Life in the Living Laboratory:
An Anthropological Investigation of Environmental Science, Tourism, and Design in the Contemporary Bahamas.

By

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Abstract

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This dissertation examines the production of the Bahama islands as a site for interrelated forms of field research, field education, and environmentally oriented tourist visitation. Recent developments in international climate science and politics have cast small islands as particularly vulnerable and susceptible to the threat of global warming and its planetary effects while the global economic crisis is blamed for the downturn in tourist arrival numbers to The Bahamas and for the ever-increasing cost of living in the archipelagic nation. As a result, redesigning the country's tourism product to compete in new travel markets has come to coincide with reconfiguring the country's energy, agricultural, and fishing industries under the sign of island sustainability. The very idea of what it means to be a nation of islands is in question, and the conditions of possibility therein are undergoing dramatic change.

The dissertation has three constitutive themes. First, it shows that recent events in The Bahamas bring into relief the continual reformulation of the experimental space of the Caribbean as field laboratory and site for knowledge production about human social evolution and economic reorganization. My attention to the emergent ecological milieu of islands in crisis highlights this history and the modes of inclusion and exclusion for bringing particular people and ideas of the social into more recent science-based problems. Second, focusing on the increased call for interdisciplinary, integrated environmental research in The Bahamas involving social science, I argue for revisiting the concept of biopolitics. This concept, historically rooted in 19th Century developments concerning the knowledge produced about and the governance of human bodies and populations, loses analytic purchase in an arena where the prefix, "bio," can be interpreted as signifying a scientific rearticulation of the problem and object of biological research in which the life processes of the human and the non-human become holistically co-constituted in particular ways. Finally, this dissertation engages with recent political ecology and scholarship on cultures of nature in order to describe contemporary ecological and conservation science as a nature making practice with political ramifications in The Bahamas, and to bring further attention to a concern for the scientific productions of nature and value within those fields.

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Contents

Ch. 1. Introduction: Considering Life in The Bahamas Today 1
Caribbean Questions: the conditions of life in the repeating islands
Islands By Design: seeing, studying, and arriving at islandness
The Bahamas As Living Laboratory: labs, fields, and lives

Ch. 2. Building Biocomplexity: The science and sociality of a proposed Marine Reserve Network 32
Beginnings
Biocomplexity
The Bahamas Biocomplexity Project
Assessing scientific social assessment
Two expert interviews
Caribbean Questions: the Caribbeanization of the world
The expanding "bio" of biocomplexity

Ch. 3. Climate Change and the Tourism Product: Climate as an idiom for travel markets and island lives 49
The "tourism product"
Diversification: branding an archipelago
Climate Change and the Carbon Neutral Destination: tourism as vector and victim
Caribbean Questions: paradise discourse and climate change?
Climate change in the living laboratory

Ch. 4. The Educational Islands: Eleutherian adventures in the age of environment 67
Islands for education, islands as educational
Science, tourism, and knowledge production
Freedom 2030: mixing education with enterprise
Caribbean Questions: colonial models and laboratory situations
Eleuthera: "an island to reinvent the world"

Ch. 5. Down the Blue Hole: Science history and cultural heritage tourism in The Bahamas 85
Going to extremes and back again
Abaco: a performance of natural and national history
Andros: an enactment of anthropological collaboration
Caribbean Questions: national identity, history, and interdisciplinary field science
Tourist landscapes, historical context, and insider/outsider perspectives
Making the underground matter in the living laboratory

Ch. 6. The Aquatic Invader: Figuring fishermen, fisheries, and lionfish? 100
The lionfish
Engaging with Maritime Anthropology
What is natural about fisheries?
Expert conversations about threatening marine species, human and non.
Caribbean Questions: cultural ecology
Both dangerous and delicious

Ch. 7. Conclusion: channels to global markets, channels through environmental problems 113

Bibliography 116

Chapter 1. Introduction: Considering Life in The Bahamas Today



Map of The Bahamas from the CIA Factbook, 2010.[1]

