

There is a Lion on the Reef: The Political Ecology of the Lionfish

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Abstract:

The lionfish is a beautiful and enigmatic creature that has become a conservation priority for organizations that are committed to protecting coral reef ecosystems in the Caribbean. The management of the lionfish is the target of a variety of management strategies, such as the creation of a fishery, the commercialisation of the fish, and culling. This work will interrogate the discourse of framing the lionfish as an ecological threat and analyze the conservation priorities of Reef Check Dominican Republic, which are nested in a regional management plan. I will then critique the Conservation as Development project and the notion of sustainable livelihoods and illustrate how the overall management plan within La Caleta Marine National Park as a co-management strategy between the state and Reef Check DR are part of the projects of nation and empire building. This study will also draw attention to the assemblage of actors who have come together in the name of lionfish management, whose elite position in the conservation movement is accentuated by the power dynamics within the project.

Dedication:

For Jen and Clara

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LIST OF INTERVIEWS:

- 1) Dr. Isabelle Côté: Professor of Marine Ecology , Simon Fraser University
- 2) Luis Malpica Cruz: PhD Candidate, Simon Fraser University
- 3) Aaron Shultz: Director of Research, Cape Eleuthera Institute
- 4) Leeane Nowell: Manager of Flats and Ecology Program, Cape Eleuthera Institute
- 5) Ana Maria Perez: Biologist, MNR&E,
- 6) Omar Shamir Reynoso: Vice Minister of Coastal Resources, MNR&E, Santo Domingo
- 7) Nina Lysenko: Director of the National Aquarium , Santo Domingo
- 8) Ruth Feliz: Administrator of Protected Areas for the MNR&E, Santo Domingo
- 9) Ruben Torres: Marine Biologist and President of Reef Check Dominican Republic, Santo Domingo
- 10) Antonio: Dive Master -Treasure Divers, Boca Chica
- 11) Jutta Pitz: Tropical Seas Divers, Boca Chica
- 12) Markus Haemmerle: Dive Master -Caribbean Divers, Boca Chica
- 13) Richard Essen: Recreational Diver
- 14) Ron Knight: Director of SCUBA Operations at the Cape Eleuthera Institute, Bahamas
- 15) Matt McGoveran: Student of Coral Reef Field Course, Carleton University
- 16) Lisa Yamma and Sara Sea Saver :Carol Morgan School, Santo Domingo
- 17) Franklin: Lionfisherman and COOPRESCA Member, La Caleta
- 18) Juan: Fisher and Founding Cooperative Member, La Caleta
- 19) Carlos: Fisher and Vice President of COOPRESCA, La Caleta
- 20) Pedro: Fisher and COOPRESCA Member, La Caleta
- 21) Alexa: SENPA (Environmental Protection branch of the Military) Guard, La Caleta
- 22) Samuel: Guide at El Carey and COOPRESCA Member, La Caleta
- 23) Miguel: Taxi Driver, La Caleta
- 24) Maria: Guide and El Carey Dive Center Staff, La Caleta

CHAPTER 1: INTRODUCTION

FOREWORD

I began my journey towards a Master in Environmental Studies late in the summer of 2010, on a back packing trip that ended with a 'discovery SCUBA dive' in Honduras. After one dive I was hooked, for months all I could think about was the weightlessness of my body and the fascinating fish and beautifully coloured creatures. For a year I looked for any opportunity to get back into the ocean and decided that the best way to do this was to pursue a dive course, and properly learn how to dive. Not only did I want to be a certified diver, but I wanted to understand what was happening to my eyes and my body underwater and to build an ecological vocabulary around the fish, coral, sponges, crustaceans and other creatures that inhabit the reef. I found the opportunity I had been looking for – the ideal place to get my PADI (Professional Association of Diving Instructors) certification. Reef Conservation International in the Sapodilla Keys of Belize was offering certification for a two week trip when you sign up and volunteer to take Reef Check data on your free dives, being those that are not required for certification. I was hopeful and trusting that the work of Reef Check was primarily focused on conservation and not securing my tourist dollars. I was optimistic that the conservation objectives were not based on neoliberal priorities, and that I would genuinely be participating in an effective monitoring initiative for the benefit of the ecosystem and those individuals whose livelihoods have historically been linked to it.

Once I was comfortable and competent as a diver, it was time to get to work collecting data for Reef Check, and participating in a lionfish cull - a program endorsed by Reef Check to manage the population of the invasive lionfish. The woman who led the dive was the expert 'lion hunter', a long time vegetarian and self-proclaimed environmentalist, dive master and manager at Reef CI. On this dive, she was training me how to spear a lionfish, an activity I had agreed upon, but was not entirely comfortable with. After completing a safety training on land and watching the dive master hunt a few fish, she passed the spears on to me.

We swam along a patch of reef looking for a fish, and finally we came across a beautiful, large lionfish with its frilly pectoral fins waving gently in the swells. It was actually suspended upside down by inflating its swim bladder, a strategy thought to be used to confuse its prey. With the spear engaged, and

the other poised to hold the fish down, I stared at this remarkable and curious upside down creature. Like all of the other fish on the reef, it did not appear to be bothered by my presence, nor take notice of the spears pointing directly at it. I stared at the fish for what seemed like an eternity as the sound bites kept repeating themselves in my mind... “voracious predator...invasive species...no known predator...’gotta eat ‘em to beat ‘em’....eat your reef clean....preys on juveniles...reproduces quickly...damaging the reef...threatening the reef... threatening the tourism industry and economically important fish for local fishers....voracious predator...voracious...voracious.” I put the spears down.

That night I ate and enjoyed the lionfish that the dive master caught, but was amazed at the discourse used to describe the lionfish from the same person who, in one moment was such a compassionate advocate for the protection and care of all creatures of the ocean, and the next using military analogies and inciting hate against this outsider species. While I am not against the practice of fishing, I am intrigued by the way language is used to convey ecological phenomena. Through this thesis and the MES Plan of Study I have come to question the interconnection between political and economic dynamics within the realm of biological conservation, particularly in terms of discourse and elite actor networks. The process of personal reflection and praxis (Friere, 1970), research and discussion, thinking, reading and feeling that has culminated in this work, has been as much a personal journey as an academic project.

FRAMEWORK OF THE PROBLEM

The natural history and ecological impact of the lionfish in the Caribbean is a fascinating topic of study. The goal of this thesis is to investigate how the science and ecological knowledge is communicated and understood by various groups and individuals from a variety of backgrounds and social locations. It will investigate why the lionfish has become a priority issue for conservation managers, among many ecological ‘threats’ to the reef ecosystem. The case of the management strategy in La Caleta Marine National Park (MNP) offers an opportunity to illustrate how the power of discourse in the perpetuation of a crisis and threat legitimates the perpetuation of neoliberal ‘business as usual’ via the commercialization of lionfish and a transition from fishing to eco-tourism through the expertise of the NGO. This case will be explained in a social, historical and cultural context, which will work to uncover a ‘chain of explanation’ (Blaikie & Brookfield, 1994 in Büscher et al., 2012) on why the ‘threat’ of the ecological issue is

understood differently by different people.

Using the lionfish as a lens, I will approach this project in two main ways. First I will ask how the impact of the lionfish is framed and communicated in the field of Ecology, and what the discourse of the lionfish teaches us about the spatial, temporal and societal implications that are bound to the terms native and invasive. I hope to render visible the problematic language and imagery used in addressing biological invasions and what the implications are to use such discourse on the post-colony of Hispaniola that has such a strong and important history of a discourse of belonging. Second, I will ask how the lionfish invasion exposes some of the tensions associated with biological conservation, particularly economic valuation of ecosystem services, commodification of nature, and transition to 'sustainable livelihoods' via ecotourism. In studying the response of the lionfish invasion in the Caribbean, specifically through Reef Check Dominican Republic (RCDR) in La Caleta MNP in Santo Domingo, I will expose examples of uneven power relations in the arena of conservation, especially the reproduction of elitism that exists in Dominican society. In order to analyse how the lionfish is understood I will examine the usage of the term threat and the context in which it is used in the gray literature around the lionfish and in the interviews for this work.

I chose to frame my research in the Southern coastal region of the Dominican Republic (DR) because of my history working with a grassroots educational group as well as my interest in Dominican history and politics. For me, the DR is an interesting place to study conservation as it is often applauded as a success story of the global south in terms of the 'indigenous movement' of natural resource protection – in fact it has an extensive network of protected areas, over 21.5% of the country's area, the fourth highest percentage of any country in the world (Holmes, 2010, 625). It is essential to consider how the two dictators of the 20th century – Rafael Leonidas Trujillo and Joaquin Balaguer, who are responsible for the original creation of this network of protected areas, employed the process of national park creation to secure large tracts of land for their personal (and familial) economic gain via large scale timber and tobacco farming (625). This history suggests that the creation of such an internationally applauded network of protected areas is a part of a larger nation building process of 'naturating the nation' (Sundegerg & Kaseman, 2007), where the protected areas conjure images of Dominican nationhood that are juxtaposed beside that of Haiti, which is commonly framed as an ecological disaster. In utilising the rhetoric of conservation and

protected areas, the elite of the Dominican Republic are able to reproduce difference between appropriate use (tourism) and inappropriate (resource extraction) of natural resources, and are able to rely on this discourse to perpetuate the elitism that exists with the conservation movement and the exclusion of poor, racialised Dominicans and Haitian migrants from parks, natural resources and other areas of Dominican society (Holmes, 2010, 632).

In the DR, the creation and management of national parks continues to be the response to create an environmentally justified enclosure. Historically, parks were created by the Trujillo and Balaguer regimes to both secure land as well as to protect the notion of a wilderness romanticised by Balaguer. National parks in the DR expose how the processes of 'primitive accumulation' (Marx, 1976 [1867], 873) or 'accumulation by dispossession' (Harvey, 2005, 137) are put forth in the name of the environment – be it for the protection of biodiversity, climate change mitigation, or even the protection of fisheries (Benjaminsen & Bryceson, 2012). In La Caleta MNP the accumulation of wealth is centered on the transition to tourism with the promise of an eco-tourism alternative to the massive industry in neighboring Boca Chica, and the commercialisation of the lionfish. These economies, which involve green commodities proposed and managed by RCDR, and the Ministry of Natural Resources and Environment (MNR&E) are described as an alternative to overfishing, however are employing the very processes that are involved in the problems that the managers are trying to solve, namely the free market and overconsumption.

Fairhead, Leach & Scoones' (2012) work identifies the process of 'green-grabbing', or the "appropriation of land and resources for environmental ends...where appropriation implies the transfer of ownership, use rights and control over resources that were once publicly or privately owned – or not even the subject of ownership – from the poor into the hands of the powerful" (238). They point to the injustice inherent in this process and state that the process is becoming more and more common as concern for the environment becomes more embedded in society. Appropriation is further defined as:

simple capital accumulation, in which profits accruing to capital are reinvested, increasing capital and the concentration of its ownership. Or it can be primitive accumulation, in which a more publicly owned nature is enclosed into private ownership, and existing claimants are expelled (or have rights attenuated) to become a proletariat separated from land and nature, releasing resources for private capital (DeAngelis 2001, Glassman 2006, Kelly 2011 in Fairhead et al., 2012, 239).

Fairhead et al., discuss how the new processes of land appropriation in the name of the environment needs

to be examined for 'clear continuities' with past appropriations and productions of nature (2012, 247). In this study I argue that the production of the lionfish as the enemy alien and the increased management of the marine park is closely connected in motivation and practice as the initial removal of the community of La Caleta for the creation of the park in a process of territorialisation, explained by Peluso & Lund (2011, 673 in in Büscher et al., 2012) as "no less than power relations written on the land." The NGO acts as the 'Trojan horse' (Temple, 1988) by which these power relations materialise, through which the information- both ecological and management based- are transmitted and the nucleus of the assemblage of actors committed to addressing the lionfish. Edward Said (1994) has written, "at some very basic level, imperialism means thinking about, settling on, controlling land that you do not possess, that is distant, that is lived on and owned by others" (7). Vandergeest & Peluso (1995, 388 in Büscher et al., 2012) define the process of territorialisation as "including or excluding people within particular geographic boundaries, and about controlling what they do and their access to natural resources within those boundaries." According to these articulations, the case of lionfish management in La Caleta MNP via the co-management with RCDR is a process of imperial territorialisation that has a clear and concise connection to a violent colonial history, particularly in the creation of the national park. The management focus illustrates a perpetuation of the accumulation of wealth, which has embedded within it a class hierarchy that is evident in the network of actors who have come together to address the arrival of the lionfish. Further, the fishers whose livelihoods are and have been connected to the area are positioned as perpetual threats to the revered coral reef ecosystem and are targets of "all round tutelage" (Mumdani, 1996, 17) in terms of environmental governance as well as educational programs with a focus on behaviour change, not of the elite, but the economically marginalised.

The lionfish management program and the sustainable livelihood transition from fishing to eco-tourism is in this work being critiqued as a case of neoliberal biodiversity conservation, or in other words 'selling nature to save it' (McAffee, 1999 in Büscher et al., 2012). Büscher et al., synthesise the analysis of neoliberal conservation as:

An amalgamation of ideology and techniques informed by the premise that natures can only be "saved" through their submission to capital and its subsequent revaluation in capitalist terms. Put another way, neoliberal conservation shifts the focus from how nature is used

in and through the expansion of capitalism, to how nature is conserved in and through the expansion of capitalism (Büscher et al., 2012, 17).

The language used to communicate environmental issues here is important, as are the differences and trends in how the arrival of the lionfish is perceived. This work will analyse how the creation of an environmental crisis is used to justify practices that may impact local livelihoods in the name of conservation (Büscher et al., 2012). According to Martin O'Connor (1994) "environmental crisis has given liberal capitalist society a new lease on life. Now, through purporting to take in hand the saving of the environment, capitalism invents a new legitimization for itself: the sustainable and rational use of nature" (O'Connor 1994, 125-126 in Büscher et al, 2012). This process becomes even more problematic when the notions of what is 'sustainable and rational' are decided by those who hold the most power, namely the scientists, government officials and conservation managers who deem fisher folk behavior as decidedly unsustainable and irrational. In stating that the extraction of resources based on a capitalist mode of production is unsustainable, the manager's solution to transition to ecotourism utilises the same profit motives, which perpetuate the driving force in relationships between people and nature, or that saving nature must include the potential to make money or there is little to no incentive for 'rational' people to pursue it (Büscher et al., 2012, 14).

Commercialising the lionfish and selling stewardship opportunities to divers through eco-tourism, which is marketed as a non-consumptive activity- thus congruent with the objectives of conservation- are among the many examples of neoliberalism in conservation that hide the real ecological and social impacts of neoliberalism, or that 'green-wash' the products sold, where green-wash refers to making the product or service appear more environmentally responsible than it is. Here the products being the lionfish itself, and diving opportunities to manage the populations of lionfish through local or international tourism. This calls into question the motivation of managers and other actors to participate in such practices. Political ecologists Igoe, Neves, and Brockington (2010) follow Antonio Gramsci and Lesley Sklair who argue that neoliberal conservation is part of a current "Sustainable Development Historic Bloc", where a diverse group who share a particular interest merge to form a dominant class who heavily influence the ways in which other people consent to see and talk about the world (Gramsci 1971 in Büscher et al, 2012, 17). They state:

In remarkable synchronicity, the sustainability crowd and the neoliberal development crowd have united to remake nature in the South, transforming vast areas of community-managed uncapped lands into transnationally regulated zones for commercial logging, pharmaceutical bio-prospecting export-orientated cash cropping, mega-fauna preservation and elite eco-tourism. The Sustainable Development Historic Bloc, according to Sklair (2001), is a historical moment in which a transnational class of corporate CEOs, professionals, government officials and bureaucrats, NGO leaders, merchants, and the media are working together to overcome the crises outlined above by offering easy consumption based solutions to complex socio-ecological problems (Büscher et al, 2012, 17).

Igoe builds upon this notion stating that conservation NGOs are among, if not the main producers and purveyors of a certain type of nature, that he refers to as 'eco-functional', which is a "construction and portrayal of nature in which economic growth and healthy ecosystem function can be optimised and synchronised through technocratic interventions overseen by experts. Through eco-functional nature, hyper-consumption and environmental sustainability are taken to be fundamentally compatible projects (Igoe, 2010 in Büscher et al, 2012, 18).

The framework of political ecology and a critique of neoliberal conservation as outlined above, as well as discourse analysis will be deployed to critique the way in which the lionfish and eco-tourism projects are positioned in La Caleta MNP as the way to conserve the reef generally, while recognising the potentially progressive outcomes of such programmes through the ideas and critiques of community members. The arrival of the lionfish in the DR and the accompanying management strategy presented itself to me as a lens through which to analyse some of the tensions in conservation initiatives, management of national parks. It has also allowed me to problematise the discourse around invasive species management and environmental education and stewardship, which are reflections – or even magnifications- of the aforementioned ideas and theories. It is my goal in this work to analyse power structures in Conservation as Development projects and begin to dream about ways to use critical pedagogy to work for environmental justice. Further, it is my hope to provide space to the voices of the community members of La Caleta in regard to these themes, particularly the fishers.

OVERVIEW OF METHODOLOGY

1) Literature Review

Ecological Impact and Management Guide for the Lionfish

I will begin by reviewing the literature on coral reef conservation generally, then the story of the

lionfish arrival, its natural history, ecological impacts and recommendations for management in the ecological literature. I will then provide an overview of the 2012 publication by James A. Morris titled *Invasive Lionfish: A Guide to Control and Management*, which is a product of the research conducted by the research groups at the Cape Eleuthera Institute (CEI) in the Bahamas. I will summarise and report on the ecological literature, and use the following theories and frameworks to analyse and critique the way that the ecological problem is framed, prioritised and interrogate the management strategies.

Political Ecology

According to Peet & Watts (1996) the field of political ecology “dates back to the 1970s when a variety of commentators...coined the term as a way of thinking about access and control over resources, and how this was indispensable in understanding both the forms and geography of environmental disturbance and degradation, and the prospects for green and sustainable alternatives” (Peet & Watts, 1996, 6). In order to frame the critique of the response to the arrival of the lionfish in the Caribbean, I will use the framework of political ecology, whose central themes are “first, the grounding of environmental degradation in the trajectories of accumulation and the operations of market-based power; second, the intertwining of environmental conservation with struggles over environmental control; and third, the ongoing emergence of new ecologies,...with implications for destruction as well as creative alternatives” (Peet et al., 2011, 30). Political ecology is a useful way to uncover the underlying ideologies inherent in this environmental phenomenon. According to Paige West, political ecology exposes “local-global articulations that were not before visible with earlier anthropological approaches to environmental issues and capital’s demand for cheap labour and natural resources. [Political Ecology] examines and elucidates the ways in which multi-scaled political and economic processes affect people living in rural or biologically diverse areas, and the discipline takes seriously the production of nature (West, 2006, 24). Richard Schroeder states that positive economic incentives to promote land use practices are the ‘commodity road to stabilization’ and that communities next to protected areas frequently bear substantive costs as a result of lost access while receiving little in return (Schroeder in West, 2006, 34). This point is crucial to the study that I have done, and will be articulated in the results of the interviews. I have chosen to employ the ‘conceptual toolkit’ of political ecology for this work, because of the main assumptions pointed out by

Blaikie & Brookfield:

First, society and land-based resources are mutually causal in such a way that poverty can induce, via poor management, environmental degradation, which itself deepens poverty. Second...spatial accounts of degradation which link through chains of explanation, local decision makers to spatial variations in environmental structure. Third, land management is framed by external structures...the role of the state, the core-periphery model, and almost every element in the world economy (Blaikie and Brookfield 1994 in Peet & Watts, 1996, 9).

Another important idea is that “one must accept plural perceptions, plural definitions...and plural rationalities...as political ecology opened up the possibility of a serious discussion of how nature and environmental problems were represented and how discursive formations shaped policy and practice (Peet & Watts, 1996, 9). Further, in looking forward, this work looks to the ideas of what Peet & Watts describe as ‘liberation ecology’, which recognises “the emancipatory potential of the environmental imaginary, and to begin to chart the ways in which natural as much as social agency can be harnessed to a sophisticated treatment of science, society and environmental justice” (Peet & Watts, 1996, 15). Putting the arrival of the lionfish and the subsequent management plans into a historical, economic, political and social context shows that “marginalization, surplus appropriation, relations of production, and exploitation displaced the old lexicon of self-regulation, adaptation, homeostasis, and system response” (Peet & Watts, 1996, 6). However, this work is hopeful in recognising that if the environmental problems and solutions are produced, then there is opportunity to produce an alternative that is more respectful and inclusive.

Actor-Network Theory

Actor Network Theory (ANT) will be deployed as a guide to trace the linkages between the lionfish and the various actors who are involved in the fish’s life and management. As noted, “several of its key architects and proponents have stressed, ANT was never supposed to be a programmatic theory, but a loose intellectual ‘toolkit’ or ‘sensitivity’” (Law, 2004, 157), thus I propose to organise the actors involved in this research in terms of the network. I, as a participant in an ecological stewardship program, and subsequent researcher on the lionfish in La Caleta MNP came to be interested in this phenomenon precisely because of my initial interest in coral reef ecology and the way that the lionfish was posed as a threat. I hope to illustrate the importance of the production of the lionfish by recognising the fish as a nonhuman actor as an important link in the assemblage of actors. I plan to investigate the response to the arrival of the

lionfish in the Caribbean by tracing the links of several assemblages. One of these assemblages will be the actors of community engagement programs in order to expose the elitism that exists within the assemblage by showing who is involved and who is mentioned in the 'community'. In this work, as noted by Price (2008), the norms of the conservation objectives are 'grafted' onto the already legitimate norms of the creation and management of the national park. RCDR becomes the focal point, or node, through which the normative claims can be made and then disseminated, in this case through the advice of the Management Guide and elite volunteers including an environmental club at a private school in Santo Domingo. The presence of a crisis is significant as explained by Jessop (2009), who states that diverse groups and policy makers can mobilise around a common resolution to an economic or environmental crisis (i.e., the lionfish) reducing the complexity of both to a shared strategy of a green 'economic recovery'. This mobilisation and action taken by a variety of actors who may not have come together if not for the advent of ecological crisis can create the impression that all are in agreement on the course of action. However, Farrell & Quiggin (2012) point out that when a set of ideas has become accepted as a network, this can set up an 'apparent consensus'. What is important to acknowledge here that despite the 'apparentness' of consensus there is a multitude of opportunities for critique of the power structures inherent within the network as well as internal contestation and resistance which is relevant particularly when looking at who is considered 'the community' in a community Conservation as Development project.

2. Participant Observation

Thanks to the generous support of the Bombardier Master's Award from the Social Science and Humanities and Research Council (SSHRC), I was able to participate in a field course in the Bahamas at CEI – the research center that is responsible for much of the research guiding the *Lionfish Management Guide*. This experience, while invaluable in itself provided me the opportunity to interview a number of upper year undergraduate Biology students, as well as Isabelle Cote and her research assistant, one of the leading researchers on lionfish ecology, the research managers and several environmental educators who teach about the lionfish. While the access to these informants may have been possible, the participant observation would not have been, which was instrumental in my understanding of how the science on the lionfish is approached, and how social location impacts the response. Throughout the duration of my

fieldwork in both the Bahamas and the DR I had many opportunities to listen to and observe a variety of lectures, interactions, meetings, and workshops that informed my research greatly. Through my participation and observation I made it very clear that I was doing research and was invited and welcomed at the meetings. At times, simply being in the park and spending time with the fishers offered many opportunities to observe happenings, traditions, relationships, events and conflicts that greatly impacted my understanding of the role of the lionfish and the operation of RCDR as well as the spatial implications of the National Park. Specifically, I participated in the following workshops:

Sunday March 18, 2012 – Gastronomy Festival – La Caleta Marine National Park
Thursday March 22, 2012- Workshop with fishermen – Monte Cristi
Wednesday February 13, 2013 – Workshop on Regulations and Code of Conduct in La Caleta Marine National Park – Quality Hotel
Wednesday February 20, 2013 – Workshop with Boat Captains, La Caleta
Thursday February 21, 2013 – Workshop with Fishers, La Caleta
Friday February 22, 2013 – Workshop with El Carey Staff, La Caleta

3) Interviews

The majority of the first-hand research that I accomplished was through semi-structured interviews, the results of which will be retold in Chapter 6. I made several contacts prior to my arrival in the DR in February 2013, when the majority of the interviews took place and I used a snowball technique to identify other individuals to speak to. For certain strands of questions, I used similar interview questions with each of the respondents chosen for this study to investigate and evaluate similarities and differences between responses. In some cases, I had more specific questions that were much more structured and tailored to the individual or group, and other cases where perspectives were revealed through casual conversation. In order to communicate the results of the interviews and experiences in workshops and activities, I will recount the events as they happened and as they have been told to me. I recorded the interviews, and used my notes and the recordings to translate the interviews and write the results. In this work I have decided to change the names of several individuals who were respondents in this work. Also, here I would like to note that because I translated the interviews personally and take responsibility for any issues in translation.

4) Discourse Analysis

Brendon Larson points out that the discourse used to conjure support for management of invasive species draws on fears that are dormant in the minds of many people, first the invasion of the body by disease and the invasion of the nation by outsiders (Larson, 2008, 170). He further describes a bias in the way that native and invasive species are in competition with each other and that while likely unintentionally, biologists employ militaristic language and problem solving as a response (Larson, 2008, 170). This work will identify the specific language used to talk about lionfish management and the conservation of coral reef ecosystems through the words chosen in the publication *Invasive Lionfish: A Guide to Control and Management* and through my interviews and participant observation. Specifically, I will look at how individuals from various social locations use and identify the term *threat*, which changes directly depending on who is discussing the issue. This work will also analyse how the concept and terminology of ‘maximizing efficiency’ and commercialisation of the lionfish is promoted in the literature and educational materials, which illustrates how the tenets of capitalism are inherent within the management plans and strategies, and perpetuated through the discourse of conservation of coral reefs in response to the lionfish. Peet & Watts (1996) identify that the field of political ecology, is concerned with the politics of meaning and the construction of knowledge (5), and that “central to the new political ecology is a sensitivity to environmental politics as a process of cultural mobilization, and the ways in which such cultural practices – whether science, or ‘traditional knowledge’ or discourses, or risk, or property rights – are contested, fought over and negotiated” (Peet & Watts, 1996, 6). This work will investigate how the discourse of the lionfish as a threat and as a commodity changes through the thoughts and ideas shared by various actors, which is related to power relations, accumulation of wealth and the legitimization of intervention.

CHAPTER 2: ECOLOGICAL LITERATURE REVIEW

CORAL REEF CONSERVATION

Earth, the blue planet, is the home of an incredible diversity of life. While coral reefs cover only 0.1% of the ocean, they are home to an incredible amount of marine biodiversity and host up to one-third of the world's marine fish species (Côté & Reynolds, 2006, xv). Caribbean coral reef ecosystems are often described as a 'biodiversity hotspot' and 'the tropical rainforests of the oceans' (Centre on Biological Diversity, 2011). In addition to their intrinsic value, coral reefs provide four of the four main ecosystem services as described in the United Nations Millennium Ecosystem Assessment. They are: "Regulating: i.e., coastal protection from storm surges and waves; Provisioning: i.e., fisheries, pharmaceuticals, construction materials; Cultural: i.e., tourism, spiritual and aesthetic appreciation and Supporting: i.e., nutrient cycling, nursery habitats" (Centre on Biological Diversity, 2011).

In 2011, the World Resources Institute stated that more than 60% of the world's reefs are under immediate threat of direct human pressures, or 75% if climate change is factored into the modeled predictions (Wilkinson, 2011, 7). A collapse in a coral reef ecosystem would result in what is described as a phase-shift to a macro-algae dominated zone that is simply incapable of supported the biodiversity of a healthy living coral reef (Wilkinson, 2011, 8). The following list of stresses on Caribbean coral reef ecosystems is organised and outlined in the chapter Death and Resurrection of Caribbean Coral Reefs: a Paleo-ecological Perspective (Precht and Aronson, 2006, 44). Although not exhaustive, these threats are listed as follows:

Top Down: Overfishing, Destructive Fishing, Sediment Pollution, Development near Coral Reefs

Overfishing refers to the situation in which reduces the population of fish which causes ecological and socio-economic changes. For example, over the last half of a century, large predatory fish (such as tuna) have declined by over 90% and that the diversity of these fish has been reduced by up to 50% (Mansfield, 2011, 84). Destructive fishing accompanies overfishing to compensate for depleted fish stocks, which include practices such as dynamite bombing, and cyanide poisoning to stun fish which accommodates extraction of live fish for the aquarium trade and human consumption. Both practices utterly destroy surrounding reefs (Wilkinson, 2006, 23).

Sediment pollution describes the over-abundance of particulates that flow from catchment areas onto the reefs that reduce photosynthesis and even bury the coral reefs (Wilkinson, 2006, 24). The sources of the excess sediment, which also includes garbage and plastics, are most commonly deforestation, farming, mining, and development on or around coastal areas. This is of course exacerbated by development of hotels, residences, and other economic activities around coral reefs or waterways that eventually lead to coral reefs (Wilkinson, 2011, 5).

Bottom Up: Nutrient Pollution

Compounds of nitrogen and phosphorus can be loaded into coral reef systems through run-off from human sewage and excess fertiliser from agriculture. These nutrients encourage the growth of phytoplankton that block out sunlight and are potentially toxic, as well as supporting the growth of macro-algae that can out compete corals and overgrow them (Wilkinson, 2011, 8).

Sideways: Climate Change

The risks that are posed to coral reefs by a changing climate include coral bleaching, increased coral disease, more frequent and intense hurricanes, rising sea levels, and rising levels of carbon dioxide causing acidification (Precht and Aronson, 2006, 49). In 2005, there was a massive bleaching event that eliminated 80% of coral cover in the Caribbean (Wilkinson, 2011, 8). This has been compounded by the breakage due to increased number and intensity of hurricanes, and diseases such as white band disease and other pathogens (Precht and Aronson, 2006, 49). Ocean acidification is a stress that is becoming more widely known, as the increase of carbon dioxide causes the ocean water to be more acidic thus causing the limestone skeletons of the corals to be more fragile and grow slower (Wilkinson, 2011, 8). The above stresses are not an exhaustive list, and as like most environmental issues they do not exist in a vacuum, but there are a variety of synergies that exist that compound these impacts. This is exemplified by the statement by Clive Wilkinson that the reefs that recovered best after the 1998 and 2005 bleaching events were those that were well managed or isolated from other human pressures such as sediment and nutrient pollution, over-fishing, mining and coastal development (Wilkinson, 2011, 8).

THE LIONFISH

The lionfish is an invasive exotic species that is compounding and exacerbating the risks to the

health and stability of Caribbean coral reefs. This invasion is listed as one of the top threats to global conservation among issues such as de-oxygenation of the oceans and large-scale land acquisitions (Sutherland et al., 2010). The Indo-Pacific lionfish (*Pterois volitans* and *P. miles*) have spread rapidly across the Western Atlantic, Caribbean and Gulf of Mexico, producing a marine predator invasion of unparalleled speed and magnitude. Also in certain areas, such as selected sites in the Bahamas, the lionfish has reached densities of greater than 390 fish per hectare, which greatly exceeds the density in their original habitat in the Pacific of about 80 fish per hectare (Green et al., 2012, 1). The only known limit to the range of lionfish is the temperature, which is thought to be ten degrees Celsius (Barbour, 2012, 1), which leaves most of the tropics and neo-tropics at risk.

