush, the tension between real estate agents, apartment owners, tenants, and incoming employees will continue to remain a challenge to balance.

2.2.4 Culture and tradition

Yet another example of island consumption, alcoholism on Miyako is deeply rooted into notions of island traditions. Otōri is a drinking activity that has evolved since its beginnings in the Ryukyu Kingdom. Records of this activity dates back as early as the 15th century, when otōri was a practice limited to the kingdom's royals and council ministers as a New Year ceremony. During the ceremony, the King of Ryukyu was said to pass a golden cup filled with awamori, a distilled liquor distinctive to Okinawa, around to each of the princes, princesses, and ministers of the kingdom (Hagio, 2016). By the early 20th century, as awamori became commonly available among the general population, otōri took on various styles as it spread to different islands and villages of the Okinawa Islands.

Miyako widely adopted the shindachi style of otōri, during which all participating attendants are expected to make a speech, taking turns being the master. The master begins the round by making a toast before drinking a glass of awamori. The master is then responsible for serving the glass around to the other participants, before finishing one additional glass to close the round. The second round begins when the role of the master is passed to the next person, repeating the cycle from the beginning. This means the awamori is passed around the table for as many rounds as there are participants. Those present are socially trapped through peer pressure to maintain reputation and relationships, in participating in a seemingly endless loop of otōri rounds. This pressure starts as early as high school, especially as awamori is commonly found in households and thus easily accessible by students under the legal drinking age of 20.

In 1983, a high school student who partook in otōri with his friends was involved in a motorcycle accident following the gathering. This led to a critical reflection of otōri among Miyako locals. In fact, one of the villages of the island had even attempted to ban this destructive

ritual. However, as with any addiction, a simple resolution was not enough to ban otōri, with proponents pointing to the survival of an important cultural heritage of the island. While this practice has continued in Miyako as a distinct aspect of the island's tradition, there is a sense of cultural intimacy in the nature of its preservation into the modern era. It has thus evolved to embody the ritual representation of post-colonialism, with its ubiquitous association with excessive alcohol consumption in Miyako. The concept has also been commercialized by the Miyako Tourism Agency, which began selling otōri glasses as souvenirs for tourists (Hagio, 2016). Labeled as a part of Miyako's tradition and culture, fascination with otōri by tourists conceals the destructive nature of this behavior among island locals.

According to a 2014 survey by the Miyako City Department of Welfare and Health, 45.6% of the 792 men who participated in this study responded that they consume at least 10 drinks a day. This is 40.5% more than men in Okinawa Prefecture and 42.3% more than the national average. Comparatively, 9.4% of the 828 women who were surveyed in Miyako responded that they consume at least 10 drinks a day. While significantly less than men, women of Miyako nevertheless consume more alcohol than women in Okinawa Prefecture and the nation as a whole (Department of Welfare and Health, 2014). Although studies have not found a direct correlation between otōri and alcoholism in Miyako, there is no question among concerned locals and healthcare workers that this drinking practice has been contributing to increasing health problems, drunk driving accidents, domestic violence cases, child abuse, crime, delinquency, and occupational mistakes on the island (Okinawa Prefecture Miyako Welfare Health Center, 2014).

In the same survey by the Miyako City Department of Welfare and Health, when asked the circumstances during which otōri typically takes place, men and women as a whole pointed

to celebratory gatherings. This includes weddings, the arrival of a newborn, the acceptance of a child into high school, or a coworker's retirement. Additional occasions were when getting together with friends and for work-related drinking gatherings. While men and women responded similarly, this practice is by no means gender neutral. Men dominate in otōri. In response to how often they participate in otōri, 20% of women responded *sometimes* while only 4% responded *frequently*. In contrast, 41% of men said *sometimes* while 34% said *frequently*. The highest age group that responded *frequently* was in their 40s and 50s. Among men who responded *frequently*, the average amount of drinks consumed was *10 or more drinks*. Despite this proclivity towards consuming significant amounts of alcohol, 42% of men expressed no strong support for the practice of otōri, with only 7% responding with *like* and 13% responding with *dislike* (Department of Welfare and Health, 2014). So, despite the negative health effects from otōri and the general indifference, this practice is nevertheless deeply embedded into Miyako's culture and thus essential in discussing marine debris and other societal issue.

2.2.5 The evolution of environmental governance in Miyako

As an all-encompassing plan to involve Miyako in actions of a global scale, the Eco-Island Declaration first emerged in 2007 (Miyakojima City, 2008). At its core, this declaration is sensitive to conserving the natural environment while sustaining the lifestyle of the local population. The previous mayor, Akira Ishimine, came to realize the dual importance of conserving the island environment to sustain a healthy population and local economy during his visits to the Hawaiian Islands, another chain of islands with a robust tourism sector. To set Miyako as a leading example for sustainable practices, the city also proposed an in-person guided tour of projects completed under the island's eco-island initiatives. From the wind power

generation plant to the sugarcane bagasse recycling facility, this eco-tour highlights the successes and possibilities afforded by the island's natural resources and capacity. Experiential environmental education is also valued as an essential component in fostering local stewardship of the environment. The declaration turned to schools as the primary setting of this initiative and a new curriculum was envisioned for elementary and junior high schools to incorporate participatory environmental studies that encouraged hands-on learning, such as engaging students in beach clean-ups to learn about marine debris and its impacts to the local environment (Prime Minister's Office of Japan, 2008). However, before these plans could be implemented to its fullest, Ishimine stepped down from his position.

After proposing the original Eco-Island Declaration, Ishimine was met with pushback from local businesses and the building industry. Because the declaration sought to reduce the impact of those industries on the environment, they saw such initiatives as a direct attack to their economic gains. As he received complaint after complaint, a series of financial scandals also emerged, instigated by staff members within Miyako City Hall. The final straw came with the misuse of subsidies that were provided by both the Japanese government and Okinawa Prefecture to fund an irrigation project in Miyako. Unidentified staff members of the Miyako City Hall falsely reported the completion of the irrigation facility project, illegally receiving the subsidies for themselves while the construction site remained unfinished. During a Miyako City Council meeting, a councilman of an opposing political party to Ishimine referred to the island's Municipal Law and Civil Code, which states that the mayor and deputy mayor are accountable for 85% of the damage due to oversight responsibility. Further, city staff are not liable for damages regardless of their involvement in illegal activities. Consequently, pressured to take responsibility for the scandals despite his noninvolvement, Ishimine made the decision to resign

with two years remaining, at which time Mayor Shimoji filled this role (Miyakojima City Council, 2008; Ryukyu Asahi Broadcasting, 2008a; Ryukyu Asahi Broadcasting, 2008b). Under the new administration, the Eco-Island Declaration 2.0 was announced eleven years later in 2018 (Miyakojima City, 2019). In this upgraded version, the ambition is to work towards a sustainable society that lasts a thousand years into the future, which also became the slogan of this declaration (Table 1).

	Eco-Island Declaration (2007)	Eco-Island Declaration 2.0 (2018)
Purpose	Sustain Miyako's natural resources and the wellbeing of the islanders while continuing to engage in tourism	Redefine the goals and refine the vision of Eco-Island Miyako
Target Deadline	Not specified	2030 and 2050 (using 2016 as the base)
Goals	1. Eco-tourism promotion 2. Consolidate environmental and ecological development industries from the mainland 3. Develop new industries that promote sustainability 4. Strengthen environmental protection 5. Joint consideration of the needs of islanders with tourism 6. Hands-on environmental education 7. Create an environment for nature and wildlife to coexist	1. Protect groundwater by reducing nitrogen concentration from 5mg (current level) 2. Reduce household trash and output of waste 3. Increase energy self-sufficiency by investing in renewable energy 4. Protect the coral reefs 5. Preserve endemic species

Table 1: Comparison of the original Eco-Island Declaration with the updated Eco-Island Declaration 2.0. These separate declarations were developed and announced under different administrations.

2.3 Rediscovering Miyako

Personally, recent changes to Miyako struck a chord in me, as someone who lived on the island for two years during my early childhood. Upon returning to the island after 14 years away, the increase in development was striking. This stark contrast was especially clear when driving along the coast. While there remain distant memories of sprawling sugarcane fields; sandy shores; and the sparkling, blue ocean almost within arm's reach from the car window, those sights are now impeded by apartments, rows of resorts, luxury mansions, and debris. Traffic and

congestion are also concepts that had not manifested a decade ago, when Miyako still felt like a sleepy little island. Now, there seem to be just as many, if not more, rental cars as local vehicles navigating through the narrow roadways and old neighborhood streets. Having been born and raised in Honolulu, Hawaii, and witnessing the changes that Waikiki has gone through, I could not help but feel the same disappointment in the inevitability of island development and commodification occurring in Miyako.

With relatives living on Miyako, who remain in the confines of this burgeoning concrete jungle for the foreseeable future, I am perturbed by the how the lifestyle of the local population is changing as tourism is placed at a high priority and marine debris governance remains in a business-as-usual state worldwide. Though the burden of addressing such concerns should not and cannot fall solely on the lives of those on the island, the actions and perceptions held by the Municipal Government of Miyako (hereinafter referred to as the municipal government) and civil society play an increasingly critical role in determining the social, economic, and environmental future of the island.

Though faced with these jarring differences upon my arrival, I was certainly sensitive to my own preconceived notions about governance and social relationships on the island. Again, these overarching beliefs I have about the island were built on the observations and experiences I had from living on the island as a child (and consequently with a different understanding of fairness, cultural customs, and social mechanisms), so acknowledging this, I ensured that my interview questions and comments were as open-ended and objective as possible. Thus, much time was spent in carefully developing the interview questions with my advisor and other partners in removing the potential for leading responses. That being said, before even beginning the interview, my time on the island and family connections were advantages that I had in

securing interviews with a wide variety of interviewees. With the former, though I had identified myself as a Japanese-American graduate student from the University of Washington, I positioned myself as someone who had studied and made friends at the local elementary school and explored many beaches throughout the island with family.

I also shared my first experience of discovering marine debris on the shores of Miyako, which ultimately set the stage for my parents and me to engage in marine debris education and outreach. The island has received many researchers from institutions worldwide, so the people of Miyako are no strangers to foreign interest. So, while identifying myself as an outsider, similar to a handful of other researchers placing Miyako under the microscope, I was to some extent an insider who understands the language, has experienced the island's social customs, and can sense the cultural nuances. With the latter advantage, indirect social connections provided me with networking opportunities that led to interviews. Although these were not personal relationships that I have built, thus not necessarily a biased interaction, I may not have had access to certain individuals on the island, particularly those in the municipal government, without their relationship with my grandfather, Takemitsu Shinzato, who was well known on the island. My grandfather served as the Director of the Okinawa Prefecture Welfare Department from 1982 to 1988; worked as a civil servant in Miyako under several positions (i.e., Director of the Aviation Bureau, Chief Administrator of the Miyako Sub-prefectural Office, and Director of the Miyako City Finance and Administrative Department) from 1988 to 2002; and received the Order of the Sacred Treasure Award by the Emperor in 2018 for his lifetime contribution to the public.

3 CHAPTER 3: Methods

3.1 Summary of methods

The findings of this thesis are based on a number of research items, which include 1) research on Miyako's history, governance, and existing response to marine debris to establish context, identify key stakeholders, and develop questions; 2) field research to conduct semi-structured interviews; 3) field visits to beaches to gather context of the problem and activities at beaches; and 4) data analysis and interpretation. Field work in Miyako occurred over a period of 32 days, from July 4th to August 5th, 2019. During this time, I conducted 24 semi-structured interviews and observed ten beaches throughout the island (APPENDIX A).

3.2 Interview design

Interview questions were developed and reviewed several months prior to conducting the interviews (APPENDIX B). They were first completed in English, after which time the questions underwent a series of edits by my thesis chair and his colleagues before translating into Japanese. For each sub-population, questions were individualized to best represent their profession and culture. The revised questions, along with my description of potential issues and risks associated with this study, were then attached to my submission to the University of Washington's Institutional Review Board for the Protection of Human Subjects. My submission received an exempt status (APPENDIX C).

All questions were designed to be open-ended to allow room for the interviewees to add to the content. I also prepared follow-up questions in anticipation of further clarification or

prompts to which they may need to respond. However, I also attempted to remain mindful of the timing and applicability of certain questions. For example, I did not linger or ask follow-up questions for certain responses, in considering the pacing and shifting of topics. I also attempted to avoid over or underplaying certain issues, thereby preventing myself from asserting significance or insignificance of issues to respondents. Concerning the content of the questions, there is a topic skew towards addressing marine debris specifically, however other local and global environmental, social, economic, and political themes emerged from the open-ended nature of the questions. My questions also had a skew towards eliciting suggestions from a local perspective. Similar to the topic skew, the open-ended nature of the questions led many of the interviewees to bring up global implications into the discourse. For each interview, I also brought my copy of a 2018 National Geographic magazine that featured marine debris (Parker, 2018). This included visualization of the global distribution of plastic pollution from river outlets, photos of people living amongst debris (e.g., Bangladesh), and the impacts of debris on wildlife (e.g., a seabird with a plastic bag wrapped around its head). This resource was typically used after the interview if interviewees were not familiar with the global scale of marine debris and were interested in learning more about the issue.

3.3 Data collection

Interviewees were determined based on snowball sampling, a convenience sampling method in which interviewees with target characteristics are selected that ultimately determines who will be in my main sub-population (Naderifar et al., 2017). Prior to going to Miyako, I conducted a quick internet search of potential interviewees on the island from four different sectors: municipal government, tourism, NGOs, and businesses. As my aim was to begin

scheduling interviews prior to arriving on the island, snowball sampling allowed me to recruit interviewees based on available information on the internet. Through a combination of electronic and postal mail, one month before the interview period, I dispatched twelve introductory letters to individuals whom I identified as representative of one of those sectors. I received a total of four positive responses that accepted my proposal for interviews via electronic mail. These four interviewees were my initial sample seed, who then assisted me in recruiting additional interviewees, which was fairly effective on a small island such as Miyako. With interviewees frequently crossing paths with people from different sectors, who have varying relationships with the ocean, and word about my research interest quick to spread, this was an ideal environment for snowball sampling. I was therefore able to access twenty additional contacts and five additional stakeholder groups that had not emerged during my initial internet search and to better visualize the social network of the island (Naderifar et al., 2017). My interview with Eco-Island Miyakojima, one of the departments in Miyako City Hall, also granted me access to a contact that originally did not respond to my introductory letter, which is another advantage of the snowball sampling method (Kircherr and Charles, 2018). As city officials working in close proximity to the Mayor, the Assistant Manager of Eco-Island Miyakojima became my correspondents in scheduling an interview with Mayor Shimoji.