The Bahamas have always been many things at once. Geographically, the Bahama Islands are an archipelago of over 700 islands and 2,500 cays and rocks, stretching for 650 miles just East of Florida and just North of Cuba in the Caribbean region of the Atlantic Ocean, but with a land area that is only the size of Connecticut. Politically, The Commonwealth of The Bahamas has been a sovereign nation since 1973, comprised of a Constitutional Parliamentary government with a population of approximately 300,000, spread over 30 islands, with the vast majority living on the island of New Providence in the capitol city of Nassau and in the city of Freeport on the island of Grand Bahama- the other 28 islands with permanent settlements are referred to as the Family Islands or the Out Islands. Socially, The Bahamas is a majority black country, with a minority white population and a much smaller population of those of Asian and Hispanic descent. Most Bahamians identify as Christian, and the majority of Bahamians practice some denomination of Protestantism; The Bahamas government defines the country as a Christian Nation. The official language is English and 95% of the population is literate. Geologically, The Bahamas are composed of calcium carbonate platforms accreted from the seawater due to

[1] See next footnote for reference.

the continuous activity of coral reef organisms over millennia, and are therefore almost entirely flat and mostly devoid of surface fresh water with the highest point only 200 feet above sea level- Mt. Alvernia on Cat Island. Economically, The Bahamas is one of the wealthiest Caribbean nations, relying on its Tourism Sector for the majority of its GDP (60%) and for the employment of over half of the labor force.[2] Over 80% of all tourist arrivals are Americans, and the annual tourist arrival numbers in the millions far exceed the resident population. Financial services account for the second largest sector of the economy (36% GDP), another service-based industry, and The Bahamas has over 300 offshore banks, making it one of the Caribbean's largest Offshore Financial Centers (OFC). Climatologically, the average high and low temperatures over the past 30 years range from 77 degrees to 71 degrees, with average high peaks reaching the upper 80's in the summer, and the hurricane season has typically spanned from June through November. Ecologically, The Bahamas is said to have the clearest waters in the world, with visibility of over 200 feet due in part to the presence of the third longest coral reef system on Earth which contains 5% of the planet's corals. 109 species of birds breed in the island, and 120 species of plants are endemic to the island chain. The Bahamas is home to the oldest marine park in the world, the Exuma Cays Land and Sea Park, which was created in the 1950's, and to a large underwater cave system protected as the Lucayan National Park on Grand Bahama.

These are the basic categories of information which commonly delineate the multiple and coexistent contours of a nation-state as a particular sort of place for some people today, such as those who compile information about states- the American Central Intelligence Agency for example- and those who use that information to compare states.[3] Through categories like these, nation-states and their citizens are asked to recognize themselves and to compare themselves and their state to other states and other citizens. I have begun with these categorizations in order to evoke this form of recognition and comparison, to allow for and even to elicit this familiar process of orientation, location, and contextualization. But this dissertation both is and is not about The Bahamas in the sense that it does not attempt to pin down or describe a "true" definition of The Bahamas today. It can be read as an evocation of contemporary forms that seek to influence the way The Bahamas and Bahamians might simultaneously coalesce as ideas and as modes of subjectivation. This dissertation is based on 15 months of doctoral research in The Bahamas, from 2007 to 2009, and on three prior shorter visits to the country in 2002, 2005, and 2006. My interviews, experiences, and participant observations informed the substance of this work, which consists of six chapters that variously and partially describe the multi-form practice and development of contemporary environmental research in The Bahamas and the continual generation of an environmental, ecological, or planetary understanding of that place. Therefore, my attention to various forms of active experimentation in The Bahamas is an attention to the ongoing creation of a *living laboratory*- a site for the contemporary production and molding of knowledge about and categories of life, living, lifestyle, and livelihood, particularly newly emerging relations between the environment, biology, capital, and social life.