The route of the lionfish has been widely contested, as there are various stories of the motivation and the origin of the propagules. Some have stated that fertilised eggs may have been transported from the Pacific to the Atlantic in the ballast water of a ship, but this hypothesis has been refuted due to the duration of the larval stage and the number of founders. There has also been a popularised story that after hurricane Andrew in 1992 an aquarium was damaged and six individuals were released off the coast of Florida. This story has been put to rest because first, the first reported sighting of the lionfish in the Atlantic was 1985, and second because it has been established that there were at least nine founders (Betancur et al., 2011). The most likely vector is multiple releases from aquaria, likely because the lionfish became undesirable after eating all juvenile fish in the tank, or a sting. Release into the wild may have been made a popular or humane option because of the movie *Finding Nemo* where the characters are working to bring Nemo back to the ocean so he can reunite with his father (Torres, 2012). Betancur et al., show first that *Pterois volitans*, likely to have originated from Western Indonesia, is widely distributed while *Pterois miles* is restricted to the east coast of the United States and the Bahamas. This conclusion was reached by testing the mitochondrial DNA sequences of 755 lionfish and analysing the genetic diversity based on haplotypes. This study also shows that the minimum number of founding individuals between eight and twelve, not six and that the most likely there were multiple introductions from aquaria release of fish and possible eggs in waters off the coast of Florida, and that the likelihood of release from other areas in the Western Atlantic are low (Betancur et al., 2012, 1289). Most recently, managers have posited that due to Hurricane Andrew

and the subsequent loss of power, aquarists released the lionfish to save them (Torres, 2013).

Physiology, Reproduction, and Predation:

While the introduction of invasive exotic species is a controversial ecological concept due to the temporal and scalar limits to the definition (Lockwood, 2007, 2), it is shown that the arrival of the lionfish has had negative ecological impacts on its new environment. A variety of physiological and life history characteristics make the lionfish a successful invader. In 2009, James Morris completed a comprehensive study on the anatomy, reproduction and feeding behavior of the lionfish in the Atlantic region that explains the success of the invasion. He first frames the situation by recognising that the invasion itself has been successful because there was a space for the fish to occupy. He states, “given that many reef fishes along the east coast of the U.S. and Caribbean are overfished, lionfish might be utilizing vacated niche attributes such as increased availability of forage fishes and reef space” (Morris, 2009, 181). Had the lionfish arrived in a healthy and thriving ecosystem, it is possible that they would simply not have had any space to occupy. The physiological characteristics of the lionfish that prevent predation and make the fish an incredibly effective invader include the eighteen venomous spines that are located along its dorsal (13), anal (2) and pelvic (3) fins (Morris, 2009). Traits that may reduce the detectability of lionfish by both predators and prey are the combination of slow, agile movement, disruptive barred light then dark colour patterns, numerous elongated fin rays and a variety of fleshy and bony projections (Albins & Lyons, 2012, 2).

The reproductive strategies of lionfish also contribute to their efficiency as invaders. The lionfish is a batch spawner, which means that they are capable of spawning several ‘batches’ or mass groups of eggs as environmental conditions allow (Morris, 2009, 82). The morphology of the egg mass helps optimise fertilisation rates because fertilisation is external, the shape and size of the gelatinous matrix, which resembles a hollow, open ended tube, may entrap the male sperm (Morris, 2009, 83). The lionfish becomes sexually mature in less than one year, and reproduces throughout the year releasing two egg sacs with 12-15,000 eggs in each up to every four days. The mean annual fecundity of the lionfish is over 2 million eggs per year, although the recruitment rate is currently unknown as the eggs are fertilized and then travel via ocean current (Morris, 2009, 83), which is yet another reason why the lionfish has been able to become established so quickly and so thoroughly throughout the Caribbean.

The lionfish are commonly described as 'voracious and indiscriminate predators' (Morris, 2009). The following is a description of the hunting strategies used by the lionfish, to which native juvenile fish are naïve, or have not developed a defense or avoidance strategy:

lionfish are suction feeders, a common teleostean feeding technique comprised of rapid expansion of the buccal and opercular cavities, coupled with quick forward motion. Lionfish also use a variety of feeding strategies including ambush predation and corralling with their large, frilly pectoral fins, which they also use to flush benthic invertebrates from the substrate. Specialized bilateral swim bladder muscles in lionfish allows them to alter their center of gravity and provides fine-tuning of position prior to striking prey (Morris, 2009, 395).

Furthermore, a 2012 study by Albins & Lyons on the feeding habits of the lionfish shows that they blow directed jets of water at prey fish. In this study field observations of 762 feeding events in the Atlantic and 357 in the Pacific were supplemented with feeding trials in aquaria. In the study the researchers recorded that streams of water between two and nine centimeters were expelled from 100% of the aquaria trials, 23% of the feeding events in the Atlantic and 55% in the Pacific (Albins & Lyons 2012, 4). Because fish tend to face toward a stream of water to reduce the energy needed to reduce drag, this practice is beneficial to the lionfish because it can ingest the prey head first making it virtually impossible for the prey to escape. The authors note that more fish in the Pacific use this tactic, because it is metabolically expensive and prey in the Pacific are aware of predation by lionfish and have thus developed avoidance strategies whereas those in the Atlantic are naïve due to the novelty of the presence of lionfish (Albins & Lyons, 2012, 5). With tactics like these, it is difficult to think that any prey could escape and it is unlikely that avoidance strategies will evolve before it is too late for most prey of the lionfish. Albins & Lyons describe this perfectly with the statement, "a lack of effective defensive responses in native prey may have contributed to the unprecedented success of invasive lionfish, and may exacerbate the direct negative effects of lionfish on native prey populations as well as the indirect negative effects of lionfish on competing native piscivores" (Albins & Lyons, 2012, 3).

Ecological Impacts:

The reported ecological impacts of the lionfish invasion have thus far been profound. A study done by Albins & Hixon in 2008 compared the recruitment of fishes to ten coral patch reefs with lionfish and ten reefs without lionfish in the Bahamas over 5 weeks. It was also demonstrated that the Indo-Pacific

lionfish reduced recruitment of Atlantic coral reef fishes the researchers reported reduced recruitment significantly, by an average of 79%, including 23 of 38 species (Albins & Hixon, 2008, 45). A subsequent field experiment in the same location and season showed that after two months the native Coney grouper had reduced the abundance of small fish on the reefs by an average of 35%, whereas invasive lionfish had reduced prey fish by 90% (Albins, 2011, 6). This illustrates the devastating effect that the lionfish is having, especially compared to the predation of native grouper.

In 2009, Morris & Akins reported on a study that counted the contents of over 1 000 lionfish stomachs to understand its feeding patterns. "Lionfish largely prey upon teleosts (78% volume) and crustaceans (14% volume). Twenty-one families and 41 species of teleosts, especially gobies (Gobiidae), wrasses (Labridae), and basslets (Grammatidae) as well as important food species, such as groupers, snappers, and goatfishes, were represented in the diet of lionfish" (Morris, 2009, 46). This information illustrates that the lionfish is indiscriminate and having a negative impact on popular reef fish with the potential to impact tourism as well as commercial fishing.

While indiscriminate feeders, the predation of lionfish is having an acute impact on herbivorous fish such as the parrotfish, *Sparisoma viride* (Lesser & Slattery, 2011), who in turn feeds upon the 'leafy' or 'macroalgae' that grows on the coral reef heads, blocking the light source for the 'microalgae' that feeds the coral (Shepperd, 2009). The impact of the trophic cascade of this interaction is associated with the lionfish (*Pterois volitans*) invasion on a Bahamian coral reef. The study "in the Bahamas, a phase shift to an algal dominated (>50% benthic cover) community occurred simultaneously with the loss of herbivores and caused a decline in corals and sponges" (Lesser & Slattery, 2011, 1855). The reduced abundance of herbivorous fish, namely the parrotfish, "released the alga *Lobophora variegata* from grazing pressure, whether by direct lionfish predation or displacement" (Lesser & Slattery, 2011, 1865). It is clear that the lionfish invasion is having a direct effect given the time of introduction and impacts. For example, the study in the Bahamas showed that "the percent of algal cover at 46 m was 27% in 2003, 31% in 2005 and 92% in 2009...the percentage of coral cover at 46 m was 16% in 2003, 19% in 2005 and 2% in 2009" (Lesser & Slattery, 2011, 1859). Albins & Hixon further support the evidence this shift by explaining that the lionfish is a naturally released mesopredator because nothing will prey on it, which gives it free reign to

reduce the abundance of herbivores by preying upon the juveniles (Albins & Hixon, 2011, 4). This clearly indicates that lionfish predation is impacting algal cover that impacts coral cover, resulting in an overall degradation of the reef, which is simultaneously threatened by hurricane damage, coral bleaching, eutrophication and other stresses.

Not only is the lionfish impacting fish through predation, but is also displacing species with whom it is competing for food and space. This is demonstrated in the study of a reef in the Bahamas by Lesser & Slattery that report that, “an average of 11 Nassau Grouper and 6 Hinds were found on transects between 2003 and 2006. In 2009 they were absent [but] 19 lionfish were recorded on those transects” (Lesser & Slattery, 2011, 1861). This competition is also discussed by Arias-Gonzales et al.,. Their study used a Ecopath with Ecosim model to simulate the effect of the invasion on the Alacranes reef in the Yucatan Peninsula. The model illustrated that the predation of lionfish produced a direct negative impact on small carnivorous and omnivorous fish, inter mediate carnivorous and herbivorous fish, octopuses, lobster, crabs and shrimps. It also showed that the populations of shark, rays, jacks, and grouper were reduced because of competition with the lionfish for prey (Arias-Gonzales, 2011, 921).

Control and Mitigation:

There is consensus among the scientific and conservation community that the lionfish is here to stay and that eradication methods would be futile, but management and reduction of numbers is recommended (Torres, 2012). An area worthy of further exploration lionfish is any recent information about its ecological niche within its natural habitat, as it is often cited that because the lionfish arrived without any diseases or predators is a contributing factor to its success and rapid spread (Morris, 2012). Searching for articles on natural predators and the ecological niche of the lionfish in the Indo-pacific region (aside from the more recent comparative study by Green et al.), resulted in one article from 1991 that reports on a study dive where one cornetfish, *Fistularia commersonii* was found to have ingested a lionfish and that it was oriented in its stomach to indicate that it was ingested tail first. This is important as it indicates that the orientation of the spines is a clear deterrent to predation in the natural habitat of the lionfish (Bernadsky & Goulet, 1991, 230). While this data is helpful, one study does not provide nearly enough information. A clearer understanding of specifically what keeps the lionfish in check in the Indo-

Pacific would be beneficial for researchers and conservationists so as to inform potential strategies to reduce the numbers and thus negative impacts on Caribbean coral reefs. Perhaps it is not predation at all, but another ecological factor such as fecundity, larval duration, or temperature that controls the numbers and outlines the ecological niche in the Indo-Pacific.

Finally, there are anecdotal and preliminary data that suggest that there is the potential for certain fish or other species to prey upon the lionfish and that they will not necessarily be mortally wounded if they ingest the fish with spines. For example, “a recent observation in the Bahamas has documented juvenile lionfish in the stomachs of a tiger grouper, *Mycteroperca tigris*, and two Nassau grouper, *Epinephelus striatus*” (Maljković et al. 2008). A study done by Mumby et al., looked at feeding preference of grouper in a lab setting and stated that grouper, even under near starvation situations would not prey upon the lionfish, (Mumby et al., 2011). This study was indicative of one species, but there could be so many factors that contribute to this in a lab, and only accounts for one family of fish. Furthermore, many divers have successfully fed dead lionfish to a variety of predators in hopes that they will learn to hunt the lionfish (Torres, 2012). While there have been numerous attempts for managers to try to ‘train’ predators to feed on the lionfish, fish feeding of lionfish is actively discouraged by the management community because of the associated issues including potential risks to divers, including bites from barracudas and harassment from other predatory fish. Also the risks to the predatory fish, such as envenomation of the spines bringing them to areas that could make them targets for spear fishers (Gourdin, 2013).

Control and mitigation strategies rely on volunteer divers to hunt and cull, often through dive shops and regional conservation organisations such as Reef Check, or Reef Conservation International. Many of these organisations are developing strategies to encourage consumption of the lionfish as a ‘do-good’ dish that can essentially never be overfished. These conservation strategies are supported by the literature, and the scientific studies that are being done in many cases become part of the management strategy- for example the PhD dissertation by Stephanie Green, who- among other researchers has studied the impact of removal efforts (Green, forthcoming in Morris, 2012). Another example is a study by J.A Morris et al., which looked at what the control rate would have to be for it to be effective in mitigating the impacts on herbivorous fish. The study “utilized a stage-based matrix lionfish population model and

indicated that decreasing lionfish abundance would require monthly removals of 27% of the adult lionfish population (Morris et al., 2011, 8). The study also reported that this required adult exploitation rate could be significantly reduced if juveniles were removed from the population (Morris et al., 2011, 8). This suggests that there is hope to mitigate the effects and that fishing, even 'overfishing' is a viable way to engage fishers and many other groups and individuals in coral reef conservation. This calls managers to address ways in which to engage groups to participate in conservation. The location and access to coral reef ecosystems is also an important factor in reef conservation. James Morris identifies the potential importance of marine national parks in addressing the problem:

Protected areas, such as national and state parks, are robust resources for early detection and should be viewed as sentinel locations. These areas typically have ongoing volunteer based monitoring programs, locally trained staff or volunteers capable of detecting non-native species, and legislative mandates ensuring protection of the resource, require managers of protected areas to work towards maintaining the biotic integrity of the resources they manage (Morris 2009, 160).

The structure and organisation of a park certainly has a benefit as a way to manage a reef, yet the common policy of a marine park is that it is a no-take zone, which provides an interesting challenge for the park, because changing the law puts the rest of the species at risk. Furthermore, the only way to hunt a lionfish - because they will not go for a baited hook - is to hunt with a spear, which is a practice that is banned in most areas, especially when diving, not to mention in parks. This leaves park managers in a difficult place to either break the rules, or move to change the policy (Torres, 2012). Thus, while parks offer much in terms of organisation and support, the policies associated with parks could be seen as a barrier.

"Governments have often declared MPAs, but there is little follow-up action to manage the MPAs and enforce the regulations, principally because they lack the capacity and financial and logistical resources for the task" (Wilkinson, 2006, 25). Indeed, many places lack the political will to conserve or monitor natural spaces. What is not considered or communicated in the ecological and conservation literature is how local communities will be impacted by the creation and management of protected areas. This idea is laid out in the article by Donald McLeod who states that "protected areas will not survive long if local residents remain in poverty or are denied access to the resources inside" (McLeod, 2001, 224). He cites an example of how the transition of coastal areas of the Galapagos Islands to tourism with the notion that the former fishing and agriculture were ecologically damaging. They did not consider the ecological impact of

tourism, and did not benefit the local community at all, but the tour companies who were often from privileged communities from mainland Ecuador (McLeod, 2001, 224). He suggests that conservation initiatives need to provide real and sustainable alternatives to people who depend on those resources and not simply mark the resources for others. He also suggests including the communities in the conservation process, from start to finish especially in decision making so as to ensure their participation and stewardship. This work will build on these critiques through telling the story of the Conservation as Development Project of transitioning fishers into workers for the tourist industry in La Caleta MNP. This section has shown how the scientific literature works to support the management strategies, often using terminology such as efficiency and threat to further support those actions.

THE LIONFISH MANAGEMENT GUIDE

Invasive Lionfish: Guide to Control and Management edited by James A. Morris is the document (available since May 2013 in Spanish) that “provides best practices for lionfish control and management, including control strategies, outreach and education, research, monitoring, legal considerations, and ideas for securing resources and partnerships” (ICRI, 2013). It was created through the contributions of a number of researchers who work out of the research sites at the CEI in the Bahamas, including James A. Morris Jr, Lad Akins from REEF, Stephanie Green, and the Albins & Hixon group. Contributors also include RCDR and other regionally based NGOs. The document was funded and supported by National Oceanographic and Atmospheric Administration (NOAA), Reef Environmental Educational Foundation (REEF), International Coral Reef Initiative (ICRI), Caribbean Environment Program (CEP), United Nations Environment Program (UNEP), Special Protected Areas and Wildlife –Regional Activity Center (SPAW-RAC), and the Gulf and Caribbean Fisheries Institute (GCFI). The guide is comprised of seven chapters; 1- The Lionfish Invasion: Past Present and Future; 2 – Lionfish Research: Current Findings and Remaining Questions; 3 – Education and Outreach: Building Support and Expertise; 4- Control Strategies: Tools and Techniques for Local Control; 5- Monitoring: An Essential Action; 6 – Legal and Regulatory Considerations for Lionfish Management and 7 – Resources, Partnerships and Sustainable Funding. This work will focus primarily on Chapters 3, and 4 to highlight the assumptions and problems associated with the recommendations outlined in the guide.

The guide addresses the history, natural history and ecological impacts of the lionfish arrival, as well as discusses the perceived and potential socio-economic impacts. It states that many invasive species at the peak of their invasion can exceed the carrying capacity of the system, but then they reach equilibrium through competition for food and space with themselves or other species, or through parasitism, disease or abiotic factors such as temperature (Morris, 2012, 5). The lionfish appears to be following this pattern – the earliest sighting of a lionfish in the Atlantic was 1985, and up until 2000 densities increased rapidly, and now some locations have reported a decrease in individuals – but it is unclear if removal is responsible for this decline (Green et al. 2012 in Morris 2012, 5). The socio-economic impacts are described as unquantified but potentially severe, especially with the synergies of overfishing, pollution, and climate change (11). The predation on native fish and commercially important species, could be harmful to local economies as well as conservation based initiatives. Further, the guide states that the abundance of lionfish could pose a risk of envenomation to divers and thus impact the tourism industry by deterring diving in areas abundant with lionfish (11). I point out that the following questions listed as research priorities need to be addressed prior to the promotion of the lionfish fishery: *What are the costs and benefits of fishing lionfish in the Atlantic: At what scale is lionfish fishing currently occurring? Is fishing lionfish a viable option for population control? What are the socioeconomic effects of promoting lionfish fisheries?* This is notable because these are further research questions; however the research guide is already promoting the creation of a fishery in the Caribbean. Also notable is how easily managers dismiss the risk associated with lionfish envenomation in terms of fishing, but highlight it when it comes to tourist diving. In the chapter on monitoring by Stephanie Green, she outlines two main ways that the lionfish could affect tourism: 1 – that the change to the structure and function of the ecosystem will be less appealing to tourists and 2- the risk of envenomation will deter tourists. There is no mention here about the potential benefit that the lionfish will bring to the tourist industry, which is an aspect that became apparent when I took my first dive in Belize, wanting to learn more at the CEI and interviewing American divers in La Caleta and several dive shops in Boca Chica.

Chapter 3: Education and Outreach: Building Support and Expertise by Lad Akins is an overview of how to create and implement an effective strategy to gain public support for lionfish control. He begins

stating that the earlier the better, and if possible begin disseminating information prior to the arrival of the fish in the waters, as was done with notable success in Bonaire and the Florida Keys where posters, stickers and public service announcements were completed prior to the first sighting. Akins outlines some examples of outreach goals for minimising lionfish impacts as reducing populations to reduce ecological impact and risk to humans, increase political support for management and control and prevent future introductions of non-native species (16). I argue that this management guide only addresses the first goals, but the last – preventing other introductions is almost non-existent. The key lionfish messages recommended for education and outreach programs are:

- Lionfish are an invasive species and are detrimental to native ecosystems;
- Aquarium releases are the source of the invasion;
- Eggs and larvae are transported via ocean currents;
- Invasion progresses rapidly;
- Impacts may be severe;
- Natural predation is not controlling;
- Community involvement is necessary;
- Venom does not equal poison;
- Eradication is not likely;
- Lionfish are edible;
- We can make a difference – local control can be effective
(Morris, 2012, 19).

Here, special attention will be paid to the choice of words and the repetition of key phrases in this work, which illustrate a common use of the idea of a threat to ecosystems and livelihoods as well the naturalisation of neoliberalism as a solution. Chapter 4 of the Management Guide titled *Control Strategies: Tools and Techniques for Local Control* states the following that highlights first the identification of the fish as a threat, the process of encouraging stakeholders to maximise efficiency and to prioritise areas based on ease of management and surveillance (MPAs) and based upon economic value of the area. It states:

The source of the lionfish invasion will never be completely understood, but the fact that lionfish are threatening a vast portion of the tropical and subtropical western Atlantic is clearly evident. The impacts of lionfish are likely to resonate through economies, human health, and tourism, and they will include both direct and indirect ecological components over the long term. The goal of any control program will focus on minimizing impacts and maximize efficiency of control efforts (Morris, 2012, 22).

Whether through developing new technologies, buying time for natural control to evolve, or reducing the severity of impacts, virtually all of the strategies described in this chapter focus on reducing the size of

lionfish populations and their corresponding impacts. Activities supporting that goal are numerous, but the approach is simple: increase awareness, enact effective removals, and maximise efficiency. While region-wide eradication and prevention are unlikely scenarios, the guide states that recent research and anecdotal information indicate local control efforts can be highly successful in managing lionfish densities and minimising impacts. Development and support of removal efforts not only reduce effects on native populations, they also buy time for development of new technologies and may allow for natural control mechanisms to evolve. It is important to remember that for every lionfish removed from the water, a reduction in predation on native species is realised. In already stressed marine systems, even a small level of decreased impact could result in significant long-term benefits (24).

Local removal efforts can reduce lionfish numbers, but resources generally limit the geographical scope of a management area. That's why it is important to identify and prioritise sites for removal. Key areas such as marine protected areas (MPAs), high visitation or tourism areas, spawning aggregation sites, vulnerable nursery sites, and/or other areas may be deemed high priority for removal efforts. Removal plans should consider these priority areas in relation to available resources (Akins, 26, 2012).

In order to illustrate how the control and management initiatives are embedded within markets and capitalism and promoted in the Management Guide and through local initiatives, I will quote the section on removal incentives at length. The following interviews will then interrogate the management through MPAs, and the commercialisation of the lionfish to illustrate the overall emphasis of capital accumulation to address this environmental issue, which does not address the root causes of the problem, and in turn benefits an elite group in terms of recognition for environmental stewardship. The following is an excerpt from Chapter 4 of the Management Guide:

REMOVAL INCENTIVES

The incentive for participating in lionfish removals varies among individuals, and often depends on whether their livelihoods or recreational interests are connected with the marine environment. Incentives can vary widely depending on the interest and motivation of the individual. (Even those who make their living in or on the water often need an incentive.) Some may want to remove the fish because they want to protect native marine life and ecosystems, some may want to remove fish for food, and some to protect their livelihood or for economic benefit. It is important to recognize which incentives motivate individuals to

remove lionfish and to foster those motivations.

Divers

The desire to protect marine resources is a key motivator for many recreational divers, tourists, and tour operators. Their livelihoods and recreation depend on healthy marine systems, and many understand that removing lionfish whenever possible will help to protect those resources.

Fishers

Many fishers rely on their catch to provide a substantial portion of the diet for their families. Eating their catch can also be a strong incentive for recreational fishers to fish. Promoting the removal and consumption of lionfish to these stakeholders can help provide incentive for their targeted removal. Many subsistence fishers are already considering lionfish as worthy of keeping and consuming when caught. Commercial fishers and divers, including spearfishers, spend their time capturing fish to make their living. Specific fish species are often targeted for their high dollar value and marketability. Developing consumer demand for lionfish can help elevate the dollar value of the fish in the market and provide incentive for commercial removals. Because of the significant effort required in removing lionfish and their small size as compared to some other commercially targeted species, prices paid will likely need to be higher to compensate for the time required in harvesting. Luckily, lionfish flesh is deemed high quality and has been shown to be better in omega fat content than many commonly consumed native species.

Bounty programs

Bounty programs have been attempted in a few locations and have been short, lived, with little promise for success. In addition to limited funds, bounty programs lack provisions for developing stewardship ethics and are typically for the short- term monetary benefit of a few. Once funding runs out, removal effort is often discontinued and the invasion continues to progress unabated. Additionally, as markets develop for lionfish, bounty programs position governments in direct competition with private enterprise, possibly hindering more than helping.

Long-term nature of the issue

In any incentive program, care should be taken not to create expectations of short- term eradication. The region will likely be facing the lionfish issue into the foreseeable future and hinting at eradication or short-term solutions will only develop resentment as the problem continues. Realistic expectations of local control and minimizing impacts through long-term incentive programs are key in developing and presenting incentive options.

Incentive Sources

Donations

Incentives do not always have to come in the form of money. In fact, many incentive programs work together with private enterprise to offer donated items or services of value to lionfish collectors. Monthly contests, dive-tank air for fish exchanges, and raffle drawings have all been used as ways to include donated

goods as incentive for removals.

Markets

Ongoing programs based on the commercial use of the lionfish may be the most sustainable model for incentives. Market-based payment for food fish is already in place for most coastal communities and simply developing the supply-and-demand chains can provide ongoing payments for fishers to target and remove lionfish. Markets for smaller fish to be used as aquarium fish encourage removals of juveniles and many other market-based uses (such as novelties and jewelry) are being explored. Managers may also consider the timeline of the invasion in determining when to begin introducing the concept and promotion of lionfish consumption. Recently invaded areas may even consider priming the market with pre-packaged lionfish imports as a method to enhance consumption prior to the availability of locally caught lionfish.

Subsidies

While bounties tend not to work very well, subsidies may. Providing help in the form of price control or subsidy, shipping costs for exports, or specific collecting tools, training, and equipment may encourage removals and increase market supply. Governments often subsidize agricultural products, and following proven examples of effective subsidy programs may be useful.

Recognition

Sometimes the only incentive required is a little recognition for efforts well undertaken. Recognition is especially important for volunteers, but should not be overlooked in working with other stakeholders or sectors of control programs. Recognizing participation in removal training events, removal efforts, and support is often as simple as issuing short media releases on a regular basis. Additional recognition through certificates, pins, hats, or shirts can go a long way in encouraging participation and continued removals. Never underestimate the effect of public recognition in encouraging participation.

Specific strategies and issues related to incentives for lionfish capture include:

Commercial incentives

- i) Identify novel uses and alternative products for lionfish (spines, jewelry, biomedical),
- ii) Evaluate market use of juveniles for the aquarium trade (pros and cons),
- iii) Educate the public about lionfish as a food resource,
- iv) Clarify negative perceptions about the dangers of lionfish,
- v) Develop links between supply and demand for lionfish,
- vi) Recognize potential risks of creating a market for lionfish (i.e., fishers interest to “grow and maintain” lionfish on the reef),
- vii) Highlight lionfish consumption as a “green alternative” to other fish species,
- viii) Ensure quality control of product (e.g., quality of meat or presence of toxins),
- ix) Recruit marketing experts,
- x) Be open to creative marketing, yet bring a balanced perspective to limit economic and cultural “acceptance” of an invasive species,
- xi) Consider government subsidies (e.g., those similar in agriculture, farm, export, etc.),
- xii) Establish a campaign in partnership with the aquarium industry,
- xiii) Consider marketing strategies for all sizes of fish,
- xiv) Create tax incentives or other government incentives (e.g., dive operator participation, fisher

licensing, etc.),

xv) Ensure that the invasive (negative) nature of lionfish in the Caribbean is highlighted in all marketing materials,

xvi) Link decline in lionfish to restoration of native fish populations,

xvii) Investigate market use of bycatch of lionfish.

Public incentives

i) Establish and support tournaments and derbies,

ii) Create adopt-a-reef programs for removal,

iii) Recognize efforts of volunteers and partners,

iv) Provide discounts for purchase of scuba equipment/air fills,

v) Purchase, in whole or in part, removal gear for volunteers (e.g., fishers),

vi) Promote individual food consumption (i.e., “catch your own dinner”),

vii) Include control strategies in management plans, business plans, and reports for groups seeking funding,

viii) Use bounties if/when appropriate,

ix) Provide direct government payments if/when appropriate,

x) Generate prizes and rewards for removal,

xi) Establish and maintain national records (e.g., biggest fish/most fish captured),

xii) Award academic credits to university students for community service,

xiii) Promote lionfish control as a “Green Initiative,” and

xiv) Address liability issues.

(Akins, 46-49, 2012).

The recommendations in the Lionfish Management Guide that direct the actions and activities in the conservation community are grounded in the scientific data that is available. What the rest of this work will show is how the recommendations in the guide are based on problematic notions of development, commodification of the lionfish and specific ideas around stewardship and conservation that can be seen as a ‘green grab’, or at the very least a green-wash, and that may not align with the goals of the community of La Caleta. I argue here that the environmental impact of the release of the lionfish, while having a significant impact on the fish abundance of the coral reef ecosystem, is having a beneficial economic impact on the operations of conservation organisations in terms of international recognition, fundraising and lucrative international stewardship opportunities. Furthermore it is providing legitimacy for the initiation and promotion of Conservation as Development projects and the creation, protection and monitoring of Marine National Parks. In fact the project in La Caleta is being recognised regionally for its success, and RCDR is a contributor to the management guide. Further, the commodification and marketing of the lionfish is perpetuating the elitism within conservation in the DR, as illustrated by the work of the Sea Savers at the Carol Morgan School. In other words, it appears as though capitalism and neoliberalism are

parallel invasive forces that are magnified through the arrival of the lionfish and the subsequent management activities.

CHAPTER 3: LA CALETA – AN OVERVIEW

LA CALETA

This chapter will provide a regional context of the community of La Caleta by recounting the socio-economic data collected by Reef Check and discussing the advent of the cooperative COOPRESCA. The historical background and community profile of La Caleta has been researched and written for the MNR&E to inform the various actors and uses of La Caleta and serve the La Caleta Park Management Plan as a technical and legal base to achieve acceptable management strategies and conservation of natural resources that exist in the protected area. It will be used to establish restrictions on behaviour and authorise and normalise activities that are allowed in specific sites within and surrounding the park. This thesis is including a summary of this study to first, frame the chronology of the advent of the Marine Park and demography of La Caleta as it is understood by the Dominican state. The methodology of the study was to interview and give a questionnaire to community and religious leaders, and another questionnaire for the uses in the protected area was distributed to visitors, fishers, sellers, divers, and artisans. This study provides a chronological account of the community of La Caleta and a profile of the economic activity.

The community of La Caleta in the province of Santo Domingo historically was located along the littoral wall that is currently La Caleta Marine National Park. La Caleta dates to the pre-Columbian era where an important indigenous settlement flourished under the rule of Indigenous leader Higüey. The process of contact between the Spanish colonizers led by Christopher Columbus and the Taino resulted in the genocide of the indigenous people after decades of slavery and appropriation of land (Rogozinski, 1998). In 1945, La Caleta was formed with acknowledgment of the state with 90 houses, distributed without a preconceived plan for urbanisation. With passing time, families from different areas began to join the existing community (Arias, 2012). In 1960, the population that had left to finish the construction of Las Americas Airport stayed in the location they were living during construction and left the old town of La Caleta almost abandoned. In 1972 the state discovered that there were Indigenous remains and artifacts in the area, and the community was relocated to the extreme North of the Las Americas highway to give space for the excavations that were completed in the year 1974 with the creation of the Archeological Park of La Caleta (Arias, 2012).

According to the Law No. 107-04 of February 24, 2004, La Caleta was elevated to a municipal district separate from the Municipality of Boca Chica drawn by an imaginary line from the eastern limit of the Mega Port, the western limit of Santo Domingo East (noted by the Free Zone de Las Americas, the northern limit as the Municipio de San Jose de Guerra, and to the south the Caribbean Sea (Arias, 2012). The 2002 census cited that the area of La Caleta, while during that time a district of Boca Chica with a population of 68,920 to have a population of 43,885 people. By 2010 that population had grown to 63,137 with an increase of 19,252 individuals while Boca Chica had only grown by 9,962 individuals. The urban to rural population is quite significant with urban registering as 24,698 people and rural as 38,439, which indicates that La Caleta has a tendency to urbanise (Arias, 2012). Of the 63,137 people that live in this area, more than 80% are immigrants from other provinces in the country and the capital city who come for the available land to construct their houses, and the majority are from a poor social class. Furthermore, the data that shows that the age breakdown of the population indicates that over 58% are over the age of 18, which highlights the occurrence of immigration to this area (Arias, 2012). These individuals work in the Free-Trade Zone, the airport, the mega-port, poultry and pork farms, a minority is dedicated to fishing, artisan work and the informal economy (Arias, 2012). The majority of the population represents the small and medium sized business owners such as the many rental car agencies that exist in the zone as well as the flourishing department stores other private capital supply stores. Other places of employment are 'La Ciudad Cibernetica' which houses in it the Technological Institute of Las Americas, and El Metro Country Club (Arias, 2012).