All semi-structured interviews were conducted face-to-face to build trust with each of the interviewees. In doing so, this demonstrates to the interviewees that I am dedicated enough to put in the effort to meet with them and personally express my appreciation of their time and consideration in participating. Such sentiment was expressed by one of the members of the Miyako Sea and Environment Network (MSEN), who remarked that while MSEN receives many survey and remote interview requests for research studies, they rarely follow through. MSEN

further shared that they agreed to my interview due to my inclination to take the time to get to know them in person. My physical presence in conducting the interviews also led to several follow-up meetings with interviewees, during which time I cleaned beaches with them and had the opportunity to make additional small-talk about issues revolving around marine debris and Miyako in general.

3.4 Interviewer identity

In the introductory letter, I identified myself as a female graduate student in my early-20s who had lived on Miyako for two years and attended Higashi-shō gakkou, a local elementary school. For letters addressed to staff in Miyako City Hall in particular, I disclosed that I am the granddaughter of Takemitsu Shinzato.

In my early 20s, I am younger than all of the respondents, whose ages ranged from 32 to 86. This age difference may have positioned me as having less status, power, and knowledge compared to my interviewees, which may have influenced how they interacted with me and responded to my questions (Apentiik and Parpart, 2006). To anticipate this power dynamic, I had my father and mother accompany me as my interpreters, and so at least one of them was present for each of the interviews. In their early 70s and mid-50s, respectively, their presence had changed the dynamic of the interview compared to what it would have been had it only been me. Offering additional conversational commentary throughout interviewees' responses, my interpreters built rapport by relating to the interviewees and creating an informal environment for them to express themselves more freely. I also found that some interviewees appeared rather nervous and closed off when receiving questions from me, often keeping their answers short and concise. This may have been associated with my age and gender or the structured nature of the

interview. However, when weaved into a conversation by my interpreters, particularly by my father with male interviewees, they were more comfortable in elaborating with stories and opinions that had otherwise been unarticulated.

Concerning the sociocultural values of the island, my parents and I have all previously lived on the island. During this time, we interacted with various niches of people throughout the island and built our understanding of the local social, cultural, and natural environment. My mother in particular is a Miyako native, having been born on the island and having lived there for 19 years. She therefore has a particularly strong understanding of local knowledge, customs, and language. Her ability to relate to interviewees in her age group also made for smooth small talk and prompt elaborative discussions that are specific to the lifestyle and norms of the island.

3.5 Data analysis

Interviews were recorded with permission and transcribed in Japanese. While I have an intermediate understanding of Japanese, I had two translators with me to assist with technical terms during the interview process. An advantage I have is in my awareness of cultural nuances and locals patterns in communication, which allows me to control how to interpret the narratives as they are relative to the manner of communication that is unique to Miyako (as recommended by Filep, 2009). Such understanding also reduces the risk of creating an interpreter version of the narrative, which occurs when the translator brings "their own assumption and concerns to the interview and research process" (Temple and Edwards, 2002). Thus, my general understanding of the way communication is specific to the place and sociocultural values of Miyako established the basis for interpreting and analyzing the qualitative interview data. This includes the ways in which people discuss interpersonal relationships and place values on material or symbolic items.

For the purposes of my research, I interpreted interviews as a representation of not only the content of the spoken language, but the experiences that shaped why they presented the information in a certain manner. One such method is through a thematic analysis, which explores context in the communicated story (Riessman, 1993). As the interviews had been an emotional experience for several of the interviewees, the personal experiences that engendered those strong reactions speaks to the significance of the stories they tell. This process also required me to think critically about my own interview identity and how interviewees' framing of their experiences may be shaped through their interaction with not just me, but my translators as well. Because I had also approached interviewees with preconceived assumptions and expectations for a final deliverable, I was sensitive as to how much of their voice is represented in comparison to my interpretive voice.

Once all interviews were transcribed, quotations for analysis were selected via coding through the Atlas.ti program. Codes were organized by my four themes of context (i.e., history, socioeconomics, sustainable development and the environment, and culture and tradition). History is coded based on discussions of other countries, people of other countries, insiders, and outsiders. Socioeconomics is coded by local consumption of goods, tourist consumption of goods and services, and resource use. Sustainable development and the environment is coded based on discussion of tourism, development, and local livelihood. Culture and tradition is coded based on mentions of otōri, physical or mental health, and alcohol. In my interpretation and analysis of the data, interview responses are presented as direct translations and displayed in italics.

3.6 Field observations

In addition to conducting interviews, I visited local beaches to gather context regarding the severity of the marine debris problem and local beach activities. At interview sites located adjacent to a beach, I took note of the type of debris (i.e., material, size, and general distribution) and the general observations about the beach and its visitors (i.e., main purpose of the beach and number of visitors). Two of my interviewees also invited me to join in on their beach clean-ups, during which time I made observations on type of debris and number of participants. Finally, I also visited specific beaches that were mentioned during the interviews (APPENDIX A).

4 CHAPTER 4: Data Interpretation and Analysis

Through the 24 interviews completed, I engaged with 32 different individuals, as some organizations elected several representatives to meet with me. The average age of interviewees is 52, with the youngest interviewee being 32 years old and the oldest interviewee being 86 years old (Table 2). Concerning gender, males made up the majority of respondents at 81% while females made up 19%. The primary reason for this skew towards male interviewees is due to the nature of snowball sampling within the municipal government and public sector workers, where higher positions are primarily made up of male employers. Among the six female interviewees, half are directly involved in activities relating to marine debris: the activity being leadership positions of marine debris NGOs. The remaining female interviewees do not actively participate in marine debris activities and work in unrelated fields, including an office clerk, a caretaker at an elderly home, and an agent for the city's Health Department. While these interviewees were

not confident in their ability to speak on marine debris, they were comfortable in sharing information about social, economic, and cultural changes that they have been experiencing.

Interviewees were also asked about their length of residence on Miyako to determine whether they are an insider or an outsider. An insider is considered to be an individual who was born on Miyako and has lived on the island longer than at other locations. An outsider is an individual who was born on mainland Japan or elsewhere and has lived at other locations longer than on Miyako. 69% of interviewees are insiders while 31% are outsiders, all of whom were born on mainland Japan. Among outsiders, the longest duration of living on the island was 15 years while the shortest was seven months. Outsiders made up the entirety of the NGO representatives that were interviewed. The remaining five outsiders were in the business, municipal government, and national government sectors.

In total, nine stakeholder groups were represented: business, education, fisheries, the general public, the national government, media, the municipal government, NGOs, and tourism. As a small island, social risks may emerge through the potential to easily identify the individuals interviewed and place them in a difficult social position. To address this concern, I refer to interviewees by their sector, followed by a numeric placement in ascending order by age. Organizations that participated with multiple representatives are further organized alphabetically in ascending order by age.

Stakeholders	Age	Gender	Insider/Outsider	Years in Miyako (Outsiders)	Years outside Miyako (Insiders)
Business 1	32	M	Insider		5 (Mainland Japan)
Business 2a	38	M	Outsider	1	
Business 2b	48	M	Outsider	13	
Business 3	56	M	Insider		31 (Tokyo)
Business 4	70	M	Insider		0
Education 1	52	M	Insider		6 (Niigata)
Education 2	58	M	Insider		14 (Tokyo and Okinawa)
Fisheries 1	59	M	Insider		10 (Okinawa)
Fisheries 2	69	M	Insider		0
Fisheries 3	72	M	Insider		22 (Nagoya, Kawasaki, Okinawa)
General Public 1	43	M	Insider		0.5
General Public 2	56	F	Insider		3 (Gifu)
General Public 3	58	F	Insider		5 (Osaka)
Media 1	52	M	Insider		24 (Okinawa)
Media 2	64	M	Insider		N/A (Tokyo)
Municipal Government 1a	35	M	Insider		
Municipal Government 1b	39	M	Outsider	7	
Municipal Government 1c	55	M	Insider		
Municipal Government 2	43	F	Insider		4 (N/A)
Municipal Government 3a	32	M	Insider		4 (N/A)
Municipal Government 3b	48	M	Outsider	4	
Municipal Government 3c	56	M	Insider		
Municipal Government 4	73	M	Insider		
Municipal Government 5	86	M	Insider		0
National Government 1	40	M	Outsider	2	
NGO 1a	40	F	Outsider	0.58 (7 months)	
NGO 1b	43	M	Outsider	15	
NGO 1c	47	M	Outsider	13	
NGO 1d	51	F	Outsider	13	
NGO 2	46	F	Outsider	7	
Tourism 1	38	M	Insider		4 (N/A)
Tourism 2	65	M	Insider		0

Table 2: Interviewee demographics that includes their age, gender, and insider or outsider status. Column 5 (*Years in Miyako (Outsiders)*) indicates the number of years an outsider has inhabited Miyako since moving to the island. Column 6 (*Years outside Miyako (Insiders)*) indicates the number of years an insider had lived outside of Miyako, before returning to inhabit the island.

4.1 Scope of marine debris

Looking out at the picturesque ocean surrounding the island, it is easy to forget that marine debris is prevalent on shores throughout the island. What sets Miyako apart from other neighboring islands and makes it a particularly desirable travel destination is its exceptionally clear, blue ocean water. This has been attributed to Miyako's lack of streams or rivers, keeping

the surrounding waters relatively free of sediment or chemical runoff from land (Tourism 2). However, Miyako is also located on the western reach of the North Pacific Gyre, placing the island in the path of debris outputs that are transported from other nations by the Taiwan Strait Warm Current and North Equatorial Current. Larger amounts of debris accumulate on the northeastern face of the island, especially during the winter months (Business 3; Business 4; Fisheries 3; Municipal Government 1b; Municipal Government 3c; Municipal Government 4; Tourism 1; Tourism 2). This source of debris is in addition to local debris inputs as a result of local illegal dumping, derelict fishing gear, littering, and mismanaged waste, which ultimately enters into this system of debris absent appropriate disposal. For now, as debris continues to wash ashore, there will be people who clean the beaches, people who do not notice or turn a blind eye to the debris, and people who, whether a cynical or simply overwhelmed, do not see a point in cleaning beaches that will only be covered again the next morning.

Out at sea, members of the Japan Coast Guard, stationed on Miyako, come across marine debris of all sizes. What catches the eye is usually the larger pieces of debris, which they pull out of the water because they pose a threat to other vessels. Tar balls have also been found drifting ashore periodically. The previous major influx was in April 2019, when large quantities of tar balls struck the island. In response, the municipal government had enlisted the help of the Japan Coast Guard and the Japan Self-Defense Force to coordinate beach clean-ups. Because the tides cyclically move the tar balls to and from shore, the cleaning job could never truly be completed (National Government 1). Months later, volunteers and businesses are finding they still have to clean the mess, lest it impacts the island's wildlife, people, and adds to existing marine debris. For General Public 2, tar balls had been the primary effluent observed on beaches in the past.

Now, she and others on the island have noticed a rise in plastic bottles and other debris labeled in foreign writing.

Of the plastic marine debris, there was an overwhelming mention by interviewees of Chinese and Korean language on pieces of marine debris, pointing to those countries as a main source of the drifting debris. For the general public of Miyako as a whole, there is a disconnect between their own waste disposal actions and contributing to the input of marine debris. Inland, litter can be found in most locations; in sugarcane fields, caught in storm drains, scattered around construction sites, and piled around the base of trees. Just as much as there is loose trash, there is neatly packaged litter as well. Tossed out into the environment are empty bento boxes and plastic bottles which had been placed back in the plastic bags in which they were first packaged in at the store (General Public 2).

4.2 Spectrum of urgency/activities: Ondo-sa Matrix

Translated literally from Japanese, *ondo-sa* means temperature difference. Concerning marine debris, ondo-sa is discussed as a sense of urgency and engagement that individuals have regarding the subject and thus the ondo-sa matrix represents a spectrum of urgency/activities shown in Figure 2. Sense of urgency is shaped by the individual's values and circumstances (e.g., socioeconomic, political, and cultural), which ultimately structures how people prioritize marine debris among the many other personal or societal issues they encounter. Actions are indicated by the marine debris-related activities (e.g., beach clean-up, education and outreach with children, and decision-making of regulative action) in which the interviewees engage Such variations in perception are represented on the ondo-sa matrix. Placement of individuals on the ondo-sa matrix is based on the content of their interviews, so the positioning includes the

opinions and attitudes they expressed throughout the conversation as well as my personal interpretation of the nuances of their responses. This is a qualitative analysis, meaning the points on this graph are purely relational.

4.2.1 Interviewees

In the first quadrant (Figure 2) are *hot* individuals and organizations that find marine debris as a high priority issue, which is then demonstrated by the activities that they engage. Highest in the group are Business 3, NGO 1, and NGO 2. These groups lead beach clean-up activities, have made recommendations to Miyako City Hall, and interact with the community to increase awareness. NGO 1 and NGO 2 find it essential as part of their mission to better connect to the insiders but are at a loss as to why there is little engagement from the municipal government and community. Municipal Government 1 and Municipal Government 3, who were represented by both insiders and outsiders during the interviews, engage in designing and implementing initiatives that support beach clean-up and outreach efforts to locals and tourists. The remaining interviewees in this quadrant are highly concerned insider residents that participate in beach clean-up and outreach activities. Their actions are based on personal values that do not necessarily reflect their occupation.

The second quadrant represents *warm* interviewees determined as having low engagement. They are all insiders who are largely involved with the knowledge base around marine debris in Miyako based on their occupation. This includes professions involved with accessing information about the ocean, whether by direct contact with the sea, as decision-makers in the municipal government, or in pursuit of the latest news. What is interesting about this quadrant is the interviewees' low engagement with activities despite being positive in sense

of urgency or interest in the issue. Such dichotomy may be attributed to socioeconomic, political, and cultural practices that are unique to the experiences of those who were born and raised on Miyako, which speaks to the merit of incorporating these factors into marine debris research and decision-making.

Quadrant 3 holds *cold* interviewees who have little or no engagement with marine debris activities and hold marine debris as a low priority issue. Like Quadrant 2, all interviewees in this quadrant are insiders. The general public makes up most of the interviewees here, with their determination in this quadrant based on their limited ability to discuss the issue of marine debris or disinterest in participating in activities. General Public 1, General Public 2, and General Public 3 in fact all expressed feeling underqualified about participating in the interview. This hesitancy reflects a notion among the public that without the technical expertise, their voices and experiences do not hold value as research material. For Business 1 and Municipal Government 2, marine debris does not directly concern them, personally or professionally, so there is little interest to participate in activities to address the problem. Municipal Government 4 falls into Quadrant 3, despite his ability to discuss issues of marine debris in great length, as his priorities are set based on advancing the tourism and construction industries. There is therefore little urgency regarding marine debris, and throughout the interview, the focus was repeatedly shifted towards other issues, such as ocean warming and greenhouse gas emissions.

Quadrant 4 represents *lukewarm* interviewees. National Government 1 is the only interviewee who falls into this quadrant, as his occupation requires him to spend significant amounts of time out at sea. Though he has a basic understanding of the subject, he has limited knowledge of Miyako's engagement with the issue or the scope of marine debris on the island. He is placed in a positive position for activity because of his occasional engagement in marine

debris clean-up and outreach as a part of his profession. However, since the motivation is largely based on responsibilities of his employer, he is *lukewarm*.