As a country caught at the fringes of the 1st and 3rd worlds, economically, as a former British colony, as a designated Small Island Developing State with UN recognized

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[2] Many of the general statistics in the section have been taken from the American CIA Factbook on The Bahamas: https://www.cia.gov/library/publications/the-world-factbook/geos/bf.html

[3] The CIA has one of the best public collections of general information about The Bahamas, and somewhat disturbingly, this information is more readily accessible than information publicly provided by the Bahamian government.

vulnerabilities and needs, and as a questionably Caribbean nation, The Bahamas exists in a state of perpetual self-assessment colored by the understanding that its postcolonial status necessitates an almost unattainable self-sufficiency. In order to attempt to analyze this nexus that is The Bahamas today, the nexus that is the subject of this dissertation, I have had to draw upon a union of concepts and scholarly texts from the loose fields of Caribbean Studies and Caribbean Anthropology, Science and Technology Studies and the Anthropology of Science, Environmental Anthropology, and more. This introduction is an attempt to lay out this framework and the chapters that follow provide concrete instantiations of the ideas below.

The argument mobilizing this dissertation is that throughout their history, the Bahama Islands have been partially created and conceived through diverse practices of arrival, departure, and visitation. Over the 20th Century, especially after independence, The Bahamas became almost entirely economically dependent on its service industry, mainly tourism, and today, tourism is an integral part of the legal economy that allows The Bahamas to exist as a sovereign nation.[4] Dependence on tourism has come to mean that the country must continually redesign itself as a unique destination in an increasingly global market for travel. This dependence and drive to redesign has lead the tourism industry, broadly defined, to collaborate and integrate in inventive ways with scientific researchers, consultants, and scientific disciplines involved in producing new knowledge about the archipelago, its biological and geological features, and its vulnerability to change and exploitation. Together, the natural sciences and the tourism industry are producing tenuous yet powerful frames in which to envision the re-conceptualization and redesign of the islands and the livelihoods they sustain, as well as frames through which visitors and Bahamians alike might imagine themselves existing there. This dissertation is an attempt to momentarily pin down and define some of these frames at work today, and the problem space in which this enframing happens in The Bahamas is what I am calling the living laboratory. In order to examine this problem space, I take up thought itself as a contingent practice and an object of anthropological study, and this is why I tend to focus on the expression of certain ideas as much or if not more so than on specific events and actions.[5]

This dissertation and my concepts of islands by design and the living laboratory have been built around three loose themes which animate the islands in various conjoined ways and which run through each of the chapters: Visitation/Arrival, Vulnerability, and Biocomplexity. The theme of visitation points to the constant play of arrivals to the islands and the ideas, economies, schemes, hopes, and needs arrivals bring with them, as well as to the opportunities and threats that arrivals pose. This leads to the next theme of vulnerability, a popular small island topic today, and to the ways in which vulnerability must be demonstrated in order to be addressed. Vulnerability in some small islands in the world is addressed in a wholly different fashion than in others, and in the living laboratory, present day small island vulnerability is sometimes construed as another potential resource; the threat is also produced as an opportunity for visitation. Finally, biocomplexity points to the ways in which life, the "bio" of terms like biology and biodiversity, is expanding in the natural field sciences to internalize the social and cultural aspects of the field into science-based designs for ecological management and entrepreneurial innovation involving island imaginaries and visitation. In a biocomplex frame,

[4] There has always been an illegal aspect to the Bahamian economy, including piracy, arms smuggling and alcohol trading, and especially since independence the trade in illegal drugs and the migration of illegal immigrants through the islands has been an important part of the underground economy.

[5] Please refer to the discussion of Paul Rabinow's work with problematization, below.

distinctions between the human and the non human are remediated and repositioned within a laboratory milieu defined by interdisciplinary collaboration.

I see the work compiled here as contributing to three main fields of scholarship: Caribbean Studies, Science Studies, and Environmental Anthropology. I hope that this work opens up new doors for Caribbean scholarship in terms of building on postcolonial literatures by examining the ways in which the life sciences participate in the construction and production of what it means to be Caribbean in an era of island vulnerability. In terms of Science Studies, I hope to add to work on the biosciences and biotechnology and ongoing problematizations of life itself- to scholarship about what scientific productions about the facts of life mean for the way life is lived and the ways certain facts become valuable in moral and market economies. For Environmental Anthropology, I hope to contribute to work focusing on the politics and pragmatics of conservation and environmental management and to continue to open that field to a consideration of the way in which the life sciences in part determine what the environment is as well as what it is that needs conserving and managing. I owe a debt to scholars like Ian Whitmarsh and Bill Maurer who have identified the Caribbean as an anthropological region that is in part defined by scientific biogenetic understandings of island belonging and isolation,[6] and to scholars like Celia Lowe, Hugh Raffles, Cori Hayden, Stefan Helmreich, and Charis Thompson who already combine an attention to bioscience and environmental and natural politics in many aspects of their research.[7] My own combination of these three fields would not be possible without the spaces already opened by those mentioned above.