One of the principal attractions to La Caleta is the National Park. It was named a National Park through law number 67 on the 8th of November, 1974 and declared a Marine National Park by decree of the Executive Power the 30th of September 1986. In this same decree, the conditions that make the park perfect for water sports and diving were expressed. Such conditions include ideal depths, a bay protected by the reef, and the presence of submerged structures, which have turned into artificial reefs. After this, the decree was ratified by the General Law of the Environment and Natural Resources 64-00 on the 18th of August , 2000 and the Sectoral Law of Protected Areas 202-2004. The protected area of La Caleta is about 12 km², with a depth of 6 meters. The principal attraction to this protected area is the variety of submerged artificial

structures which are appealing to divers such as the “Hickory”, which was purposefully sunk in 1984 by the Grupo Investigacion Submarina with the objective to create an artificial reef to promote the proliferation of marine life. Also at the bottom there are two other ships for divers to explore, the ‘Capitan Alsina’ and ‘El Limon’. Divers can also visit an underwater trail of structures that explain the culture of the Taino in La Caleta, which was put in place after the park was declared an archeological site (Arias, 2012). Currently, studies are going on by several American Universities to analyse the Taino artifacts that have been found under the water in hopes to develop the underwater portion of the park into an archaeological site. The park has an irregular underwater topography with the well-defined terraces extending from 10 – 50 meters parallel to the coast line. The reef communities are in a state of recuperation and a great quantity of fish that use the diverse coral colonies as refuge and as a source of food (Torres, 2013).

REEF CHECK DR IN LA CALETA: AN OVERVIEW OF THE PROJECT

Reef Check began working in the Dominican Republic in 2004 as part of the monitoring for the Blue Flag program, which is a European based eco-certification that awards a ‘Blue Flag’ to businesses, hotels and marinas who adhere to ‘sustainable’ environmental guidelines and environmental education, for which Hotel Romana Bayahibe began to use Reef Check monitoring (Blue Flag, 2013). Ruben Torres then began to “make great use of his personal contacts” to put together a board of directors for a local DR chapter of Reef Check (RCDR), where promoting tourism- a major part of the Dominican economy- would act as a lever to promote marine conservation (Hodson, 2011, 3). In 2007, RCDR identified La Caleta MNP as a site where they could promote sustainable development and transition from fishing to tourism, and in 2010 RCDR signed a co-management accord with the MNR&E, (RCDR, 2011, 72). In 2008, with the financial support of the Inter-American Foundation, COOPRESCA, Cooperativa de Pescadores y Servicios Turisticos – a fishing cooperative was formed alongside the development of El Carey – a dive center to offer national and international tourists a place to rent equipment and guides for snorkeling, diving, kayaking. This center will in turn offer the fishers an alternative livelihood to resource extraction in the park – which is prohibited by law (RCDR, 2011, 72). The plan is to transfer the co-management agreement from Reef Check DR to COOPRESCA as of September 2013. As of March 2013, the cooperative had yet to be recognised by The Institute of Development and Cooperatives (IDCO) a part of

the Dominican government, thus RCDR has been working with the Dominican Development Bank, with the support of the Inter-American Foundation to secure a loan for COOPRESCA to turn into a private business, or a series of micro-businesses. To be eligible for loans from this development bank, each member of the cooperative, of which there are approximately forty (while many are not active members), must participate in a weekly workshop, for six weeks, to learn about how to manage the funds.

RCDR has participated and led many environmental education activities, primarily focused on the 're-education' of fishers to sustainable practices, they have been featured on local media including television, have been featured by National Geographic and Discovery Channel and have been the subject of an award-winning short film (RCDR, 2011, 72-80). This work will begin to show the tensions with the work of RCDR and how they emphasize community collaboration and development in conservation to their own benefit, over-emphasising the success of the project that is bringing the community little return for their losses on restricted fishing.

VARIOUS LIONFISH EDUCATION ACTIVITIES IN THE DOMINICAN REPUBLIC

During my field work I was able to attend a number of activities that occurred around the lionfish, COOPRESCA and the management of La Caleta MNP. Also noteworthy are the lionfish festivals and competitions organized by the Sea Savers at the Carol Morgan School. While not an exhaustive list of events, I will briefly describe them here to outline how the ideas of the management guide are being employed in this area. Further, these activities begin to illustrate how power operates in conservation and how this issue specifically draws together an elite network of individuals.

1) Gastronomy Festival

During my time in San Cristobal in March 2012, I had the opportunity to meet with various members of the Reef Check and La Caleta staff and community partners in order to begin to refine my area of interest, research question and inquire if they would be willing to have me researching the project within their organization and their response to the lionfish invasion. I was welcomed and invited to an lionfish activity on March 18, 2012 that brought together the culinary school of La Universidad Iberoamericana (UNIBE) - a private university, RCDR, La Caleta staff, Las Barracudas - a volunteer group of lionfish hunters, The Carol Morgan School - a private high school from Santo Domingo, and members of the fishing

cooperative COOPRESCA, chefs featured on Channel 11 cooking channel and the media. The activity was a Gastronomy Festival to discuss the ecological implications of the lionfish invasion, and then have an exhibition of a variety of new and inventive ways to prepare lionfish to market it to hotels and restaurants, and to encourage volunteer divers to participate in culling and population control. The dishes prepared at this festival were Thai curry, tamarind chutney with olives, ceviche, a soup and a grilled lionfish with peppers. These dishes are not traditional Dominican fare, and are targeting specifically to high end restaurants and tourist markets.

2) Workshop with Fishermen

According to the Lionfish Management Guide, the diving industry and fishers are the main groups targeted for intervention. RCDR, with the assistance of the United States Peace Corps has held four workshops with fishers in various communities including La Caleta, Monte Cristi, Bayahibe and Ocoa to educate them regarding the lionfish. I was invited to attend the Monte Cristi workshop. The curriculum of the workshop followed the Management Guide, and covered a history of the invasion, the natural history of the lionfish, ecological impacts, and how to safely hunt and remove the spines. There was then a demonstration of how to filet the lionfish and then it was fried and served to the group.

3) Code of Conduct Meeting for La Caleta Marine National Park

The meeting at the Quality Hotel regarding the Code of Conduct for the Marine National Park was held on February 13, 2013. Presentations were made by Ruben Torres of RCDR, El Servicio Nacional por Proteccion Ambiental (SENPA) the department of the military in charge of enforcing environmental laws, and a park manager from Bonaire. Each spoke about the specific regulations for the park as a no-take zone, laws prohibiting spearfishing, and how La Caleta was looking at the case of Bonaire to use park fees to fund conservation initiatives. After the meeting at the Quality Hotel, Ruben organised individual stakeholder meetings to speak and ensure clarity and agreement on the code of conduct for the park. Individual meetings were held for the Boat Captains, El Carey Staff, Fishers, Vendors (of shells and sea stars) where dive regulations and boundaries were described and questions were asked and comments heard. What is notable here is first that the idea of ‘apparent consensus’ is gained in the process of holding these meetings, and any contestation and resistance to the process – of which I witnessed on several occasions, are silenced.

For example the vendors, referring to the individuals who have stands selling conch shells, coral and sea stars to tourist traffic did not show up to their meeting at El Carey. In each of the meetings with the Boat Captains, Staff and Fishers, Ruben posed the question, “In the last four years – have any of you gotten rich from this project?” And in each of the meetings at least one person present posed that question back to him.

5) Lionfish Festivals

On September 27th, 2012 and April 13, 2013 the Sea Savers of the Carol Morgan School organised the event called the ‘lionfish fair’, where teams of divers sign up for a competition to harvest the most, the biggest and the smallest lionfish from the park. The derby or competitions began at 8am, and the food festival began at 11 am. The afternoons were dedicated to presenting the awards for the divers, each of the first place winners are fishers and staff of El Carey, frying and serving lionfish, and music. While I was not able to be there for these events, my interview with the Sea Savers discussed them in detail, including the planning process, sponsors, and attendees.

6) Dominican Development Group (DDG) Workshops

Because COOPRESCA has been unable to become recognized as an official cooperative with the state, RCDR has encouraged the members to individually seek out financing and funding for development projects and micro-enterprise within the area of La Caleta. In order to qualify for a loan with the DDG, people are required to attend a series of six-workshops. I was able to attend three of these meetings where topics such as financial management, planning, budgeting, and responsibility were discussed through the facilitation of an employee of the DDG. Approximately 20 coop members attended each of the sessions.

This chapter has provided background information on the community of La Caleta to help situate and explain the context of following interviews and give the story of how RCDR has come to work in the park, begin to explain the operations of power and elitism particularly in the context of lionfish management. The following two chapters will build on the theoretical frameworks necessary to analyse and situate the interviews in Chapter 6.

CHAPTER 4: FRAMING THE CRITIQUE

THE PROJECT AS NATION BUILDING

Nation building through the creation and management of national parks is vibrant within the conservation movement and has had a major influence on the national practice and identity of environmental consciousness in the DR, particularly when it is juxtaposed against the ‘ecological basket case’ of neighbouring Haiti (Matibag, 2003). Sundberg & Kaserman’s work employs a discourse analysis in order to describe how nature and threats to nature are related to immigration and the nation. They state that, “protected areas have been important sites through which the state narrates the nation” (Sundberg & Kaserman, 2007, 730). Protected areas have come to be framed as the nation’s heritage, meaning ‘something transmitted by or acquired from a predecessor’ or something ‘possessed as a result of one’s natural situation or birth’ (731). In addition to playing a key role in producing an imagined community, spaces that are designated as national work to “mediate people’s experience of the abstract idea of national territory” (Cerwonka 2004 in Sundberg & Kaserman, 2007, 731).

As previously mentioned, the DR has an international reputation of environmental consciousness, although the ‘success’ in conservation is attributed to the “network of elites within the conservation circles and capitalism’s place within this” (Holmes, 2011, 625), where the conservation elite is a scaled down version of the transnational network, although they employ the same methods to ensure their success (626). Holmes describes elitism in conservation as a series of social networks of people who have disproportionate influence in society (626). Large NGOs such as the Nature Conservancy, The World Wildlife Fund, and Conservation International are critiqued for their elite connections (via shared board membership with large corporations, or receiving funding from the World Bank or USAID) (628). Furthermore, global conservation organisations are supported by groups of scientists and professionals whose research is taken up by media to portray conservation as morally upright and unchallengeable as the best way to protect biodiversity (West, Igoe & Brockington, 2006). In prioritising protected areas management, there is a failure to critique neoliberal capitalism and there is a tendency to allow corporate green-washing (Holmes, 2011, 630).

What is interesting about the case of the DR in terms of conservation is that large NGOs have not

been given permission to operate in the DR, but have either taken up similar project through the state, which has a very significant history, or have allowed the creation of local chapters, as is the case with RCDR (Holmes, 2011, 631). Conservation in the DR has been linked to elites in government since the 1920s when the occupying US military protected the watersheds that fed the sugar and tobacco producing areas, which were later appropriated by the Trujillo dictatorship to secure the land and the lumber – to which he and his family owned a monopoly (631). In 1967, Joaquin Balaguer’s government, characterised by arming military elites to keep him in power, banned tree removal and made all trees the property of the state, which had a serious impact on people’s connections with the land as this law was heavily policed (631). This policing was present yet again in 1986 when Balaguer enacted a ‘high profile para-military crackdown’ called Operation Selva Negra (Black Forest) on charcoal burners and shifting cultivators (631). By the end of his rule in 1996, Balaguer had created 32 new protected areas, including La Caleta MNP, where some (favoured elites) were compensated for the land reforms, and some were not (632). While there are many theories that speculate the motivations of Balaguer to protect national natural areas in the DR, such as international pressure, the demand of tourism for ecologically related activities, or a deep concern for the natural environment, there is also a strong element of anti-Haitianismo that is reflected in the actions of working to create and enforce management of protected areas. “Balaguer’s strong anti-Haitian views strongly influenced his politics, and the idea of protecting the environment...provides a stark contrast to Haiti’s deforestation and erosion” (632). This notion falls in line with the fact that ‘anti-Haitianismo’ is prevalent in Dominican society and is “manifested largely in othering Haitians as African, black, poor and uncivilized in contrast to a European, white(r), developed, civilized people” (633). This recent historic context of how anti-Haitianismo permeated into national policy and was transferred through the national psyche via the rhetoric of environmental protection demonstrates the potential for such a practice today. As the Comaroffs explain through a discussion of plant biology and management in South Africa, disaster or crisis around invasive species highlights “conditions of being” in postcolonial nation-states (Cormoroff & Cormoroff 2001, 629 in Moore, 2012). This example is particularly relevant to the discussion of the lionfish in the DR as it emphasizes the urgency to which “natural images frame urgent issues of being-and-identity, especially being-and-identity of the ‘new’ nation state” (Cormoroff and

Cormoroff, 2001, 235). As a nation state emerging from a violent colonial past, the DR is eager to demonstrate that it is a competent and sovereign nation. Furthermore, because the history and geography of the DR is so closely tied to that of Haiti, which is perceived so negatively- socially, politically and ecologically by the international community, the state has that much more impetus to create its own identity, which it does by distancing itself from the Western third of the island in every way possible and perpetuating 'anti-Haitianismo', particularly in discussing invasive species in a national park, which relies heavily on using insider and outsider language to gain momentum.

The following description of the formation of La Caleta MNP as recounted by Ruben Torres for the World Resources Institute (WRI) sets the stage for the analysis of the problematic formation of national parks under the rule of Joaquin Balaguer:

The Dominican government created the park in 1986 to protect the reef and promote tourism, but in doing so displaced a medium-sized coastal town. The relocated town of La Caleta, separated from the park by a massive highway, had a population of more than 60,000, but less than 100 people were associated with park resources, fishing, or SCUBA diving. The social and economic implications of this displacement led to weak regard for park laws and fishing regulations. Rising demand for seafood from nearby hotels and restaurants had also contributed to overfishing on the reef, and pollution from the surrounding urban area and damage from anchors had caused further damage (Torres, 2011).

Torres, who currently co-manages La Caleta with RCDR, is careful to include other causes of overfishing on the reef and degradation caused by urban pollution. This introduction to the report of the WRI, which is applauding the successes of RCDR's 2007 program of integrating the community of La Caleta into the practice of conservation, is evidence that the 'traditional' use of the national park is what is considered to be problematic and what is expected to change. The community of La Caleta is invited to participate in the management of the park via regulated activities managed by the park or RCDR, but have been displaced and policies have criminalised traditional coastal activities. The removal of the community of La Caleta from the Marine Protected Area is reminiscent of the forced removal of native peoples in the mid-19th century in the United States on the grounds that they did not know how to appreciate wilderness (Olwig in Sundberg & Kaserman, 2007, 733). The underlying discourse for such removal is described as follows:

Viewed in this way protected areas celebrate nature and national identity by erasing the (continuing) violence originating in acts of imperial dispossession and exclusion...in this way they reproduce cultural hegemony in telling the nation's history. By embodying the nation through nature and by repeatedly rationalizing the need to protect nature in terms of saving the nations

natural heritage, contemporary visual and textual representations continue to naturalize an exclusionary vision of the nation and its heritage as white (Sundberg & Kaserman, 2007, 733).

This discussion highlights two important considerations in analysing the response to the lionfish in La Caleta; the removal and restriction of the community surrounding the national park, and the encouragement and invitation of the elite and international tourists. This response is encouraged by the perception of a looming and impending ecological crisis, which threatens not only the ecosystem, but the national heritage of the park and the healthy reef, which is part of the imagined natural community of Dominicans, and certainly the image of what is sold to tourists (Sundberg & Kaserman, 2007, 732). Furthermore, this phenomenon is framed in a way that gives priority access to the socially and economically elite, who in the DR are predominantly white, which has been and continues to be perpetuated in the process of nation building by the Dominican nation-state.

INVASIVE SPECIES: WHAT'S IN A NAME

According to Helmreich, nature and culture have been “put into flux by the very idea of alien species” with the designation of invasive as the social judgment of harm (Helmreich 2009 in Moore, 2012). Thus, it must be understood that the connection that is made between invasive and harmful is one that is a perceived moral issue that transcends the role of science, which is to elucidate the causes and consequences of changes in biodiversity (Brown & Sax, 2004, 535). To protect the coral reef as it was prior to the invasion, or even take action to restore the reef to the state before the lionfish implies a bias towards an unchanging nature that “retains an ambivalence toward the nature-society dichotomy that permits a longing for lost community purity that guides nativism aimed at both humans and non-humans alike” (O'Brien, 2006, 65). Here I argue that the prevalence of insider/outsider language in the historical context of the DR – particularly in relation to its neighbour Haiti- carries the image of the lionfish to another level. The argument that I am making follows the reasoning in the literature that first, the creation of the category invasive species sets up a framework to understand ecology as having a moral standing, a right and a wrong nature (Sawyer and Agrawal, 2000), with value laden ideas of which species belong, and which do not – which has spatial and temporal considerations (Coates, 2008). The way in which the insider-outsider, anti-immigrant, xenophobic attitudes is targeted not to outsiders in general, but specifically to Haitian migrants.

This is further reinforced by the fact that tourists are welcomed outsiders even to experience nature through labour or leisure (Coates, 2006, 3).

The lionfish management program is nested within a larger program (regionally in the Caribbean specifically for the lionfish), but as a part of invasive species management generally in the area of National Park Management administered through the MNR&E. The national strategy deployed by the state is particularly important when considering the historical and cultural context of the DR as a post-colonial state, as is the discourses deployed to educate and communicate about the impact of invasive species. As Comaroff and Comaroff (2001) explain in *Naturing the Nation: Aliens, Apocalypse, and the Postcolonial State*, alien species transform, represent, and diffuse political terrors as natural facts. They state that “anxiety over foreign species gestures toward a submerged landscape of civic terror and moral alarm” and that the “anxious public discourse over invasive species speaks to an existential problem presently making itself felt at the heart of nation states everywhere” (Comaroff and Comaroff, 2001, 236). The post-colony in a global neoliberal era becomes significant to this discussion in that effort or obsessions over the alien other “reach diverse realms of collective-being-in-the-world in the struggle to arrive at meaningful terms with which to construct a sense of belonging” (237). This is where the identity of the Dominican Republic, particularly through actions of establishing protected areas based on the romantic ideals of President Balaguer, connects deeply to this idea of creating a national sense of belonging. To not belong and to not comply with these ideals then is to pose a threat to the nation, which is the discourse used to describe invasive species. It is crucial to note here that this discourse has been deployed throughout the history of the DR to describe the threat of the Haitian ‘other’ and distinguish itself from the nation and nation-state of Haiti largely based on its environmental consciousness and commitment to biological conservation via protected areas and national parks. The prioritisation of the lionfish as a national issue of concern for the state is explained by the Comaroffs when they say that “politics are the pursuit of pure advantage or to struggles over special interests or issues: the environment [etc]. In the circumstances, there is a strong tendency for urgent questions of the moment, often sparked by ecological catastrophe and justified by technical imperatives of nature, to become the stuff of collective action, cutting across older, ever more anachronistic lines of ideological and social commitment” (Comaroff and Comaroff, 2001, 242). I argue

that these ideologies include the persistence of anti-Haitianismo, which has been a critical part of nation building and national discourse throughout the process of the decolonisation of Hispaniola. As Torres-Saillant (2012) points out, the advent and perpetuation of anti-Haitianismo in the Dominican is connected to the geopolitical context of the dominant capitalist economic order in the Caribbean, which emphasized the Western condemnation of the insurrection of Africans - referring to the Haitian Revolution from which emerged the Republic of Haiti in 1804. He also points to the blatant national discourse of the dictatorships of General Rafael Trujillo (1930-1960), orchestrated by the following dictator Joaquin Balaguer (1960 – 1996) as being black phobic, as “the Dominican ruling class had few options to avoid economic isolation and the government had to build a nationalist anti-Haitian discourse in order to open the doors, however precariously, to the Christian West capitalist grounds” (Torres-Saillant, 2012, 15).

It is obvious to me that the elite discourse used to describe the threat of the lionfish to native ecosystems is reminiscent of anti-Haitian sentiment used by the political elite in various points in the history of Hispaniola. While I do not mean to suggest that the lionfish in the DR has necessarily come to represent a racialised immigrant in the country, I do argue that the language based on insider/outsider and native/invasive dualisms and threats to the nation are particularly relevant and powerful in this place given the historical context. Also there is potential that such discourse can activate a particular sentiment in the memory of the elite of the population, however my study did not set out to verify this point. It also can begin to inform how and why the more powerful and elite in the country have been shown to use the discourse of national threat while less powerful individuals do not. While there may not be a purposeful connection, the reliance on such tropes to communicate the threat of the lionfish and other novel species, as well as encourage citizen level stewardship and surveillance are similar to and reminiscent of anti-Haitian sentiment that persists today, where “Dominicans *believe* that they are utterly different from and incompatible with their neighbours from across the island” (Martinez, 2003, 82). In making reference to the dualistic discourse used in the historical context as well as the current ecological context, I find hope in Samuel Martinez’ main points in his extensive work on Dominican-Haitian relations that while indeed there are deep injustices present and many examples of racism, the differences are not a fatal conflict, but ‘elite produced anti-Haitian propaganda’ (Martinez, 2003, 95). He also contends that there are many examples of

positive Dominican- Haitian relations and cultural and historical overlap, including cultural integration and acceptance, intermarriage and political support for candidates of Haitian background (Martinez, 1995, 1999 and 2003).

An extreme but vivid example of how national discourse of insider/outsider language and military discourse, which included an 'imperative to act' is the massacre of 1937, commonly referred to as 'El Corte', where over 30,000 Haitian people were killed in five days on the order of General Rafael Trujillo. I do not mean to trivialize this horrific time by suggesting that the cull of lionfish mirrors this event, but I do argue that the power of discourse and insider/outsider language is important particularly in this historical setting and for the DR as a post-colonial state. Thus the description of a national threat and invasion, even in the culturally and racially 'benign' realm of coral reef ecology has a very real connotation and memory in the DR that is arguably activated more decisively by the elite and powerful. Descriptions of the Haitian threat used to justify the massacre, before and after the event include "Haitian migration is a "pacific invasion" that was endangering the Dominican nation. This "invasion" was supposedly "Haitianizing" and "Africanizing" the Dominican frontier, rendering popular Dominican culture more savage and backward, and injecting new and undesirable African mixtures into the Dominican social composition" (Krohn-Hansen, 1997, 53). The way that the threat of Haitian presence in the Dominican is framed in these quotes is strikingly similar to the discourse of the threat of the pacific lionfish to the ecological composition of the native fish in the coral reef ecosystem. Further, Trujillo is cited encouraging citizens to participate in the eradication of Haitian immigrants by stating in a speech, "You are independent, and yours is the responsibility for carrying out justice. Traditions show as a fatal fact, that under the protection of rivers, the enemies of peace, who are also enemies of work and prosperity, found an ambush in which they might do their work, keeping the nation in fear and menacing stability"(Trujillo in Turits, 2002, 597).

These are but a few examples of anti-Haitian xenophobic statements and rhetoric employed to justify the violent actions of the state. Again, this work is not equating the culling of lionfish to the genocide of Haitian people within and surrounding the border, but suggesting that this historical event and subsequent xenophobic attitudes, deportations and policies have the real potential to be activated in the national psyche, particularly the elite, that has been exposed to such deep insider/outsider discourse under

the guise of national protection of 'natural' heritage, which calls the invasive species program within the National Botanical Garden into this conversation.

The Botanical Garden is a protected area within the capital city of Santo Domingo which not only serves as a park, but a restoration site including a lab and education center focused primarily on restoring and educating Dominicans and tourists about native flora and fauna. In addition to the education center which hosts tours within the park and sends representatives to other parks to do workshops and educational eco-tours, the Botanical Garden is home to a national archive of government documents around the formation, regulation and management of national parks (Reyes, 2013). Of particular interest to this study, the Botanical Garden has an archive of Ministry regulated Invasive Species Programs in the country which highlight the discourse used to understand and more importantly communicate the impacts of invasive species and incentivise action and stewardship from the public. In 2009, following the programs directed by USAID, The Nature Conservancy, the Caribbean Invasive Species Working Group, the MNR&E and a program called Quisqueya Verde, a committee of Invasive Exotic Species was established. A three-year project was initiated with this committee, which is made up of national representatives from the Museum of Natural History, MNR&E, Dominican Customs, the Botanical Garden and La Hispaniola Ornithological Society as well as representatives from five Insular Caribbean Nations (Bahamas, DR, Jamaica, Saint Lucia and Trinidad and Tobago), to come together every 18 months to share information, best practices and collaborate efforts to mitigate the impacts of invasive species.

In the daily newspaper, El Dia on March 18, 2011, the meeting in the DR of this committee was publicized. The language used to describe the impact of invasive species and encourage financial contributions and environmental stewardship through volunteering time and resources for removal strategies supports the ideas presented in this work. It states:

Everyone knows what a cancer is. A grave disease caused by cells that are multiplying out of control until it kills the entire organism. The environment also has its uncontrollable cells. They are called invasive exotic species and they are threatening the entire country! (El Dia, 2011).

The article goes on to cite the economic valuation of ecosystem services stating that biodiversity loss impacts air and clean water, fertile soils, and pollination that we all depend on and ends stating that "indifference is not neutral, that it is actually working against conservation", that there is an imperative to

act – to remove, eradicate, control and monitor. The use of the invasive species as a threat to national security by activating fear of cancer is precisely what I argue is a manifestation of deeply rooted fears of invasion, historically connected to anti-Haitianism and the population is called to act and surveil as they would in a military context. As previously discussed, but with particular emphasis here on conjuring tropes of national security and military intervention to address this fish – which is positioned as a threat to national security and a cancer on the nation, which makes the importance of language choices and discourse analysis a central theme in this work.

I support the ideas put forward by William O'Brien that "the language of nature is important", and that "we must be critical of perpetuating a discourse that guides the way in which we represent the immigrant other" (O'Brien, 2006, 75). While I see merit in the argument put forth by Jordan and Hettinger that views nativism as taking a positive stand and uses stewardship to engage people to stand up for the oppressed and threatened ecosystem, whose very existence is becoming at risk of extinction from the homogenisation accompanying globalisation threatening culture as well as diverse, endemic and vulnerable ecosystems (O'Brien, 2006, 72), I also recognize the real risk of activating insider/outsider sentiments in discussing which species belong and which do not. I see these connections as problematic because they so purposefully make connections between the natural and human world in such a prescribed way, which is the very issue at hand. Perhaps, as Barbour suggests, warning readers to be wary of xenophobic rhetoric is a way to approach these issues in discourse (in O'Brien, 2006, 72), but leaves the question of which nature is right and worthy of protection or even restoration and which is demonized and slated for removal unchecked. Thus, we need to find a way to identify environmental problems that honour all peoples, and question circumstances and situations that do not. The question of posing problems is part of John Livingston's contribution to the critique of the environmental movement. "Livingston feels that conservation initiatives continued to fail because they did not address the underlying causes of human exploitation, pollution and habitat destruction" (Rogers and Leduc, 2008/9, 23). Focusing on invasive species and park management, not only fails to recognise the underlying problems, but acts as a distraction and implies short term success which entices participation in the conservation process, particularly that of the 'Conservation as Development project'.

THE NGO AS EMPIRE BUILDING

The process of establishing a set of norms and codes of conduct regarding behavior within the national park and the transition of the economies of the fishers of La Caleta from fishing to eco-tourism is largely related to the global external influence of neoliberalism. Comaroff and Comaroff (2001) explain how neoliberalism pervades the realm of environmental politics when they state:

Neoliberal capitalism, in its triumphal, all-encompassing global phase that offers no alternative to laissez-faire; nothing else, not other ideology, no other political economic system- seems even plausible. The primary question left to public policy is how to succeed in the 'new' world order. Why? Because this new order hides its ideological scaffolding in the dictates of economic efficiency and capital growth, in the fetishism of the free market, in the exigencies of science and technology. Under its hegemony, the social is dissolved into the natural, the biological, the organic (Comaroff & Comaroff, 2001, 242).

This idea works to explain how the management strategies, including commercialising the lionfish, are naturalised and presented as the only option (no other options are even mentioned) as a direct connection to neoliberal development and capitalism. The specific activities that are part of the fundraising, capacity building and community outreach of RCDR as well as La Caleta MNP are driven towards national and international tourism, is too an elitist function as it rewards one type of interaction with the ecosystem (tourism) and vilifies another (resources extraction). For the small economies of the Caribbean, "tourism today is what sugar was during colonization; a monocrop controlled by foreigners and a few elites that service the structures of accumulation for global capitalism" (Cabezas, 2008, 21). The control of the tourist industry and the International NGO's presence illustrates this point. The management strategies associated with the lionfish show how the focus of conservation sensationalises the issue based on what Rogers and Leduc describe as 'alarm and grief' while moving towards an attitude that suggests a need to 'get-over-it and get-on-with-it- "a more optimistic approach to recovery that moves past the initial grief and loss and strategizes with the forces at hand to promote recovery" (Rogers and Leduc, 2008/9, 23). Here, the forces at hand are the localised functions of power that emphasise the need for a shift to 'sustainable' livelihoods, which is a re-articulation of capitalist accumulation of wealth and a development paradigm nested in notions of modernity and progress. Here RCDR plays a specific role as the 'saviors' of the ecosystem and the associated livelihoods in the battle against the lionfish, which is an actor itself that brings together a wide variety of elite individuals, groups and institutions. RCDR is embedded in a global and regional

network of organizations and policies that are guiding lion fish management in relation to coral reef conservation. The management guide was created as a result of the Regional Ad-Hoc Lionfish Committee “that emerged in 2010 during an assembly of the International Coral Reef Initiative to facilitate a coordinated response to the lionfish invasion in the Caribbean, generate a regional strategic plan to try to control it, care handling and follow-up actions” (Gourdin, 2013). The control of lionfish via the Ad-Hoc committee, which is co-chaired by Mexico, United States of America and Specially Protected Areas and Wildlife (SPAW) - Wider Caribbean Region is supported on Article 8 of the Convention on Biological Diversity, and article 12 of the SPAW protocol of the Cartagena Convention (Gourdin, 2013).

RCDR’s work that commodifies and commercialise the lionfish suggests that commodification, as produced by late capitalism, serves as the solution to environmental change (West, 2006, 43) as mandated through science and the expertise of this Environmental NGO, nested in a global framework of conservation activities. Dominique Temple describes International NGOs as the ‘Trojan horse mercenaries’ of colonisation who, using gifts to win trust, can then act as counsel or direct the economic development projects on the basis of substituting power and substituting reciprocity with exchange structures (Temple, 99). She states:

When colonization fails and when the borders between the Third World and the Western World become sharper, then some paratroopers of the Western economy-disguised as natives are sent across the front line. In a word, under the guise of a gift, the International NGO destroys the interior borders of human communities. The gift becomes the Trojan horse through which Westerners expect to definitively break the third world defenses, to secretly open from within the reciprocity economy’s doors to free exchange, and thus dash any hope of another development (Temple, 1988, 99).

With the advent of the management project, the community of La Caleta, namely the fishers that work in the park were targeted for this ‘gift’ of development, where RCDR would donate their effort, connections and resources collected as donations in return for compliance in transitioning from fishing and resource extraction to tourism. The sources of funding for the ‘gifts’ of development are also indicative of the larger empire building and development project to which Reef Check as an International NGO belongs.