Ultimately, all interviewees, regardless of how they are represented in the ondo-sa matrix, are familiar with marine debris and are aware of its presence on the island. Awareness is therefore not simply a matter of whether interviewees know what marine debris is. Rather, categorizing urgency/activities demonstrates how marine debris is valued as an issue that one ought to take action on for society and future generations. This is based on a complicated conglomeration of factors, values, and personal experiences that shape actions and behavior. To understand what is missing in increasing local engagement with marine debris, it is therefore necessary to give due regard to the priorities and suggestions of the *cold* and *lukewarm* individuals just as highly as the opinions of the *hot* and *warm* individuals.

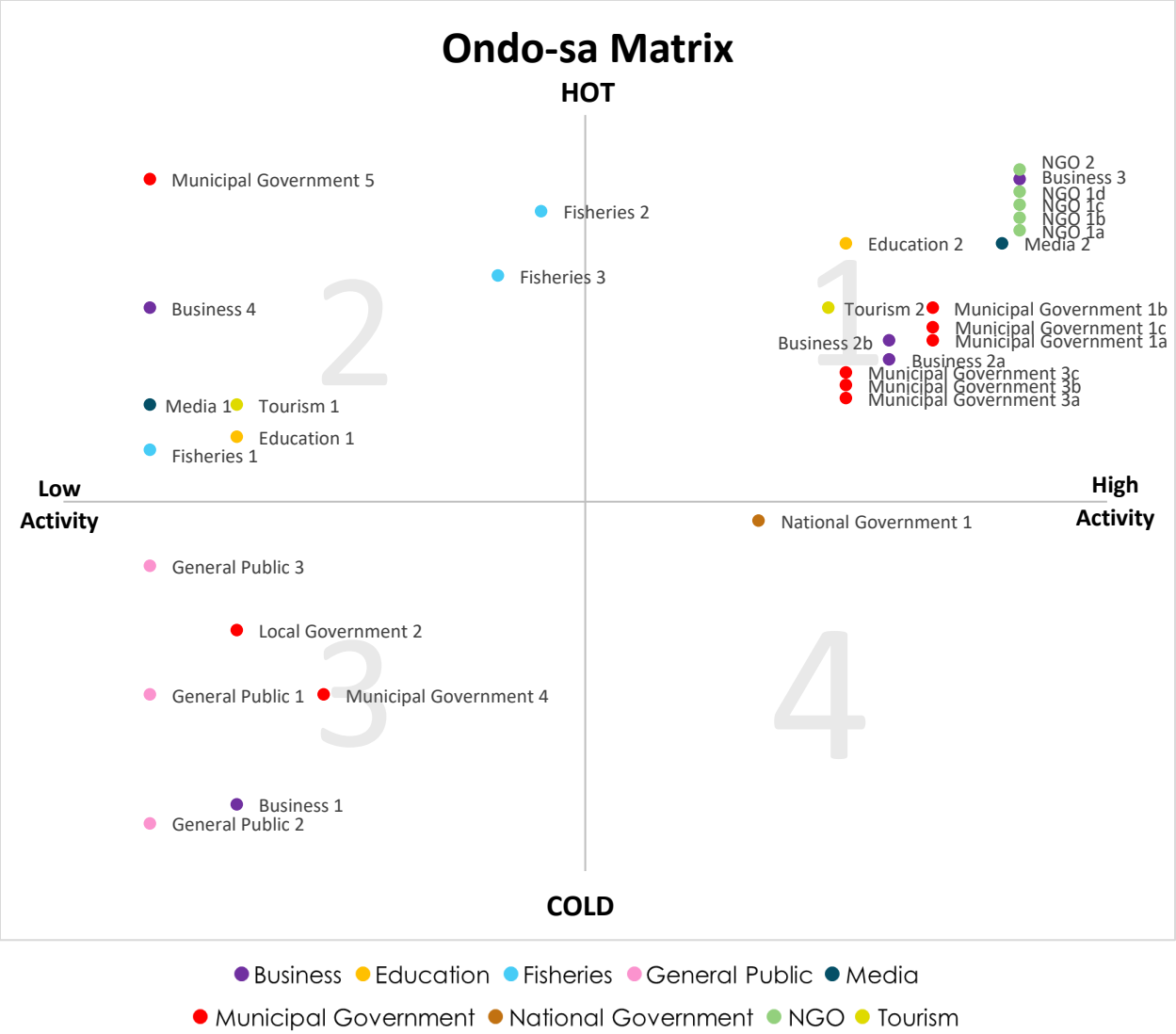

Figure 2: Ondo-sa Matrix as seen by interviewees. For those whose temperature runs *hot*, marine debris is a high-priority, urgent problem that needs to be addressed immediately, lest the consequences exacerbate and become irreversible. In contrast, those whose temperature runs *cold* do not view the topic as an urgent issue that requires immediate attention. On the x-axis is level of activity, which increases from left to right.

4.2.2 Insiders and outsiders

This insider-outsider dichotomy is particularly exemplified in the issue of marine debris, as actions and emerging conflicts that seek to address the management of waste are defined by

this identifier. Looking at the ondo-sa matrix by insider and outsiders, the majority of outsiders are in Quadrant 1 (Figure 3). In the words of an insider, *"people who make the choice to come live on Miyako do so because they are deeply invested in interacting with the environment, so from the moment they arrive, they jump into these causes"* (Education 1). While that may mean fulfilling one's dream of opening a beachside restaurant or a surfboard shop at the entrance of a popular beach, to others, their travels come with a sense of purpose and duty towards the environment. Similarly, General Public 1 finds that outsiders who have come to work with the ocean have more respect toward the natural resources that they have the opportunity to interact with as locals. He even hears outsiders sharing sentiments of how *"Miyako's ocean is dying more and more"*, giving a sense of lingering nostalgia and the motivation to preserve what is left of the beautiful island that they first sought to make their homes. Many outsiders have also traveled the globe before settling on Miyako, which may have provided them with a different set of perspectives and values about the world. Having experienced diverse and spiritual environments, interacted with different communities, and encountered environmental degradation and solutions not common in Japan, they carry a worldview that is distinct from those held by insiders (Media 2).

Supporting the efforts of outsider NGOs are volunteers, who are an invaluable force in the ceaseless battle against marine debris on Miyako. Though similar to localized cleaning, and to the frustration of Business 3, much of the large-scale volunteer efforts are focused around the months of April and October on popular beaches, before the leisure season begins. Those local volunteers are generally mobilized by outsider-led NGOs, but their perseverance in organizing beach clean-ups have amassed a dedicated group of insider participants as well. One insider, Media 2, expressed his sorrow for the lack of participation by his fellow insiders. He was so

inspired by the sight of outsiders meticulously picking up debris of beaches without uttering a single word of complaint that he decided to participate. What he typically observes during their monthly beach clean-ups is a turnout of 30 to 40 participants, with only one or two insiders present.

One stakeholder that stands out in the group of outsider NGOs is Business 3. Business 3 is an insider and slightly higher in ondo-sa in relations with NGO 1 and NGO 2 due to his deeper understanding of the island as a complex socioeconomic and political battleground in addressing marine debris in Miyako. Although Business 3 is an insider, he lived in Tokyo, mainland Japan, for 31 years, which is thus far longer than his time spent on Miyako (Table 2). This extended time away from Miyako in his youth may have provided him with a social conscience or worldview that is similar to those expressed by outsiders.

Despite the commonality of expressing high urgency toward marine debris and demonstrating high activity, there is also the greatest attestation of animosity and frustration between interviewees in Quadrant 1 from interactions they have had in the past. This occurs because different stakeholders have their own opinions when it comes to the effectiveness and dedication toward keeping shores clean. For Business 3, he is not interested in collaborating with other organizations for the time being, even one that is based near his business. Why? He notes that one of the volunteer organizations holds one or two large clean up events that focus on easily accessible beaches within arm's reach. These efforts are not enough for a man who talked about his own beach cleaning endeavors as frequent, at least several times a week, and including shorelines that are rather difficult to reach, with little tourist traffic. As for the municipal government, he has lost hope in their participation based on their hands-off approach and failure to put its money where its mouth is. While the city has a local revitalization program to place

subsidies on clean-up projects, there is no sense of urgency within the municipal government to keep up with the ever-accumulating amount of marine debris. Even within the quadrant with high urgency/activities, collaboration is nonexistent as stakeholders in Quadrant 1 have come to establish criticisms toward and build negative relationships with one another.

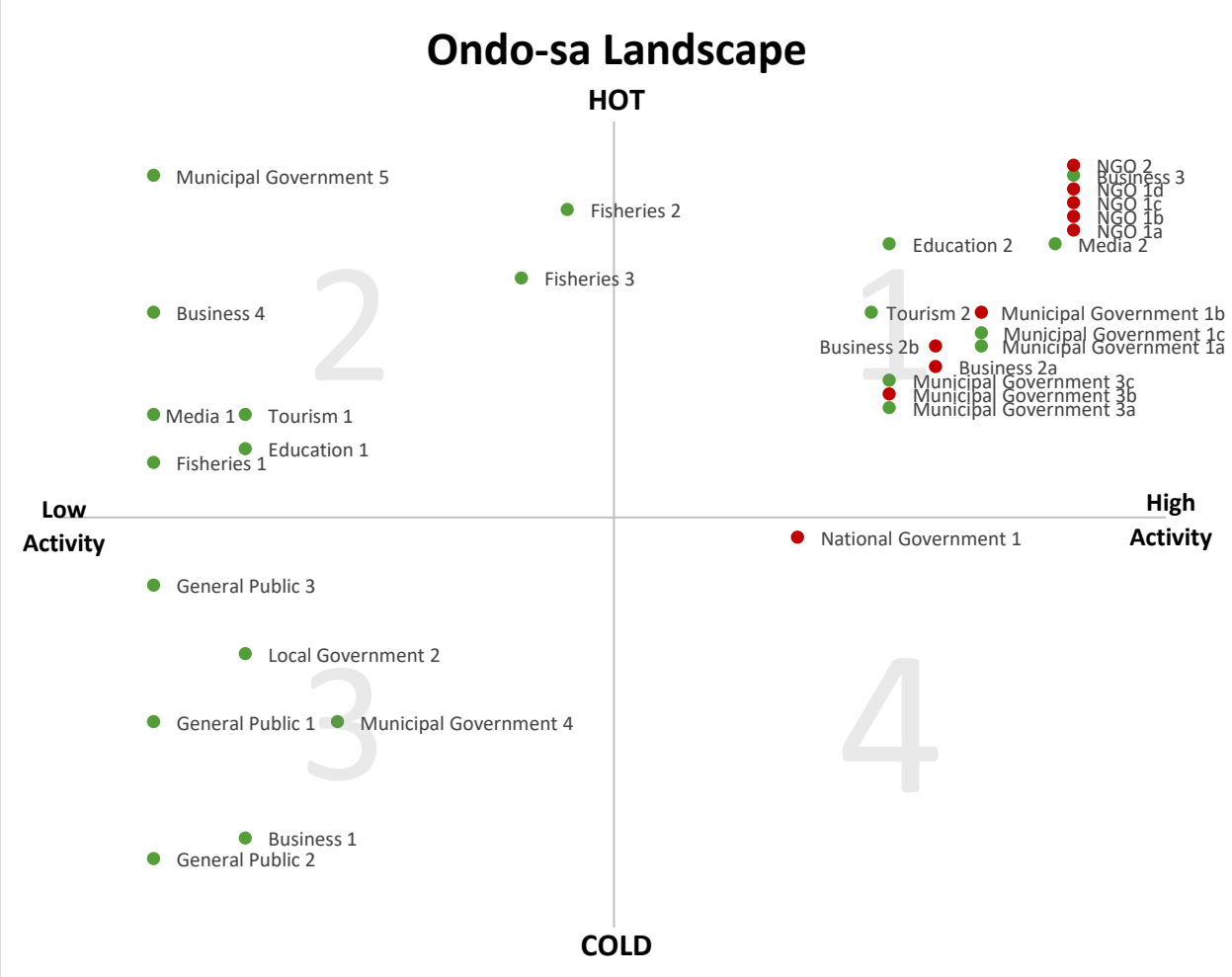

Figure 3: Ondo-sa Matrix as seen insiders and outsiders. The red dots indicate outsider interviewees while the green dots indicate insider interviewees.

4.3 Suggested actions to address marine debris by interviewees

Suggested actions were expressed throughout the interviews, concerning perceived issues surrounding marine debris. Out of 32 individuals, 26 interviewees provided suggestions, while the remaining six were either not confident or unsure of their ability to provide a response. Due to the open-ended nature of the interviews, a slew of categories emerged throughout the suggested actions made (APPENDIX D).

The most common suggestions came in the form of education and outreach. The need for education and outreach was a shared sentiment across interviewees of various sectors and ondo-sa. Behavior change was brought up less frequently but was mentioned along with education and outreach suggestions. The majority of these suggestions target the local population as well. For these respondents, *"even if we make a policy, it'll really come down to people's individual attitudes"* (Business 1), because policies or regulatory actions will not be effective unless the audience that they are targeting is better informed and willing to change its behavior. Intergenerational distinctions of learning and adapting to changes also emerged in the suggestions. Among those who discussed age, there was an underlying cognizance that outreach needs to focus on younger generations, beginning with school-aged children. As for the content, common topics mentioned were littering, single-use plastics, waste management, and impacts on the environment. Others take education a step further to recommend disseminating technical scientific information. Business 3 was adamant about holding a symposium to provide locals with a visualization of the implications of continuing in a business-as-usual manner:

> *Holding a symposium would be good, to display imagery like "what does this coastline look like?" We can then show a simulation of what coastlines will look*

> *like in the future with increasing amounts of debris. For example, in 10, 50, 100 years, all this trash will cause harm, killing vegetation, disfiguring animals, and ending up being eaten by our grandchildren (Business 3).*

Here, there is an underlying message that education and outreach are paramount in public perceptions of marine debris. For those who may not be aware of marine debris or the severity of its effects, a trash littered beach may be but an eyesore and inconvenience to their recreational activities. Beaches that are highly visited by tourists and easily accessible are more frequently cleaned by businesses, volunteers, and by the JGSDF under orders by the municipal government, so the debris that is on the other side of the beach umbrellas or beyond the massive formations of rocks and vegetation can be easily overlooked or disregarded.

There is also a growing disconnect between insiders and the beach. Insiders are spending less and less time visiting the beach, unless during annual festivities, such as the Sanitsu Beach Festival (General Public 2). Caught up with work and the many small-island functions, the beaches are but a nice view on their commutes to and from various responsibilities. As a local whose work involves interacting with tourists alongside a beach, Business 3 sees firsthand this juxtaposition. Impassioned himself about marine debris, he takes the five minute walk down to the shoreline and collects what debris he can; most times by himself, though sometimes with friends, family, and the curious tourist. Thus, education and outreach for him is to face the reality of the situation head-on, to see and feel the impacts for themselves.