As a final opening thought, I note that anthropologists and social scientists involved in contemporary productions must consider the consequences of collaboration. And they must attend to the reflexive modes that are engendered within and between institutions and disciplines. If "the essence of tyranny is the denial of complexity," then we must also consider the question, what sort of tyrannies are perpetuated by the institutionalization of interdisciplinary complex systems approaches?[8] This attention to and tension around the internalization of social science in the living laboratory of The Bahamas runs through this dissertation and through my own participation in scientific productions there, and it was the feeling of this tension that started me on the path to what would become this project. In the summer of 2002, long before this dissertation was conceived of, I traveled to The Bahamas for the first time to conduct research towards the completion of my undergraduate thesis in environmental biology. Out of several ongoing projects from which biology students were to choose to participate as a project assistant, I chose to join the American Museum of Natural History's Bahamas Biocomplexity Project (BBP) and their initial attempt to administer socioeconomic surveys in fishing communities in The Bahamas. I was told that this social aspect of the project would be integrated, after a period of years, with regional biological and environmental data in order to put together a systemic model of the relationship between local human populations and the regional marine ecosystem

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[6] See Whitmarsh, Ian. 2008. *Biomedical Ambiguity: Race, Asthma, and the Contested Meaning of Genetic Research in the Caribbean*. Cornell University Press, and Maurer, Bill. 1997. *Recharting the Caribbean: Land, Law, and Citizenship in the British Virgin Islands*. University of Michigan Press.

[7] Lowe, Celia. 2006. *Wild Profusion: Biodiversity Conservation in an Indonesian Archipelago*. Princeton University Press; Raffles, Hugh. 2002. *In Amazonia: A Natural History*. Princeton University Press; Hayden, Cori. 2003. *When Nature Goes Public: The Making and Unmaking of Bioprospecting in Mexico*. Princeton University Press; Helmreich, Stefan. 2009. *Alien Ocean: Anthropological Voyages in Microbial Seas*. University of California Press.

[8] Quote from Jacob Burkhardt, Swiss historian, source unknown.

functioning in order to inform policy on the creation and management of a proposed marine reserve network (MRN). It was my questioning of this notion of the possibility and promise of "integration" and scientific holism that eventually inspired my own collaborations in The Bahamas, presented here.

Caribbean Questions: the conditions of life in the repeating islands

The arena of Caribbean Studies is one example of critical scholarship which interrogates social and historical categories and forms. I engage with this work throughout this dissertation in order to consider how we might think of the laboratory of The Bahamas today and how we might come to experiment in and inhabit the world. And yet an analysis of the living laboratory of The Bahamas does not flow easily from Caribbean Studies, and this is precisely because The Bahamas both is and is not Caribbean, and because the familiar objects and orientations of Caribbean social science might not adequately speak to some of what is happening there in the contemporary moment.

My work in The Bahamas has taught me about the politics of being (and not being) Caribbean. "Caribbeaness" is a complex attribution with which The Bahamian state and Bahamian people grapple with continually. Historically, The Bahamas has been subject to the same wide ranging and influential events as the rest of the Caribbean region, most notably the transatlantic slave trade, European colonialism, and the 20th Century independence movement. And yet, The Bahamas has been excluded from many collections of social science on the Caribbean and is usually not listed as a Caribbean country when scholars discuss the countries of the region, though it is often categorized as part of the Caribbean Region when it comes to international state politics. For example, the United States' Central Intelligence Bureau lists it as a Caribbean nation. This confusion results from more than the fact that The Bahama Islands are not in the Caribbean Sea (they are situated just north of Cuba on the North American Plate). It has been written that Bahamians do not consider themselves Caribbean because their affinities and trade ties lie more with the US than with the other islands.[9] It has also been written that The Bahamas, due to its long history of success with tourism, is too wealthy to be classed with the rest of the Caribbean, or even the Caribbean of former British colonies. The Bahamian government has reservations about its membership with the Caribbean economic community (CARICOM) and its subsequent inclusion in the Caribbean free market. In this vein, I am interested in the ways in which The Bahamas does and does not exercise its "Caribbeanness," and I cannot begin with the analytic assumption that this is a Caribbean place, even if these islands share a Caribbean history. This observation has necessitated an investigation into Caribbean Studies and Caribbean Anthropology in order to gauge how to relate this living laboratory to the discipline's themes, conversations, and tensions.