Reef Check International was founded in 1996 by marine ecologist Dr. Gregor Hodgson with the goals to create partnerships among government agencies, businesses, universities, other non-profits and community volunteers to address coral reef health and stability (Reef Check International, 2013). Reef

Check goals are to “Educate the public about the value of coral reef ecosystems and the current crisis affecting marine life, create a global network of volunteer teams trained in Reef Check’s scientific method to regularly monitor this health, to facilitate collaboration that produces ecologically sound and sustainable solutions and to stimulate local community action” (Reef Check International 2013). The work toward these goals through two main programs; EcoDiver – an educational program for kids and adults that offers dive certification; Coral Reef Management Program – monitoring and management system that promotes the establishment of Marine Protected Areas to conserve coral reefs and encouraging local residents to use the reef sustainably (Reef Check International, 2013). These programs encourage national and international tourism to achieve these goals, and the monitoring program, within RCDR is predominantly done by American visitors or the Barracudas dive team (Torres, 2013). Reef Check International is funded by a number of businesses, institutions and foundations including Rockefeller Bros. Funding, Body Glove, Quicksilver, The DiCaprio Foundation, The Hurd Foundation, MacArthur Foundation, Living Oceans Foundation. Grants are received from US NOAA, UNEP for Caribbean, US AID, US State Department, World Resources Institute, CORAL, DOW Chemical Company Foundation and IOC/UNESCO (Reef Check International, 2013). RCDR accesses funds from Reef Check International, but also receives specific funding from the UNEP, who just donated to support the monitoring equipment including GPS cameras, megaphones, walkie-talkies and other items to increase the efficiency of monitoring and fining those who extract illegally within the park boundaries (Torres, 2013). They also receive funds from local businesses including dive shops, MNR&E,, The National Aquarium, and the British Embassy in Santo Domingo (RCDR, 2013). Funding and support from such sources, namely USAID, the UNEP and private industry clearly shows how Reef Check and their regional chapters are influenced by a larger picture of ‘sustainable’ economic development.

RCDR is also a part of a regional collaboration of actors concerned with conservation and the lionfish. An email that goes out to the Lionfish Ad-Hoc group promotes the “excellent work of Reef Check DR who put on an amazing fundraiser with Vesuvio Restaurant putting lionfish on the menu” (Gourdin, 2013), where tourists and the Dominican upper class can choose lionfish as an ecologically sustainable seafood choice. Also, RCDR is applauded for their educational video “Turning our Backs to the Ocean”

which was made with the support of the Punta Cana Foundation, Jaragua Group, INTEC University and Banreservas. The video explains that the lionfish is among several threats to marine ecosystems, and states that the commercialisation of the fish is a way for people to engage in ocean ecosystem stewardship. The video explains:

We have the opportunity to do something, it is time for us to intervene and get involved, to see how our lives are connected to the sea is a good start. The lionfish is just one example, there are many threats to the ocean, reefs, and coasts. We need to reflect on how we can make a difference. Let us not turn our backs to the ocean (Laururi, 2012).

The messages of the video are consistent with the management guide and all of the messaging of lionfish control programs in the region, as it was applauded in the email to regional members – that the sea is in need of protection, that the lionfish does not belong and is a major threat, and that commercialisation is the answer. Further, this video and its director won the local ‘Globo Verde’ award from FUNGLOBE (supported by a non-profit Global Foundation for Democracy and Development) in September, 2012. This award gave RCDR international recognition as the film was premiered in New York. RCDR has had many other opportunities for international recognition and promotion of their work. For example, their launch event in June, 2006 was at Marina Casa de Campo in La Romana. Actress Kelly Hu was the Reef Check spokesperson and the director of USAID, the major funder of RCDR made a presentation (Torres, 2006). Since then the park has been visited and the ecotourism project celebrated by Scientists Sylvia Earle (2011) (who along with Leonardo DiCaprio are honorary chairs on the Reef Check International Board of Directors (Reef Check International, 2013), and Environmental Scientist Pierre-Yves Cousteau (2012). RCDR offers several opportunities for youth from Bayahibe, Santo Domingo and Nuestro Padre communities to participate in day and weekend educational camps. During these camps youth are given the opportunity to learn about the natural history of many species and the ecology of the reef, and participate in many activities in and out of the water. Despite these notable opportunities for Dominican youth, the overwhelming majority of activities and fundraisers are geared toward the economically, socially and political elite in the country. Many events, including several that I attended are even prohibitive to anyone but the elite. Examples of the activities include dive tourism, annual open water swimming competitions and underwater photography competitions, club nights, art exhibitions (Pannocchia, 2012) – none of which

are inviting or accessible to most Dominicans and are only attended by the Dominican elite and foreigners. Exclusively as a response to the lionfish, activities include a gastronomy festival with celebrity chefs exhibiting novel recipes, and a lionfish derby and information session organised by the staff and students of the Carol Morgan private school in Santo Domingo (Pannocchia, 2012).

The workshops for fishers further illustrate how the NGO takes on the role of the expert and manager with the fishing community. Instead of a welcome invitation to enjoy the space for recreation and information as offered to the tourists, the fishers are invited with the intention of behaviour modification and change. Here, the fishermen are constructed by the management community as people, “who lack information about overfishing, information that experts possess and that could be passed on, rather than as possessors of specific and specialized knowledge” (Chiappone 2000 in Moore, 2012). Whereas tourists and the elite are applauded for their moral high ground in supporting the protection of the park and the surrounding coral reef ecosystem, the fishers are approached in a way that looks down upon their current behaviour and asks for a change. There is no questioning of the modes of transportation that bring the international tourists, nor the impact of their accommodations, which I argue is a bias that favours one group and vilifies the other. The prioritisation of attracting tourism to secure capital and promote ‘sustainable development’ reflects what Neil Evernden describes as the failure of the environmental movement. This is to use valuation of natural resources to explain the importance of environmental health, instead of insisting on a radical change and environmental consciousness (Evernden, 1985). Thus, in this way elite individuals are encouraged to support the protection of the reef and the park, while not confronting or challenging the problems associated with capitalism (Holmes, 2011) and perpetuating another form of social exclusion in the space that historically was tied to the community of La Caleta.

The way that the lionfish is prioritised and positioned, and how the project of the transition from fishing to tourism is organized and the division of labour and allocation of funds and wages is a very clear example of how general democracy, human solidarity, and ecological balance is thwarted to meet the special interests of the ruling class (Houghton in Bookchin & Foreman, 1991, 88). In this case, the ruling classes are the conservation and NGO managers as well as the park and government officials who strategically place the lionfish at the forefront through the creation and perpetuation of a crisis, while

consciously ignoring other projects and issues that could and should be addressed if the ecological stability of the reef is the top priority. In my opinion, climate change induced coral bleaching (which is a Reef Check research priority less widely discussed and is not a focus of fundraising or educational activities), sedimentation and pollution as direct results of coastal development and point sources industrial pollution could be areas of focus for Reef Check, and they choose to prioritise the lionfish – that is doing great ecological damage, but certainly not in isolation from the other impacts, which have a much more political nature in addressing and brings in less donations as it is a far less ‘sexy’ and appealing environmental problem. In focusing on the lionfish for stewardship and educational initiatives, it permits the status quo and business as usual of the powerful groups in the country, it validates the need to heighten security, surveillance and monitoring of the national park boundaries and the behaviors within it. And, of course it maintains a position of privilege of the scientific community and the elite managers who have access to this knowledge and dive equipment while framing the local users of the park for recreation and livelihood as ignorant threats to the well-being of the ecosystem. Furthermore, the vast and problematic difference between how much the managers and employees of El Carey Dive Centre and COOPRESCA in La Caleta earn is another layer in the privileged position of park managers. This shows that instead of reducing the hierarchical structures to harmonise social relationships, the lionfish deepens the social stratification in the community and the unique actor network that has come together to address this interesting ecological situation. The invasive force of the lionfish here highlights how ecologically disruptive neoliberal conservation can become.

SETTING CONSERVATION PRIORITIES

Conserving biodiversity is among many global issues that are currently competing for funding, attention and political support. Thus, “conservation priorities must be set so that scarce funds and resources are used efficiently and effectively to prevent long-term loss and degradation of biodiversity and ecological systems...funding is insufficient in the context of current threats (habitat destruction, overexploitation of resources, invasive species, climate change, and emerging diseases)...and conservation competes with other societal priorities”(Wilson et al., 238). Various mathematical models are used to minimise the resources expended while meeting the given set of conservation targets, maximising the impact of the effort by

weighting goals based on numerically derived assets based on priorities such as protecting threatened, umbrella or flagship species, areas of high species richness or endemism or functioning ecosystem processes (241). This process of defining the relationship between investment and benefit derived, while complicated is associated with the process of assigning hierarchical value of one species over another, and economic valuation of ecosystems and their services to humans. While in itself is a complicated process leaving doors of subjectivity and bias wide open, it also calls into question the process of defining the environmental problem and the subsequent scientific questions being posed.

Much conservation effort is focused on particular species, such as the panda, the tiger and the increasingly popular polar bear among other charismatic flagship species, which are chosen as priorities because of their capacity to improve public support for conservation, however their prioritising may not be based on local priorities or values, and are actually unlikely to reflect the conservation urgency of other – less adorable-species (245). Supported by the International Union of for Conservation of Nature and Natural Resources (IUCN), many countries and regions have legislated the protection of endangered species, based upon the moral and ethical imperative to avoid extinctions, despite the fact that the money may in fact be more effectively spent protecting several less endangered species (244). This discussion also applies to the concept of a biodiversity hotspot -a category to which Caribbean coral reefs belong,-which prioritizes rarity, irreplaceability, and a measure of threat or vulnerability, yet does not necessarily mean that they will have the best outcomes for biodiversity conservation (248). In this case, the lionfish is constructed as a villain to garner support for the conservation of parrotfish and other beautiful, native, and unique reef species.

There are numerous social, economic and political factors which influence conservation priority setting and the creation of protected areas, which is used to foster a variety of conservation interventions and monitoring strategies to protect biodiversity (Wilson et al, 250). Mathematical formulations to determine where best to allocate funds is limiting due to the nature of formulating the problem and the exclusion of synergies that are inherent in any system, thus selecting areas that are protected such as national parks is stated to add a probability of success due to stakeholder willingness to participate and political support and vigilance (Wilson et al., 255). I bring these points forward to illustrate that the process

of deciding how, when, and where to invest in biodiversity conservation initiatives and which species or systems to highlight or prioritise is a subjective exercise while is often perceived as scientifically objective. Beyond subjectivity, the ideas behind and practices of conservation of biological diversity, especially via the creation of protected areas and sustainable livelihood conservation as development programs are inherently political and are often based on problematic notions of progress, development and poverty eradication. For example, in the article by Wilson et al., that discusses how conservation priorities are set, they state, “Establishing a protected area in a region can have positive effects. For example the livelihoods of residents might be improved through the provision of opportunities for eco-tourism ventures, which can potentially reduce the dependence of local communities on natural resources” (Wilson et al, 2009, 257). This statement clearly shows the ease to which conservation managers can make recommendations, often supported by policy within and outside protected areas that will force individuals or communities to completely change their livelihoods while framing the solution to environmental threat as reducing resource extraction, which ignores other stresses which demand structural change and environmental justice. What is important to note here is that the system of competition for funds, attention, and lack of political will and support for conservation are central to this critique.

The decision to create such a widespread regional campaign to address the lionfish is indicative of the fact that “gradual environmental degradation goes almost unnoticed, and governments often overreact to sudden events of lesser overall impact” (Soule, 1991, 746). Further, single species management ignores the suite of ecological processes that maintain and sustain such species, and the management of one species may conflict with the management of another (Simberloff 1998 in Wilson et al., 2009). For example, encouraging mass tourism and diving to control the population of the lionfish runs the risk of degrading the reef further. The decision to take such a risk aligns the business of conservation with business as usual economic development where it is profitable and desirable to think and move in the short-term, where investors and donors can see the progress and return on investment. The lionfish in this way does a magnificent job at exposing how Reef Check, along with REEF, and Reef Conservation International among others sell the image of the lionfish, attract tourists to participate in stewardship and frame the invasion in such a way that positions tourists and divers as the heroes and protectors of the reefs and

continues to demonise those whose livelihoods have revolved around resource extraction. This permits business as usual economic development while making the fishers the scapegoats of reef degradation, as the development of hotels- including eco-lodges and resorts to support tourists, dive operations, airlines which contribute significantly to greenhouse gas emissions and point source pollution that impacts the ecological integrity of the reefs. In this way, the lionfish is framed as a very approachable issue and an enticing way to engage in stewardship.

In order to garner support for reef conservation through Reef Check and other NGOs I have argued that the lionfish is emphasised as an additional stress to an already highly vulnerable ecosystem. While being framed as the 'greatest threat', it offers an avenue for which tourists, divers and environmentalists may gain access to such a privileged region of the world and participate in a stewardship activity, as did my experience that piqued my interest in this topic. For the lionfish to be understood as such a threat to coral reefs, it must be framed in way so there is no question that it must be reduced and eliminated, thus it has been externalised from the 'natural' Caribbean coral reef ecosystem by being exclusively described as an enemy invader. Again, in the DR, such discourse carries a message from a violent colonial past and I argue it activates a specific sentiment of protecting nature from the 'other'.

CHAPTER 5: FRAMING THREAT: THE CREATION OF A CRISIS

LANGUAGE AND DISCOURSE: THE FRAMING OF AN EVIL FISH

Swiss linguist Ferdinand de Saussure, from whom the school of linguistics has emerged, described language largely as an abstraction, divided into two parts, the system of signs and the speech or language in use (Gibbon, 1999, 18). Saussure saw the sign as both a signifier (sound) and a signified (concept), both as being arbitrary (18). Noam Chomsky is also concerned with the arbitrariness of the two parts of language that he calls performance and competence. The signs in language then are described to be dependent on social and cultural context to derive their meaning to various people. In this work, the context of what is meant by threat of the lionfish is the topic of study. When we use language we make choices and those choices are not always innocent, but can be a reflection of belief systems that underlie them (Gibbon, 1993, 24). The very field of Invasion Biology, which began with the work of Charles Elton has been built using specific militaristic language and metaphors to convey the key messages of the impacts of invasive species (Larson, Nerlich & Wallace, 2005, 252). Regardless of the impacts of invasive species on native ecosystems, which this work does not intend to interrogate, the very process of defining what belongs, what does not belong, what assemblages and co-evolutionary strategies are deemed balanced and healthy, and which interactions are damaging are quite easily compared to political and social relationships, namely xenophobia, particularly when images of borders are used and when militaristic language becomes strong (251). This work is attempting to show that the term threat in relation to the arrival of the lionfish is used differently by different people from different social locations and purposes. Threat fluctuates from threat to biodiversity, threat to national heritage to economies and human health. The use of the term threat is employed by conservation managers and flows through educational channels to encourage support for management activities, and that the idea of threat changes based on who is using the term. The question of what is the most pressing threat to coral reefs was posed to the respondents, and it is shown that the response fluctuates as well, not only suggesting the subjectivity of management decisions but the way that the environment is understood by different people. While there are numerous considerations including culture, level of education and of course that the interviews were conducted in both Spanish and English, I attribute part of this to be the use of crisis building in the area of resource management. While invasive

species management is often criticised for ethics in culling and militarised language (Gobster, 2005, 261) the lionfish is an interesting case as it uses the threat to native biodiversity by showing the fish as a threat while at the same time working very hard to calm public fears of envenomation in order to encourage fishing and consumption. This manipulation of language is evident within the following interviews, which I feel reflect the presence of market competition, and the want or need for conservation managers to raise money to support their programs.

The idea behind restoring an ecosystem or protecting nature based on a specific time period further shows the subjectivity of decision making that is often perceived as scientific or objective. In *The Trouble With Wilderness: Or, Getting Back to the Wrong Nature*, William Cronon problematises the concept of wilderness and nature by examining the history of national parks in the United States. He states that “celebrating wilderness has been an activity enjoyed by well-to-do city folks, whereas country people generally know far too much about working the land to regard unworked land as an ideal” (Cronon, 1991, 15). He goes on to explain that the myth of wilderness as ‘virgin’, uninhabited land (or sea) is especially cruel when seen from the perspective of people who once called that area their home and have forcibly moved in order for “tourists to safely enjoy the illusion that they were seeing their nation in its pristine, original state” (Cronon, 1991, 15). The romanticised notion of a pristine natural ecosystem that many tourists, particularly divers hold so dear is an indication of a worldview that is alienated from the land, and leaves no room for human beings to actually make their living from the land, or sea and exposes a dangerous dualism that sets people apart from nature because the concept of wilderness comes into direct conflict with the very thing that it encourages us to protect (Cronon, 1991, 17). Thus, by suggesting that the coral reef ecosystems need to be managed by exclusionary measures such as creating Marine Protected Areas reinforces the idea that humans will only do damage if allowed to move freely and interact with this wild space. In looking for middle ground I urge a level of critical questioning that does not privilege certain use while vilifying others because let us not forget that it is not all behaviour that is legislated as illegal within these wilderness areas – but only the behaviours that involve resource extraction, or the same interactions that have been going on for centuries. Tourism, research, volunteering, and documentation and underwater photography however are not only legal but encouraged, regardless of the environmental

impacts of the transportation that brings people there, the coastal development needed to support these visitors, and of course the potential damage of increasing the volume of people in the water and the potential impacts on the very same fragile reefs.

Language is an important aspect of analysing the management strategies of the lionfish. As Lauren Corman's work illustrates the link between raccoons, freegans and the variations and uses of the word racoon, there are serious social implications for how animals are described and the associations made with humans (Corman, 2011). "Discourse Analysis is concerned with the role of language in constructing and organizing social reality. From this perspective discourses do more than reflect or describe the world; discourses are productive of that world and therefor have material implications" (Tonkiss, 2004 in Sundberg & Kaserman, 2007, 731). For example, the terms *voracious*, *invasive*, *limitless reproduction*, *threat*, *native*, *displace* are used repeatedly on websites of coral reef conservation organisation Reef Check International, RCDR, REEF website and recently published cookbook and the 2012 Guide to Control and Management. We all make choices in the language that we use, and the choice to portray the lionfish as a threat, an enemy, and an unwelcome organism represents a paradigm in the conservation movement and has implications for how fishers are framed and understood in a similar way.

According to Cultural Anthropologist Amelia Moore, the lionfish has become a scientific 'totem animal', as it has been designed by science-based management organisations to signify the vulnerability and value of the marine environment (Moore, 2013, 682). Moore draws on the ideas of Donna Haraway to show that "fish, as well as fishers are actively figured through our interactions with them...human-animal collaborations, like fisheries, simultaneously create creatures of imaginary possibility and creatures of fierce ordinary reality" (Haraway, 2008, 5 in Moore, 2013,680). This shows that these understandings of ecological study and representation are far from objective, but are laden with subjectivity of authors, managers and the individuals who come in contact with the fish itself or the story of the fish. The lionfish is framed as an ecological menace that entrenches the authority of conservation managers to address the synergistic problem of overfishing and invasive species as threats to the fisheries, which include lobster, conch and shrimp (Moore, 2013, 681). The method used is a familiar economic project to internalize the lionfish into the fishery itself, and support it becoming a commercial and recreational fish species to be

consumed at home or as a 'sustainable seafood dish' in restaurants especially within the tourist industry (681). More than figuring just the lionfish, Amelia Moore exposes an important point that has greatly impacted my understanding of the lionfish management strategy, which is that while the lionfish has become a totem for management, fishers themselves have become entrenched as a result (Moore, 2013, 682). She states:

The thinking that pits the lionfish against fish to save the fishery – here, the story of the lionfish-works as a double internalization for the malleable figures of fishermen and lionfish. The lionfish is no longer perceived as only the enemy invader; it is becoming internalized into the fishery as a commodity species. The strategy to have fishermen fish for this species will supposedly succeed precisely because fishermen are imagined to be transgressive overfishers. Thus, by doing what they do best, fishermen will also supposedly sustain both the fishery and their own livelihoods as they are internalized into lionfish management plans (Moore, 2013, 682).

While Moore's work relates to her research and experience in the Bahamas, my investigation in La Caleta MNP in Santo Domingo, Dominican Republic supports her ideas. I have heard the statement, "let the fishermen do what they do best and overfish the lionfish" numerous times from conservation managers. I have also repeatedly heard that "you can sell a dead fish once, but you can sell a live fish over and over again." The fishermen who live and work in La Caleta are indeed framed as both threats to the reef ecosystem through overfishing and are positioned as the hope for restoration via Conservation as Development projects, sustainable livelihood transitions from fishing to tourism and the commercialisation of the lionfish.

Becky Mansfield reports that the issues of overfishing in the ocean are disproportionately the fault of industrial fishing while often being blamed on the small-scale artisanal fisheries. Her report states that just over 1% of fishing vessels in 2008 were industrial vessels and 10% were over twelve feet in length. 11% of the fishing capacity is done by large-scale fishing, which accounts for half of the fish captured for human consumption. Small-scale or artisanal fishers then make up the rest of the 89% for the other half of fish caught for consumption. Large scale fishers use almost 40 million tons of fuel per year, while small scale use 5 million tons; large scale produce between 8- 20 million tons of by-catch where small scale produce almost none; and for each \$1 million invested in boats, large-scale employ 5-30 people whereas small-scale fishers employ 500 – 4,000 (Mansfield, 2011, 91). Mansfield's work clearly shows that while the focus of conservation targets small-scale fishers, proportionately they are the scapegoats for the

reduction of biodiversity in the oceans as large scale fishers have far greater ecological impact.

Moore identifies as a hope for her research that it makes the fact that the creation of a fishery is a world-making practice, not just the discovery of a vulnerable entity in need of protection (Moore, 2012, 683). As Moore highlights, the strategy to overfish the lionfish positions nature in crisis and calls fishermen's existence into question as appropriate parts of nature (671). Small-scale fisheries, such as those in the Bahamas and in La Caleta, illustrate how targeted local interventions such as lionfish management are taking priority with too little emphasis on wider trends- "and blame and responsibility for environmental degradation continue to be aimed at those who are less likely to be involved at higher levels of the international and national policy making processes" (Moore, 2103, 683). "It is generally agreed in the management community that commercial and artisanal fishing negatively affect marine reef biodiversity in the Caribbean and that protected area management must target fishing communities adjacent to MPA's (Hawkins and Roberts 2004 in Moore, 2013, 672). What is rarely called into question is if fishing communities are appropriate sites of such scrutiny, and why fishers are targets and not point sources of industrial pollution, coastal development or behaviours and activities associated with greenhouse gas emissions- such as international tourism? This is associated with notions of what are appropriate and inappropriate interactions with nature and ecosystems which are judgments based on cultural values and assumptions of the nature and culture dichotomy. This is precisely why analysis of power and elitism in the conservation movement and the establishment and maintenance of National Parks in the DR is a part of this work.

During my time studying in La Caleta, I observed a number of instances where the negative attitudes of conservation managers towards the fishers of La Caleta became apparent. One of the most notable instances happened on a morning that Ruben Torres was visiting the park. When I approached the dive center there was some commotion and the Servicio Nacional de Proteccion Ambiental (SENPA) officer and Ruben were both intently talking over their walkie-talkies to a boat captain and to the representative of the MNR&E. Allegedly, there was a motorized fishing boat extracting conch from within the park boundaries. New surveillance equipment was purchased through UNEP funding including a camera that records geographical coordinates to show that indeed fishers were extracting from a prohibited

area, which is a common response to SENPA accusations that they were not in fact within the park boundaries. Once the SENPA officer had given the fisher his fine, Ruben turned to me and said, “This only happens when I am here. I know that it must be tough to go after people from your own community for breaking the law or even your friends but come on. I mean these people must be really stupid. They have to know the impact of what they are doing, but they just keep on doing it. We can pack up at any time and go and help somebody else, somebody who wants the help” (Torres, 2013). In that moment I could sense the level of frustration that he was feeling as a manager of a project that was being blatantly contested by not just the fishers, but the individuals who were in charge of monitoring the park, and his reaction appeared to be a result of an accumulation of instances such as the one that had occurred that morning. What I interpret from this is the way in which he insults the fishers’ behaviour and assumes their ignorance rather than acknowledge the possibility that the action is a response to the management of the park and a site of resistance to the power dynamics at play. Further, I was struck by his comfort in expressing that level of frustration with me, which revealed how my identity was perceived. I do not mean to suggest that this attitude is the norm for conservation managers, but in this context it was very clear that this manager in this place held a clear position that the fishers in La Caleta lacked the consciousness to interact appropriately with the reef, and that the work of RCDR is the saving grace, bringing knowledge and thus consciousness.

Beyond the attitudes that I observed during my time in the DR, the way that fishers are framed on the Reef Check DR website posts are telling in how the fishers of La Caleta are framed as threats to the ecosystem. The lionfish in the Caribbean has been widely described in academic and grey literature – including websites, blogs, Facebook posts and even cookbooks- as a ‘voracious’ predator, an unwanted invader, and potentially the greatest of all threats to coral reef ecosystems (REEF, 2012). There are numerous examples of how military jargon is employed to describe how people should do their civic duty to get involved in lionfish eradication (Reef Conservation International), How you can ‘eat em to beat em’ (REEF), and even statements like “let’s do what humans do best and overfish the lionfish” (Torres, 2012). The blog posts of events and happenings in and around La Caleta and Banco de la Plata Marine Protected Areas highlight the tensions between conservation managers and those whose livelihoods are

dependent on the resources under the sea. Notably, the audience of the website are not the fishers themselves, but include other departments of Reef Check, and other NGO's who are collaborating with them on conservation initiatives among many others who may encounter the site. The first of two posts that I will describe positions fishers as threats to the coral reef ecosystem with blatant neglect for policy for environmental protection. It states:

Despite the fact that Banco de la Plata is a protected area, that fishing with a tank of air is prohibited and that lobster fishing and selling is banned from April to June, these fishers dive with tanks for eight hours, breaking all of the safe diving rules and taking out anything edible, including big lobsters, all for the ability to feed their family. If you were in the position to resolve this dilemma, how would you do it? Write your comments (Torres, RCDR, 2013).

The post is accompanied by a picture of a smiling fisher in a boat holding up a big spiny lobster, and space to write comments, of which there are none. I have to wonder if these fishers were asked this question in person before having their business published on the RCDR website, or what they might write as a response.

The second post is framed by an image of a pile of small parrotfish and one large angel fish on a market table ready for sale. The way that fishers in this area organize their economy is a small fish market located under the highway between La Caleta and the park. Fishers sell their catch – either fresh or frozen-by weight as per fish species. The image that the post is referring to critiques this process:

Fishing tends to select larger individuals first, which means predators like groupers, and when you see pictures like this, of the day's catch mostly comprised of parrot fish, it can be concluded that the top of the chain food have been depleted (commercially speaking). Now fishers are after the parrotfish, and what will they sell next? You can see on the left a Queen Angel fish, which is not considered an edible fish, nonetheless in a depleted system anything of a large size is valuable (Torres, RCDR, 2013).

Another post on the Reef Check DR website reinforces the antagonistic battle mentality and pits people against the fish by reporting, "With the capture of thirteen lionfish in only one day, we can secure the lives of more than 300 reef fish daily in La Caleta, that otherwise would be devoured by the lionfish. Those that were caught were eaten and how good they were! Score Board: Humans 13, Lionfish – 0 (Torres, RCDR, 2013).

The RCDR website has become a space to communicate the underlying attitudes towards the fishers in and around the Marine Protected Areas, which is activating a deep and historical vision of

perceptions of nature, threats to nature, and who is protecting nature. Further, the site serves as a place to illustrate how those involved in the management activities are making progress and are successful in their goals, using an analogy of a scoreboard to highlight who is actually winning reinforcing a battle mentality commonly activated in the discourse around invasive species. The lionfish is carefully positioned as the threat and the battle becomes against them, however it is clear that the fishers are positioned in a similar vein. In their work *Environmental Orientalisms*, Sawyer and Agrawal point to specific points in history to explain how the “neo-Malthusian concern to protect Nature from exploding non-white populations reflects a latent, yet impassioned, gender/race/sexual complex that mirrors earlier imperial projects” (Sawyer & Agrawal, 2000, 73). They draw on the work of Foucault to assert that “nature...acquires definition and import within a matrix of competing and often contradictory social interests...therefore nature is the effect of particular discursive processes of power/knowledge that have historically fashioned the domains where distinction, meaning and truth are made” (Foucault in Sawyer & Agrawal, 2000, 74). Viewed through these theories, the classification of the lionfish as a threat, the establishment of borders of the Marine Protected Area and the restriction of the access of the ‘exploding’ population reflects the very point that Sawyer and Agrawal make, which is that this environmental issue is a perpetuation of colonial attitudes based on racialization. They argue that these actions are a part of a larger imperial project that reflects those of the past which privilege particular people, behaviour and their histories to perpetuate the inequalities of power and maintain the status-quo regarding accumulation of wealth and capital (75). Moore explains how the lionfish actively draws these power dynamics together and links the production of the fish as enemy to the fishers as enemy:

Without notions of human and social impacts, these particular framings of nature and culture, fishermen and lionfish would not be such powerful figures and there would not be that dynamic opposition that accompanies the very idea of anthropogenesis and environmental change that helps maintain conservation management as a strategic arena of design and action. The way in which the nonhuman other is figured in this domain of practice also implicates human others in that domain, as framings make figures and determine their power (Moore, 2012, 683).

This is particularly relevant to the discourse regarding the community of La Caleta, as well as the othering employed by the Dominican nation toward racialized Dominicans and Haitian migrants, which I argue makes the discourse around invasive species in the DR a particularly worthy of examination because of the

familiarity of the anti-immigrant sentiment and the persistence of 'anti-Haitianismo' on the island.

According to Donna Haraway, "organisms emerge from a discursive process" (1992, 298) which does not necessarily make it any less real. What this construction then demands is an analysis of its arbitrariness and an inquiry into the historical context that influences how the images are produced (Sawyer and Agrawal, 2000, 74).

I argue that there is a specific choice to focus conservation management on lionfish control instead of other relevant issues that would demand a more political response and challenge 'business as usual' capitalism, such as climate change or coastal development. I believe that this choice favours conservation managers and allows them to gain recognition, earn capital and grow an increasingly elite network of actors and volunteers that frames tourists and divers as heroes and fishers as villains. This is done through a use of discourse and scientific rationale that is reminiscent of colonialism and imperialism which "justifies a colonialist rhetoric that, during periods of colonial entrenchment, asserted the common heritage of tropical resources and sought to justify European control on scientific grounds" (Sawyer and Agrawal, 2000, 92). In this work I do not wish to suggest that the lionfish is not having an impact, but that the conservation community needs to work towards a response that honours diverse knowledges, livelihoods and challenges the root causes of ecosystem degradation, not simply engage in simplifying the issue and finger-pointing.

CONSERVATION AS A DEVELOPMENT PROJECT: COMMERCIALIZING THE LIONFISH

The location and project with Reef Check DR, COOPRESCA and La Caleta MNP are products of many forces that have come together in time and space. Space is described by the mental, material, and social practices characterised as experience, perception and imagination are historical, discursive, ideological, legislative and imaginative (Lefebvre 1991 and Harvey 1990 in West, 2006, 27). The production of space starts from a mental idea, a material location and social relationships and radiate out. It can be stated that, "nothing is, everything comes to be" (Lefebvre 1991 and Harvey 1990 in West, 2006, 27). The space of La Caleta MNP is no exception, it is a location that has a particularly interesting history that has been produced and reproduced, and a place that represents different things to different people.