For Fisheries 3, education ought to be aimed towards the municipal government, based on his disappointing experience with discussing sea level rise during a meeting at Miyako City Hall:

> *On the 26th, when the cruise line came in, there was talk about what to do about the main port there. Back when this port was first being constructed, I suggested raising the breakwater by one meter. At the time, the people of City Hall just laughed at me. But the reason why [I suggested this] is that in Ishigaki, there had already been reports of an increase [in sea level] by more than one centimeter… Everywhere else is also rising, so that'll be 50 more centimeters in 50 years (Fisheries 3).*

Another interviewee spoke to the nature of the assortment of debris that washes ashore, sharing that

> *because there is such as variety in what drifts ashore, I have been thinking of ways to be creative with reusing the debris. And so that's why I'm turning to art as a way of making something new with the debris…we are really trying to push forward the notion of holding an art contest using debris as the medium (Tourism 1).*

Particularly aimed at children during summer break, Tourism 1 is optimistic of the power of art in bringing locals and visitors to the beaches to engage directly with the problem hands-on.

Beach clean-ups were also suggested by General Public 1, National Government 1, Tourism 1, and Tourism 2. Beach clean-ups serve the purpose of maintaining the aesthetic and health of the environment, while ensuring that beachgoers can safely enjoy their time there. While not a permanent solution, this is nevertheless a valued and crucial activity that prevents

harms along the coastlines from getting worse. Generally, the understanding of beach clean-ups is that they are largely led by volunteer organizations. When the municipal government does become involved in beach clean-up activities, they are met with skepticism of their true motives.

> *They [the municipal government] hold events from time to time, but I wonder what purpose they serve. It just seems like a facade. The places that are popular [among tourists] are cleaned, but for obscure locations like Shimajiri, where not many people visit, there's trash everywhere (General Public 1).*

NGO 2 was also left with this impression when she organized a beach clean-up at Higashi Hennazaki, at the same location where three months prior, the JGSDF had been requested by the municipal government to assist with beach clean-up. This came at a time when the island was receiving an influx of tar balls, which are difficult to handle and clean. The disheartening sight that NGO 2 and fellow volunteers were met with was bags of debris gathered by the JGSDF, which were left abandoned and never collected by the Clean Center, which is a part of the Miyako Life and Environmental Department. Beach clean-up protocols for volunteers also call for the separation of debris into different bags by material (i.e., plastic, glass, and aluminum), but even that was not followed through by members of the JGSDF and the tar-covered gloves they wore were tossed inside the debris bags as well (NGO 2). Thus, NGO 2 and her volunteers took the time to sort through the mixed waste, much of which had decomposed over the three months in the bags. With this lack of guidance or oversight from the municipal government to JGSDF on demonstrating appropriate protocols of marine debris disposal, there is the sense that beach clean-ups are a political vehicle to advance the agenda of the municipal government: *‘‘The Self-*

Defense Force has kindly cooperated with the city and so they are imperative to sustain in Miyako'. This is the kind of scenario that the city wanted to fabricate" (NGO 2). This messaging by the city is viewed as a justification for the growing presence of the JGSDF in Miyako and promotes them under benign roles, such as that of community service members.

Tourism 2 also shared his concern of the municipal government's disinterest in taking action. Discussing the potential for holding beachfront businesses accountable for cleaning the shores in their general proximity, he inferred that the difficulty in *"associating beach clean-ups with tourism is that only beaches that are popular among tourists will be concentrated on"*. However, he also expressed that the city already has its hands full with increasing numbers of businesses, such as gift shops and beach amenities, that are setting up shop without the city's approval. The city is therefore working to establish regulations to ensure businesses are managed properly. Though it is unclear whether those regulations will incorporate responsibilities regarding marine debris.

Among the volunteer organizations that take the lead on beach clean-ups, suggestions are focused on long-term behavior changes. These individuals have countless hands-on experiences in pushing past thick vegetation to pull out wedged plastics, climbing over rocks to loosen thick tangles of fishing ropes, getting their hands greasy to remove the tar balls, or sifting through the patchwork of colorful fragments of plastics in the sand. This is done on an island where the minimum average daytime low is 69 degrees Fahrenheit and a maximum of 89 degrees Fahrenheit, so the timing of clean-ups is important in avoiding the glaring sun and humid conditions. Having taken on the task of cleaning beaches that will just be covered again the next morning, their suggestions seek to address the source of marine debris, which is the overproduction and consumption of materials and how they are mismanaged worldwide and

locally. For NGO 1, the role of education and outreach is to *"prevent people from littering and going through single-use plastics"* (NGO 1d). Whether it is by reducing their purchases, avoiding single-use items, or choosing products that last longer, improved communication of the root cause of the marine debris problem is seen as vital in achieving long-term solutions that urge people to rethink their relationship with materials and plastic. Concurrently, the responsibility cannot all fall on the general population. NGO 1a suggests calls to action that are aimed toward manufacturers of plastic products:

> *Right now, there's a strong focus on 'say no to single-use plastics', but we need to change that to 'let's start making more reusable products'. Otherwise, we'll keep producing single-items items that'll just be tossed away soon after use (NGO 1a).*

NGO 2, however, looks to establishing relationships with island locals as a way of increasing awareness of marine debris problems and activities. She recognizes that effectively getting through to people requires time in building personal connections. Although time intensive, she believes that persevering with consistent communication and community-building will give rise to long-term environmental stewardship.

> *It's not enough for me to just organize and partake in beach clean-ups. To better communicate with people and spread the message, I have been uploading photos onto social media. That way, people may think, 'why don't I give it a try' or 'I want to go to the next one'. And I don't just post information about my own work, but I share the work that other organizations are doing in different parts of the island. People who genuinely*

want to take action are popping up more and more, like bamboo shoots. And I think that's the true beginnings of an eco-island, is it not?(NGO 2).

The socioeconomic situation of Miyako was addressed by Media 1, Media 2, and Fisheries 2. The shared concern among those interviewees was the tendency for the municipal government to make top-down decisions that benefit economic development, while leaving the wellbeing of the locals out of consideration. Media 2 noted that *"there are no countermeasures to deal with the significant increase in tourists"*, thus the needs of large construction industries and other business sectors thrive under the municipal government's attention. He further paints the current circumstance of the island's grim future of colonization and consumerism:

More and more land, some of which hold significant cultural meaning to locals, is being sold as well. In Nishibe, the Uparazu Sanctuary has even been put out for sale. Large-scale construction projects are also swiftly progressing throughout the island, so left and right, huge Self-Defense Force facilities or hotels are being built (Media 2).

Fisheries 2 believes that the answer to this question can be addressed by *"[determining] how to best incorporate local citizens' perspectives into how new businesses operate, which is something that the current administration has not been able to do"*. Speaking to the municipal government's reluctance to follow through with actions, NGO 2 discussed the inefficiency of the island's recycling system, which no longer exists on-site. By the incredulous look on her face and the disbelieving tone in her voice, mixed with grim laughter, the paradoxical nature of an

Eco-Island that does not even maintain its recycling facility was baffling to her. While the island had a recycling system in place,

> *after the contractor ceased its operations, those [plastic] trays became landfill, considered as combustible trash. And this was all because that one facility went out of business… Recycling is said to be part of what makes an island an eco-island, so what are we going to do about this (NGO 2)?*

4.4 Suggestions for addressing marine debris at different parts of the ondo-sa matrix

At 88% of interviewee response, I received the most suggestions from Quadrant 1, as they are regularly thinking about concerns and strategies about marine debris or for ocean resources in general. Quadrant 2 also had a high rate of suggestions within their responses at 87.5%. In Quadrant 3, all of the interviewees who did not suggest solutions are individuals who do not regularly interact with decisions pertaining to the ocean, including General Public 1, General Public 2, and Municipal Government 4. They particularly expressed uncertainty throughout the interview of their abilities to answer my questions and were not sure of how to respond with suggestions. Municipal Government 1, Tourism 1, and Tourism 2 did not provide any suggestions either, as they felt they already implement what they can to address marine debris and are working to further expand or maintain those efforts.

4.4.1 When ondo-sa is cold

For Business 1, General Public 1, and Municipal Government 4, their suggestions all vary, but are environmentally focused (Figure 4). Business 1, while not expressing much urgency about the impact of marine debris in Miyako, most likely made the suggestion for behavior change through education and outreach as part of his occupation. As he interacts highly with tourists and is responsible for educating customers about the marine environment, the subject of marine debris and single-use plastics has been discussed. His suggestion may therefore reflect what his employer is promoting despite his own nonchalance about the topic. General Public 3 suggested cleaning the beaches, though at a higher frequency and scope compared to the current trend. While he is not involved in beach clean-ups himself, his passion for fishing often takes him to ports where he sees how dirty the shorelines can be. Municipal Government 4 set his priorities elsewhere, as he perceived climate change and ocean acidification as more pressing issues. The remaining three interviewees with *cold* ondo-sa did not provide any suggestions, stating that they did not feel competent enough to respond.

4.4.2 When ondo-sa is lukewarm

National Government 1 is higher in ondo-sa compared to those in the *cold* quadrant, which is reflected in his suggestion. While he also suggested keeping shorelines clean, he proposes to do so by increasing administrative support to volunteer efforts. He additionally suggested the need for more partnership-building between stakeholders from his experience in attending a Miyako City Hall meeting. After observing conflict after conflict between the municipal government and civil society, he saw a dysfunctional sociopolitical system that is

unable to reach consensus and take collective action. Here, his position as an outsider in a neutral position as neither *hot* nor entirely *cold* had allowed him to make these observations of the overall sociopolitical landscape of the island.

4.4.3 When ondo-sa is warm

The majority of interviewees with *warm* ondo-sa suggested education and outreach with the target audience of decision-makers, whether they be in the municipal government or part of the larger international community. Intergenerational implications are also considered among these interviewees, as Education 1 is concerned about educating children while Fisheries 1 is most concerned about educating older generations. These two, along with Business 4, Fisheries 3, and Municipal Government 5 make suggestions that are based on communicating knowledge about marine debris, predominantly to the local population but aimed at an international audience as well. This comes in the form of more actively engaging with decision-makers of foreign countries through an international forum for addressing marine debris. Media 1 and Tourism 1 both include considerations of tourism, which is likely associated with their occupation. Relative to the other interviewees of Quadrant 2, Media 1 may be the most well versed in discussing the socioeconomic situation of the island, from the dissemination of information and reporting at his workplace. He therefore recognized the importance of looking at the impacts of the tourism industry to the local population. For Tourism 1, as he also made the suggestion to keep shorelines clean, the pressure to address marine debris may be focused on maintaining the aesthetics of the island to sustain the yearly number of tourists.

4.4.4 When ondo-sa is hot

The most common suggestion in Quadrant 1 was prevention. Many of the interviewees in this quadrant have hands-on experience of what shorelines look like and the never-ending supply of marine debris that washes ashore. Due to their understanding of this reality, prevention of the larger root causes of marine debris may be more desirable to them as a long-term solution. Another frequently mentioned suggestion was education and outreach. However, unlike Quadrant 2, the target audience here was focused on the general public. The impression here is that many of the interviewees in Quadrant 1 have already made many attempts to collaborate with or make suggestions to Miyako City Hall, only to leave the exchange frustrated and with no progress made. This echoes the observation made by National Government 1 of the heated arguing that is typical of stakeholder meetings in Miyako City Hall. Under such sociopolitical conditions, those who demanded change from within the municipal government were met with an administrative wall that is unwilling to support or work on marine debris issues. Education and outreach may therefore be seen as a tool through which to build support among the local population and create a stronger voice to address marine debris within civil society.

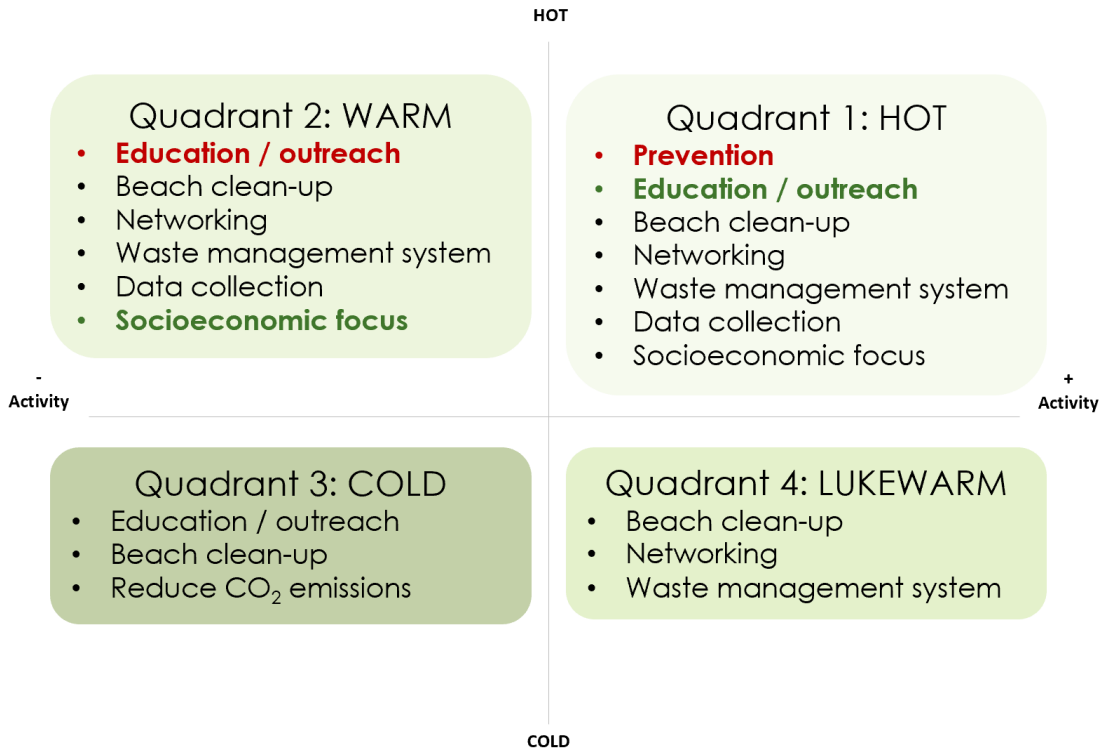

Figure 4: Ondo-sa Matrix organized by suggested actions. Suggestions made by each of the four quadrants are indicated here. In Quadrants 1 and 2, the red indicates the most common suggestion made, while the green indicates the second highest suggestion made.

4.5 Marine debris' entanglement with local history, governance, economy, and culture

In addition to providing suggestions for addressing marine debris issues, the interviews highlighted a number of political, socioeconomic, and cultural issues that can inform why dichotomous perceptions emerge between respondents.