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The social science literature on the Caribbean is extensive and diverse, and throughout the 20th Century development of Caribbean Studies the Caribbean area has become a specific "testing ground" for social scientific research and a metaphoric representation of evolving social forms. Through the exposition of case studies, the delineation of social models, and the

[9] For a collection of short essays on the intricacies of Bahamian life see, Bethel, Nicolette. 2008. *Essays on Life Vol. 1: Bahamian Essays Originally Published in the Nassau Guardian*. Lulu.

evocation or refutation of sociological and anthropological problems and conceptual orientations, The Caribbean has provided ground for the production and deconstruction of such notions as cultural contact, New World society, class solidarity and diversity, systems of global production, colonial history, ethnicity, race, religion, gender, nationalism, transnationalism, diaspora, identity politics, globalization, creolization, paradise, and modernity- much of this scholarship under the rubric of colonial/postcolonial studies which variously tackle the theorizing of the practices and politics of oppression and resistance. The particular contingencies of specific Caribbean places have come, variously and inconsistently, to stand for general truths about kinds of postcolonial human nature, or their refutation and/or the nature and practice of postcolonial social theory itself. It is not a stretch to say that the Caribbean has come to be understood as a sort of living laboratory for colonial and postcolonial social research. Yet, during my time in The Bahamas I encountered processes, specific events, and situations that the academic genealogy of Caribbean social science cannot quite speak to because there are many processes at work simultaneously- economic, biological, anthropological, and more. This creates a situation which forces one to create cross-cutting conceptual combinations in order to tell new stories and to ask new questions which may or may not be deemed postcolonial, but which owe a debt to this scholarship in any case. David Scott's work provides a sense of reading diverse literatures together, and he captures how one might successfully work with postcolonial studies and build off it to create a new orientation. Antonio Benitez-Rojo's work speaks to a postmodern understanding of the Caribbean, tracing the islands as a form of thought, discussing the mystery, ambiguity, and dynamism the region has historically presented to the world. [10]

Scott has a complex approach to the consideration of the postcolonial contemporary Caribbean. His is a critique of those authors who seek to re-imagine the colonial past in the hope of altering the present, and he notes that little consideration has been given to what it is about the present which necessitates revising the past. He writes, "the precise nature of the relation between pasts, presents, and futures has rarely ever been specified and conceptually problematized. It has tended, rather, to be assumed, to be taken for granted."[11] Scott notes that most postcolonial Caribbean critiques, such as those criticisms of various forms of anticolonial nationalism, take up the goals of nationalist movements, and explain how they have failed, as answers, in the present. What these critiques don't do, however, is consider the *problems* that the anticolonial nationals constructed in the first place. They merely assume that the colonial problems then, classic Fanonian problems of colonial racism and oppression, are the same as the postcolonial problems now.[12] This, for Scott, tends to lead to the exposition of the negative structures of colonial power and to the concomitant narrative description of a romanticized subaltern agency in the face of this negating power. Scott's view is different: "it is our postcolonial questions and not our answers that demand our critical attention."[13]

In order to rethink postcolonial Caribbean questions, Scott arrives at the conception of the temporal problem-space. This is the discursive context of dispute and intervention around which questions, answers, and stakes are posed, and this is related to the notion that criticism within a problem-space, Scott's own goal, must be strategic and alert in order to determine whether the

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[10] Scott, David. 2004. *Conscripts of Modernity: The tragedy of Colonial Enlightenment*. Duke University Press. I must thank Donald Moore for bringing this work to my attention. Benitez-Rojo, Antonio. 1992. *The Repeating Island: The Caribbean and the Postmodern Perspective*. James Maraniss, translator. Duke University Press.