As Agrawal and Gibson (2001) suggest, even if legislation boasts a 'participatory' or 'community' label, it is rare that individuals from the community have had any say at all in the policy and are based on a

naïve view of community (2). The advent of COOPRESCA in La Caleta park was and continues to clearly be a project designed by the project managers of Reef Check in order to follow through with the prescriptive recipes of community based development and handing the project over to the community that is supported by Reef Check International and their supporters. When one investigates how the cooperative operates, who is benefitting from the project and what the future holds for the stakeholders, it is clear that the community members who make up COOPRESCA are not the individuals who stand to benefit most. Furthermore, in suggesting that the entire community will benefit from the transition from fishing to tourism fuelled by the sales of lionfish as a way to bridge that transition is a fallacy. The different perspectives and realities of community members make this linear arrangement next to impossible to organise and facilitate or to obtain consensus or even broad agreement on how to proceed difficult.

The role of community in conservation work has changed greatly in the last several decades. In a break from previous work on development that positioned the community as a hindrance to conservation work and progressive social change, current writing glorifies the role of community as a way to decentralize power, create meaningful participation, and cultural autonomy (Agrawal and Gibson, 1). In this way the project in La Caleta operationalised the community aspect of the project to harness the environmental thought of the day, in this case community involvement, as a central focus of their work, and they receive vast national and international recognition for their work. I argue that it is the elite within the community of La Caleta, including the various actors who are pulled into the network who are poised to benefit from this arrangement. In contrast the fishers, who are reportedly the beneficiaries of the Conservation as Development project or in other words participants in transitioning into a 'sustainable livelihood' are faced with increased regulation, enforcement with little to no economic benefit.

The community of La Caleta is much more complex with individuals differentiated by status, political and economic power, religion, social prestige, and intentions. As described by Agrawal and Gibson, "some interact harmoniously while others do not, some see the area as needing protection others are interested in the short-term yields, some seek refuge from the government and the market while others embrace it and sometimes communities only come into existence because of their interaction with the state or others" (Agrawal and Gibson, 2), as did COOPRESCA, to meet the needs of the conservation as

development goals of RCDR.

A Conservation as Development (CAD) project is described by Paige West as using economic incentive to participate in the conservation project (Integrated Conservation and Development Project). NGOs made up of conservation scientists, planners and practitioners, environmental activists, researchers, and volunteers enter into a set of social relationships, often around protected areas (West, 2006, 5). I describe the transition project from fishing to tourism with the members of COOPRESCA as a CAD, which is based upon the notion that if local communities receive sufficient benefits from a biodiversity enterprise then they will work to conserve it (West, 2006, 38). This project clearly takes the ‘commodity road to stabilisation’ – or the neoliberal approach to conservation that “favours export economies, trade liberalisation, and development policies that bypass the state and where the market is seen as the saviour of biological diversity and the most rational and efficient way to organize social and economic life” (West, 2006, 39).

Arturo Escobar describes development as a discourse that constructs others as requiring change, and it is a discursive practice that has profound material consequences (West, 2006, 113). People around protected areas are characterised as ignorant and a threat with no acknowledgement that the people created the space they wish to insulate from human impact (West, 2006, 179). It is condescending to suggest a behaviour change will make a culture environmentally appropriate (West, 2006, 32).

NGOs often produce the problems to be solved then design and carry out the projects meant to solve them (West, 2006, 5). One way that I feel that RCDR is utilising the lionfish to promote the success of their own work is reflected in the appeals used on their website through Global Giving, which is a site designed to help donors search for various development or conservation projects. RCDR has two possible projects on this site; first is the Coral Reef Restoration Project of the Coral Reef Nursery, where fragments of coral are transplanted from coastal regions around the island to promote genetic diversity. Donors are encouraged to ‘Adopt a Coral’, and the size of the donation translates to the size of the area adopted. This project has a goal of \$10,000 USD with 33 donations for a total of \$1,530. Second is the ‘Controlling Lionfish in the Caribbean’ project which has 82 donations of \$7,305 USD to date, suggesting that the Lionfish Project is more enticing and popular to ‘Global Givers’. This appeal, like most appeals of this

variety are accompanied by a disclaimer that states that the funds will be directed to overall conservation strategies and may not be used exactly as suggested through the appeal. However, this appeal states that “\$10 will create a monthly incentive fund for the most fish caught; \$20 will fill 4 SCUBA tanks for a ‘Lionfish Hunter’ team to go on a control dive; \$50 will cover expenses to train 4 divers on Lionfish control and \$100 will buy a ‘marine park certified’ spear gun to use by volunteers during control dives” (Global Giving, 2013). The funds from Global Giving do not necessarily translate exactly into what is advertised on the website, and not one respondent mentioned an incentive fund when I asked about economic incentives from the lionfish. However, once again on the Global Giving website via the project manager of RCDR, the familiar blame game emerges with the ‘Project Message’ stating, “Humans have been very successful in eradicating many species from the oceans, but over-fishing the Lionfish in the Caribbean can be a good thing. Let’s be human once again and protect our local diversity” (Global Giving, 2012).

Biodiversity conservation interventions are the terrain through which the practices of economic development are carried out. They engage transnational movements of ideologies and discourses and serve as sites for the cross-cultural contact between variously situated sets of actors and link the environment to the market economy (Escobar 1999 and Sachs 1993 in West, 2006). In the Global Giving appeal it shows that the immediate impacts of the lionfish management program are attractive to donors. Further, the opportunity to SCUBA dive while either hunting or studying lionfish is a massive draw for eco-expeditions through Reef Conservation International, volunteer data collection dives and courses such as the eco-diver training through Reef Check, courses through the Island School in Cape Eleuthera in the Bahamas and was certainly a drive for me as a research project.

As West, Igoe & Brockington contend, conservation efforts do not respond to changing needs of communities – but tend to simplify people, fix communities in space and time and then people are seen as difficult. They and the projects are deemed failures when they do not conform to their created image at the outset of the project (West, Igoe and Brockington, 2006, 261). This process of simplification is damaging because it reduces, “rich and nuanced social interactions with what natural scientists see as the environment to a few easily representable issues or topics...often conveyed as resource use” (265). Eco-tourism has become synonymous with protected areas, and because of this interaction people living in and around

protected areas are connected through a revenue source, and the area becomes a conduit of people from other places (262). The tensions of relying on eco-tourism for conservation and development, which are evident in my observations of the case of the transition to tourism in La Caleta Park, are well described by West, Igoe, and Brockington (2006):

Ecotourism works to create simplified images of local people and their uses and understanding of their surroundings. The local people are blamed when the projects fail. Ecotourism also works to change people's understanding of their surroundings, and it can lead to pressure on local resources because of the numbers of tourists and increasing tourist activities... ecotourism often causes conflict and changes in land use rights, fails to deliver community level benefits, actually damages environments, and has a myriad of other social impacts (West, Igoe and Brockington, 2006, 262).

While the common language used to garner support for marine conservation includes protecting beautiful and pristine wild space, there is also a high degree of economic valuation of the ecosystem, the services associated with the reefs as well as the creatures living there. All of the fish on the reef are fetishized, where the people continually state that they have been told that "they can sell a dead fish once, but they can sell the experience of a live fish over and over to different people." The commodity of the lionfish is not being used to serve the local population but is yet another way in which the excess is given to the wealthy, even tourists while the marginalised populations are once again selling their labour. The commodification of the lionfish pulls the veil over what is involved in fishing this species and assumes that people willingly want to engage in the commodity market and assume all of the risks - physical and economic. Further, what is hidden is the fact that the fishers receive between 50 and 80 pesos RD (roughly \$1.20-\$1.90 USD) per pound of lionfish, and high end restaurants charge around \$30 USD for a plate of lionfish (Ortega, 2013), which highlights the vast disparity in who benefits economically from the commercialization of the lionfish, and again the fishers assume the physical risk of working with the lionfish.

For Karl Marx (1995[1867], 47), commodity fetishism refers to the ways in which capitalist production masks the social relations in the production of a particular good or service. Fetishism happens when commodities are consumed 'without reference to the relationships and contexts from which they are produced (Igoe, 2012). In the case of the lionfish, its fetishisation and integration into the market as a green seafood choice obscures how accumulation by dispossession operates and how capitalism is used to justify the land use changes necessary to encourage a sustainable livelihood project. This investigation will show

how commercialising the lionfish does not and cannot replace other commercial fish because the process of fishing lionfish greatly differs from fishing other species, is more dangerous and requires specialized equipment thus privileging fishers with capital to invest or who already have the equipment. It is the hope of this work to render visible the problems associated with marketing the lionfish.

THE ELITE ASSEMBLAGE CREATED BY THE LIONFISH

The history of conservation is commonly identified with “the well-known histories of colonial and neo-colonial resource alienation in the name of the environment – whether for parks, forest reserves or to halt assumed destructive local practices” (Peluso 1992, Neumann 1998, West et al. 2006, Adams and Hutton 2007 in Fairhead et al., 2012, 240). While elitism and economic incentives are not new, Fairhead et al., identify the emergence of a new phenomenon in terms of who has come together in the name of the environment. They state:

In the twentieth century era of ‘national parks and protected areas’ there always were more interested parties than the state and conservation organisations – the scientific community and tourist industry for example – but today there are many more players implicated, who are more deeply embedded in capitalist networks, and operating across scales, with profound implications for resource control and access (Fairhead et al., 2012, 240).

I argue that the production of the lionfish as an enemy, and as an enticing stewardship opportunity plays an important role in this assemblage of actors. Donna Haraway’s work on animal and human relationships is helpful in framing lionfish as “material-semiotic nodes” where animals are actively figured through our interactions with them and are “formed into particular figures in the act of meaning and become creatures of imagined possibility and creatures of fierce ordinary reality” (Haraway, 4, 2008 in Moore, 2012). Her description helps to situate the way that the lionfish, and its complex and impassioned relationship with people not only brings otherwise unconnected actors together, but creates meaning of and for the actors – the lionfish included.

Since the arrival of the lionfish, the conservation actors have put a significant focus on engaging people to reduce the population of this rogue fish. All of the educational and community based initiatives of Reef Check appear to be designed and targeted to the elite of Santo Domingo and international tourists. While there was a link already established between the MNR&E, RCDR Staff; La Caleta Park Staff, COOPRESCA members, the arrival of the lionfish has added a number of actors to this network. They

include *Las Barracudas* – a group of bankers and volunteer divers who have taken on the role of ‘lionfish hunters’, the Carol Morgan School – a private high school in Santo Domingo, and UNIBE – a private university with a gastronomy department. This assemblage is a network of elite groups and individuals who participate in conservation initiatives based on the lionfish invasion, which is a common occurrence within conservation in the DR (Holmes, 2011). On the last Sunday of every month, a group of dive volunteers, who have assembled themselves into a team called ‘Las Barracudas’ visit the park and do a series of complimentary dives to harvest the lionfish. The team does not pay for their boat rental, their belts or tanks, nor their entrance into the park or any other equipment that they need which other divers must purchase. They hunt and spear lionfish on their dives and they take home the fish that they catch, usually between ten and fifteen large fish (Ortega, 2013). This is another example of how the privileged and elite continue to benefit from their connection to the park and are shown to be the ‘saviours’ of the reef while the fishers whose interaction with the reef is based on extraction are demonized. They even benefit from free diving and fish. This assemblage comes at the expense of a more inclusive set of actors that more accurately represents the Dominican population, and I argue that it dissuades the inclusion and participation of the community of La Caleta. This dissuasion comes from the repeated and deeply rooted divide between the spectrums of power in the country, which are commonly associated with race and class (Holmes, 2011).

The environmental education project taken on by a group of students at the Carol Morgan private school in Santo Domingo exposes the elitism in conservation being discussed in this work. When I began researching this topic I was intrigued by the opportunity for youth to become engaged in environmental stewardship through RCDR, and to use the lionfish as an entry point to discuss the ecology of the reef. Upon closer investigation I have found that it is not youth from the community of La Caleta who are engaged in stewardship, but an environmental club called the *Sea Savers*, which was born out of the Carol Morgan School. This group, supervised by American Biology teacher Lisa Yamma, is made up of approximately fifteen senior students who organise events through RCDR including the Adopt-a-Reef project as well as organising the annual Lionfish Derby in La Caleta Park, of which there have been two. The Carol Morgan School is the most exclusive and prestigious private school in the country where the admission is not only based on the ability to pay the tuition, (which is over \$10,000 USD per year), but is

thought to be based around the reputation of the family (Franco, M, 2013). Serving kindergarten to grade twelve, the school is attended primarily by the children of foreign diplomats, business owners, and local government officials and uses an American curriculum adapted for the DR (Carol Morgan School, 2013). This aspect of the lionfish management calls for a more critical approach to environmental education. Further, the approach and language used by the Sea Savers illustrates how lionfish management and commodification indeed perpetuate an elite group of environmental actors, which validate privileged actions and work to criticize economies based on resource extraction and validates a transition to ecotourism. Cheryl Lousley states that “normalized environmental education addresses what individuals can do to ‘help the environment’ which masks our implication in creating an unsustainable and unequal world” (Lousley, 1998, 20). The ‘save the earth’ rhetoric “mythologizes the causes of environmental crisis into a moral, rather than a political issue” (19), which translates into having the crisis blamed on the immorality of the people who live in the vicinity (20). What is clear here is that the elite in the country, in this case the elite youth, are using the lionfish management to position themselves morally as the Sea Savers. The process of conservation is often one of elitism and exclusion, despite the global call for community approval and participation in the process (Schelhas et al, 2002). As seen in the example of the lionfish in La Caleta MNP under the management of Reef Check, the actors who have assembled to address the lionfish invasion are primarily of an elite social and economic class.

CHAPTER 6: VOICES FROM THE COMMUNITY: LIFTING THE VEIL OF THE LIONFISH

When I began this research, I was intrigued by the opportunity suggested by the scientific and conservation community to address food insecurity with an invasive species. Upon closer investigation I have come to understand that the very real impact of the lionfish acts as a gateway which allows entry or rather perpetuates and justifies neoliberal capitalism in conservation. Despite the fact that consumption and commercialisation are the ways that the management community suggests actors address the arrival of the fish, and that the lionfish has taken priority over other ecological issues, my research shows that no one believes that this is an effective long-term solution. The results of my interviews illustrate that the four groups of individuals that I have created to compare and contrast in this work have varying perspectives of the lionfish, and use different language to describe its impact and management strategies. The trends that I have extracted from the stories and ideas shared with me illustrate that while there are exceptions, individuals who have economic or vested interest in perpetuating management and development intervention, such as RCDR and the MNR&E are more often cited as describing the lionfish as a more grave threat than other actors. Further, those respondents whose work relies on the continued research of the lionfish, including scientists and resource managers also perpetuate the lionfish as a threat. These respondents also support the management and commercialisation of the lionfish through fishing as well as derbies, while recognising the limits of this approach for a long-term and wide-spread solution. The scope of these interviews range from scientists and managers at the CEI in the Bahamas to Canadian students to managers, government officials and community members in the DR.

The interviews with the diving community illustrate another layer of economic incentive proposed by the arrival of the lionfish, as an opportunity to capitalise on the presence of such fish as a particularly intriguing species that people are drawn to see, as well as for stewardship opportunities, eco-tourism, 'voluntourism' and research. These perspectives also bring forward a strong critique of the motivation of RCDR as an NGO by suggesting that they in fact are in competition with regional dive centers and prohibit access to information.

Interviews with the teacher Sea Saver of the Carol Morgan School highlight how information is passed from the scientists to students and that the impact is a negative feeling towards the lionfish, which

further justifies intervention, management, further research and control. The interviews also illustrate how environmental stewardship perpetuates a 'moral high ground', and positions the elite as the saviours of reef, which in contrast positions the local community and fishers as perpetual threats. Further, the elite nature of the school itself shows how the lionfish as an environmental problem brings together an elite network driven by neoliberalism, as illustrated with the support garnered from the community associated with the Carol Morgan School. These perspectives signal to me that there is much work to do in the field of environmental education to focus on ecological issues and rethinking hierarchical structures and assemblages of power that are promoted in neoliberal conservation. The way that the power and elitism is employed in the 'successful' creation of a market for lionfish highlights how this ecological problem is described and the solution based on business as usual economic development, an idea strengthened by the use of the terms threat – whether it be to the nation and native species, the ecology of the reef or to the tourism industry.

The interviews and stories recounted by the fishing community and members of COOPRESCA illustrate several points presented in this work. First is that it is problematic to homogenise the diverse and changing needs and wants of the community in terms of community conservation. Next, there is an incredible presence of environmental consciousness and care for the coral reef ecosystems, which is in contrast to how fishers are portrayed in the literature and in other interviews where overfishing is described as a perpetual environmental problem and local people portrayed as unaware and uninterested in the environment, or only interested because of their livelihoods. Further, there is a strong criticism of the Conservation as Development project from the community, despite the fact that many individuals participate in order to be involved in conservation, have been impacted economically because of less available fish, and a desire to see La Caleta Park return to a well-loved and popular tourist destination. There are individuals who certainly have hope for the project and perceive great benefit from it, but I read that the project is not what it intended to be. Finally, and most related to the thesis is that the strong language of threat of the lionfish differs greatly, in that many fishers describe threat to their personal health and safety, and identify other environmental phenomenon as a greater threat to the reef ecosystems.

THE SCIENTIFIC AND MANAGEMENT COMMUNITY

Dr. Isabelle Côté – Simon Fraser University

Dr. Isabelle Côté, Professor of Marine Biology at Simon Fraser University provided a great deal of insight into the trajectory of research and management of coral reef ecology and the arrival of the lionfish in Caribbean waters. She has been supervising graduate students researching the lionfish for the last three years. The current and upcoming studies that she will be working on are investigating to see if the behavior of lionfish is changing due to the increase hunting of divers and fishers, as it is suggested that the lionfish will become more wary thus harder to harvest. She is also working with a graduate student to develop methodology to test the prevalence and abundance of invertebrates as it is suggested that the lionfish has begun to prey largely on this group, as the populations of juvenile fish have greatly been reduced. Dr. Côté stated that Stephanie Green's doctoral work illustrates that indeed, removals can have a beneficial impact on prey populations, even if not all lionfish are harvested. Dr. Côté is concerned that the scientific information that suggests that because the studies show and managers concur that the lionfish will not likely ever be eradicated, that there is no hope for control. She hopes that her work, among others such as Dr. Green and the Albins & Hixon group will show that even infrequent removals can lower lionfish densities and that indeed management should be pursued, and researchers should continue to evaluate the levels to which they need to be controlled to have the desired effect.

When I asked Dr. Côté about her opinion on the lionfish management programme led by the Reef Environmental Education Foundation (REEF), she told me that "the lionfish has been very good to REEF." While supportive of their campaign, Dr. Côté stated that REEF has "created the opportunity to develop a huge program around the invasion....REEF has positioned itself- not in a negative way- at the forefront of awareness and education. They are going about things in the right way- running workshops, teaching and targeting fishermen on how to handle the fish, tastings to show people about the toxicity of the lionfish, trying to train fishermen and managers to remove lionfish, promoting the consumption of lionfish. A lot of education. Their program is very good, but it is a big part of what they do" (Côté, 2013). On the process of overfishing the lionfish Dr. Côté states: "Yeah, it would be awfully nice if we could overfish the lionfish, but that is not likely to happen. In the US anyway, if you target a fishery then it immediately becomes

managed by the government to make it sustainable. NOAA and the national fisheries service are holding back because they cannot be seen to be promoting the consumption of lionfish because as soon as it becomes commercial and a targeted fishery it has to be managed. By law they cannot drive that fishery into the ground. The reality of their fisheries legislation. It needs to be sustainable- they cannot encourage targeted fishery. At this juncture in the interview Dr. Côté's research assistant Luis shared his opinions about creating a lionfish fishery in Mexico. He told me that "In Mexico – the problem is that there is no market yet, they do not give the price that the fisherman want. It is a contradictory thing if they get the price- they do not have incentive to start a fishery. There was a study done where a student investigated the price per pound that the lionfish would have to fetch and there was a two-fold difference in price."

Dr. Côté speaks about what is so attractive about the lionfish as an environmental problem. She says that the fish is very interesting; it's a beautiful fish – different than every other fish on the reef. It's an environmental problem that is very easy for people to grasp – there is a clear source, aquaria release. There are 65% less little fish on the reef, which is easy to understand even if people don't care about little fish. Dr. Côté is also critical of the education program in the lack of movement around the education of aquarists. She states that the link is not explicit enough and that there is no pressure to ban potentially invasive fish. On creating a fishery for the lionfish, Dr. Côté agrees that this is the way to go, but recognizes the very real limitation that seems to be ignored by conservation managers, which is the method of fishing, which begins to expose the political economy of the fish. She says, "they taste good, but it is a species that you cannot fish with the methods that have been so successful in destroying so many fish stocks. No fish stock has been decimated using spear fishing. You can bring down the size of a stock, but it's not like long lining or trawling. It is hard to catch. There could be a great market for it. Finally, seafood you could eat with a clear conscience. It has to do with the misconceptions of the toxins." When I asked Dr. Côté about the risk of ciguatera, a toxic bacteria that bioaccumulates and poses a risk for the consumers of fish at the top of the food chain, as the lionfish has become. There have been some locations where ciguatera has been detected. She said, "Well that would just be bad luck."

Both Luis and Dr. Côté spoke candidly about the population dynamics of the lionfish, which I believe are not being translated in the education materials. I account for this as being part of the managers

processes of ensuring that people become invested in management and stewardship, as these are the activities that not only generate income for the NGOs, but provide legitimacy for their efforts, justify their community involvement - and the way that they manage communities. Luis described a dive he did two days earlier and was impressed to see a few big parrotfish and jacks that he was not able to see a few years ago. He says he looks at it in terms of a predator prey relationship, where at some point the lionfish might reach its own carrying capacity.

Dr. Côté adds, "lionfish are here to stay. It looks like populations are coming down, and it might be not only because of removal. When populations grow they start slow and then really pick up then they plateau and then dip down. There is a lag time between running out of food and then starving and dying. In some places, you see this dipping back down its take a while because lionfish can switch prey really easily but eventually they will run out of food. The high high densities that we have seen are not sustainable. I think they will come down to some sort of level by the time they get there, we will probably see the effect of them imposing very high predation rates on juveniles of species that should have grown into commercial species. We are not seeing commercial impacts, give it another 5 or 10 years and probably we are not going to see something not good. We will see the cascading effects in that the juveniles, they can't grow up to do the job they are supposed to do on the reef. I think that we haven't seen the worst yet. Even if the densities are going down, there is going to be this delayed reaction. It's going to get worse before it gets better" (Côté, 2013).

Dr. Côté spoke about the networking effect that the lionfish has created in the Caribbean. She noted, "People in the Caribbean have become very organized and relatively quickly in terms of getting everyone together and sharing information and sharing best practice, you know this region has suffered all sorts of issues. I have been working in the Caribbean for the last 30 years or so and this is, to be honest, the first issue where I have seen this rapid mobilisation of people, and this organisation you know at the end of the day just because of the nature of the program I don't know how much good it is going to do. But it will leave behind this organisational structure and networks and connections between people that may end up being very useful if something else happens in the future that requires networking, advanced warning, sharing of best practice and so on. If there is a silver lining of lionfish it might be the social capital and

organisational capital.”

Dr. Côté talked about the potential of the dive community to mobilise on this issue. She said that they are a big help, and have the capacity to take leadership roles in addressing the problem. She also pondered whether or not there would have been a faster initial response if the lionfish was not such a beautiful fish. Dr. Côté then told me a story about a study that she wanted to do. For a research project she was working with a dive operator in New Providence, the kind of operator that sends a photographer out with every boat and people are sold the pictures. She was told that the lionfish was one of the most popular fish in the photos that they sold. Dr. Côté wanted to do a study on the relationship between the photos and advent of lionfish, but they did not keep records unfortunately. This insight is a perfect introduction to the information shared with me by two dive operators in Boca Chica, Dominican Republic, which reflect how the lionfish is perceived not as an ecological threat, but as human health issue that could affect people’s willingness to get in the water, and as an opportunity to show a magnificent fish to divers in the Caribbean – many of whom visit to see just such a thing.

Dr. Côté’s insights are important to this study in several ways; first in explaining the trajectory of research on the lionfish. Next she states that the lionfish indeed has taken priority with conservation, particularly with REEF, a lead on the creation of the management guide and supports the regional management of reducing populations of lionfish. She highlights the limits of the commercialisation of lionfish, although supports the initiative and illustrates that the full ecological impacts are yet to be seen as well as the lack of focus on the aquarium trade as a source of educational workshops. Dr. Côté’s experience working in the Caribbean has led her to state that this environmental problem has led to the social capital and capacity building that she has not seen before.

Aaron Shultz: Director of Cape Eleuthera Institute

Aaron Schultz, Director of the Cape Eleuthera Institute has been supervising research, outreach and education for the organisation since 2007. He described his opinion of why the lionfish is such an attractive and intriguing environmental problem. He told me that “it is an invasive species, and people like to throw money at problems they think they can fix. Eradication should never be used in a sentence with lionfish, it just isn’t going to happen, but management of lionfish on the reefs is a possibility. A lot of

people are concerned about lionfish affecting native fisheries, and they have always been able to have grouper and snapper on their plate. They have been overfished here, and to add an invasive species to the list of threats it adds another layer of concern. Climate change education is gaining momentum at CEI, but lionfish is getting more attention because [climate change] is such a big issue, a global issue and a lot of people feel like they can't really do much. It isn't as in your face, not as tangible as a species you have never seen before." He also described the educational program offered to the high school students and the communities at homecomings. He stated, "The students do some dissections and look at stomach content. They taste the lionfish, to show that it is an edible fish instead of fish that are often taken from the reef like snapper and grouper. We would be working to add lionfish to the menu. Snapper and grouper are built into the culture, it would be a long campaign to take them off the menu. We do taste testing at the homecoming events. It's not just focused on lionfish – we do cobia and tilapia cook offs to raise awareness about other programs at CEI as well. We want to educate about how to avoid getting stuck by the spines, and that it is an edible fish. It is slow, we have been at it for a little while, and I don't think most fishermen are fishing for it. There isn't really a demand for it, and I think that is what needs to be created first is demand for it in restaurants and fishermen will spend their time harvesting them. It takes more time to handle lionfish, and you have to be careful of the spines. I think people know more about them, and we are having an impact in localised pockets. We are really keen on lionfish derbies. That could potentially have a positive effect, but it has to be a sustained effort."

This interview highlights how the lionfish is understood as a threat to native biodiversity and fisheries, but certainly not the only threat. The way that the lionfish is described as such a high priority is reflective of the fact that people are more willing to invest their time, effort and money in problems with possible solutions and that do not require substantial social and behavioural change for themselves, at the expense of prescribing livelihood changes for fishers. The lionfish becomes a central focus for the work of NGOs, thus being framed as a disproportionate threat. His words also suggest that the lionfish is a much more approachable problem, especially in comparison to climate change that differs not only in scale but political framework. These considerations become very relevant in the analysis of the work of Reef Check and the advent of the lionfish working groups, which I see as using the commercialisation of the lionfish

and education programs as a platform to promote neoliberalism in conservation and perpetuate an elite network of actors who gain validation and recognition for their commitment to environmental protection. This network places the NGO in a position of privilege and expertise, which becomes particularly relevant in the process of encouraging a transition from fishing to eco-tourism.

Liane Nowell: Manager of Flats and Ecology Program, Cape Eleuthera Institute

Liane Nowell, Manager of the Flats and Ecology Program at the Cape Eleuthera Institute (CEI) described the lionfish education program and community outreach associated with CEI. The program is particularly relevant to this study because a fair amount of the biological studies around the lionfish, including the Albins & Hixon Group, Lad Akins work and the work of Isabelle Côté and Stephanie Green have been produced from studies through this research center. The management guidelines are situated around these studies, and impact the messages communicated to regional managers, including the DR. Liane told me that “Cape Eleuthera Institute is a school and a research station, two independent non-for-profit organisations. Most funds come from donations. People who support the research are families of the students, tuition costs are also part of the funding. Students are from the eastern seaboard of the United States, private schools. Families and communities of kids who come are donors as well as friends of the foundation and supporters of hands on experiential learning. The students get the US Standard High School Curriculum, which is place based, hands on and applicable to their experience in the Bahamas. They are taught by experts in the field – they read scientific papers, produce a poster that gets published in the Fisheries Conservation Foundation website. They leave as published authors, and they present at a research conference attended by their families if they are available and government officials. There are eight programs, Sharks (juvenile lemon sharks and deep ocean), conch, turtles, lionfish, patch reef research, flats research (mangrove bonefish and climate change). The lionfish program is pretty popular with the kids.”

I asked Liane to tell me about the approach used to communicate the phenomenon of the lionfish and how is the lionfish invasion framed. She replied, “As a negative thing. Lad Akins and Isabelle Côté’s work is the focus of the lionfish program. They come down a couple times a year. They stay for two-week chunks. They donated the Simon Says Boat – for research. Essentially CEI takes a lot of data for them. The lionfish also hits on the three goals of the CEI –outreach, education and research. We do outreach at

Homecomings, every settlement has a Homecoming – all people go to that settlement. CEI always has a booth and demo some of the filets, give out food, give away filets of lionfish. The common misconception is that it is poisonous and not venomous. We show how to properly filet a fish, not to hold a spear in the air. A lot of work on how to treat spines. How to do it properly and how to filet, how to get rid of the spines on the boat. A lot of little things so people realize it is safe. Another project is a cooking competition, many local restaurants to compete in cooking competition, the winner gets this or that, the fisherman that gets the most number of filets, they will get a contract with CEI to give them filets for a stable price. It's getting there. At every homecoming, more people are willing to try it. Once people try it they love it – once the demand is there. Not too many people will bring it home. Unless someone is asking for it, they free dive, they take grouper, lobster, conch, but not lionfish unless someone asks them for it. Instinctively they don't do it. They don't want to deal with it on the boat – they just don't want to deal with it. Our philosophy is 'If you create a market for it, humans are pretty good about wiping out species. The Bahamians respond to info about the grouper...If you tell them one lionfish eats like 23 grouper that kind of thing will get through to them.'

I asked how specifically the CEI students get involved and how much attention the lionfish gets in comparison to the other programs, "Liability restricts spearing while diving and the kids are not allowed to spear. We focus on research to facilitate conservation. Learn more about the impacts of the invasion on the reef. The shark and flats then lionfish the third highest in program. There are only three that hires interns, gets funding and do a lot of research and have many projects outside of the islands school. REEF, Simon Fraser, lionfish program gets 3-4 interns plus the program manager. We try to go into elementary schools and do lionfish demos, serve lionfish. Targeting young people is better, they are so much more open, they say "yeah try it mom, I had some in school."

I asked Liane how she perceives the lionfish after working at CEI for two years and her background in Biology. She replied, "I am hopeful about it, I do see it from a conservation perspective for the other reef fish. I kind of feel bad for them, it's not their fault that they are invasive, they are a really pretty fish. Among my friends, we eat lionfish about twice a week; there are no regulations, no seasons. They do not swim away. They are not aggressive...They will never be. They are curious and indifferent.

If you try and spear it more than twice, they will get smart and swim away. I won't spear anything in the water, but I have no problem spearing lionfish. Everything else in the water....I won't spear because of my soft heart, but I have no problem spearing them. If you spear heavily, you can really annihilate them.”

I asked Liane about the future of conservation and the lionfish. She said “People do not know how populations are controlled in native habitat. Even then, you are not going to introduce their larval predator. Just since being here I have noticed a moray eel, a big grouper and a shark have eaten a lionfish. They have not yet made it to the mangrove ecosystems, because that would really start decimating the populations because they are the nurseries. Community outreach will be helpful. As far as I know, we have a pretty good relationship with the community. We don't try and enforce anything, just provide information and let people make up their own minds. We do not sell any products, we can't sell lionfish, and we cannot take business away from a local Bahamian. We are just providing the facts on lionfish.”