4.5.1 Uncertainties facing a militarizing Miyako

Marine debris is not the only concern that is changing the nature of Miyako's coastline. Interest in the militarization of the island was a topic of particular apprehension among those in

fisheries. Fisheries 3 reflected on his thoughts on the current maintenance of the Miyako port as it scales up and prepares to welcome in more cruise and military vessels:

> *Even for a port on a small island like Miyako, our perimeters are so heavily enclosed. In the future, this area will likely become a naval base. The thing is, the Japanese government gave us a deposit of 1,350 million yen, which we split between the three fishery cooperative associations. So, we have no place to speak out against them (Fisheries 3).*

This places Miyako fishermen in a predicament reminiscent of the island's colonized past. The expansion of military presence on the island is similarly perpetuated through financial compensation, which in this case amounts to approximately $12 million, to silence dissent against control for the port. Simultaneously, as noted by NGO 2, the JGSDF has been publicly characterized by the municipal government in a way that champions their occupancy on the island as cooperative members of the island community. As external political and military forces are changing the landscape and value of the island, the presence of marine debris has also been used by members of Miyako City Hall to establish different identities of military presence on the island.

4.5.2 Modernization in pursuit of the eco-island

At the foundation of the 2018 Eco-Island Declaration 2.0 are the SDGs. In this Declaration, the municipal government urged all Miyako citizens to work as a unified island to reach the targets together (Municipal Government 1b). Regarding waste initiatives (Table 1), the

sub-targets included household waste reduction, enactment of countermeasures for illegal dumping, and the expansion of clean-up activities. The problem, however, is how to build a unified island when growing societal, economic, and cultural differences are dividing the people of Miyako. Thus, before delving into implementing specific initiatives on waste, the city must meet the basic conditions conducive to a unified island that seeks collective action.

The initial motivation of the Eco-Island Declaration 2.0 (2018) was based on citizen feedback such as, "I don't really know what Eco-Island is", "I don't see how it has anything to do with my life", and "I get the importance of the Eco-Island approach, but I don't know how I can get involved" (Miyakojima City, 2019). At the time of the interviews, although the Eco-Island Declaration 2.0 had only been out for several months, since March, a similar attitude reverberated among interviewees. National Government 1 may have very well expressed the sentiment shared by the general public, saying *"I've heard of it before, but I don't know what its goals are"*. For others, while they commend the city for setting ambitious goals to work toward, they are not confident in their capabilities to follow through with those targets: *"there's little guidance from the municipal government, so the Eco-Island Declaration will not be able to make much headway"* (Municipal Government 5). The goals expressed in the Eco-Island Declaration 2.0 are rather broad and it is difficult to ascertain whether this particular administration will genuinely deliver the objectives to their full magnitude. There is a tendency for the municipal government to hold events that display Miyako City Hall's active engagement to meet the goals of the Eco-Island Declaration 2.0, with media coverage promoting its activities. Although infrequent, news of beach clean-ups by the municipal government may prompt locals and tourists to take notice of the issue. Nevertheless, for both insiders and outsiders whose patience and trust

for the municipal government is waning, those events are nothing more than a superficial façade to assert their progress.

As Miyako residents remain skeptical of the promises made in the Eco-Island Declaration 2.0, Municipal Government 1b has turned his focus towards finding ways of involving tourists and hotels, rather than concentrating solely on engaging the local citizens. This thought is more in line with the original Eco-Island Declaration (2007), which incorporated the goal of creating a synergistic cooperation between Miyako businesses, locals, tourists, and the natural environment. The mechanism developed by Municipal Government 1's planning and production department is an incentive system targeted towards the general public and tourists. To avoid the financial burden of distributing a monetary reward to all participants of marine debris cleaning and prevention efforts, a certification system was created to incentivize members of the general public and tourists to help reduce the amount of trash on shores and inland. Rather than a monetary award, participants receive credit, or a virtual currency, to one of the participating businesses on Miyako where they can receive a discount for their voluntary services. There are currently 20 participating locations throughout the island, including hotels, cafés, and restaurants. The planning and production department is particularly working to increase the number of hotels involved, to encourage more tourist participation. Ultimately, the businesses distributing the certificates must pay for the losses they accrue from distributing the discounts, and yet *"if it's to keep Miyako's environment clean and support the efforts of NGOs, there are many businesses who want to lend their support. This is really encouraging"* (Municipal Government 1b).

Municipal Government 4, who was directly involved with the development of the Eco-Island Declaration 2.0, has priorities elsewhere. He points to curbing carbon dioxide emissions and reducing the island's reliance on fossil fuels as the main drivers of the Declaration.

> *The most important thing is for Miyako residents to think, 'this island is the best place for me to call home', which is what is always at the forefront of our plans. And so, in thinking about this, and about the planet as a whole, we need to focus on ways to reduce our CO_2 emissions. By doing so, we can also directly protect the overall condition of the environment itself (Municipal Government 4).*

Throughout the interviews, both Municipal Government 4 and Tourism 2 delivered detailed information on Miyako's carbon offset program with great enthusiasm and pride. Interestingly, Tourism 2 framed the carbon offset program as the municipal government's contribution to an eco-island, which explains Municipal Government 4's propensity to prioritize CO_2 emissions over other goals, such as reducing household waste or conserving the island's wildlife (Table 1). As the first location nationwide to implement a carbon offset program for a sporting event, the municipal government's efforts were recognized by the Ministry of International Trade and Industry of Japan in 2017. The city of Miyako received a Carbon Offset Award for this feat and the framed certificate was displayed proudly on the wall behind Tourism 2.

Fisheries 2 was involved in conceptualizing the original Eco-Island Declaration (2007), and he finds that the revamped version is operating under very different principles:

> *Looking at today's Eco-Island Declaration, it seems to be operating under commercialism, riding on the tail of the business expansion boom…Right now, it's a way to entice companies with monetary transactions, so the objective is centered around ways to best increase profit. Eco-Island should be about how to best support locals in working and addressing issues internally. Though, that's not to say that we don't need external help at all either. Ultimately, it's about finding a balance between supporting local efforts and partnering with big companies (Fisheries 2).*

So, what would a balanced principle of development look like, where the wellbeing of the local population is central to the municipal government's activities? What is missing is the occasion for the municipal government to listen to and incorporate the local citizens' perspectives in multiple facets, from the Eco-Island Declaration to business operations (Fisheries 2). There is also the notion of involving Miyako in an international forum for sharing information on marine debris (Business 5; Municipal Government 2). This is certainly a recommendation pursued worldwide, in the form of international conferences, partnerships, and workshops. The next question that needs to be asked, then, is whether Miyako is ready to participate in such a global setting. In the current state of Miyako's response to marine debris, it may be difficult to effectively communicate local issues, recommendations, and data without a strong platform for intra-island communication, returning to the comment made by Fisheries 2. Only then, will Miyako be prepared to participate in the marine debris discourse at a national and international scale. Doing so can also prompt discussions on the handling of waste by locals and tourists of foreign countries, which is a concern for many Miyako insiders and outsiders.

4.5.3 Growing socioeconomic stressors

So why are Miyako locals not involved in activities to clean up marine debris or make behavior changes to reduce their consumption of materials? For one, despite the heavy traffic of people going in and out of the island, the actual local population is said to be dwindling (Japan Medical Analysis Platform, n.d.; Miyakojima City, 2016). As the population of outsiders increase, Miyako is quickly filling with unfamiliar faces for insiders. General Public 3 observed that people from the mainland are much better conversationalists than people of Miyako, therefore many of them come to work as receptionists on the island. While their skills are uncontested, they are not necessarily welcome: *"Little by little, they are invading the island…This makes me sad. It really seems like we're being invaded"* (General Public 3). Another insider reflected with melancholy that *"there's less and less greenery on the island. With apartments being built here and there, I can't even remember what Miyako used to look like"* (Municipal Government 2).

As described in Chapter 2, the development rush has also created increasingly difficult living conditions for Miyako locals. With construction projects popping up throughout Miyako, so grows the need for construction workers, beyond the capacity of the island to provide labor and to support construction workers coming from outside the island. Although temporary, this means more living quarters are necessary to house these employees. Workers are coming from countries such as Cambodia, the Philippines, and Indonesia, with translators traveling along with them (General Public 3). Because apartments are rapidly being erected on what little land is remaining on the island, this demand has meant tremendous price spikes for apartments. Locals whose monthly income is no more than $1300 are scrambling to keep up with their doubling or tripling rent (Media 2; Okudaira, 2019). Rent on the island has also been said to have become

more expensive than that of Tokyo, which was a detail that was echoed by several of the interviewees (Education 1; Fisheries 3; General Public 2; General Public 3; Media 1; Media 2; Municipal Government 2).

Yet, like most societies, impacts of development are not experienced equally among the local population. For General Public 2, an insider, while she acknowledges the challenges faced by those living in apartments, she herself lives with her husband in their own house, so her current ease of living on the island is described as pleasant and distanced from other internalized economic discrepancies. Civil workers employed within Miyako City Hall have stable positions and are comfortable with their current living conditions as well (Municipal Government 2). Thus, growing income discrepancies are creating social divides among insiders as well.

4.5.4 Pointing to interracial and intergenerational perspectives

For an island that largely sells itself to tourists, there are strong sentiments among both insiders and outsiders of the flood of foreign visitors. *"On my way home from work, I'll stop by the grocery store, but depending on the time, I find that many items are already sold out for the day"* (General Public 2). When asking interviewees about their thoughts on tourism in general, there was an overwhelming discussion of China. Particularly, the mannerisms of Chinese tour groups as a whole were subject to local criticism and offense. While there are many Japanese tourists as well, Miyako locals have noted a rise in Chinese tourists with the increase in cruise vessels docking at Hirara Port. Pointing to cultural differences in behavior, several interviewees discussed the lack of sorting and disposing of personal trash into the appropriate bins.

> *You know those open areas where you can sit and eat? Well, everything they've [Chinese tourists] consumed just gets left behind without getting cleaned up. Garbage bins are another thing. They throw things in without sorting and they keep throwing in trash until they're overflowing and spilling out. I often hear from other locals that they really dislike the tourists' manners (Municipal Government 2).*

Despite such vitriol expressed toward tourists, specifically from China, there is recognition of the roles that tourists themselves play in helping to address marine debris. For one group in the municipal government,

> *Our model is that the more tourists we receive, the cleaner the island will become… Tourists come to Miyako because they love the island, so instead of leaving their mess behind, it would be ideal if they make the effort to pick up the trash they produce or find (Municipal Government 1b).*

However, this statement also comes with racial undertones between tourists who are expected to pick up trash and tourists who litter. While it was not explicitly stated, there remained a sense of racial bias toward Japanese tourists, that they will be the shining example as people who are stereotypically known to be neat and follow orders.

This is not to say that interviewees avoided reflecting on the consumptive nature of the locals. How this argument was framed was predominantly through an intergenerational lens.

> *In the past, because Miyako is a remote island, all of our waste was buried beneath the ground, returned to nature. Nowadays, as materials become more abundant, those same habits persist, and so people litter without a second thought…To get out of this loop, not only do we have to change our consciousness, we need to educate the next generation in schools (Education 2).*

Such was also the reasoning behind the historical problem of illegal dumping throughout the island, which is another large source of trash. This has been an ongoing issue on the island and a point of action for the municipal government and NGOs alike. Even in supposedly protected locations such as the Ono Forest, large home appliances can be found abandoned and tangled among the vegetation on the dark forest floor.

Aware of the growing problem of illegal dumping, the municipal government included a commitment in the Eco-Island Declaration 2.0 to take proactive measures to reduce and monitor these occurrences (Miyakojima City, 2019). While the city imposes a five-year penalty and a fine of up to $90,000, it struggles with its enforcement capacity. This creates meta-problems, such as cases of under-reporting, which further incentivizes people to continue this illegal activity without consequence. Local citizens are not the only offenders either. Mayor Shimoji and employees of Miyako City Hall were under fire in 2014 for misconduct in their handling of a $205,000 budget allocated towards an illegal dumping waste removal business on the island. Not only did this company conceal the collected trash under cliffs, city officials pled guilty to falsifying paperwork, forging official documents, and altering waste collection data in the City Hall's official computer (Miyako Mainichi, 2018). The city's premature declaration of achieving a Zero Garbage island and the illicit activities to cover-up the incident was met with outrage

(Education 1). It is behavior like this that creates mistrust and cynicism between the municipal government and the people whom they are appointed to support.

Media 1 noted that in recent years, reporting of illegal dumping has been increasing, suggesting rising citizen desire for holding individuals accountable for this behavior. Unable to break past old practices, an assortment of home appliances can be found in various nooks and crannies throughout the island. Out of the sight and out of mind. While this attitude remains to this day, for those concerned with cleaning up the trash, the task can become impossible without taking a scythe or heavy machinery to all the densely vegetated areas of the island. For trash that is littered out on the streets, its fate is most likely to end up drifting away to the ocean or entangled in thick branches. Concerned volunteers may therefore be limited in resources and capacity to physically retrieve the illegally dumped waste and transport the items to the Clean Center. This is where partnerships between NGOs and the municipal government can establish a cooperative effort to truly enforce the Zero Garbage Initiative. Unfortunately, such collaboration is not feasible under the current perceptions of urgency and activities as expressed through the ondo-sa matrix.

There is also a need to look deeper into the reasons that have driven locals to dump household items in the forest or off the side of a cliff. As much as this is an issue of the offender's behavior, there may be underlying factors associated with the locals' ability to afford the disposal of larger appliances, both in terms of the financial capacity and the persistence of social standards from the past. Education 1 suggests a system to remove the upfront cost of disposal to deter individuals from resorting to illegal dumping. For example, an additional disposal fee can be added onto the total cost and collected at purchase or the municipal government can designate funds to cover disposal fees and services. Implementing such

preventative actions may provide locals with alternatives that are viable and straightforward, as opposed to resorting to illegal dumping. This, however, places responsibility on the municipal government and public sector, which had proven to be unreliable in their past handling of illegal dumping. Moving forward, this suggests a need to implement a system for accountability to ensure those responsible parties in the municipal government are disposing of the waste appropriately. In the meantime, illegal dumping remains a challenge for the city government in terms of implementation and enforcement of initiatives.

4.5.5 Prevalence of island traditions

One sentiment that epitomizes the attitude of the insiders is the notion of not catching a break from the cultural expectation to participate in all of the island events [*shima no gyōji*]. From the outside, one might think that these events surely should not restrain insiders' time and energy to the point that they cannot become involved in other activities, say beach clean-ups. However, the reality is that locals have designated various milestones in life as a reason for organizing gathering and spending time with one another. Just as discussed in Chapter 2, the birth of a child, a child's admission into high school and college, retirement, and death are some of life's major events that call for a gathering in Miyako. Memorializing loved ones who passed away does not end after the funeral either. There is also the "seventh day", "forty-ninth day", and "third year" that holds just as much weight. It is not uncommon for an elderly insider to start his or her day by reading through the obituaries of the local newspaper. Whose family do we need to prepare envelopes and order hors d'oeuvres for next? In addition, there are New Years and Obon, two of the most important holidays in Japan. On a small island such as Miyako maintaining good relationships with peers, coworkers, and family members is vital to uphold.