[11] P. 3

[12] i.e. Fanon, Frantz. 1963. *The Wretched of the Earth*. New York, Grove Weidenfeld.

[13] Scott, 2004, p. 3.

"questions it is trying to answer continue to be questions worth having answers to."[14] Such criticism poses new hope for the proposition of political alternatives in our present and for the imagination of possible futures because the re-conception of the problem opens new space for the conception of possible responses.

Scott's main example in his monograph is C.L.R. James' *The Black Jacobins*, the famous anti-colonial and epic narrative of the Haitian Revolution and the tragedy of Toussaint L'Ouverture.[15] Tragedy, Scott notes, problematizes the "view of human history as moving teleologically and transparently toward a determinate end, or as governed by a sovereign and omnisciently rational agent."[16] Tragedy raises doubts about the relation between pasts, presents, and futures, it exposes the "hubris of Enlightenment and civilization" and points toward a more complex and contingent understanding of human life.[17] With such a conceptual view of tragedy and problem-space in mind, Scott hopes to reread *The Black Jacobins* as a work which moved beyond the anti-colonial, a work which provides grounds with which to critique the postcolonial present.

In a meditation on modernity, Scott discusses critiques of James as unaware of the diversity within modernity,[18] stating that the Enlightenment idioms promoted by the French Revolution were an important aspect of Toussaint's revolutionary subjectivity and that to worry otherwise is to miss the point that subaltern resistance is no longer at stake in the way that it was.[19] The relevant questions for Scott concern the problem of modernity, understood in the Foucauldian sense of a positive formation of power that shapes the material and epistemological conditions of thought and possibility. Toussaint L'Ouverture, in this schema, becomes a *conscript* of modernity, not only a resisting agent. The plantation is also reconsidered in this view as a form of modern power which shaped conditions of slavery and subjectivity, and this moves the consideration of slavery away from the anti-colonial criticisms of its negative effects and the search for agency. He notes that "what is at stake here is not whether the colonized accommodated or resisted but how colonial power transformed the ground on which accommodation or resistance was possible in the first place, how colonial power reshaped or reorganized the conceptual and institutional conditions of possibility of social action and its understanding."[20]

Thus, for Scott, Toussaint is a conscript of the founding modernity of the Caribbean, a founding modernity that continues to shape the thoughts and lives of others in the region. The lack of a visible indigenous population in the Caribbean,[21] and the forced and brutal "civilizing"

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[14] P. 4.

[15] James, C. L. R. 1963. *The Black Jacobins: Toussaint L'Ouverture and the San Domingo Revolution.* Random House.

[16] Scott, 2004, P. 12.

[17] P. 13. In this light, Toussaint is not so much a figure of Caliban, the hybrid and agentive subaltern, as Hamlet, the tragic modernist subject (Scott, p. 16).

[18] i.e. Fischer, Sibylle. 2004. *Modernity Disavowed: Haiti and the Cultures of Slavery in the Age of Revolution.* Duke University Press.

[19] I should note that Scott does not directly cite Fischer, and that Fischer promotes an understanding of cultural diversity within notions of modernity and does not directly promote subalterity as a category. That said, I still see a contrast along these lines between the two scholars.

[20] P. 119.

[21] A point contested by Forte, Maximilian. 2005. *Ruins of Absence, Presence of Caribs: (Post) Colonial Representations of Aboriginality in Trinidad.* University of Florida Press.

process of plantation slavery, make the Caribbean the inaugural form of modernity. In the plantation, slaves and masters were altered in modern ways and inserted into modern global processes that would come to matter for reasons because of their dehumanization and violence. The point is, for Scott, that the Caribbean put forth *new conditions of life*, creating the West Indian as the conscripted subject and object of a modern ethos.