The interview with Liane brings forward several important points. First is the persistence in which humans are framed as 'good at wiping out species'. This implicates fishers more than anyone, and they are often the target of such comments, despite the lengthy commodity chain and obvious political economy of the industry. Like the logger or the miner, those most directly in contact with the commodity get the intense pressure and the issue become one associated with morality, rather than the political nature of the issue, and those with economic privilege are referred to quite differently. Next is her comment on having a soft heart which prevents her from spearing anything on the reef except for the lionfish. This is where the power of the discourse and the lionfish as threat comes out. Therefore, I argue that the fish is framed as an enemy, a threat, and why the language is so strong and powerful, as it can conjure emotions of dislike and hate in individuals who have a deep ecological connection and otherwise would not ever spear a fish. Liane is working toward a Masters in Biology, is a dive master and has a wealth of experience in the marine ecosystem in question. Her attitude toward the lionfish is a very good example of how the discourse was effective in ensuring that this fish is not accepted into the ecological community – although it is there to stay- and that consumption and commercialisation it is the solution.

Ana Maria Perez – Biologist, Ministry of Natural Resources

Biologist with the MNR&E of the DR, Ana Maria Perez, has been part of the ‘Environmental Consciousness and Capacitation’ project around the lionfish since 2010. In her interview with me, she talked about how a representative from Jamaica came to the DR to train the ministry on how to address the problem in a three-day workshop, in which RCDR was involved. The focus of the workshop was to engage fishers to hunt the lionfish to control the populations, how to commercialise the fish, and to reduce the taboo about the toxicity of the meat and to train people on how to avoid stings. Mrs. Perez’ description of the lionfish as a grave threat is central to my argument that social location and influence impacts the way that people understand and react to environmental issues. She states, “The lionfish is a tremendous threat. There should be a UN World Day for this fish. Like there is a day for the ocean, climate change, there should be one for lionfish. Climate change is something we can adapt to, but the fragility of the reef and rapid spread there is not hope to adapt that quickly. It will impact the services offered by the reef, the biodiversity and the base of all life and the economy.”

On the process of ‘re-educating’ the fishers she describes her opinion on the process. “Of course fishers are open to changing their fishing practice because they see the threat to their livelihoods, for this reason (the lionfish) there are no shrimp, grouper, snapper. They are open and informed to change their practice and work with the environmental authorities to mitigate and reduce the impact of this fish in the DR and all the Caribbean islands. No they are not afraid to eat the fish once they have been informed.”

Omar Shamir Reynoso: Vice Minister of Coastal Resources, MNR&E, Santo Domingo

Omar Shamir Reynoso, Vice Minister of Coastal and Marine Resources provided me a great deal of insight on how the MNR&E have responded to the lionfish. He spoke in detail about the co-management between RCDR and the government, which allows the scarce resources in the ministry to be used for other things, and Reef Check can offer the science and monitoring aspect for the park. Beginning in 2010, the government provided funds to buy lionfish from fishers, per head, not per pound to entice fishers to capture the juveniles as well. Managers have considered marketing the juveniles for the aquarium trade, which is remarkably ironic as this was the source of the lionfish in the Atlantic, and also absent from educational programs as the focus is on the fishers to ‘clean-up the problem’. The government was also participating in

creating educational and promotional material encouraging the consumption of lionfish, even creating cartoons featuring prominent political figures. In early 2012, the government stopped this program because they became concerned with the possibility of the presence of ciguatera in the region, thus they did not want the liability of anyone getting sick on their recommendation. When I asked Omar how the lionfish compares to other ecological problems facing coral reefs, he told me with a laugh, “the lionfish is not a big problem – overfishing is the big problem.”

The interviews with the MNR&E illustrate several themes in this work. First is that there is inconsistency in the notion of lionfish as a major threat, which speaks to subjectivity and suggests that there is room for individuals to communicate the same information differently. Mrs. Perez, whose portfolio includes the lionfish project has the strongest language around the lionfish as a threat, whereas Mr. Reynoso, who no longer works with the lionfish due to ciguatera identifies overfishing. The reluctance of the government to promote the consumption of lionfish is also noteworthy here. This suggests that despite the risk to human health, the NGOs continue to promote consumption. There is also the idea that fishers are happy and willing to switch to fishing lionfish. While the subsequent interviews with fishers suggests that indeed, fishers are concerned with the impact on commercial fish, the willingness to fish for lionfish is in fact only present for the fisher who uses traps, and the others have stated that the process is too demanding for the benefit. To me this illustrates the way in which managers construct a problem and a solution while simplifying the issue in order to promote their projects under their portfolios.

Nina Lysenko – Director of the National Aquarium – Santo Domingo

Nina Lysenko, the Director of the National Aquarium described to me a detailed program that began for the lionfish, as a study funded by the MNR&E and supported by UNESCO beginning in 2011. RCDR was included in this study, particularly in their scientific reports and examples of community outreach to eliminate the taboo that it is poisonous and to begin to commercialise the lionfish. She told me, “The purpose of the study was to evaluate the presence of lionfish in various regions of the country. The east coast has a high prevalence of barrier reef – this was a monitoring project. The fishermen in the east are not 100% dependent on fishing, they participate in various activities, and their reactions, based on interviews, is one of fear.” Nina stated that, “we have to implant the idea of utilisation and advantage of

lionfish to the community in various ways. Programs are being developed with hotels, dive centers, fishers, restaurants to take advantage of their presence – the lionfish is not leaving so what can we do to reduce them, what control can we use with local methods. We are also using Reef Check to evaluate and monitor, because having accurate information is very important – they have received help from the Cuban aquarium with tools, and participated in an exchange of ideas and methods for monitoring.” Nina then told me that the study has stopped receiving funding, thus the dissemination of what has already been studied is limited to volunteers, of which there are few, and there is no way to continue the study to evaluate the impact of removals. She went on to describe how Reef Check is important because they can continue to do that work, but only in the areas they are working in, such as La Caleta. This is what Nina describes as the biggest limit to research and outreach, which she relates to inconsistency in funding and changes in government. Nina told me that a massive problem to the commercialisation of lionfish is the taboo that it is poisonous, thus the key message in addressing the lionfish is “Sin espinas – es igual de cualquier otra pez” or “without the spines it is just like any other fish.”

Nina’s interview presented a very important consideration within this study that puts the prioritisation of the lionfish in a regional context, and shows how vulnerable conservation programs become when funding and government support is precarious. This is how and why private NGOs gain such importance and power, when the state is not able to support and maintain research and conservation programs. Also, when the government changes, often they bring in different ministers to take on various portfolios and there is little consistency from one government to the next, and nepotism contributes to certain individuals in positions where they may not necessarily have expertise. She also highlights the role of the NGO Reef Check taking on a very significant role for the government in collecting data, communicating and monitoring, especially now that they are taking data on lionfish in the surveys. In a political climate where funding comes and goes, it is seen that RCDR has something critical to offer, and that the messages of commercialisation and consumption are very much supported perhaps partially to gain support and further funding for the organisation itself by focusing on a single solution to a problem, which I argue is oversimplified.

Ruth Feliz: Administrator of Protected Areas for the Ministry of Natural Resources and the Environment, Santo Domingo

Ruth Feliz, Park Administrator recounted to me the history of the park, the government support of the park and the benefits of partnering with RCDR. Her statements illustrate how fishers are framed as threats, and how lionfish management is celebrated. She recounted, “in the 1970’s Joaquin Balaguer moved the entire community of La Caleta to the area across the highway and turned it into a protected area in 1986, by decree. She says the state offered them land and placed them across the road. There was no problem – the community was so small. It was supported by UNESCO and the government of Russia donated money to develop the area into a park. The Museum of Man now houses the remains from the Taino cemetery, which were extracted and put in the museum that used to exist here. Now there are proposals to do more excavations to search for and restore the rest of the remains that exist in this area.”

Ruth digresses to refer to how National Parks are regarded in the DR. She talks about two stories in one week from two daily papers, Popular and Hoy. In Popular, there was an article that came out about the disrepair that La Caleta has fallen into. Framed behind a photo of the garbage washed on shore after Hurricane Sandy (over four months earlier) the article stated that the government was not using the resources marked for the upkeep of the park, and that it is in complete disrepair with no one using the space. This is described as a political move to push for the privatisation of National Parks and a move toward allowing the sale of state land to private investors, particularly those interested in promoting tourism. In Hoy, the other paper, the work that has been done to restore La Caleta is celebrated. Ruth states, “There are actors who are interested in personal investment in this National Park. Politicians and people who do not have a level of consciousness want to develop this area. There are laws protecting the development of this area, and it is illegal. But there is a group of people who are pushing to have that changed and to privatise the area. It would change the whole purpose of this park – to provide habitat for rare species and protection of the rare species that exist.”

She returns to the topic of the co-management of the park with RCDR. “This is a shared administration. They have done an excellent job doing research. They have assisted a lot in conservation of the marine resources. The Ministry does not have the resources to do certain things. They have done

various studies and they have recovered, restored several areas of coral that were completely destroyed here in this park, from natural phenomenon. These same fishers had destroyed this area, but now it is being restored. Thank god, through the RCDR projects and through our surveillance and protection we have been able to turn things around for the environment. This area is important to the community and to the country. The state has valued this area by making the place protected. The population however does not value the natural resources that they have here. There are interest groups who are getting involved in the area, but not for the environment, for their own economic interests, like trying to build a pier to facilitate fishing. The state is not in agreement with this. They have planted over 4 million trees. There is a very strong support for protected areas. This park - in 1996 and 2000, was almost completely abandoned. When Leonel Fernandez came into power, he began to restore this area. The train, the museum, was not able to be worked on but slowly they were investing in making this area beautiful again. Without natural resources, we are nothing. That is how we get our riches. That is the real richness. That is how all human beings are able to survive is with nature. Our future goals are to integrate the community, that they achieve a level of consciousness so that they value the resources that they have here. This park is the lungs of the community and they are privileged to have it here.”

This perspective clearly illustrates how this particular government representative frames the park, the state, the community and the NGO. It falls in line with the literature of political ecology that states that the communities surrounding protected areas are impacted by the creation and management of parks. RCDR is celebrated for what they offer to the government, and the role of the state is celebrated for their environmental consciousness and commitment to protecting the reef, in sharp contrast to how the community is described. Where the development of mass tourism and fishing in the park are prohibited, the lionfish program and the transition to eco-tourism is a way for which neoliberal conservation to sneak in, under the guise of a sustainable livelihood initiative supported by the experts, and which are based on the magic of the market.

Ruth Feliz talks about the lionfish stating that “the Ministry had a program where they were buying lionfish from the fishers here for 50 pesos per fish – not by the pound. We want to eliminate them. This is what we want to do with this type of fish because it is invasive that is damaging our native fish. It is

a grave threat to the original fish here. People were really afraid of the fish, word spread very quickly about this fish in all the coasts and in other countries. People had the idea that because the spines are venomous that the fish is toxic. We tell them they are good to eat. Let me tell you, I love it, it is so delicious. It is like it is a Class one fish like grouper. The people are starting to eat it. Thank God the fishers here are on top of this fish, and we are making a market for them to sell it. Here it is authorised to fish it and sell it by the ministry because it is going to wipe out the fish that originated here. So we want to get rid of them. With coco, fried, with salsa, it is so delicious. Here we have a lot of events, and we also sell permits and there is a tax that goes into a fund that pays all of the staff.”

Ruth Feliz’s interview brings forth the perspective of a park manager to illustrate the argument that commercialization of lionfish is indeed an appropriate way to address the ‘grave threat’ that they pose to the marine ecosystem. She also highlights how the fear of the community needed to be addressed so that the consumption could create a demand for the product. This links the concept of threat, from human well-being to risk to the ecosystem, to the free market as a solution. Again this shows the need for fishers to change, but not other actors. Her articulation of the fact that the community does not value their natural resources makes a very significant point in that it shows how the community is homogenised, described as lacking appropriate interactions with the ecosystem. The homogenisation and vilification of the actions of the community quiet the stories of environmental discourse that do exist, and the potential to understand specific acts of defiance as resistance against governance and the state, not ignorance. This interview relates back to the concepts of territorialisation and the violent colonial history of the creation of the park where the community was displaced ‘for their own good’ and the good of the state and resistance was not tolerated or even recognised in the retelling of the story.

Ruben Torres: President of Reef Check Dominican Republic, Santo Domingo

Dr. Ruben Torres, president and founder of RCDR has been the driving force behind the project in La Caleta and shared a great deal with me about RCDR and his experience managing the park. He also was welcoming in inviting me to many workshops and meetings. Ruben began telling me about how Reef Check operates. “Reef Check is a coral reef health monitoring protocol and a way for non-scientists to get involved in collecting data on reef health, or to have more people in the water. It started in 2004 with the

Blue Flag in Bayhíbe resort. They brought people from RC in the US to do the first assessment and workshop. After that the UN funded us to do sustainable tourism activities here. Reef Check first does socio-economic data, then the environmental conditions focusing on counting fish, coral cover and how much of the bottom is covered by biotic and abiotic components. It is designed to be a simple protocol they choose indicator species. For example, we count large parrotfish. If there are none, that indicates overfishing. We collect disease data, temperature and this year the lionfish in the Caribbean was added as one of the fish that we count. Lionfish has become a big problem for the Caribbean. We have trained 100 people locally to do the Reef Checks. A couple of the fishermen at La Caleta were trained.”

When I asked about the lionfish as a conservation priority he responded, “The lionfish is getting a lot of attention because it is a new problem basically, but it is also creating a lot of impact on the reef. Scientists are trying to address that situation but also it provides an alternative, which is why we are promoting consumption of the fish as management. We are trying to get fishermen to stop taking grouper and lobster, and we can tell them to go ahead and fish them [the lionfish] intensively if they want. We are saying that the lionfish came to the wrong place when they arrived in the Dominican Republic. There were a couple of years where people were scared of it, but by doing tasting and teaching people how to handle it so they do not get stung. Now they are taking it quite nicely. In La Caleta, we are seeing the benefit of the management in number and size of lionfish. One of the effects of overfishing is reduction of density and size of individuals, so they are definitely being overfished. It is an invasive species, it is not supposed to be here in the first place. They are a top predator on this reef, and reduce local biodiversity by 80%. They came without parasites, disease or predators, so that is why humans can be the ones who control. Humans are very good at overfishing. We are following the International Coral Reef Initiative, and one of the topics is lionfish control through a committee that I am part of. Scientists from the region sat down and decided the strategy, REEF is one component, and the management guide came from that. Humans are already consuming it, so that is one control before natural predation can occur.”

When I asked Ruben about where the lionfish sits in terms of other problems on the reef he said, “it is difficult to rate because of the different scale of environmental impacts, but they are everywhere. They can live in any habitat and depth. They are a major threat I would say. In La Caleta the fishermen

group was not that organized before so Reef Check thought to create a fishing cooperative- that was four years ago to get them organized, improve their structure and get them improving their income so they can reduce fishing pressure and move into other things. They are selling to the restaurants, but also buying from other areas. Right now they are making money from the lionfish, it's a brand new product that they are using now. They are supposed to be selling all their catch through the coop, but there are limits, I don't know why they aren't doing that yet. September is the date that the project that got the aquatic center started is ending. Ideally, the coop will take over but a couple of things need to happen before that which they need to be legally incorporated, there have been many delays with the paperwork. We proposed to them that instead they create a private tour company. The donors, the Inter-American Foundation in Washington, will actually have the final say to see if they can manage the aquatic center on their own. I think it is going well, we were able to get the aquatic center going, get the cooperative organized, and get the co-management of La Caleta. Right now the fishers are going through workshops to access micro-credit loans. They will be available to anyone in La Caleta. It is part of the project with the Inter-American Foundation to develop economic alternatives.”

In the interview Ruben illustrates a very optimistic view of the project that suggests that lionfish can simply replace other commercial species and that RCDR recognizes that there is a need for economic alternatives. This shows that there is support for the commercialisation of the fish, which this work argues detracts from the complexity of the issue by placing the market in the center of the conservation activities and is based on the connections through Reef Check, which are inherently unsustainable if or when RCDR hands the project over to COOPRESCA. Ruben's biological expertise is communicated clearly in his descriptions of the impacts of the lionfish, and he is always careful to include the synergies of impacts from other sources, yet states that the lionfish offers a unique opportunity to fishers as an alternative to their current destructive practices. This work is not to refute the science of the impact of overfishing, or the arrival of the lionfish, but to examine how these issues are framed, understood and communicated. Ruben's interview clearly shows the faith that the NGO puts in the market as a solution, which this work argues is simply a perpetuation of exploitation, where the fishers earn significantly less than anyone in the commodity chain, and the NGO receives recognition, funding and validation from their successful work in

community based conservation. Indeed, reducing lionfish abundance will impact other fish – this is not in question. What is in question is how the lionfish takes priority over other stresses because it is a simple market based solution, which I argue is not going to have the long-term impact necessary for the overall health of the reef and certainly not for the livelihoods of the fishers. What is happening and likely to continue through such conservation practices is that the elite are using conservation not just to protect nature, but promote their own financial interests and social status and the fishers bear the costs of fishing restriction, and receive little in return.

THE DIVING COMMUNITY:

The diving community is identified as a principal actor in the ‘fight against lionfish’. Because of the natural history and habitat of the lionfish, which is most often deeper than most swimmers and free divers can reach, SCUBA divers can reach the fish to hunt it because of the dive equipment, thus it is said that divers can and should take an active role in the culling of lionfish. While I was in the neighboring town of Boca Chica, which is a very highly developed tourist area, complete with mega hotels and seven dive centers, I had the opportunity to interview three dive shops who provided three very interesting and different perspectives of the dive industry in regards to the lionfish, and one who was very critical of the management of La Caleta Marine National Park.

Antonio, Treasure Divers

My interview with Treasure Divers, which operates out of Hotel Don Juan, a major hotel along the strip in Boca Chica, which brings in tourists from North America and Europe. Their dive center is fully equipped and state of the art, with more than three dive masters available on any given day. My interview with Antonio, a dive master and manager of the dive center at Treasure Divers was brief, but informative. When I began to ask about the impact of the lionfish, Antonio and two other staff members immediately wanted to show me the scars of where they had been stung. This was a very common occurrence, where Dominicans in direct contact with the lionfish had scars to show, and stories of the most intense pain that they had ever felt. While no diver in this study has been stung, every single fisher that I interviewed almost immediately told me the story of their first sting. “Those things are dangerous”, Antonio told me. He went on to tell me that he and a few other instructors had participated in a workshop with the MNR&E and had

been trained on what to do in case of envenomation. Antonio's main concern appeared to be the risk to tourist divers, who may not have ever seen such a fish and who would might want to touch it, or accidentally bump into it. The safety of the divers was very important to him, but he also told me that he feared that if people hear too much about how dangerous they are, they will avoid diving and snorkeling all together, which is not something that he would want to see happen. On the commercialisation of the lionfish, Antonio was very enthusiastic, "they are delicious, and better to eat them than to be stung by them. It is better to eat the lionfish that are many than the lobster that are few." Antonio's perspective shows the concern for human health, but also the risk that the fish presents to the tourist industry. It also supports the commercialization of the fish, particularly in the face of overfishing.

Jutta Pitz -Tropical Seas Divers, Boca Chica

Jutta Pitz, dive master and co-manager of Tropical Seas Divers represents how the lionfish can be perceived as a welcome species in the coral reef ecosystem and that offers something unique to divers that dive operators could 'capitalise' on, as Jutta suggested. Jutta, from Germany but a resident of Boca Chica for the last fifteen years has been working with Tropical Seas Divers since she arrived in the DR. In our interview, Jutta told me that: "It is a beautiful fish and great to show to the divers. 2006 was the first lionfish that I saw. I said hmmm, I knew that they did not exist here. But he was very little, but stayed in the same place so I went and visited him and then one diver had a very nice camera so we took a picture and sent it to a German diving magazine and said 'what is with this fish?' Is he on vacation? He said that in 1992, six escaped and invaded the Caribbean. Two years ago, there was a big population, but the dive centers fished them a lot. Like I said I like my lionfish – you know the reef is much overfished here, so I am happy that I can show people a beautiful fish. Groupers normally eat the lionfish in their home, but here the groupers are overfished and tiny and the lionfish are much bigger, so that is the problem. The lack of fish on the reef is not the fault of the lionfish, it is the overfishing. They are hunted before they even have the change to reproduce. The degradation of the reef is the big problem. In a healthy environment, they [the lionfish] would not grow to these big populations."

When I asked Jutta about the attention that the lionfish gets compared to other issues, she told me "They should take care of their environment here, and then the lionfish comes second. I have been here for

15 years, and I have seen populations reduced not because of the lionfish, but because of overfishing. To take care of the lionfish is good, but that does not stop the disaster down there. Even here in Boca Chica, we do not have that many because the dive centers hunt them down. We do hunting, but only if the customer specifically ask to hunt the lionfish. We don't get tourists asking to do it, only residents who live and work here. There are 25 dive spots in Boca Chica. I think that La Caleta and the dive centers here could work a bit better together. We tried to put buoys out here so we don't have to drop anchors, but they are always getting stolen. We try to replace them but that is quite costly.”

When I asked Jutta about the relationship between her dive center and local fishers, she laughed and told me there was no relationship. “They catch my fishes. They live, we live. I am not happy if you come early in the morning you see the little fishing boats and they have the smallest fishes. They are fishing with mosquito netting, getting even the very baby fishes. When I approach them to ask them what they are doing they say they use it as bait. I tried to tell them not to use the babies to catch the parents, but they don't want to understand. It's a strange situation. I'd really like to do something but you can't, you have to wait for the government or the Ministry of Environment, but otherwise you cannot do anything. You have laws here about nets, fishing but nobody cares. One time there was a fishing boat out there and it was fishing with a net, which is illegal. I went to the marina where the Ministry is patrolling. They did nothing, and later I saw the boat bringing them some fishes. It's the same with all the laws here...different laws for different people.” On transitioning from fishing to tourism, Jutta told me, “It is a good idea. We tried to hire a fisher from La Caleta to take care of the buoys so that he would not fish, but he took care of the buoys and was fishing, so it wasn't really effective.”

Jutta's perspective offers a very important aspect of this work. First, she clearly names the lionfish as a benefit – which is the first time I had heard this perspective in this investigation. She also is very critical of the fishing community, which illustrates how the tension increases as competition for resources increases – speaking to some of the problems associated with economic valuation of ecosystem services and components. Jutta also brings forward what I have heard in passing so frequently, that in the DR laws function differently for different people. Jutta's articulation of the fishers not wanting to understand may represent her understanding of why the fishers continue to fish, and why fishers are so commonly referred

to as ignorant. This minimises the potential to see any action as a form of resistance, where regulation of fishing is common, and regulations on diving, and tourism are absent thus potentially creating tension between actors.

Markus Haemmerle, - Dive Master -Caribbean Divers, Boca Chica

When I approached the counter of Caribbean Divers and introduced myself to owner and dive master Markus Haemmerle, I could see a small bag of lionfish- clearly juveniles- behind his desk. I told Markus that I was researching the lionfish and the co-management of La Caleta Marine National Park, and he insisted that I use his name when I share his perspective, as he had strong opinions on these subjects. Markus began by telling me about the advent of the lionfish around Boca Chica and that he personally culls and promotes culling as the population had exploded, and he was seeing from between 80 to 100 individuals in one dive. He noted that he culls because ultimately it is better for the ecology of the reef, because they are preying upon the juvenile fish and reducing biodiversity. He tells me that there are a few restaurants on the strip (referring to the stretch of beach full of shops, hotels and restaurants) that will buy the fish from him. During the interview Markus expressed strong sentiment that the lionfish needed to be controlled, as it was a disaster for the ecology of the reef, but definitely not the only risk. He was also very critical of commercialising the lionfish – particularly when it is sold by the pound- because it creates an incentive to let the fish grow as big as possible, then fishers will catch the largest fish. This was a practice that I witnessed on a dive at La Caleta, where I went out on a dive with an American father and daughter. Carlos was the dive master, whose interview will be presented later in this work, and when we returned to the surface and were talking about the fish with the divers, Carlos said that they leave the small ones so that maybe things will learn to prey on them, and since they are small, they do not eat that much. This is certainly counter to what the ecological literature states, that even small fish eat multiple times their weight in prey and describes the worry that managers have that by marketing the fish it incentivises individuals to let them grow. Markus supports the idea of selling the fish per individual, and restaurants absorbing the cost for small fish in order to encourage and economically reward fishers for taking the time to catch the small ones as well. But commercialising the fish the way fish are traditionally sold here, says Markus, is a very bad idea. While he actively culls, and has almost cleared out this area of lionfish – he would never

serve it or eat it. He cites the risk of ciguatera and other risks of bioaccumuated chemicals as reasons why.

I asked Markus candidly about his opinion on the work of RCDR, and he gave me a very open response for his distrust of the organization and was specifically critical of the current manager, who according to Markus is earning millions of dollars and using Reef Check and the donated items for his own personal gain. He told me about how he as a foreigner operates in Boca Chica. He said that he recognizes that the people who have money make money, but he criticises the manager at Reef Check for using the environment to promote his own livelihood. “Anchors from dive boats and shipping boats are cited as a very detrimental practice to coral reefs as they destroy the structure of the coral with each anchor drop. Caribbean Divers and other local operators used their own investment to install buoys and moors to attach the dive boats to mitigate this damage.” Markus told me that Reef Check had a lot of buoys donated to them in order to protect the entire area, including Boca Chica, but when Markus approached Reef Check to access some of the buoys, he was quoted a price for their rental. This was outrageous for Markus as he was already incensed about how lucrative conservation had become for Reef Check, namely for the manager who seemed not to have any desire to share the money he was making, nor to collaborate with Caribbean Divers for what Markus sees as the very same ecosystem separated only by a few kilometers. There is of course potential for Markus’ response to be a reaction to personal animosity between himself and the manager of Reef Check, however in the next statement Markus makes a very valid point that is more difficult to refute based on his position. He states that if Reef Check was genuinely interested in protecting the ecological integrity of the reef, then they should ideally be trying to encourage the community collaboration and support of as many individuals and groups as possible. Reef Check is an organization that exists because it collects data on the state of the reef, the abundance and structure of the reef community that then informs management practices. Markus has, on numerous occasions, requested the data for La Caleta in order to gain insight on the status of the reef in the area, but has yet to be provided the data. (Upon my return to Canada, I made the request for the information and had the excel spreadsheet in my inbox within a week). It appears in this case that Reef Check DR is actively not sharing the information with other actors in the region, for what could be one or a matrix of many reasons. What Markus questions is what RC DR is really doing, and in whose interest. He wants to know who uses that information, and

what makes them so deserving of so much international funding if they are only concerned with their tiny area of protected reef. He also stated that he is very unsupportive of Reef Check's idea to transition to eco-tourism, particularly in offering dive services. While it could be seen that this statement comes from a resistance to local competition, as the dive sites in La Caleta are very popular destinations and Caribbean Divers does offer trips to the park – Markus cites the use of donation dollars to set up private enterprise that currently remains in the hands of the NGO and a lack of training of the divers and dive masters at El Carey as his reasoning. I concur that a dive operation, due to its highly dangerous nature of activity needs to have a highly qualified team of staff and emergency procedures in place should there be any problem, and of course the equipment should be in good repair with available funds for maintenance and replacement. Currently, El Carey is not making enough money to support itself (Torres, 2013), and if a dive center is going to be in the future plan- this could be a recipe for disaster. Markus' interview was enlightening in that it articulated many of the business related concerns with eco-tourism, the precarious perception of the work of a 'local' (with international funding) NGO, and the commercialisation of the lionfish. His personality and insistence that these perspectives make their way into this work with his name attached suggested to me that, in his opinion, the work of RCDR is doing more for the economic benefit of the manager than the ecosystem it was set up to protect.

On other threats to the coral reef Markus recognizes the impact of tourism, particularly the volume of tourism in Boca Chica as a significant stressor, which this work argues is absent and even obscured in the promotion of eco-tourism. When I asked about runoff and the impact of the boats and traffic of the megaport (the massive port that imports most goods into the country and see hundreds of cargo ships arrive each week), he responded that they don't really do a lot of damage that he can see. Markus does say that the local people including fishers are having a massively detrimental effect on the reef. He says, "Here people take and take and don't give a shit. Here, the law works differently for different people, people empty their motor oil, use spears and huge nets to fish, walk on the reef with their shoes and I have seen people pay the police or SENPA to look the other way. With the local people the environmental consciousness is low."

Markus' perspective offers a very strong critique of the NGO and the transition to eco-tourism. He

also offers another layer of how the community of fishers is discussed. While I do not refute that there are many behaviours that are having negative ecological impacts, I contend that there could be more to it than ignorance or 'not giving a shit', particularly when tourism and other activities that bring income to the more wealthy and powerful are not criticised.

Richard Essen: Recreational Diver

Richard Essen's interview has come to represent the perspective of a tourist diver who was seeking out a 'sustainable' tourism opportunity on his vacation with his daughter, which is precisely the demographic of tourist that is sought for La Caleta through RCDR. Essen told me, "I came to La Caleta because of a recommendation from other dive centers on the North Coast and calmer waters. I heard about the lionfish about eight years ago, I saw one in the Philippines. I have done three dives in La Caleta, and probably saw about a dozen all together. I was surprised at how many there were, because I thought they were quite rare. Even though I now know that they are an invasive species, I still think that they are a beautiful fish. I don't like to see any fish hunted on the reef, and I think it is a good idea for the dive master to hunt it, and if I had the gear I would do it myself. I was surprised to see that they left the smaller fish, and when I asked why he didn't harvest those, he told me that the other fish would take care of the small ones, and the large ones were the ones that need to be removed because they do not have a predator. I am impressed that the DR is doing as much as they are in terms of conservation and being very aware of trying to preserve what they have and I applaud them for that. I am a little surprised that there aren't more tourists, it's beautiful, easy to get to, and the dive sites are really nice. I guess Boca Chica grabs all the tourists before they can get here, or no one knows about this place. It is a bit hard to figure out how to dive here if you don't speak Spanish".

When I asked Richard about what he thinks the biggest threats are to reefs, he did not mention the lionfish. He stated, "I have seen a lot of dead coral. I know that global warming, and places that are too well loved with people who do not know how to control their buoyancy are the big threats. I think that there should be more fish here than there are, but in the last ten years, there is not nearly as much variety or numbers of fish". These remarks I find particularly interesting because as a diver, Essen identifies the act of diving and tourism as one of the greatest threats. This is significant here because it shows that there is

potential to be critical of one's own behavior, and could suggest that awareness of one's role in environmental problems does not necessarily result in behavior change. Also relevant here is the lack of mention of overfishing, which illustrates how a diver, a business operator and a fisher would have varying perspectives.

Ron Knight: Director of SCUBA Operations at the Cape Eleuthera Institute, Bahamas

Ron Knight is the individual responsible for managing dive operations and assisting students and researchers at CEI, including the Albins & Hixon group, the Côté group at Simon Fraser and Lad Akins at REEF. He has vast experience in leading dives and has much anecdotal information to share regarding his perception of the lionfish. On the impact the fish is having Ron told me, "The first time I saw I thought it was the most beautiful thing in the world, and I still do. But knowing the reality of what I know, it has to be eliminated. I would like to appreciate it in the Pacific, but here to me they are a prey item. I will try and find some way to disrupt its pattern or its function. I have witnessed a lionfish eat three juvenile fish in a matter of seconds. It was like watching a vacuum cleaner pick up dirt. They are the perfect hunter. And they are very adaptable. They are voracious eaters." Ron's description of the lionfish parallels the notion of maximum efficiency often touted as a benefit of capitalism, and in this context he is saying that the native fish do not stand a chance against this 'perfect predator'.