Such social standing is maintained through participation in *shima no gyōji* gatherings, where otōri is the typical driver of social functions. Many of these gatherings may in fact be an opportunity (or an excuse, to put it strongly) to maintain the long-standing practice of otōri in the name of relationship building and preserving one's identity in the insider community.

Otōri is also pervasive within the municipal government. One occasion that recently put Mayor Shimoji under fire was in 2014, when he and his administrative staff began otōri during a disaster response meeting in preparation for an oncoming typhoon. In his first comment to the press, Mayor Shimoji referred to otōri as a habitual practice for Miyako and pointed to a function within City Hall [*otsukare kai*], which is to eat and drink during a meeting to encourage one another and bolster synergy. He further defended their actions by downplaying the severity of the typhoon and speaking to the city's competence in ascertaining the situation. However, following an onslaught of complaints by disgruntled citizens, he later announced that the municipal government will henceforth prohibit the provision of alcoholic beverages in Miyako City Hall and during administrative meetings (Miyako Mainichi, 2014).

The prevalence of this practice represents how complex and dynamic island life is for insiders. From the eyes of an outsider, otōri appears to be just as advertised by the Tourism and Commerce, which is a fun cultural practice that brings people together and strengthens the bonds of a community. For insiders concerned about otōri, the activity enables the excessive consumption of alcohol, predominantly during social gatherings of men. Women who are interested in joining in are welcome to do so, but otōri is not an activity that is instigated in a gathering of women (General Public 2). The most common narrative is that otōri takes place within a household, where women are expected to take care of preparations and other responsibilities during the gathering. Thus, while men partake in otōri, women are busy with

their aprons on, cleaning the living room, rushing to the supermarket, frying the tempura, and bringing out dish after dish (General Public 3). General Public 3 shared her story about this sociocultural difference with the mainland:

> *My sister has three daughters, but one of them married into a family in Ōita Prefecture. One New Year, her mother-in-law decided to visit Miyako. And do you know what she said to me? 'Why are Miyako women always wearing aprons and in the kitchen? Come, let's go and drink!' That was unbelievable for me to hear. But we've become nothing more than maids and the mother from Ōita was shocked as well (General Public 3).*

Returning to the notion of *shima no gyōji*, those island functions are all opportunities to engage in otōri, which again is a predominately male activity. While the men pass around the awamori, Miyako women view those functions as a nuisance that disrupt their own lives as they simultaneously balance work and family obligations. Nevertheless, they proceed with preparations, lest they want to be the subject of gossip among family and friends. General Public 3 therefore encapsulates the normalcy of insider Miyako women in preparing for *shima no gyōji*. Thus, there is the notion that the social standings of insider women are at risk depending on their presence in organizing and providing services during these functions.

Beyond social pressures, otōri is associated with various health problems as well. In a 2019 physical check survey by Okinawa Prefecture, Miyako was found to have the highest rate of obesity and metabolic syndrome in the prefecture, which makes them more susceptible to health problems such as heart disease, diabetes, and stroke (Kawahira, 2019; NHLBI, n.d.). There is also the problem of underage drinking, with accessibility of sake within households.

When children grow up in households where this is common, it is also not surprising that junior high or high school kids will recreate their own otōri hidden in the sugarcane fields.

Otōri is just one of the major island customs that represents the complexities and heterogeneity of Miyako. Due to otōri's deep entanglement into how insiders live their day-to-day lives, many of their priorities revolve around upholding social functions amongst themselves. However, from the various narratives expressed about otōri by insiders, there is also a division. Among people who participate in otōri, there are those who take pride in its tradition and those who partake in the activity to uphold social standing among peers, whether they are neutral or detest participating in it. Regardless of where they fall in this list, individuals who regularly engage in otōri not only face social and physical consequences but have negative repercussions to family members and other insiders who do not participate in otōri.

Marine debris and otōri are therefore both societal problems distinct to Miyako, sharing qualities of being chronic, intergenerational, and highly dichotomous in local narratives. Disregarding either problem is not conducive to a sustainable island, and so a problem such as marine debris cannot be approached without a more holistic understanding of priorities and stressors that stem from distinct cultural customs of the local community.

5 CHAPTER 5: Discussion

5.1 Persisting issues and potential solutions

5.1.1 A discord of priorities

In Miyako's case, there are many NGOs and individuals, both insider and outsider, who are dedicated to cleaning beaches and have persistently communicated their discontent with the municipal government. Their efforts, however, are often disjointed and existing practices are inadequate in raising the ondo-sa of the wider local population. To address such discord of priorities, the interviews have indicated several potential solutions that can begin to bridge this gap. First, frequent meetings between NGOs can consolidate reports and information about the state of marine debris on Miyako throughout the year. The many organizations can then discuss the scope and frequency of their actions to better coordinate efforts and work to eliminate tensions concerning diverging techniques in approaching the same goal.

Second, the insider-outsider dichotomy suggests a need for the concerns of the insiders to be acknowledged by outsider NGOs as they engage with the local community. The frustration among outsider NGOs on the indifference expressed by insiders is attributed to a lack of understanding between insiders and outsiders, which has led to distrust between the two groups of people. While an insider's inaction may paint them as lazy or uncaring to the outsider, they hold a plethora of concerns that are not clearly articulated without communication or trust. Strategies developed by decision-makers and policymakers to address marine debris must therefore be aware of the local social, political, and natural landscapes to provide pathways that support existing efforts and suggest ways to facilitate discussions between the municipal government and civil society.

Third, the municipal government must reflect on their definition of an eco-island and consider not only the long-term sustenance of the environment, but of the people of Miyako as well. As relentless development draws more foreigners and mainlanders into the island and

transforms the land to an unrecognizable mass of gray concrete and scorching steel beams, it is no wonder that insiders are weary of further change. Yet, as the municipal government moves forward with its plans to expand their relationships outward to strengthen their tourism sector, locals are left behind, with little power to defend their livelihoods. The pursuit of an eco-island has become a slogan for Miyako to appeal to a nebulous international target for sustainability, but an eco-island must begin internally to ensure that the people of the island can also sustain their way of life. The wellbeing of the population as a whole must also take focus on the long-standing practice of otōri. As alcoholism plagues all generations of insiders, from the individuals who drink excessively to their families that bear the repercussions at home. This will be a far difficult task that extends beyond the expertise of the NGOs focusing on marine debris, but a collaboration with the city's Health Department can provide them with a better understanding of the deeper sociocultural behaviors that may be a contributing factor that hinders marine debris activities and efforts.

Finally, to maximize the dedication, resources, and experiential know-hows of all the interviewees in Quadrant 1, the quickest strategy may be to establish collaborative networks that are built on an internal reflection of the island's current state of affairs regarding marine debris activities. Doing so can provide a holistic depiction to track the movement, types, and locations of debris, while developing a clean-up plan that targets less trafficked beaches as well. When these activities are unified, representatives from each organization can approach the municipal government with a focused list of concerns and suggestions that are supported by consistent data and local narratives. Such partnership may benefit from a management system that establishes standardized methods of debris collection, maintains regular beach clean-ups throughout the year, and improves efficiency through team-building exercises led by NGOs and Eco-Island

Miyakojima. Furthermore, city meetings are held once a year, which has thus far been the only venue for the municipal government and volunteer members to share activities and discuss any areas of deficiencies (Municipal Government 3a). A robust data collection system may also help bring all participants and city members on the same page about the quantity, type, and scope of marine debris throughout the island. By keeping consistent records, the city will be eligible for funding from Okinawa Prefecture's marine debris grant as well (NGO 2). This not only supports further efforts by NGOs but legitimizes their activities and demonstrates Miyako's dedication to engaging in marine debris action to stakeholders on the prefectural, national, and international levels.

5.1.2 Successes and remaining challenges in moving the municipal government

In 2018, the Clean Center received a total of 246 bags of volunteer collected debris. This total has been steadily increasing since 2016, at which time 198 volunteer bags were collected. Under the current system, those wishing to partake in a beach clean-up must go to the Clean Center to fill out an application stating the date and location of the clean-up, and the applicant's contact information. Until recently, volunteers had no choice but to haul their own debris to the waste center. Now, the Clean Center has taken on the responsibility of retrieving the collected debris once applicants call in with details of where they placed the bags.

What if debris is much than larger than what can fit inside the volunteer bags? There is little financial support or administrative personnel to aid individuals who are struggling to dispose of items such as old boats out of commission, refrigerators, or even logs of wood. Business 3 found himself in a predicament when he was met with the sight of seven lumber logs, 80 centimeters in width and 15 meters long, on the beach that he frequents for clean-ups. At this

beach, the one path to reach the shore from the roadside is by climbing down nearly six meters by rope on the side of a cliff. For one man, let alone a small group of his employees, it was an impossible task of moving those logs for disposal inland. Upon contacting the Okinawa Civil Engineering Office and the Coastal Maintenance group, he discovered that the logs were Chinese property, meaning neither the municipal government nor the Japanese government could handle this debris until ownership of the lumber was renounced. Determined to clear the shoreline, the next course of action was to enlist the help of the Japanese Ministry of Foreign Affairs. After a three-month period, he was finally given permission to remove those logs. The task of slicing the logs and bringing in a vessel to transport the debris took a private company three to four days, for a total cost of nearly seven million dollars that was paid for by the Japanese government (Business 3). This further exemplifies the disconnect in priorities and the distribution of a large sum of money and resources for short-term fixes over investments toward long-term strategies.

While much of the focus has been on reactive efforts to address existing debris, fewer financial or administrative resources have been dedicated to preventative actions. Among the interviewees, the overwhelming characterization of the general population was that debris is largely coming from foreign countries and thus, not a problem that they can do anything about. Volunteers picking up trash at beaches often hear the cynical cries of *"even if you pick up that trash along the shores, they're just going to come back, so give it a rest"* or *"no matter how much you clean, don't you know that more trash will just come back? Why do you keep doing it?"* (Media 2). This prevailing mindset among insiders, particularly that of older generations, will be a persisting challenge for both NGOs and the municipal government, unless all parties become consistent in their activities, communication, and priorities to the general public.

Municipal Government 3a finds his sector limited in implementing more stringent regulations or developing new laws that target preventative behavior. Along with the increasing amount of volunteer bags and household waste, the Miyako Life and Environmental Department is already overwhelmed with the quantity of materials that is brought into its one facility on the island, to be collected and sorted on a daily basis. With its hands full simply to keep up with the mounting everyday household waste, Municipal Government 3a feels that they are limited in their ability to establish new initiatives.

5.1.3 Two steps forward, one step back: The role of education and outreach

The next steps in extending education and outreach efforts may be obvious but is nevertheless necessary to discuss. After I visited the Miyako Marine Park, I was left with an impression of their detachment from acknowledging the urgency of marine debris. As a tourist attraction that is situated alongside (and even into) the ocean, this park is designed to provide visitors with a view of life underwater, with the added benefit of being in an air conditioned facility. This massive underwater observatory is lined with clear, acrylic panels to look out into the ocean, with educational puzzles and games on the island's diverse habitat lining the opposite walls. While not outwardly promoting marine debris education, the Marine Park has started making changes to its consumption of plastic materials, turning to utilizing paper straws and bags instead. Interestingly, when asked about the extent that marine debris is recognized as a serious problem to the Marine Park, Business 1 was clear in expressing that it is not. There is the occasional plastic bag that floats past the clear windows, which they do extract when timed accordingly with window cleaning; otherwise, the shores surrounding the Marine Park were described as having little debris (Business 1).

Curious about this assertion, I visited the neighboring shore, which was visible from the sloped path leading up to the Marine Park entrance. While the path to the beach had been clear in the past, the opening was now concealed by the construction of yet another concrete structure that may become a beachside resort. Like other construction sites throughout the island, the surrounding ground was littered with a variety of trash that most likely tracked the activities of the workers who ate, drank, and took smoking breaks during their shifts. Balancing along the side of the constructed base of the building, I was able to reach the six feet tall, three feet wide entryway through the thick vegetation that led out to the shore. There, I was met with the typical sight of a beach not frequented by tourists: thick ropes tangled on rocks, large styrofoam items caught in the vegetation, beverage containers of all materials (i.e., plastic, glass, and aluminum) littering the shore, and colorful microplastics peppering the sand. When my parents and I returned to this beach for a clean-up, with our sunhats, volunteer bags, and sun-protecting long sleeves, we were clearly visible to visitors of the Marine Park, as some curious faces lingered to peak briefly over the edge before moving along. To be fair, from that distance, while they may have been able to recognize our activity, the actual amount of debris may not have been clearly discernible.

In addition, if we had not been present on the sandy shore to draw visitors' eyes, their attentions would likely have been fixated toward the ocean and not the debris-covered shore. While he may have inadvertently summarized the scenario for locals, Business 1 encapsulated the fabricated scenery as well: *"After all, there are beaches [on Miyako] with lots of debris, but they are not locations often visited by tourists. I think while locals are aware of the scope of debris, tourists are not. They only see the beautiful beaches".* As previously discussed, the beaches that tourists visit are most likely beautiful because they are the focus of volunteer beach

clean-up activities. Furthermore, while spaces like the Marine Park may list marine education and outreach as one of its core functions, it appears that the Marine Park does not consider marine debris as a threat, keeping visitors and employees under a false sense of security within the manufactured habitat. To break past this portrayal, the Marine Park can become a venue for holding symposiums or workshops, in collaboration with NGOs and the municipal government, providing scientific information to their audience. This will not only increase awareness among visitors, many of which are families with young children, but to the employees of the Marine Park as well.

Another component that departments in Miyako City Hall find especially important is their efforts in improving marine debris education for Miyako youth. In particular, the Education for Sustainable Development program is a new project that a department in the municipal government is working to launch in the near future. This is a nine-year program that runs from elementary school through junior high school and strives to provide students with more hands-on fieldwork to learn about environmental issues. This program has already been incorporated into Japan's national education guideline (MEXT, n.d.), so the city is developing localized content that best represents Miyako's context (Municipal Government 1b).

In light of the growing information on marine debris and microplastics that is disseminating across Japanese media, the Japan Coast Guard has also been incorporating marine debris outreach into its educational presentations. In one of the stories told to a group of five and six-year-olds, the protagonist, a sea turtle, enthusiastically munches on a plastic bag, mistaking the debris for its favorite jellyfish. In an effort to save the dying sea turtle, it undergoes surgery and is able to have its body free of plastic. While an innocent and optimistic conclusion to the

sea turtle's harrowing tale, National Government 1 sees this as a good opportunity to imprint the message to children of the impacts of littering and discarding single-use plastics.

Beyond the scope of NGO and municipal government projects, what roles can local schools in Miyako play? Across all sectors, the role of education in addressing marine debris is vital in fostering long-term change. As previously mentioned by Education 2, whether it is reducing material consumption or alcohol consumption, a stronger emphasis on youth awareness can break the generational behaviors that have perpetuated unsustainable customs. Upon speaking to two principals, one from an elementary school and the other from a middle school, it was clear that these issues cannot be overlooked, especially based on their impression that the circumstance will only become worse for future generations. Eco-Island Miyakojima has also approached schools for the opportunity to collaborate on eco-island themes and participate in various initiatives to prevent and clean up marine debris.

Yet, what was also articulated in conversations with Education 1 and Education 2 were the lingering challenges in integrating environmental education into the current school system. Education 1 pointed to his elementary school's urban location as a reason coastal issues such as marine debris are not discussed. Rather, topics of waste and the role of the Clean Center emerge during science classes. While it was acknowledged that a curriculum focused on environmental studies is needed from an elementary school level, what has been holding Education 1 back is the discontinuity of implementing environmental education curricula. Decisions made in schools are temporary, as the next principal or teacher to come through can completely change the subject, depending on their interests. Without a more permanent structure and the leadership of dedicated members of the school faculty, marine debris education cannot successfully continue, and unmotivated school administrators can use the aforementioned excuse that high turnover rate

renders any attempts to be useless. This becomes a problem of funding as well. With no budget designated by the city for environmental studies, proposals for such funding must come directly from schools. For this process to move forward through the school board, ample time, commitment, and dedication is necessary. With a completed plan, schools can look beyond the municipal government for funding and instead look to the private sector. Large corporations, such as Coca-Cola and other companies focused on environmental causes have established grants specifically to promote environmental education in schools, with amounts from $50,000 to $100,000 (Education 1). However, when schools are not actively engaged in or are interested in creating a plan, proposals to apply for those larger grants cannot be completed.

Schools are also limited in time, as school curriculums cannot stray from the subjects that are predetermined on a national level. However, not only are children's schedules tightly packed during the weekday, their weekends are governed by the many *shima no gyōji* in which their parents and grandparents find themselves absorbed. While Education 2 has also received requests from various organizations to recruit student participation in marine debris and other environmental activities, he has been unsuccessful in amassing engagement from children and their families during the weekends.

Even with the interest there and the schedule secured, schools also receive limited funding for projects from the municipal and prefectural governments. From Education 2's experience, organizing a beach clean-up for his students at his previous school was feasible. Due to its smaller class sizes, the school's budget, one that is specifically allocated towards any comprehensive subjects deemed important to the school, was sufficient to purchase the gloves, tools, and beverages to engage students in learning about marine debris and cleaning a beach on a hot day. In his current position, the available budget is not enough to support a school with a

total attendance of 510 students. Beyond the cost of preparing the necessary materials, the task of transporting the students to the beach was considered to be unreasonable. The cost to charter one bus is roughly $270, so to ensure that each of the four grades has the opportunity to partake in marine debris education at the beach, the total cost would be approximately $1010.

Fortunately, with growing interest from schools, members of the municipal government, and NGOs, there may be opportunities for collaboration between these stakeholders by bringing hands-on experiences directly to the schools. In particular, NGO 2 is interested in speaking to a class of elementary and junior high school students about the consequences of littering and how although this practice may have been acceptable for their grandparents, the materials that are produced today do not return to the earth as they did in the past. From within, this can change the behavior of insiders to reduce the amount of illegal dumping and littering. At Education 2's middle school, they are creating more opportunities for guest speakers with knowledge of marine debris to visit during class times, such as social studies and home economics. Experts in the field of marine and environmental studies throughout the nation should also be actively sought out to participate as guest speakers, to provide schools with a perspective that they may not otherwise receive from local resources (Education 1). While inviting speakers on a national scale can broaden the scope of topics discussed, there is also an opportunity to strengthen partnerships within Miyako. Along with NGO 1, there are already several NGOs that are invested in youth education, so a collaboration with schools during their science or social studies classes may be a possibility to involve schoolchildren and teachers in raising their awareness about marine debris. Beyond the participation of NGOs, other stakeholders who are in Quadrants 1 and 4 of the ondo-sa matrix that currently demonstrate high activities can share their experiences with Miyako

youth.

5.2 Addressing the insider and outsider divide

NGO 1b began picking up marine debris 15 years ago, when he moved to Ikema Island. Rather than words of appreciation or an opportunity for community-building, he was met with cries of *"how dare you come from outside and start collecting trash that's not yours to take!"* (NGO 1b). While he persisted for the sake of the environment, the aggravated insiders responded in full by breaking the windows of his home and continuing their verbal assault. In the past, Okinawa Prefecture had designated funds to support Miyako fisheries and their families. Fisheries 3 had been involved in distributing monetary compensation for marine debris clean-ups for his region at the time. Daily allowances were made available explicitly for fisheries families, for cleaning up a certain amount of debris in a determined area, with the amount paid being equally divided amongst participants. Although the main incentive for participants was undoubtedly to bring home additional money and to some extent maintain healthy port conditions, debris that would end up in the ocean or harm the environment was removed. In this regard, fisheries families valued debris as an asset. Thus, to have an outsider settle onto the island and remove debris in certain regions was akin to stealing valuable property.

What NGO 1b experienced partially explains the frustration and discouragement that outsider NGOs feel in engaging with local insiders. NGO 2 similarly recalled with exasperation the many occasions she has butted heads with the mayor and other members of the municipal government. Their experiences clearly epitomize the insider-outsider discord of the past, which to this day has implications for the lack of trust and reliance that outsider organizations have for the municipal government. Ultimately, these negative exchanges have come to hinder productive

progress in dealing with marine debris. Similar to the situation discussed within the current school system, depending on who is in office and involved in decision-making, there can be variations in urgency/activities even within the municipal government. Without any strong regulatory systems in place, there is no knowing whether marine debris actions will have the necessary funding, workforce, and attention from year to year or from one administration to another. Levels of commitment can also be divided by those based on genuine aspirations and those that are superficial. Similar to the idea of the Eco-Island Declaration, there are people in Miyako who promote the idea of sustainability and marine debris action while failing to follow through with action, or in other words, walk the talk. In contrast, there are people in Miyako who have been butting heads with the municipal government and persistently cleaning beaches as new debris washes ashore. Yet, as this intertangled collection of insider and outsider interviews has revealed, this discourse is not purely black-and-white; inaction may be explained by personal reasons that cannot be easily understood by an outsider, and the deep-seated frustration that outsiders carry towards the municipal government comes from past experiences of rejection and opposition during those interactions.

5.2.1 Setting realistic pathways for solutions

Like the Eco-Island Declaration 2.0, setting high expectations can be a point of motivation, despite the impracticality of the endeavor. As such, NGO 2 set such a target for herself to change the level of awareness about marine debris of the 50,000 (population as of 2012) individuals who live on Miyako. To see this goal through, NGO 2 finds value in persistently taking action, no matter how big or small the contribution is. Little by little, she

hopes to involve more people, continue organizing monthly beach clean-ups, and regularly inform other individuals about the urgency of dealing with the problem of marine debris.

In reality, not all families in Miyako have the liberty to become involved. This is where narratives of insiders' struggles to pay their rent and maintain responsibilities to their families are crucial to acknowledge. Efforts to engage the local population by NGO 1 and NGO 2 have spanned more than seven years, speaking to the deep commitment and passion that the founding individuals have for Miyako and this cause. However, throughout their commitment on this path, they too have experienced criticism, anti-outsider attacks, and prejudice by insiders. While their frustration and disappointment can therefore be considered to be warranted, this illustrates the lingering mistrust from both insiders and outsiders. NGOs who are irritated by insiders' indifference to their cause may find that taking the opportunity to support insiders communicate their own frustrations and anxieties to the municipal government can bridge the gap between insider and outsider. This requires the acknowledgement that marine debris on Miyako is an issue that intersects with intergenerational behavior, cultural functions and customs, weariness toward foreign visitors, and fears of the ongoing impacts of development to their rapidly changing home.

5.3 Global implications: approaching marine debris on islands worldwide

Growing international efforts to address marine debris are focused on Small Island Developing States (SIDS). Similar to other developing countries, SIDS face economic barriers, development limitations, and the capacity to confront growing environmental, economic, and socialpolitical threats on their own. As developing states, common threats also include illegal resource exploitation, transnational crime, climate change, and extreme natural disasters, among

a slew of other factors (UN, 2015). Acknowledging these concerns, the UN established the SIDS Action Platform in 2014 as a basis for partnership formation and action plan development. NGOs, private sectors, regional entities, local governments, communities, and academic institutions have been engaging in partnerships, covering a range of issues and challenges to SIDS. One that aims to minimize the impacts of marine debris is the Global Partnership on Marine Debris (GPML). Its core goal is to reduce and manage marine debris to safeguard human health and the global environment. The GPML also promotes the objectives of the Honolulu Strategy, to implement actions, monitor progress, and disseminate knowledge (Goransson et al., 2019).

What does the incorporation of island perspectives to the marine debris discourse add to our understanding of its impacts and solutions? Should the classification of an island as small or large, developed or developing affect the level of engagement by intergovernmental and multinational organizations to support marine debris actions? If so, how can islands that are part of developed countries take advantage of their economic status to best address the needs of local communities?

Until now, the impacts of marine debris in relation to islands have been focused on SIDS, and rightly so. Through this study, it is also clear that small islands of developed countries have their own sets of historical, political, socioeconomic, and cultural factors that determine proactive and passive behavior regarding marine debris activities. Corruption has rendered attempts to act on solutions difficult as well, where those who have high ondo-sa feel stinted in their capabilities to do their parts in reducing impacts of marine debris to Miyako due to pushback from the municipal government. The challenges that Miyako faces in addressing marine debris speaks to its multifaceted complexities, which may convey the arduous task ahead

of engaging in efforts on an international scale. While the specific narratives and suggestions drawn from Miyako may not apply to all islands and communities worldwide, this study offers some insight into the political, social, economic, and cultural issues that shape the ways in which local populations perceive marine debris and the efforts to take action.

6 CHAPTER 6: Summary, Recommendations, and Conclusion

6.1 Summary

While the ubiquity of marine debris is without question, little is known about how to integrate solutions into a local social system that is just as complex as it is heterogeneous. What has been made clear through this study is that there are underlying social and economic stressors within the local island population. Without understanding what these burdens are, the conventional conclusion is that locals are not more engaged in marine debris activities because they do not care or they are too lazy to be bothered. However, it is prudent to dispel such notion and instead incorporate the perceptions of local insiders to better gauge what conditions are conducive to encouraging more local participation. NGOs, municipal government bodies, and other motivated individuals in Quadrant 1 (those who are currently engaged and active in solving problems) can begin by considering the following reasons for why insiders are not engaged in solving marine debris issues:

- Growing challenges in supporting themselves and their families
- Persisting pressures in preparing for and engaging in *shima no gyōji* (ongoing cultural commitments)

- Perpetuation of traditional littering and dumping practices in the absence of more stringent implementation and enforcement of regulations
- Few opportunities to visit beaches due to preoccupation with work and family responsibilities
- Growing distance from the ocean, as shorelines are increasingly becoming privatized spaces for tourist use

With these stressors that are disproportionally felt by the working class insiders, which are not felt in the same manner by outsiders, marine debris will not be prioritized in the same manner by insiders. Miyako insiders therefore should not be expected to participate in marine debris activities when the root problems of their social and economic stressors are not also being addressed. Rather, marine debris on Miyako can be approached more holistically when motivated stakeholders acknowledge the different spectrums of urgency/activities and why such differences exist.

6.2 Recommendations

Based on interviewee suggestions, it is clear that the two ends of the ondo-sa matrix demonstrate different understandings of how marine debris can be handled or prioritized on Miyako. With perceptions varying depending on factors such as the insider and outsider dichotomy or socioeconomic and cultural stressors, marine debris is not a priority for everyone on Miyako, and so locals should not be expected to participate when the underlying stressors are also not addressed. And so, the *warm* and *hot* suggestion of the ondo-sa matrix that should be focused on are ones that work to alleviate socioeconomic stressors, such as cost of living, rate of development, and local impacts from tourism. Insiders may then be able to have more of a grasp

of their own lives to have the capacity within themselves to participate in marine debris activities.

And so, if NGOs truly wish to gain local participation, outsiders may be more successful when using their organizations as a platform to advocate for socioeconomic relief and gain the trust of the people who they want to reach the most. To improve local wellbeing is to sustain the livelihood of the population in the long-term. As the outsider NGOs were most disheartened by the lack of local engagement in their activities, this gap can be bridged by sympathizing with the plight of the local working class. Outsiders who have established their organizations on Miyako to address local issues can then use their platforms to advocate for socioeconomic relief and gain the trust and respect of the people who they have hoped to reach the most.

6.3 Conclusion

When the concerns of the full spectrum of Miyako residents ondo-sa (sense of urgency and engagement in activities toward marine debris) are taken seriously, there is an opportunity to strive towards a Miyako that sustains residents' lives as well as the environment. Solutions that address marine debris must therefore holistically encompass the history, socioeconomic, political, and cultural landscape of Miyako as a societal problem. Miyako can then engage in marine debris discourse at the national and international level to report their findings and communicate their experiences with confidence that their words represent the people of the island, young and old, both insiders and outsiders.

Finally, while the particulars of the socio-economic, political, and cultural challenges may be unique to Miyako, the findings presented in this thesis is likely applicable to other islands or coastal communities with disparities in socioeconomic and cultural challenges. NGOs,

researchers, and other interested entities that seek to approach marine debris issues at those locations must therefore acknowledge those underlying factors to understand the various perceptions of marine debris and its solutions.

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APPENDIX A: Beach observations

APPENDIX A contains information on beach observations that were made between July 13th and August 1st, 2019. Table A displays my notes from the 10 different locations throughout Miyako, two of which I visited twice. The *Description* column refers to the general uses for the location, most of which were either tourist sports or fishing ports. The *Observations* column includes personal observations that I made on the day of the visit. The *Debris types* column lists the breakdown of observed debris and their positioning within the various locations. Figure A (adapted from Miyakojima City, n.d.a) pinpoints those 10 locations on a map of Miyako.