In regards to the potential of the management program, Ron told me, "To be honest, I don't see any control being able to stop them, but we might be able to slow them a little bit until we can find something that will control them. All the lionfish derbies in the world won't stop them. We can do what we can, trying to get people to eat them." His description of the community outreach to encourage the consumption of lionfish was interesting and suggests that fishers need to be schooled in conservation and frames the fishers as threats who lack the information necessary to interact appropriately. He says, "Every time you try and change somebody's culture or enlighten them on some things it is usually an uphill fight at first, but eventually the tide will change and we will be able to help them help themselves understand that they want to conserve that resource instead of deplete it."

Ron also speaks on the issue of the difficulty promoting spearing lionfish in parks and on SCUBA. Ron says, "We have a permit from the Bahamian government to spear lionfish on SCUBA. They really do

not want to relax on the regulation not allowing any spearing on SCUBA. They have given it to us to fish for research. We will cook it up and share it, but we have to measure and weight every fish first". At CEI, the funding for Stephanie Green's PhD research was the main funding for the lionfish program and education and outreach. These programs are intimately tied, thus illustrating how not only the key messages are tied to the research, but how the educational program is dependent on funding from research and thus the perpetuation and necessity of the problem. If the lionfish is not framed as a crisis, and is not enticing researchers then the education and outreach programs, which have become embedded in what is offered to international students cannot be maintained.

These interviews that I have included here from the dive community represent a variety of perspectives on the lionfish that illustrate the potential for economic opportunity, the mistrust of the state and NGOs from the perspective of a non-Dominican and the real physical risk that the venomous spines of the lionfish pose for those who work directly in the reef and for guests who are unaware. Further, the interviews highlight how the local community and their fishing practices are regarded as ignorant and full of self-interest which calls morality and awareness into the picture over politics and power. In this group of interviews the term threat has various representations from human health of fishers and divers, to ecological threat, however this strand offers the lionfish as a benefit to the already degraded reef. I read this as stating that the lionfish, for this group is not the 'grave threat' posed by the science and management community.

THE EDUCATIONAL COMMUNITY

Students of Coral Reef Field Course

I was able to interview several fourth-year biology students from various Universities in Ontario who participated in a field course on Coral Reef Conservation offered by Carlton University. The course was designed to give students the opportunity to create a research question, collect data, do the analysis and write a report. The students were interviewed during the data collection stage of the course, after the students had participated in a statistics session led by Professor Nigel Waltho. The following is an interview with fourth year Biology student Matt McGoveran revealing how more detail regarding the lionfish has impacted his understanding and feelings toward the fish:

“Professor Waltho told us about a virus that came in 1983 and wiped out a bunch of herbivores that clear up real estate for corals and sponges. The lionfish is a significant threat to the remaining herbivorous fishes, like the parrotfish. Without the herbivorous fishes, they will not clean off the algae. The lionfish is way more of a significant threat that I initially thought it would have been if it was just predation.” Essentially Matt is describing the cascading trophic effects of the predation of herbivores by the lionfish. Here, he is describing that because of his more specific ecological knowledge, he feels that the lionfish is more of a threat.

When I asked him then how his perception of the fish changed once he had participated in a session where the impact of the lionfish was specifically discussed, Matt told me that his perception had changed significantly. “When I saw the lionfish, I had more -hatred would be a good word for it. When I saw the lionfish today in the cave I definitely saw it in a new light. Nigel also informed me of how strong the toxins are, and he said in some cases it can be lethal, and I definitely gave it a wider berth. I used to work with it right in my plot, right in my face – but now I give it a good four-foot distance. I actually wanted to disturb it, get rid of it. I wish I had a spear fishing gun, because hey it would be a good meal.”

I asked Matt how the arrival of the lionfish measures up in terms of scale and degree to other ecological perils, such as climate change or hurricanes, which was Matt’s original topic of study during the field course. He responded, “Hurricanes operate at a larger temporal scale than the lionfish, however, lionfish are putting a new pressure onto the system that was not there previously and because of that this is shifting the entire system. We don’t really know what the system will be after the lionfish pressure – quite simply we haven’t been studying it long enough to understand its full effects.” On his attitude toward the management strategy Matt stated, “I still feel that this bounty method may not be effective, what we need to do is find a way to give people an economic incentive. Quite frankly what I think should happen is governments, like that of the Bahamas should consider rewarding people for their kills. So put stations at a marina, where fishers can go to get a sum of money, especially because the local population is heavily focused on fishing. If they know they are going to get even more than just a meal on their plate, they will be driven to go after these lionfish and provide a greater control of them. “I would say look at the free market of the fishing industry and tell me if that is sustainable? We overfish way too much as a human

society. We are taking far too much biomass from the oceans as is. A prime example is the cod population on the east coast of Canada. We have completely decimated that population by fishing, if we want to get rid of lionfish – fishing could be effective.”

Matt’s account of how he saw the lionfish illustrates the argument in this thesis that the way that the scientific information is communicated has the ability to harness very powerful emotion and thus motivation for action. I do not mean to refute that invasive species are having a severe impact, but the language of hatred toward a species and the desire not to manage the ecosystem but to disturb the function of the individual is a very powerful lesson in how we use discourse to communicate environmental phenomenon. Further, Matt’s statement that we do not really know the long-term impact of the arrival of the species suggests that even more care be taken in how the management is approached.

Sea Savers at the Carol Morgan School

I was able to visit the Carol Morgan School and speak with Lisa Yamma, Biology teacher and supervisor of the Sea Savers extra-curricular environmental club. My interview with Ms. Yamma and a senior student illustrates another argument that I am making in this work, that focusing on lionfish management creates an elite network based on the commodification of the fish, which is based on framing the fish as a threat.

Sara, one of the founding members of the Sea Savers began recounting how she became involved with Reef Check and the lionfish project, for which they are now widely known. “It was mid-way through the year in 2011 when Miss Yamma approached me and I was part of the environmental club, but we weren’t really doing anything. She was starting the Global Issues Network (GIN) Initiative. We brainstormed on who to add, and we had a group, but no idea. I was like, what about the coral reefs, what about the lionfish, and they were like ‘no’ that’s all you hear about here. So I said guys, we are an island; we are going to be presenting in South America where not everyone has this problem. They finally went to Playa Fronton and did a Reef Check [data collecting activity] and saw how awesome the corals were. We started focusing on the parrotfish, is the ideal fish – it nibbles the algae off the coral, and it poops sand – it produces 40% of our sand. Once we did our lionfish festival, we had an article about us in the newspaper. Then there were three more articles talking about the lionfish right after that. Restaurants started selling

lionfish, supermarkets stopped selling parrotfish and bringing lionfish in once a week. All of a sudden everyone was talking about it, and it became something so big.”

Sara continued, “we created a market for the lionfish because before, no one knew what it was - they thought that it was poisonous, and that you couldn’t eat it. Our intention was to create a project that we could present at a conference in Brazil and suddenly it turned into that we were the cause of this festival. We would talk to our families, and then our cousins would be talking about it. Also something that helped was that we made sure that all of our elementary school kids came and saw our fish. We went over the problem and how they can be part of that solution. And the kids would be jumping around when their parents came to get them, so excited about this fish. It was amazing how they learned, they could repeat exactly what they tell them. It became like a chain reaction, the kids would tell their parents, and then companies would serve lionfish and call us, and we would give the talk about lionfish during their lunch breaks. We went to the board meeting of Banco Leon – a bank (associated with the family of a student). Another student who joined the Sea Savers, her family owns a chocolate company, and they designed a little chocolate fish with a label that talks about who we are and what we are doing. Everything is exploding. We made a video, ‘Comete un Leon’ (Eat a Lion), that was played at the Escojido Baseball games. There were lots of people commenting on it on Facebook and Twitter. We are really lucky that we go to this school, because I’m not sure if we could have done the same if we didn’t have the people. Students here have a lot of connections with companies, we got sponsors and that helped us. For example, if one girl wasn’t here, we wouldn’t have had access to show the video at the baseball game.”

Lisa Yamma continued, “as a teacher, it is the first project that I have worked on in ten years that is actually making a difference. You know, recycling water bottles – you know they don’t go anywhere. Picking up trash is fine for 30 minutes and then it is done. Working in International Schools, these parents are the leaders of this country and these kids are the next generation and that’s what is so exciting. They are informing their parents, but when they take over the companies – they have lived this. They understand how valuable the corals are and the importance of keeping things clean. It’s nice to see that the future is not as sad as we think. I want to tell you more about the GIN conference. The GIN Initiative comes out of a book written about ten years ago that profiled the 20 greatest global issues and 20 years to solve them, and

the authors point is that creating networks to share information and work together is key. It isn't just environmental issues, but all kinds, poverty, terrorism, drugs, obviously biodiversity. Seven or eight years ago, the Asian International Schools started a student led conference. So, when our director told us that he wanted us to go and present, that was when we needed an idea and even though we live here, our knowledge of the reefs are so limited."

Sara added, "We will actually be hosting it in 2014. Now having gone to the conference, we thought that maybe our project wasn't good enough to present, but we got so much validation and recognition for our project, that it feels really awesome. You can see a lot of other environmental issues, but because coral reefs are under the water, it is easier to ignore the problems. I got more and more into the idea, and I think it has changed each one of our lives and the directions we want to take our careers in. I want to be a teacher, I used to want to study history, but now marine biology."

When I inquired about the funding and planning process of the lionfish festival at La Caleta, Sara stated, "It was at the beginning of the school year, we had no money. It was very last minute. The festival consists of food and music, but also the first competition on the island. Now we are planning our second, but it will be the fourth on the island, as it has been replicated by others. So, we organized a diving competitions, we needed ten teams, or twenty people who wanted to hunt lionfish by diving. The divers were a couple local divers from La Caleta, Las Barracudas, a club who fishes lionfish for fun as a hobby, and we had an American guy. When I got the email from the American, I really felt like I had made a connection to the whole island and the world. The main messages that we give to the little kids are the natural history of the lionfish, the predation on the parrotfish. We made sure to tell them that the fish, isn't a bad fish. It's our fault that it is in our ocean basically, but since it's our fault, we need to clean it up. Of course the little kids are like, "send it back!" They wanted to put them all inside a spaceship and send them to the moon. We give the talk with the fish in the aquarium in front of us, so they don't want to kill it. But then it brings up the food chain and so many cool science topics. So, it's neat to see how it is spreading. We spend about 80% of our time on lionfish activities, and 20% on the adopt-a-coral program. When we presented for the college fair, there were about 50 schools, including Columbia University, Johns Hopkins, and Yale. We put a fish tank in the guidance office and keep two lionfish in there to teach the younger

grades and visitors. We pulled the lionfish from La Caleta when Jacques Cousteau's nephew was there, and the tank was donated by BanReservas, Coca-Cola, and SINI Inc., a pharmaceutical company. We were really informal last year for the festival, we fundraised by asking our parents for money here and there, but this year we have a team of five students dedicated to fundraising, so we have big sponsors like Bic, and Body Shop, about, 200,000 pesos so far.”

“We have noticed though that there are a lot of people who are really afraid of eating the lionfish, and it is almost like trying to reverse a stereotype, like racism almost. Trying to reverse this connotation that people have about the lionfish, and you want them to know that the lionfish is bad, but edible and delicious. For my birthday my family got me a pendant of an Indonesian coin, and on one side is the lionfish. Evidently it is seen as something good, in other cultures, but to us it is such a disaster of what it is doing to our reefs. In Thailand, lionfish is a delicacy. I have always seen it as a mean fish. All of our drawings have a mean face. A cartoonist, a student, drew our lionfish logo. Since everyone sees it as a fish that no one wants to kill, we want to make it mean so people won't be afraid to hunt it. El Vesuvio, La Boheme, Badui are some of the restaurants who now serve lionfish. We are thinking to encourage a Sushi restaurant to make lionfish sushi. Some of the restaurants are connected through our families and friends, like at Vesuvio. Balcones de Atlantico, in Las Terrenas, one of the daughters of the owners goes to this school, and they invited us to teach us how to cook lionfish, and they serve lionfish. Actually, for every night you stay there, they donate one US dollar to Reef Check. I started volunteering with Reef Check, and spent an entire summer, and began even attending their board of directors meetings. Reef Check is co-managing the park with the state, and even that is interesting because it is going to be an example project, to promote the 'actual' taking care of our national parks with a private NGO. There is a lot of corruption within our government, they take money that they are supposed to be spending on parks. People working in the Ministry of the Environment often are people who know someone within the government, not necessarily people with ecological knowledge, and it fluctuates with each change of government. They do not have dedication for what they are doing, and I think that you need to know and care about the thing that you are taking care of. We have evidence through Reef Check that there are more fish coming back in this area. What Ruben did was immerse himself in the community, he knows that in a fishing community, you

cannot just tell people not to fish, you cannot just take their livelihood away. El Carey is run by the people of La Caleta, so they have other things to do than overfish.”

The group interview with senior Sea Saver and Biology teacher and supervisor clearly illustrates the elite network of actors involved in supporting lionfish management. The connections with the business community to the success of the lionfish festival in La Caleta, which was replicated in other areas demonstrates this point. Further, what is present in these perspectives is the validation that the students have experienced, which speaks to concern and action being associated with morality rather than taking a political stance. In action addressing the lionfish, no political stance is necessary, nor is their contestation of neoliberalism, but the commercialisation of the fish is celebrated thus supporting capitalism, the market and in the case of high end restaurants, the exploitation of labour of the fishers who earn a disproportionate amount for their role in the commodity chain. The interviews with the fishers will show that marketing the lionfish as a ‘sustainable’ option certainly does not take livelihoods into account. I argue that this makes the lionfish appealing to the political and economic elite, who do not have to examine their role in environmental degradation, and are applauded for their valiant efforts, and are making a much higher percentage of profit from this species than the fishers. I do not wish to portray youth initiative as negative, but I do want to argue that had the students chosen to campaign for fewer ships to enter the area or another issue that challenged not perpetuated capitalism, they would not have achieved such success or support from their families and their prospective businesses.

What is also very important from this interview is the way that the image of the lionfish is carefully chosen to have a specific effect, as a mean fish to encourage hunting but not a scary fish. This perspective, beside the story of the coin where the lionfish is revered and is a delicacy further illustrates the subjectivity of how the fish is seen, portrayed and understood. Finally, I would like to draw attention to the way in which the co-management is applauded by the students who appear to convey their mistrust of the state and faith in the private sector to accomplish conservation goals. I believe this to be a reflection of the opinions of RCDR, and the climate of their community.

THE FISHING COMMUNITY

My time spent attending workshops, meetings and conducting interviews in and around La Caleta offered incredible insight into this work, and I am very grateful for how welcomed I was and how much the community shared with me. I conducted over thirty interviews with fishers and community members, but due to the scope of this work, I will only include those most relevant to the question of the lionfish, the discourse used to describe it and its impacts and to uncover the reality of the commercialisation and management. I would like to recognise here the many stories, insights and opinions that people shared with me that were inspiring examples of community collaboration, history and place, and commitment to the protection of the park and surrounding ecosystems that are often not or underrepresented.

Franklin: Lionfisherman

Over the course of my field work, I spent a lot of time with Franklin. Based on what I had read on the RCDR website, seen in the GloboVerde documentary and how fishing the lionfish is a viable alternative, I expected to see many fishers working to harvest the lionfish. I was surprised to learn that Franklin is the only fisher supplying the cooperative with lionfish regularly, and his stories and insights have led to my critique of commercialising the lionfish, first because the return on his investment is so low, and next that it takes a great deal of resources like traps with significant by-catch to fish for lionfish. What is more is that given the investment necessary, what will happen to the fishers if and when the conservation objective is achieved, and lionfish populations have stabilised?

Franklin began by talking about how he came to be a fisher in La Caleta, “When I arrived to La Caleta after a career as a police officer I worked for six years at the airport. After that, I left policing and arrived at the coast, bought a little boat and started fishing. That was when the community was here at the wall. I have lived in the same house since then, just over there. I didn’t move, my place was outside the place they wanted for a park. I took care of my family with what I earned fishing. Now I work fishing, diving, and bringing tourists out. Now I fish lionfish too. There are a lot of them here, and at the national level. They eat the other fish; they are reducing the populations of the other fish like snapper. I am one of the founding members of the cooperative. In 2006 or 7 we started having meetings and began to organize ourselves. And by 2008 we, with the help of Reef Check we formed. Because the National Park is here,

we now can't spear fish in the park, so we have to go further which costs more in gas, or takes more time to get out beyond the border. We started with six or seven members and now are about forty. Now the fishing isn't so good, so we can earn working in tourism. Our earnings have increased. Without being able to fish within the park, we have to share the motor for the boat and we pay for gas to get outside the protected area. Sometimes you have to travel almost to the capital, which is pretty far. If you want to be able to catch the fish we used to catch you have to travel far, like tuna or dorado. This would cost four or five gallons of gas. So, the class of fish that I usually go for are grouper and snapper. I use traps. 200 feet deep usually. I have caught grouper about 100 pounds, but they are far out you have to be really careful with the wind. We always go out in pairs. I have all my own equipment, thankfully. Grouper and snapper usually get me about 70 pesos per pound, but it's not easy to find them now. Before, the sea was full. Now I could put in 2- 300 pesos of gas and not find anything. Just a waste of time and gas."

When I asked about the cooperative he told me, "The objectives of the cooperative is to get us a fishing boat, that can take us out for maybe fifteen days. We could earn a lot, 40 or 50 000 pesos if we could get out there. We have not been able to get any credit or funding to be able to do that, because we have yet to be recognized as a cooperative by IDCO. Tourism is offering us an option. There used to be an amazing restaurant here. This place used to be full of tourists. It is tough working with tourists in our little boats. Without the decree recognizing the cooperative, there is nothing. We are not recognised by the state, cannot borrow money, cannot register. Now, we just receive the donations from outside given to Reef Check, but we cannot get anything on our own until the decree. There are other places in the country, like Bayahibe that have boats, catamarans that are 300 or 400 horsepower that are full of tourists all day, taking people out to swim and dive. Here, we don't need something that big, but something bigger would be nice."

When I asked about how he feels about the transition from fishing to tourism, he told me, "It's not as though we can never fish again, but we are hardly fishing in now. And when we do, we weren't earning what we used to. Here, now when tourists arrive and we are here we can offer them a tour, transport to the dive sites. We put the earnings back into the cooperative. Like with the lionfish, we fish them and sell them to the cooperative, who sells them to the restaurants or whoever wants them. We do that with other

classes of fish too, but they sell them out the other side (referring to the fish stand outside of the park). I sell the lionfish to the cooperative, so maybe every three days I get eighteen pounds. I own the traps, two traps. I'm the only one who has the traps. Well, since the lionfish arrived, it was maybe three years ago. When I first saw it I thought, this fish is weird! Now, it's been here for maybe two or three years and people want to buy it because it such a delicious fish."

When I asked if he thinks the lionfish is a threat, he told me, "Yeah it is eating little fish, but that's what big fish do, eat little fish. They eat other fish." I continued questioning, "Are you worried about the damage that the lionfish will cause to the other fish?" He replied, "Nah – listen I put out a trap and catch only sixteen or fourteen. When I get more traps, I will catch more, like a quintal." Franklin then told me that he was participating in the workshops with the Dominican Development Bank in order to get a small loan to purchase more (sixteen) traps that cost around 6,000 RD (\$144 USD) to supplement his income and that his plan is to continue to harvest lionfish.

Franklin's statements indicate that while he recognises the impact of lionfish on the commercial fish that support his livelihood, he is not using the language of threat. His description of the fish quite frankly states the obvious, that yes it is a new and 'weird' fish, but it is doing what fish do. His lack of worry for the future impact may suggest that he has accepted the lionfish as part of the ecology of the reef, and that there is potential to reduce their numbers through fishing. Franklin is the only individual of eighteen full-time fishers in La Caleta who has the traps necessary to catch the lionfish without spearing individually, which places him in a privileged position in the commercialisation of the lionfish, and has made him the central figure of the 'Eat a Lion' campaign with RCDR and the Sea Savers. He is even the star of the Globo Verde Award winning documentary on the lionfish, mentioned above where Reef Check is applauded for their efforts promoting sustainable livelihoods and marketing lionfish. Franklin's insights and opinions are instrumental to the argument that I am making, that RCDR is making selling lionfish look like a much more lucrative endeavor as a community conservation project than it really is. To illustrate this further, I will explain the report of lionfish sales shared with my by Reef Check. Appendix A is a breakdown of the lionfish sales accounted through COOPRESCA. It shows that the lionfish is purchased per pound for either 50 or 60 pesos RD, there is payment for cleaning the fish, transportation to the

restaurant is accounted for. The price difference between the fish represents who is buying the fish, whether it is community members or restaurants, which pay 80 RD. Worth noting here that a lionfish dish at one of these high end restaurants sells for around \$30 USD. Inventory to be sold is fish frozen to be sold at a later date. This report shows that from April 13-May 31, 2013, Franklin sold 63 pounds to the cooperative and earned \$3,780.00 RD in that time. If he is harvesting twice a week, as he described to me, he would have to pay \$400 RD per week harvest in gas to get to the traps equaling \$2,400.00 RD leaving his income \$1,380.00 RD or \$33 USD in six weeks. The fishers from outside the cooperative sell the lionfish to the cooperative for \$50 RD, and earned a total of \$1,300.00 RD or \$31.25 USD. Another fisher invests about two hours per harvest twice a week and earned over six weeks \$450 RD or \$10.80 USD. Gas and transportation to the hotels to sell the fish (a factor that prohibits many fishers from accessing other markets) costs \$900 RD or \$20 USD. This leaves \$2,190.00 RD or \$52.64 USD to support the over forty members of the cooperative over six weeks and a total since the advent of the sales of lionfish in May, 2012 at \$43,441.25 RD or \$1,044 USD.

This data in addition to my interview with Franklin shows that indeed there is an interest in harvesting lionfish, but that there is a need for specific and expensive equipment to even enter the market in a lucrative way, as the time investment to harvest individually is prohibitive, as will be discussed in a following interview. Franklin has invested in the traps, he actually made them by hand, from which he also harvests snapper, which is the by-catch of the lionfish trap at that depth. The idea that Franklin, the fisher who economically earns the most from lionfish sales, and who has invested and plans to invest more in traps makes \$33 USD in six weeks, and if all the lionfish purchased by restaurants earns them \$1,890 USD (not including their costs) is celebrated as the way forward for lionfish management and conservation is a clear example of a green-wash, that certainly does not consider the political economy of this specific industry, and makes the practice appear far more viable than it actually is. Reef Check is gaining international recognition for encouraging fishers to transition to lionfish from other commercial species and tourism, which is said to protect the reef and supports the economy of the community through the creation of a cooperative. I am not convinced that such small returns on investment assumed by one individual fisher should be used as a model for conservation and addressing the lionfish regionally. Further, Franklin

is a 73 year-old man who is now altering his fishing practice by taking a loan to invest in equipment. This certainly suggests that he sees this as a viable option. What is not mentioned but is very apparent here is the contradiction of creating a fishery with the goal of destroying it. What will the traps then be used for and how will Franklin make a living if the conservation goal of reducing the population of lionfish is achieved? As previously mentioned by Dr. Isabelle Côté, it is illegal in the US to promote the destruction of a fishery, so why is it encouraged in the DR? While indeed there appears to be some short-term incentive, the long-term potential is questionable and contradictory to the conservation goals. Moreover, the short-term goals privilege a few fishers who can invest in either dive equipment or traps and certainly place the NGO, who gains recognition and thus potential funding and support, and the elite restaurants, who capitalise on a seafood choice 'with a conscience' in the arena of the expert which promotes the fallacy of sustainable development and justifies the faith in the market in this example of neoliberalism in and for conservation. Finally, this privilege is translated to the validation of the environmental group Sea Savers, who are recognized for their work promoting the consumption of lionfish and working to establish a market that will help to protect the reef. This work argues that a simple market based solution based on consumption lacks the critical reflection necessary to make a lasting impact in this and other environmental initiatives.

Juan: Fisher and Founding Cooperative Member

The interview with Juan provides this work with a critical perspective of the work of RCDR and the eco-tourism project. Juan began by telling me about his first encounters with the lionfish. "2-3 years ago was the first time I saw the lionfish. I was afraid the first time I saw it, but I was the first one here to eat it. I had already heard the story of where the fish came from, that it was in an aquarium. I participated in a lionfish workshop with a project through Reef Check; it was another biologist, not Ruben as he was just learning too. I learned a lot in the workshop. I was surprised to learn about all of the damage that the fish was doing to people. There is also a fish, called the rock fish that has the same venom as the lionfish. The lionfish is reducing the fauna in the ocean."

When I asked Juan if he had noticed a difference in how much he earned since the arrival of the lionfish he told me "Of course, it is reducing the other fish. It takes a lot more time and effort to fish lionfish. You have to cut the spines, the tail. If not you could get stung. And if you don't hunt these fish,

they will eat the others that we need, even the lobster and the shrimp. We are working all over the country, and voluntarily trying to get rid of the fish through the derby's and activities. We don't do it every day, as we are working. You know, economically we don't have the possibility to attend to it every day. Maybe once a month. But there are activities at the national level where people come from all over to hunt lionfish, and they do it here. Listen, it's not easy. Well, to hunt them is easy because they are calm, but after a week or two weeks the populations come right back. They consume all day long. Here we sell lionfish. There are fishers from all over, Boca Chica, Haina, Juan Dolio, Guayacanes. We collect them here and then sell them to the restaurants on the boardwalk [Of Santo Domingo]. Various people come here to buy them as well. Here, there is only one person who uses a trap to catch the lionfish. Outside of the protected area, there are fishers who are allowed to use the spear, and they bring them in, in large quantities."

When I asked if Juan thought hunting lionfish was easier or more difficult than other fish, he told me that it is more difficult and it takes more time, "at really profound depths, there are enough of a quantity. But you need equipment. You need a net, or dive gear to get at them. If you don't have that, then you can't find them in enough quantity to make money."

Juan also provided me a great insight into the transition from fishing to tourism: "The resources that were promised for the project have not materialised. The package that they were selling about the project, I have to say was in vain. First they promised that we would be able to access loans for new boats, but in four years we have still not been recognised by IDCO, and so we cannot apply for loans. How important are the boats, which we need to invest in. So, we haven't been able to do the work that we need to do, without the investment. In tourism, the earnings have been very little. There is a lot of tourism in this area, around here [pointing to Boca Chica] and in the capital, but here, after four years has not worked. Before, we used to earn a lot more fishing before there were controls. There are a lot of people who left this place, left fishing altogether when the project arrived, they went to other places. I am going to tell you the truth. I do not see a bright future, because in four years what do we have to show? For the future, I want to see it become a success, I want to see people from all over the world here, pages advertising on the internet. But the administration is not working. I see it as stagnant. That is how I see it. This park was so beautiful

in the 70's and 80's - it was amazing. I would love to see it that way again. Full of people. We earned a lot from tourism back then.”

When I asked Juan about how the lionfish compares to other environmental problems, he told me, “I was one of the first to eat that fish. It was caught in a trap about three years ago, we showed it to Ruben and he let us know that the spines are venomous. I didn't know what it was, so I didn't want to touch it. If you get stung, you put it in hot water. It is like grouper, it has a good taste. They are good to eat, but it is a bad predator, it will wipe out the smaller fish, it is attacking the little ones. People say that they are doing damage to the reef, but here the reef is healthy. We don't have a lot of pollution here because of the park. Here we can control the populations of the fish too, but outside there are many many. The big problem is that they can go up to 300 feet in depth, and they even get darker at that depth. It logically is having an impact on our livelihoods. When it preys on young ones that we catch as adults to sell, it impacts us a lot. It's a predator, it's bad. But our political system has done a lot of damage to us too. So, here, this sea and this area receives a lot of pollution from the Ozama River (the main river to the ocean from Santo Domingo). We do not have treatment of this water, so all of the water that comes out into the ocean is black water. This is a problem. No one can swim in that river. There is no control over it. In that area, people still eat the fish, but they are contaminated and the people who eat it aren't aware. It does more damage as it goes up the food chain. Not only here, but in San Pedro too. That is the biggest problem.”

Juan's descriptions and critiques illustrate the recognition of the impact of lionfish, but point to water pollution, a result of lack of political support of infrastructure as another bigger threat to the ocean. His insights also critique the RCDR project through the cooperative, and show the reality of what is going on, which runs counter to the information portrayed through the organisation itself and in the media. Further, he sheds light on the process of fishing for lionfish and its limitations for fishers, that most do not have the resources to invest in the equipment needed to harvest lionfish in large quantities. My interviews with Juan lasted for hours, and were staggered between tours and fishing. He recounted to me a great deal about the history of the community, what it was like when people lived where the park is now, why people would leave and his memories of when the park was busy, which he identifies as a goal for the future. His stories have influenced my understanding of the space greatly. Juan communicated the importance of place

and space to the fishers and community of La Caleta, namely when he took me by the arm and brought me to a shady area under a tree and told me “I was born right here,” and continued telling me stories about living and working in the park for the last six decades. In these stories was a level of commitment to the well-being of the community, and the reef.

Samuel: Guide at El Carey and COOPRESCA Member

Samuel has been a dedicated guide and member of the cooperative since it began, and is a strong supporter of the conservation goals and methods of RCDR. His interview illustrates the key messages and perspectives shared with all National Park staff in the DR, and the management of the lionfish. Samuel has given many interviews, and in my opinion his perspectives and words are reflections of how the state and the managers want the key messages to be communicated. Also, Samuel’s passion and dedication to the park, the conservation goals, and the economic well-being of the community flowed through this interview, as did his motivation for spreading the environmental consciousness he has gained further. He began by telling me about the 21 day training to work in the park, “It was a very gratifying experience and I learned so much that I did not know before about ecology, managing trees and other plants and the role that they play. Also about how important parks are to this country. For example the importance of vegetation. It secures the soil and prevents erosion. That is the problem with Haiti, and why their environment is so degraded and they have so many problems with water after rain.”

Samuel then told me about his experience working with RCDR. “Before this I was working from home selling medicines and doing massage, also I was selling some food with my mother. RCDR has been like the godfather to El Carey. Thanks to them many fishers have gained consciousness and fish with thoughts about the future, not like before. They pay closer attention to the size of the fish, and respect the rules of the park and are doing a lot with the lionfish, some fishers fish them. The lionfish is a big threat, but it is good to eat. We have to eliminate them. There is a group that comes the last Sunday of every month. We give them the air and boats and they go out and get rid of them. They do a good job and protect our parrotfish, which gives us our beautiful sand because they eat from the corals and break off new pieces that clean our beaches, which are important for us.

Samuel’s interview illustrates several key points in this work. First, he highlights a strong sense of

national pride for the protection of vegetation and the environment, which is often contrasted to Haiti and embedded in nation building, which was communicated in his recounting of what he learned during the training to work in the national park. He also communicates the key messages of RCDR and lionfish management, very succinctly recounting the fish as a threat to native fish, particularly one that creates sand, and as a consumable product showing the impact that the training and workshops have had. While Samuel's perspective illustrate the economic valuation of the ecosystem, it also highlights the passion and commitment of the community.

Carlos: Fisher and Vice President of COOPRESCA

Carlos, the Vice President of COOPRESCA was interviewed extensively for this work. He was extremely generous with his time, invited me into his home and shared with me many stories about what it was like to live in La Caleta before and after the advent of the park, his perceptions on RCDR and the lionfish. Carlos was born fifty meters from the sea. His grandfather and father were fishers, and he feel like he was raised in the ocean. On his first contact with the lionfish, Carlos told me, "I was so afraid at first, the first sting brought me to the hospital. Now I want to catch it. We participated in the competition and we won first place for most fish and the biggest. Now we can't find those quantities here. The community has learned how delicious the fish is and now there is a great demand. The cooperative has to buy from other places now. Swimmers were afraid of going in the water. Thankfully we have not had any accidents with tourists and now the fishers are using a different way of fishing with traps to avoid risk."