Table A

Date	Location	Cardinal direction	Time of Day	Time Spent	Description	Observations	Debris types
7/13/2019	Sunayama Beach	Northwest	Early afternoon	Short	Tourist spot; popular for snorkeling, swimming, and sunbathing	Many families with young children were present this day, lounging under of beach umbrellas and playing in the water with large floats.	Vegetated path to the beach had some litter, including plastic wrapper and plastic bottles; the shore of the beach itself had no observable debris
7/13/2019	Muiga Cliff	South	Early afternoon	Short	Tourist spot; lookout destination	Most tourists are likely to remain in the parking area to overlook the shoreline. Stairs leading down the rocky cliffs to the shoreline are most likely used by locals, particularly fishermen. Some fishing gear (i.e., buckets and fishing pole) were wedged into the cliff, which may have been left there intentionally by fishermen. There was also an abandoned storage 'bunker' that was also full of most likely local trash.	Ropes, nets, buoys, styrofoam floats, cigarette packs, and plastic bottles.
7/13/2019	Higashi Hennazaki Lighthouse	Southeast	Early afternoon	Short	Tourist spot; lookout destination and main attraction during the Miyako Triathlon	Many visitors were present this day, strolling along the long path up to the lighthouse. After paying 200 yen to climb the staircase to the top of the lighthouse, marine debris was visible beyond the concrete barrier, on the rocks. Debris is therefore of site for most visitors, unless they climb the lighthouse and point their attention towards the rocky shorelines. There is also a fishing port on a decline leading off from the main path to the lighthouse. There, a stretch of more debris can be seen on the across the sand and out onto the rocky jetties.	From the top of the lighthouse, styrofoam, ropes, buoys, and large plastic crates are visible. Down by the fishing port, other medium-sized plastic products add to the list.
7/13/2019	Yoshino Kaigan	East	Mid afternoon	Short	Tourist spot; shore lined with beach umbrellas, gift shops/food vendors, and equipment rentals	Many families with young children and young adults were present this day. There is no marine debris littering this area that is designated for tourists. However, the beach umbrellas act as an invisible barrier, with marine debris littering the shores beyond their boundaries as well as into the vegetation near the cliffsides.	Mostly small plastic fragments and microplastics on the sand; larger styrofoam, buoys, and ropes closer to the vegetation.
7/13/2019	Urasoko Fishing Port	East	Mid afternoon	Short	Fishing port; not many tourists and mostly locals involved in fisheries	A quiet beach, with only two other groups present at the time. One of the groups was four European tourists, while the other group was a local couple who had brought their own table, chairs, and freezer box (containing some passion fruit, which they graciously gave us upon engaging them in small talk).	Mostly plastics, buoys, and home appliances tangeld in the vegetated path toward the beach; small plastic fragments fishing lines, and microplastics on the sand; larger styrofoam, plastic bottles, buckets, pallets, and ropes closer to vegetation. A tire was also buried deep in the sand and partially submerged in the water.
7/14/2019	Hirara Fishing Port	East	Mid afternoon	Long (2 hrs)	Fishing port; fishing spot for locals and tourists	four other groups of people came to set up shop to fish (one couple was a tourist with a rental car that left very shortly after arriving, having had no luck); water had many schools of small fish and one small jellyfish; we caught one fish (Irabucha - knobsnout parrotfish) about halfway into fishing.	No debris was visible in the water; several food and beverage wrappers were littering the port.
7/17/2019	Miyakojima Marine Park (Karimat	Northwest	Mid afternoon	Long (2 hrs)	Beach is adjacent to the Miyakojima Marine Park; not many visitors, as access point is through heavy vegetation	Beach is visible by visitors of the Marine Park as they maky their way up the incline to the park. It appeared as though some of the passerbys were interested in what we were doing, but did not linger as they continued to way to and from the park.	Beach clean up (3 people) – Day 1: after 2 hours, we filled 7 marine debris bags and several large fishing gear (i.e., ropes, buoys, and large styrofoam) set aside. Mostly of the large debris were caught on rocks/vegetation, with some stuck in the sand and rocks that we were not able to retrieve.
7/20/2019	Miyakojima Marine Park (Karimat	Northwest	Early afternoon	Long (2 hrs)	Beach is adjacent to the Miyakojima Marine Park; not many visitors, as access point is through heavy vegetation	We were not able to complete our clean up until three days later, after Tropical Storm DANAS (FALCON) passed.	Beach clean up (3 people) – Day 2: after 2 hours, we filled 16 more marine debris bags for a total of 23.
7/28/2019	Kaginmi Beach (Ikema)	North	Late afternoon	Long (1.5 hrs)	Not many visitors, as access point is by descending down six meters with a single rope on the side of a cliff	This beach is the usual clean-up for Business 3. The shoreline is difficult to access, as a rope is required to climb up/down the rocky slope. There were no tourists present at this time.	Beach clean up (4 people): after 1 hour, we collected flammables items, which were mostly styrofoam (i.e., both large pieces and many weathered, broken down pieces), small buoys, and fishing lines. Glass bottles, medical equipment, and larger derelict gear (i.e., ropes, large buoys, plastic crates, and styrofoam floats) were set aside to sort into other bags. Also notable was a washed up refrigerator.
7/29/2019	Urasoko Fishing Port	East	Mid afternoon	Short	Fishing port; not many tourists and mostly locals involved in fisheries	No other visitors were present at this time, with the exception of one local fisherman (carrying a fishing pole and a small fishing bag).	Mostly of the debris were plastic bottles and fishing gear (possibly due to its proximity to port). Large debris (i.e., tires, plastic pallets, ropes, and a barrel) were stuck on or wrapped around rocks while others were buried beneath the sand. There may have also been a trail of tar on the sand, as evidenced by black, greasy splotches.
7/29/2019	Takano Fishing Port	East	Morning	Long (1.5 hrs)	Fishing port; not many tourists and mostly locals involved in fisheries	This was a volunteer beach clean event organized by CSO 2. On this day, participants included 31 adults and 4 children. This even was also a collaboration Tida, with is a national group that visists locations to vacation together.	Beach clean up (35 people): after 2.5 hours, they collected sorted bags of 50 flammables, 10 glass, 2 aluminum, 9 small fishing gears, and 28 plastic bottles.
8/1/2019	Shimajiri Fishing Port	Northeast	Late afternoon	Short	Fishing port and ferry terminal; tourist and local access to Ogami Island	Port at which many people take the ferry to visit Ogami Island (roughly 4km from Shimajiri). There were not many people at the time: an old couple (possibly tourists) wandering around the port and a man (likely local) sitting on the bench at the edge of the port with his two dogs.	Visible debris were mostly derelict fishing nets and styrofoam, with some plastic bottles wedged between the rocks

Figure A


Kaginmi Beach
Miyakojima Marine Park
Shimajiri Fishing Port
Sunayama Beach
Hirara Fishing Port
Takano Fishing Port
Urasoko Fishing Port
Yoshino Kaigan
Muiga Cliff
Higashi Hennazaki Lighthouse

APPENDIX B: Interview questions

Category	All Stakeholders
Demographic	What is your age?
	How many years have you lived on Miyako?
	Where did you live prior to living on Miyako?
	What is your employment position?
	Do you have children living with you on Miyako?
Perception	To what extent is marine debris a concern for your organization?
	Who is responsible for causing marine debris?
	Who should be accountable for addressing marine debris in Miyako?
	What does your organization do?
	What are the issues of marine debris on Miyako?
	Are you satisfied with the way marine debris is being addressed by your organization on the island?
	Are you satisfied with the way marine debris is being addressed by other (civil society/government) sectors on the island?
	What other organizations are working on marine debris?
	Have you collaborated with other (civil society/government) sectors in Miyako?
	Have you collaborated with other (civil society/government) sectors on other islands to address marine debris?
Awareness	How aware are you of efforts by other (civil society/government) sectors to address marine debris?
	Have you heard other people complain about trash on the beaches? If so, by whom, where at, and how often?
	What are the risks associated with marine debris today (e.g. environmental, health, or socio-economic)?
	What are the anticipated risks associated with marine debris in the future?
Interaction	How often do you participate in efforts to address marine debris?
	What (civil society/government) sectors are you currently working with to address marine debris?
	Are there (civil society/government) sectors that you find will be beneficial to collaborate with?
Policy support	How strongly do you support the Eco-Island Miyakojima Declaration?
	What are your thoughts on the Eco-Island target goals to have clean beaches by 2030? By 2050?
	Has your organization made any policy recommendations regarding marine debris?
	What role does education have in addressing marine debris?
Solutions	What could [participant's organization] do to reduce marine debris?
	What are the costs or perceived costs of reducing and mitigating marine debris?
	What are limitations for success?
	What could (civil society/government) sectors do to reduce the input of debris along the coast?
	What could (civil society/government) sectors do to reduce the consumption of single-use plastics?
Self-efficacy	What would you like to see your organization do more or better at to address marine debris?
	What would you like to see other civil society/government sectors do more or better at to address marine debris?
	How difficult would it be for your organization to address overconsumption of single-use plastics on Miyako?
Response efficacy	How could marine debris on coasts or ocean be better addressed?
	What partnerships are needed to make that happen?
	What barriers might prevent that happening?
	How responsive you do think people on the island will be to those changes?
	Do you think that beach clean-ups or other implemented strategies are working?

APPENDIX C: Determination of exempt status received by the University of Washington's Institutional Review Board for the Protection of Human Subjects

UNIVERSITY of WASHINGTON
HUMAN SUBJECTS DIVISION

DETERMINATION OF EXEMPT STATUS

July 18, 2019

Dear Karin Tiffany Otsuka:

On 7/18/2019, the University of Washington Human Subjects Division (HSD) reviewed the following application:

Type of Review:	Initial Study
Title of Study:	Assessing public-private partnerships in governing waste management of marine debris in Miyakojima, Japan
Investigator:	Karin Tiffany Otsuka
IRB ID:	STUDY00007455
Funding:	None

Exempt Status

HSD determined that your proposed activity is human subjects research that qualifies for exempt status (Category 2).

- This determination is valid for the duration of your research.
- This means that your research is exempt from the federal human subjects regulations, including the requirement for IRB approval and continuing review.
- **Depending on the nature of your study, you may need to obtain other approvals or permissions to conduct your research. For example, you might need to apply for access to data or specimens (e.g., to obtain UW student data). Or, you might need to obtain permission from facilities managers to approach possible subjects or conduct research procedures in the facilities (e.g., Seattle School District; the Harborview Emergency Department).**

If you consider changes to the activities in the future and know that the changes will require IRB review (or you are not certain), you may request a review or new determination by submitting a Modification to this application. For information about what changes require a Modification, refer to the **GUIDANCE: Exempt Research**.

Thank you for your commitment to ethical and responsible research. We wish you great success!

Sincerely,

Leah M. Miller, PhD
Team Operations Lead, IRB-D and Team D
lemiller@uw.edu
(206) 543-2977

APPENDIX D: Actions to address marine debris as suggested by interviewees

Stakeholder	Ondo-sa Quadrant	Goal	Target Audience	Actions
Business 2a	1	Education/outreach; Prevention	Hotel management	Develop company-wide policies that address waste generation; Reduce purchase and consumption of single-use items
Business 2b	1	Prevention	Hotel management	"No cleaning" policy already offered at four or their six hotels
Business 3	1	Behavior change; Education/outreach	Locals	Hold a scientific symposium, displaying simulations of Miyako coastlines in the future
Education 2	1	Education/outreach; Behavior change	Children; Teachers; City administration	Incorporate marine debris education into the school curriculum; Strengthen partnership between schools and the city administration
Fisheries 2	1	Socioeconomic focus	Big companies; City administration	Prioritize local efforts and economies, rather than exporting problems to external sources; Rely less on big companies that are seeking to develop their business on Miyako
Municipal Government 1a	1	Socioeconomic focus; Partnership-building	City administration; International audience	Increase recognition of the efforts by volunteer organizations; Engage in discussions of marine debris at international conferences
Municipal Government 3a	1	Partnership-building; Prevention	City administration; Plastic manufacturers; Volunteer organizations	Assign leadership roles and responsibilities within the Municipal Government 3 division; Place strict regulations or penalties toward plastic manufacturers; Hold more frequent meetings amongst volunteers groups
Municipal Government 3c	1	Data-management; Education/outreach; Partnership-building; Prevention	Locals; Private sectors; Volunteer organizations	Promote locals to reduce their consumption of material resources Place more emphasis on private sector-led efforts and rely less on government intervention; Better consolidate clean-up efforts and data collected by the different volunteer organizations
Media 2	1	Socioeconomic focus	City administration	Prioritize the livelihood and wellbeing of the local population, not tourism development (e.g., construction industries, big businesses, and travel agencies)
NGO 1a	1	Behavior change; Education/outreach; Prevention	Locals	Generate less waste, especially by avoid the use of single-use products; Purchase products that are easier to dispose of properly and responsibly
NGO 1b	1	Behavior change; Education/outreach; Prevention	Locals	Begin by making small changes, as it is impossible to stop using plastics altogether in a world filled with plastic products
NGO 1c	1	Prevention	Manufacturers	Encourage the development of more reusable products, rather than single-use products
NGO 1d	1	Education/outreach; Prevention	Locals; Manufacturers	Reduce and reuse existing items; Encourage the development of more reusable products, rather than single-use products
NGO 2	1	Improve waste management	City administration	Develop a self-sufficient recycling system in Miyako
Tourism 2	1	Education/outreach; Keep shorelines clean; Prevention	City administration; Locals	Hold an art contest, using marine debris as the medium, to spread awareness
Business 4	2	Data-management; Partnership-building	International audience	Participate in an international forum with neighboring countries to share marine debris data and narratives
Education 1	2	Behavior change; Education/outreach; Improve waste management	Children; Teachers; City administration	Incorporate marine debris education into the school curriculum; Improve waste collection system
Fisheries 1	2	Behavior change; Education/outreach	Fishermen (older generations)	Hold frequent conversations about the consequences of littering to the marine habitat and to their common resource
Fisheries 3	2	Education/outreach	City administration	Improve science communication to better inform decision-makers
Municipal Government 5	2	Education/outreach; Policy implementation	City administration; Locals; National government	Implement penalties and fines to increase citizen awareness; Educate citizens through top-down approach, particularly focusing on prevention of illegal dumping Urge a top-down approach from the national level (i.e., National Diet of Japan), to provide local mayors with guidelines to follow
Media 1	2	Socioeconomic focus	City administration; Locals	Hold holistic discussions within the city administration on the impacts of tourism to the local population
Tourism 1	2	Keep shorelines clean; Socioeconomic focus	City administration; Local businesses	Implement and enforce regulations for beachside businesses; Consider strategies for beaches that are not frequented by tourists; Hold beachside businesses accountable for keeping beaches, which are popular among tourists, clean
Business 1	3	Behavior change; Education/outreach	Locals; Tourists	Implement policies and regulations that actively promotes positive behavior
General Public 1	3	Keep shorelines clean	City administration	Hold beach clean-ups regularly and include beaches that are not frequented by tourists
Municipal Government 4	3	CO2 emissions reduction; Environmental stewardship	City administration; International audience; Locals; Private sectors	Focus on ways to reduce Miyako's reliance on fossil fuels
National Government 1	4	Keep shorelines clean; Partnership-building; Improve waste management	City administration	Increase support (e.g., resources and public services) for beach clean-up volunteer organizations; Recognize the need for conflict management during city hall meetings