When I asked Carlos about the risk of lionfish to the reef compared to other problems he responded, "The airplanes leak gas, leak oil and give out fumes. Where is that supposed to go, it ends up in the ocean. All the turbines run on oil and gas – this is the pollution I am talking about. It is noticeable in the air as well. But we have to pay attention to the lionfish, because it is impacting fishing a lot. But the lionfish doesn't do damage to humans the way pollution does, it does damage to its own fish. If it eats all the fish, what will we have left. It isn't like us who eat a plate of food and go on with our day, it is always eating. We have to take more time with it because we have to be so careful, and it is very painful those stings."

When I asked about the transition from fishing to tourism, he told me, “I like working in tourism because I don’t want to get up at 4 in the morning, and spend 200 pesos in gas to find nothing. With tourism you are always earning. Fishing is good, where there are fish, but here there are no fish. Now we are working to make sure there are fish for people to come and see. That is what people want, and that is what we say. We can sell a dead fish once, but a live fish we can sell over and over.”

Though most of our discussions Carlos talked about how supportive he was about the work of Reef Check and the transition to tourism and his faith that fishing would control the numbers of lionfish, which he sees as a threat to tourists. He has travelled to Mexico to participate in training programs with RCDR, and communicates his support of the project, and how he personally has gained a great deal of consciousness about marine ecology through his relationship with Ruben and RCDR. Carlos was arrested in 2011 for spear fishing within the park, used to spear fish and won national competitions and raised his family fishing. Carlos’ interview illustrates the power that economic valuation of ecosystem services has on environmental education as well as how incentivising conservation can be enticing. Despite the impacts that tourism has on the environment, Carlos names the airport as a source of detrimental pollution. Further his insights illustrate the impact of lack of fish on livelihoods, which points to a very real lack of option, which could be a factor in why people in the community agreed to participate in the project in the first place.

Alexa: SENPA (Environmental Protection branch of the Military) Guard

Alexa has been a full-time resident of La Caleta Park for the last three years, she is stationed in a small residence on site to monitor and surveil to ensure no one is fishing on behalf of the Servicio Nacional Proteccion Ambiental. I asked Alexa to tell me about some of the tensions associated with monitoring the park, fishing in the park and allowing spearing for lionfish. She told me, “almost everyone who comes here knows the law. Yet we still see a lot of people coming in with spearfishing equipment. Not only the small fishers, but people who are not threatened by the law, who are not afraid of being charged because they perceive themselves above the law, and that they will get away with it. The environmental laws are for everyone, regardless of your status or position. There are many more people who are caught that are there to fish recreationally than the small fishers who do it for their livelihood, but there are those too. There are

fishers who go to the boundaries of the water and someone passes them the spear. I have arrested the president and vice president of COOPRESCA for fishing in the park, for having a spear -about a year and a half ago. For us, it doesn't matter who it is, if they break the law we need to report it. We are trying to protect what is ours, what is everyone's. Yes I have seen people go out with a small spear saying that they are just going to fish lionfish, but come back with other classes of fish. You know we tell them, but there is not a specific ticket for this. You could imagine the temptation if you are down there and you see other fish you could eat or sell. It is a different way of fishing, and it takes time so it would be easy to want to take advantage."

Alexa's response indicates that allowing spearfishing of lionfish in the park adds a new layer of difficulty in monitoring people's behaviour in the park. Also, that despite the support for park activities recounted by the vice president of COOPRESCA, indeed there is resistance to the laws and management of the park, which could indicate dissent, a more unclear interpretation of environmental consciousness, and points to the difficulties surrounding setting up laws and policies that are counter to both historical and cultural practices as well as limiting extraction. Further, this is the first interview where recreational fishing by other actors than fishers for livelihoods are named for their actions, which is incredible given their prevalence. In none of the interviews were large-scale industrial fishing practices even mentioned.

Pedro: Fisher and COOPRESCA Member

My interview with Pedro illustrates my argument that not all people perceive the lionfish as an ecological threat, but that it has become an accepted part of the reef ecology. Pedro told me about how his history as a fisher, "I was born at the side where the beach is now. My uncle showed me how to fish, and that is how I began my career fishing. With my brother here, we joined together and we always fish in a pair. So, when he began diving, I became his captain. That is how it always has been, one fishing and one watching for sharks. The community then was very small, less than fifty houses. When we moved there was little resistance, we had to get used to the change because there was hardly anyone who could say anything, the government would take apart anything against them. Of course now there have been many immigrants and our families are growing, I have six children."

Pedro told me about the first time seeing the lionfish, and like every other fisher about his first

sting. “Wow I was so surprised! It is such a weird looking fish, with a very strange head. It is like nothing I had ever seen before. That sting hurt for months, I didn’t want to have anything to do with it after that, but now I have more experience and know how to work with the spines. It surprised us; in all the years fishing here I had not ever seen it. Slowly we started to receive some information about it, and we have come to the conclusion that we must eliminate it because it is doing damage and reproducing quickly. It has the highest reproduction of all fish in history. Still I question how they got here from Miami. Now, we try hard to eliminate them – but it is not easy because they reproduce so fast. We don’t always see the little ones, so if we leave one, there will be so many more.”

When I asked Pedro about how the lionfish compares to other threats to the reefs he told me, “The greatest threat to the environment is hurricanes here. They destroy the coral and have huge impacts on the land too, and they drag a lot of garbage into the sea. And industry is having a huge impact too. Chemical waste in the water is killing a lot of things and killing the coral. RCDR has done tests and showed that chemicals and waste from the airport and factories find their way to these waters. Also the waste from the hotels around Boca Chica contaminate. The waste from the free zones enters through the ground water too. So, the lionfish doesn’t contaminate the water. It just eats other fish. It is doing damage to the ability for the other fish to grow, but not polluting, not doing damage to the environment that way. Pollution is much more dangerous than lionfish. The people suffer from problems with their skin, their eyes from this pollution. It affects everyone. Lionfish eats little fish. It is a fish. It is not like other fish because you cannot touch it. The spines will give you big problems. It will send you to the doctor. If we can eliminate them completely then we will not have to worry. But catching lionfish to make money will be more difficult than any other fish because of the way you have to capture it. Now we use small spears and traps to capture them. When it arrived, many many people were stung because they did not know. The future with lionfish, there will be very few because we are going to eliminate them, this area will be clean of them. Of the fifty fishers here in La Caleta, 45 of us agree with the park. We have to keep the area beautiful and promote tourism. We need to keep the land clean and the people feeling happy and welcome, and make sure there are beautiful attractions and fish under the water. I see the work of Reef Check as good, well my personality doesn’t see anything improve with a fight, so little by little things are changing. I would like to

work in tourism here because now, there are not a lot of fish.”

Pedro’s interview offers insight into the creation of the park, the power of the government of the time to quell resistance and his opinion of fishing for lionfish. The legacy of the quelling of resistance is suggested in Pedro’s words that ‘his personality doesn’t see anything improve with a fight’, which suggests that he is not satisfied with the project. He is optimistic that the populations can be managed, and states very clearly that chemical pollution from industry is a bigger problem than the lionfish, but certainly agrees that the lionfish is having an impact. The fish acting like a fish is a common theme with the fishers, who each name a different environmental threat when asked. This suggests a potential acceptance of the fish, a different priority than addressing the lionfish, and of course a different understanding of what is a threat to the environment. The idea of a threat is more commonly used with the fishers to describe the threat of envenomation, which each person I spoke to had experienced.

Miguel: Taxi Driver in La Caleta

For the majority of the field work I travelled on public transit to La Caleta each day. On the return home, I would wait at the bus stop where a number of taxi drivers would wait for fares. My informal interview with Miguel illustrated a perspective of the commercialisation of the lionfish that I heard several times informally. After describing my research and recounting the key ecological messages around the arrival of the lionfish, Miguel told me that he had heard of the fish before, that he had heard people around here talking about it. When I asked him if he would ever eat it he replied, “No! Are you kidding me? You would have to be crazy to eat that fish. It has poisonous spines, and no other creature in the ocean will eat it, and they are telling us to eat it. No way, not a chance! And you can put that in your paper!”

I had witnessed this attitude toward the fish to varying degrees, which shows the level of fear of being poisoned and the risk to human health posed by the fish and points to potential mistrust of the powers that are promoting the consumption. While in the home that I was staying in completing this field work, I cooked and served lionfish on several occasions and shared with friends and neighbours with little skepticism. However, Miguel’s statements indicate a perception commonly referred to by other interviewees, which justify their actions of having tastings and community outreach, as well as the perception of the managers by the community, which suggests that they are wary both of the fish and that

the managers have the best interest of the community at heart.

Maria: Guide and El Carey Dive Center Staff

Maria is a guide who works at the Dive Center at La Caleta and is an instrumental member of COOPRESCA. She shared a great deal about how the lionfish is marketed and how the cooperative functions in the community. Maria contributed greatly to my understanding of the diverse goals and objectives of the cooperative, and her commitment to protecting the environment, working with and for her community and family is inspirational. Maria informed me about some of the tension within the cooperative. She told me, “that the staff were given a chance to work for a higher salary for one year, or a lower salary for two years, and chose the option of two years. The three staff agreed to work a 40 hour work week with two days off for \$4,500 RD monthly (\$108 USD).” Maria told me that before working at El Carey, she worked assembling shoes at a free trade zone in the area. Her salary there was \$1,700 RD per week (on average), thus she earned more in a notoriously exploitative sweatshop than she does at El Carey, a project celebrated for offering sustainable livelihoods.

Maria communicated to me a great pride in her job and was very grateful for the opportunity to work and network at El Carey. She named learning computer skills, customer service, communication and a wealth of knowledge about the park as concrete benefits that have resulted from her working there. She also told me that for her job satisfaction comes from the opportunity to work with and for her community, despite the problems that she sees, which I read as the top down or interventionist beginnings of the project. She told me, “I went to a meeting with other groups like ours at the Eco-Lodge in Rio Blanco. What I saw in the other groups there is what I think we need with ours. There are people doing all sorts of things, not just fishing and tourism, but restaurants, drivers. There was a love of what they were doing, it came from them.”

Maria then talks about marketing the lionfish. “We buy the fish from fishers here for 60 pesos and 55 from Boca Chica. We sell to the public for 80 pesos. But we lose weight in the cleaning, so we make maybe 10 or 12 pesos per pound, no more than that, sometimes less. We sell to Gallo Pinto, Vesuvio, Sofia and more. We have eight high end restaurants selling lionfish. We need to increase the demand so we can supply it- that is why we are trying to raise awareness. So, we aren’t making much yet but with more traps,

which is the plan of the fishers here to invest in more traps we will have an abundance. People need to not be afraid to eat it. On Channel 11 the Ministry of Natural Resources made a show about the lionfish saying that the spines will not kill you, it will hurt but with hot water it will be ok, that the risk is not that bad. The people like it. Here we serve it a lot at all the activities. We fried over 80 pounds at the Carol Morgan fair. We started with borrowed money to buy them, but with strong capital we will not need to borrow more money to buy them. We are taking part in the Development Bank workshops in order to get microcredit loans from the Government, Reef Check is helping in this. We are thinking to buy more traps to put outside the park – obviously we cannot fish in the park, but we can then have more lionfish. Here, it is only one man fishing. In Andres, there is one. The fishers lose a lot. It's not easy. If it were not for Ines bringing the fish to Vesuvio, we would not be able to afford it. If it wasn't for the connections from Reef Check, we would not have the opportunity to sell the lionfish to the restaurants. To get it to Vesuvio's out by the pier costs \$190 RD to go and come back. It takes all the profit.”

Maria brings out the critiques of the conservation as development project in her interview, and illustrates that RCDR's connections are the only way possible for the project to be sustained at this point, despite the fact that the members are 'in training' learning to manage the project for themselves. This is crucial for the critique of the project, as the idea is to hand over the management to COOPRESCA in September 2013 however the infrastructure is not in place to function without the management of RCDR. I argue that if the neoliberal model of development is pursued as it has been in this project, then the shift of power to the community demands to be front and center of the project, not as a side note, which I argue requires a different approach than faith in the market for economic prosperity for all. I think that if the market and capitalism had this potential, then the community of La Caleta would already be free of economic marginalisation, not embedded deeper as a result of globalisation and free trade. The community is the target of a particular idea of development, not the initiators of the project and are subject to training, capacity building and ecological consciousness raising. This places the NGO in the realm of expert, not just in Marine Biology, but in economic development, where they rely on the specific details of science to guide actions, all the while indicating that the local people need to change their behaviour, ways of thinking and their livelihoods. There were many individuals who told me that people left La Caleta as a result of the

park, restrictions and the eco-tourism project. There were many people who want nothing to do with RCDC and who work with them who resist in a variety of ways. And there are people who work with the project, who bring their passion and their ideas hoping for a positive change for their communities and families. All of these individuals have illuminated the complexity of a problem that is trying to be addressed following what I believe to be a problematic approach.

These interviews show how the four groups created to compare and contrast in this work have similarities, yet exhibit differences in discourse used to describe the lionfish. As a result of the interviews with various individuals, I conclude that the management strategies in fact are not in line with the thoughts and ideas of what any of the people close to the issue believe. The science and management community feel that the efforts are too small and too complicated to be sustained. The scientific community, upper year biology students agree that the efforts will be futile. I argue that in a way, the lionfish then detracts from other issues in marine conservation that require more political action, such as climate change, and allow for the simplification of environmental degradation and the response an exercise in finger pointing. The reason why NGOs are committing resources and effort for the lionfish is for the self-preservation of their programs, the tangibility of the issue for local and international stewards and as Aaron Shultz pointed out – “because people like to throw money at problems they think they can solve.” Isabelle Côté’s words, “the lionfish has been good to REEF” really ring true in this vein. For this reason, the groups and individuals who have something to gain from the managing the lionfish, such as the Reef Check staff and associated volunteers are more often likely to use language that perpetuates the crisis of the lionfish. The term threat in these instances is utilised to conjure support for their programs, to pursue further research and most importantly – promote the market economy as a solution to environmental problems.

What I observe from the practices, stories and ideas shared with me illustrate that while there are exceptions, individuals who have economic or vested interest in perpetuating management and development intervention, such as RCDC and the MNR&E are more often cited as describing the lionfish as a more grave threat and higher priority than other actors, especially the fishers who are much more accepting of the lionfish into the ecosystem - as a fish, that behaves as a fish, despite the recognition of the impact it is having. These respondents also support the management and commercialisation of the lionfish through

fishing as well as derbies, despite the limits of this approach for a long-term and wide-spread solution. I also have shown that RCDR's work promoting the consumption of lionfish and eco-tourism uses neoliberal capitalism as the solution to the problem, instead of critiquing the way that this practice exploits labour and allows for an unfair distribution of profits. Further, it simplifies the issue and hides the fact that only one fisher in La Caleta is making any profit, that the process of fishing lionfish is more labour intensive and dangerous, and is limited and that there is a need for capital investment. This need links the issue to a development bank and project that is nested in national and international development ideas. This is questionable in the short-term, but more-so in the long-term where investing in equipment to fish out a species seems counter to long-term sustainability of an industry.

The interviews, perspectives and activities in La Caleta illustrate how the lionfish has created an elite network of actors who have come together. From UNIBE, Las Barracudas, to the Carol Morgan School, this work shows the way the arrival is communicated justifies intervention, management, further research and control, which is taken on by the elite. Even the fisher involved in fishing lionfish is in a privileged position, as he is able to invest in the traps necessary. The interviews also illustrate how environmental stewardship perpetuates a 'moral high ground', and positions the elite as the saviours of reef, which in contrast positions the local community and fishers as perpetual threats. What I present in this work is that there are diverging views of what the threats are to the coral reef ecosystems, and that the risk of lionfish to the native biodiversity is more of a priority to those with greater economic and political power. What is clear is that those with incentive for management use much stronger language to talk about the lionfish as a threat, whereas other community members suggest that while indeed impacting the reef, it is a fish doing what fish do. What I hoped to show through the interviews with various members of the community of La Caleta is that indeed there are many individuals who are committed to the health of the reef, and the well-being of the community. These individuals work hard at the project despite its inherent problems, which are widely recognized. Further, there is tremendous hope for the future of the park, the community of La Caleta, and that the goals for the future include a space where people come together to enjoy and appreciate the place and each other.

CHAPTER 7: CONCLUSION- LESSONS LEARNED

I have shown in this work that the framing of the arrival of the lionfish in the Caribbean renders visible several problems associated with elitism in the conservation movement in the Dominican Republic, and the power inequalities associated with national park management, Conservation as Development projects and commercialisation and discourse of invasive species. I have problematised the form of environmental education that is taking place on this issue and have shown that the case of the lionfish promotes business as usual neoliberal economic growth, using the discourse of environmental stewardship and sustainability thought the perpetuation of threat as justification, while neglecting to address, and even detracting from the social and economic inequalities that are intrinsically linked to the ecological state of coral reef ecosystems. Further, the way that the environmental education activities are organized imply that the fishers around many coastal Caribbean regions are in need of the newest and most recent information regarding the state of the reefs after the arrival of the lionfish, which frames them as 'blank slates' and does not honour their local knowledge, nor their relationship with the ocean or the ecosystems. The fishers become targets of educational workshops rather than partners, which is an inequitable and problematic approach. These inequalities are rooted in colonialism and in capitalism, and are presently manifesting themselves in sustainable livelihoods and development discourse employed through national park management and the production of valid or scientific knowledge that is used to justify such management, which presents appropriate and inappropriate ways of interacting with nature. While I appreciate the ecological impact of the arrival of the lionfish, I do not endorse the strategies that are being used to address the problem as they do not challenge the roots of ecological damage, but only serve to try to clean up the mess and promote capitalist accumulation of wealth. This allows the elite to continue to gain credit and economic power for their environmental stewardship, and the poor people of colour to be blamed for their economic hardships and environmental degradation.

An ecological philosophy that informs what I perceive as a more inclusive and more challenging approach to understanding the situation with the lionfish is that of social ecology. Social ecology, if it is to provide a solid basis for alliance building, must critique and challenge all forms of hierarchy and domination, not just the natural world and must set as its overarching goal, the creation of a non-

hierarchical society if we are to live in harmony with nature (Bookchin, 1991, 97). Oppressed people know that humanity is hierarchically organised around complicated divisions that are ignored only at their peril... The ecology movement needs to know it too (Bookchin, 1991, 31).

I feel that Reef Check promoting the work of COOPRESCA in La Caleta as a sustainable livelihood project employs this critique of the ecology movement by trying, at least on the surface, to address this very critique of racism and classism in the focus solely on wilderness preservation. Some may argue that an attempt is greater than no attempt at all. In this case, I feel as though this tokenistic involvement of the community is a green-wash, which suggests that the initiative is presented as far more successful and lucrative than it actually is. First, Reef Check receives international attention, financial support and recognition- and even acclaims and awards for their work, which directly benefits the managers and those who have made a very successful career in conservation. Through their portrayal of the successful community project of La Caleta, which through my research I have shown to have limited community support and benefit, Reef Check capitalises on the fact that people (donors and supporters) want to see communities involved and these racial and class based tensions eased. Furthermore, the individuals involved in COOPRESCA are being put at a great risk with their investment of time, energy, labour and liability given the risk involved in the diving industry and investment into a business, whether through a cooperative as was the goal at the outset-or through a private business as it is currently being discussed. This project, which is an attempt at decentralized community conservation, is not intrinsically ecological or based on community derived goals. Such an outcome depends ultimately on the social and philosophical context in which such programs are placed (Bookchin, 1991, 63), and the lionfish control program within La Caleta Marine National park is one such example of a plan that has aims to provide the community a chance to participate in conservation, but does not do so in a way that challenges the hierarchical social structures that exist in the country. In fact, this case reinforces such a hierarchy in that it positions the conservationists as heroes, the fishers as villains and the park as the most appropriate avenue in which the ecosystem should be protected. More than this, the commercialisation of the lionfish relies on the free market and creates a justification for neoliberalism. The intervention is posed as an opportunity for community collaboration and participation, an opportunity to make an additional income from the sale of

lionfish meat while releasing pressure on other vulnerable species and a way to entice privileged travelers to visit under the guise of volunteer eco-tourism. The lionfish is portrayed then as a grave threat and risk to native ecosystems, and as a menacing organism in order to conjure support for the management of this species. The tropes of insider and outsider language are particularly powerful on Hispaniola and the nation states as post-colonies, as it activates memories of nation building and separating Dominican and Haiti.

While the approach of lionfish management may indeed have ecological benefits, particularly in the short term, there is no mistaking that the way that the intervention is framed favours the perpetuation of capitalism, development in the sale of fish, and encouragement of specialized dive tourism of which the ecological impacts are not mentioned. The discourse around how to make more money from tourism (sell the experience of the fish) than extraction (sell the fish once) deepens the economic valuation of ecosystem services, which I contend is an incomplete justification of why and how to live better with the earth.

In *Natural Alien*, Neil Evernden makes a strong and important critique of the ecology movement, stating that economic valuation of nature is a massive flaw of the environmental movement as is the default to the efficacy of communicating environmental concerns to the wider public (Evernden, 1985, 8). Furthermore I concur that Ecology, far from being the 'subversive science' has emerged as the 'darling' of the environmental movement, using numbers and data to show to people what impact ecological damage will have (Evernden, 1985, 8). There are severe implications to using this methodology and frame of reference for addressing environmental problems, as it compromises the overarching goals of the environmental movement, which I understand to be the creation of a deeper consciousness around our relationship to the earth and each other. Evernden says that Ecology as a science has fallen into the trap of using the same tools and language that are seen to be the problem in the first place. This no longer encourages an environmental consciousness based on emotional connection, but promotes the wise management of resources for further generations (Evernden, 1985, 8-9), and for the privileged to enjoy. Furthermore, the discourse around keeping the population of lionfish at a manageable level is laden with problematic assumptions. One assumption is the lack of recognition of the life and agency of the fish and second is the reliance on nativism and 'othering' or outsider language based on spatial and temporal assumptions of an ideal ecosystem and feminized concepts of pristine wilderness, which carries a very real connotation on the

island of Hispaniola. Many of the interviews for this work have shown that social location, which in the Dominican Republic and the Bahamas is associated with race and class and connected to a history of colonization and persistence of neo-colonialism today.

In thinking about the limitations of the lionfish management program, and certainly the sustainable livelihoods transition to eco-tourism, I argue that they will not be able to achieve their objectives of conservation or social justice by following the path of neoliberalism. This is evident in several of my interviews which show that while the conservation project is widely applauded, there is a sweeping sense that the objectives of the project will not be met, and that what was promised has not been delivered. This can be attributed to what anthropologist Gregory Bateson called “closed-loop” thinking. He considered this as a characteristic of pathology:

whereby in failing to take into account the wider processes of which it is part, the self-corrective actions of an ill-functioning system perpetuate illness-causing conditions, while providing temporary illusion of improvement. In neoliberal conservation, by subsuming wider processes of ecosystemic sustainability into the narrow logic and premises of orthodox liberal economics, neoliberal conservation becomes impervious to corrective feedback from the human and nonhuman entanglements it is shaping and on which it depends. Ideological immersion means that protagonists of neoliberal conservation become unable to countenance its possibly detrimental effects, even when humans and nonhumans may be communicating such effects (Bateson in Büscher et al, 2012, 16).

While this study has illustrated the prevalence of hierarchies of power within neoliberal conservation, there are indeed dissenting voices from below and from above, and in some of the main conservation biology outlets. For example in the journal *Conservation Biology* its founding editor David Ehrenfeld argued that, “The reduction of all conservation problems to economic terms is counterproductive and dangerous. Trusting to market forces and the laws of supply and demand to correct inequities and restore healthy equilibria does not work in economics and certainly does not work in conservation” (Ehrenfeld 2008, 1092). This thesis has sought to uncover inequalities of power in conservation and illustrate how environmental problems are understood differently by different people. While I am critical of the conservation movement’s use of market forces and neoliberalism, I have been profoundly moved by the awareness and dissatisfaction of this by many of the people that I interviewed, and the great insight, care and passion that has flowed through people’s ideas and stories, which is hopeful for the future. What is astounding then, even when leading scientists and managers know that these tactics of conservation are

limited, why they persist? I believe this to be associated with the systemic prevalence of competition- for attention to global issues, for funding, and for market share. Competition, a primary component in capitalism is also naturalised in the discourse of the lionfish – where the species is said to have an unfair advantage. In a presentation at Rutgers University, Ehrenfeld quotes George Orwell and Wendell Berry saying, “We are going to have to learn to live a little poorer. Not poorer in spirit, not poorer in happiness, just poorer in the material things we don’t need. If we can learn this lesson, many the best parts of civilisation and nature will survive after all” (Ehrenfeld, 1999). I concur that in order to move forward for a healthier and just world, technical intervention and the market will not be the solution. Perhaps a better way to approach the challenge is to begin to let go of the things, particularly the material things that represent power and expertise. Barbara Deutsch-Lynch writes, “where power in society is unequally distributed, not all environmental discourses will be heard equally” (1993, 106). In the spirit of environmental justice, which “demands attention to divergent environmental constructions” (108) I have sought out the understandings and stories of the fishers of La Caleta, as well as other community members to give voice to their interpretation of how the arrival of the lionfish is understood and their opinions of the management programme implemented by RCDR. I deployed a discourse analysis to illustrate how different actors understand and speak differently regarding the arrival, impact and management plan around the lionfish. I do not wish to create or perpetuate a dualism or divisive thinking in only highlighting the differences between thoughts and attitudes, thus I included many anecdotes where similarities exist as well. I showed that those actors whose social location holds political and economic power in relation to conservation (scientists, managers, representatives of government departments, students and volunteers) have vested interest in perpetuating the environmental phenomenon of the advent of the lionfish as a crisis, which is in desperate need of control, which legitimates intervention - namely the neoliberal approaches to conservation and management. These approaches include the management of fishing in La Caleta Marine National Park, promoting the consumption and commercialisation of the lionfish, promoting dive tourism and volunteer diving to manage the fish, all of which perpetuate the notion of the moral high ground regarding environmental stewardship, and business-as-usual economic development which does not challenge the negative impacts of capitalism or neo-colonialism, but tries to show that the market is the best

way to help the environment. These perspectives are contrasting to those of the local community of La Caleta including the fishers whose interviews indicate that yes, the lionfish is having an impact on the ecosystem, but is not the biggest problem facing the reef or their livelihoods. In most cases for the fishers, the 'threat' of the lionfish is not necessarily the ecological threat, but the threat of envenomation. I draw attention to the lack of alarm from the individuals who spend every day on, in or near the reef and suggest that it is not lack of specific ecological knowledge or detail that explains this. I contend that the alarm communicated by other actors, those with something to gain from such a crisis is worthy of examination. While scientists and managers suggest that the fishers are in need of re-education, training and a plethora of initiatives to 'help them see' how they can live more sustainably because they lack the scientific details, I suggest that the managers need to listen more closely to the ideas and priorities of the community and work to let go of some of the power that they hold in order to address the blatant hierarchy and moral imperative suggested by the common discourse around the lionfish, coral reef conservation and people's relationships with the environment in general, which are laden with neo-colonial rhetoric and teleological development agendas.

In critiquing the lionfish as a conservation priority I do not mean to suggest that the arrival of this species is not having a severe ecological impact. My experience and investigations have led me to believe that indeed there is a difference and that it is likely to impact ecosystems and livelihoods well into the future. The priority of the lionfish over other, more politically charged issues such as climate change, which demands the examination of power and privilege is where I draw my concern, added to the problematic discourse of insider/outsider and invasive species more generally. Perhaps accepting the lionfish as a new part of the ecosystem needs to take priority, and conservation managers and governments should prioritise dismantling the hierarchies that necessitate massive resource extraction and tackle other issues that will have a more deep impact for the ecology of the coral reefs, and the lives of people who are connected to those ecosystems. What is also clear as a result of the semi-structured interviews was the way in which the risk of the lionfish was highlighted more as a threat to human health than the ecological impact of their predation to locals, as well as the risk of eating the lionfish. The fact that the threat is perceived and communicated differently by different people is proof that such ideas are constructed, and certainly not

inherent in any environmental problem. Thus, this work shows that the perception of threat of the lionfish changes with social location and type of contact with the reef, and the creation and perpetuation of the threat of the lionfish as a crisis is most prominent in the interviews with individuals with economic incentive and positions of power for management. I conclude by weaving together similarities and analyzing diverging opinions with the ideas that social location impacts discourse and actions, and to validate the perspectives of the typically underrepresented voices, which are often cast as not having an environmental perspective, or one solely associated with livelihood. This is written by Martinez Alier (2002) in the work, *Environmentalism of the Poor*, which indicates a Maslovian ordering of basic needs, which ignores the aspirations and values of many people (Deutsch-Lynch, 1993, 117). What I found in this work is an outstanding environmental ethic from the community of La Caleta and I suggest that the way people are described is a way that legitimates management and control. Indeed, some people's understanding of threat is linked to their livelihoods, as illustrated by the abundance of stories of stings and envenomation – but this is not the only link that economically marginalised peoples have with their land, which are stories that I think deserve value and are worth including here. Often in conservation circles, the short-term need to extract resources shadows over the environmental perspectives of the economically marginalised, suggesting that concern for the environment is a luxury for groups preoccupied with livelihood and basic equity issues (110). This assumption quiets diverse discourses or renders them invisible, or worse unimportant or flawed. In this study I work to highlight the existence of a strong environmental consciousness, and show that the differences of opinion or understanding of the lionfish may not represent lack of information, but as an act of resistance to the process of neoliberal crisis building and the result of a different relationship with the reef, one that is certainly longer in temporal scale and one that is peopled with stories, memories and important cultural connections. I suggest here that these discourses have much to offer in terms of environmental education, as it provides space to imagine more inclusive alternative ecologies with more open views of environmental change. It is plausible to suggest that class may impact the behavior of resource extraction despite scarcity or less time to participate in stewardship and advocacy, but to suggest that environmental perspectives are lacking is a denial of history and a deliberate silencing. Scott (1990) in Deutsch-Lynch (1993) states that “the apparent discordance of

peripheral voices only reflects the plurality of hidden transcripts and the forced homogeneity of the official” (118). In seeking multiple perspectives I hope to show that indeed, the perspectives of the conservation managers are reflected in the local population, but that there are many stories to tell- sadly many that are here not told – that give legitimacy to environmental and social perspectives that run counter to the dominant power structures in society today. I do not mean to suggest that here I will provide a full or even accurate description of people’s ideas of nature and culture, but I humbly attempt to show that there is much more than what is reflected in the *Lionfish Management Guide*, and reef conservation activities generally. It is my hope that through the investigation of how the lionfish is studied and understood, this humble work will contribute to a more critical investigation of environmental discourse and honour a more inclusive set of actors who are working for a better world.

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APPENDICES

**Appendix A: COOPRESCA Financial Report on
Lionfish Sales from 13/April to 31/Mayo 2013**

Lion Fish	Pounds	Price	TOTAL
Purchased	26	RD\$50.00	RD\$1,300.00
Purchased	63	RD\$60.00	RD\$3,780.00
Payment for Cleaning		RD\$450.00	RD\$450.00
Transportation		RD\$900.00	RD\$900.00
Sold at @80RD	4	RD\$80.00	RD\$320.00
Sold at @100RD	83	RD\$100.00	RD\$8,300.00
Sold in Filets (de 4.5 lbs)	0	RD\$100.00	RD\$-
Lost to Cleaning	18.8		
		Earning	RD\$2,190.00
Inventory to be Sold	6	RD\$100.00	RD\$600.00
		Projected Earning	RD\$2,790.00
Earnings From 27/5 AL 7/9 2012		RD\$5,220.00	
Earnings From 7/9 al 5/11 2012		RD\$150.00	
Earnings From 5/11/12 al 8/4/ 2013		RD\$35,881.25	
Earnings From 8/4/13 al 8/5/ 2013		RD\$2,190.00	
		RD\$43,441.25	
TOTAL			(Suriel, 2013).