But how do we describe the contemporary ground that shapes these conditions of life in the Caribbean today? How do we characterize the current confluences of productivity that create the region as a particular kind of problem space? Benitz-Rojo has a complex framework for non-reductive thinking about the region which I find helpful as a frame for the discussion to follow. His analytic mode of "Chaos," referring to the advent of disorder in the passage of time, nonetheless has an emphasis on repeating dynamic states and regularities. He writes, "I have tried to analyze certain aspects of the Caribbean while under the influence of this attitude, whose end is not to find results, but processes, dynamics, and rhythms that show themselves within the marginal, the regional, the incoherent, the heterogeneous, or, if you like, the unpredictable that coexists with us in our everyday world."[22] The trope of repetition, within this mode is especially salient for Benitez-Rojo, because only repetition as difference, the motion of irreducible change, can be identified in the fluidity of Chaos that is the sociocultural Caribbean. What he calls the "repeating island," then, is a notion that is meant to evoke the impossibility of characterizing the region with an attention to one site alone or the comparison of diverse sites. Rather, the sense of the repeating island, as infinitely repeating and inescapably complex, is the feeling one gets when one tries to pin down the culture of region, and the feeling is all there is. For Benitez-Rojo, the Caribbean is *the* paradigmatic site of contact and diaspora, having always been involved in processes of supersyncretic fluidity and continual global dynamism.

I borrow this sense of the Caribbean from Benitez-Rojo because I think it is also evocative of the way in which the islands of The Bahamas are produced through science-based interventions in tourism and environmental management. As I will discuss in detail below, the life sciences are in the business of creating and conscripting animal, ecological, planetary, and human natures, and this work takes on interesting forms when the scientific work is caught up with defining and designing the nature of islands. As I will argue, this island nature is increasingly produced as dynamic, complex and vulnerable, but it is also produced as part of the historical play of travel, traffic, arrival, and visitation that has come to shape the economies of the region. I think that this is currently a time in which The Bahamas, and certainly other small islands of the world, can be thought of as one repeating island in which the conditions of island life itself have been framed in terms of travel and legitimized by natural science.

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The following sections introduce and explain two concepts which I have borrowed from phrases used in my own field site. *Islands by Design* is the name of an environmental assessment and engineering company in Nassau and the "living laboratory" is a phrase I borrowed from a Bahamian government official in the Ministry of Environment who was using it to describe his hopes for what The Bahamas might become (more on these borrowings below). I am using "islands by design" to describe my orientation towards arenas in which The Bahamas is materially and ideationally produced for the conjoined purposes of scientific research and the redevelopment of the travel industry. I use "the Bahamian living laboratory," as a trope within

[22] Benitez-Rojo. P. 3.

this orientation which highlights the animated and biological aspects of these processes and the multiple ways in which the Bahama Islands have become an experimental field.

These concepts intersect with and build off of the aforementioned Caribbean scholarship through an attention to the conceptual and material practices of academic, scientific, and political place and person making, what might be considered contemporary conscription. I take Scott's use of conscript to refer to the sense of compulsion inherent in these formations, but also to the sense of recognition and enlistment that the notion contains. In other words, the term connotes coercion, but beyond that, it connotes a certain positive subject formation based on an understanding that work must be done on the self, on the world, and on that relationship. This tension between orchestration, recognition, and repetition in a milieu of the creation of new conditions of and for island life is what I take from Scott and Benitez-Rojo and their brands of postcolonial and postmodern scholarship.

I hope to extend this notion of the conscript in order to show that the environmental life sciences engage in their own specific forms of social theorizing, and that the living laboratory of The Bahamas is a problem space wherein it is possible to redesign ideas about human nature, personhood, and the contemporary- understood as that tenuous relationship made between the recent past, the present, and the near future.[23] I also hope to point out that there is no specifically subaltern conscript at the center of this work, although there remains intense social stratification; we are all conscripts in the living lab, infinitely repeating- though the stakes are not the same for all. This is a problem space in which it becomes possible to ask new questions about the Caribbean while re-conceptualizing the engagements of postcolonial scholarship with contemporary science studies, and a space in which to consider what sorts of problems are appropriate and interesting objects for Caribbean social study today.

I engage with Caribbeanist scholarship in this dissertation including the work of David Scott and Antonio Benitez-Rojo, mentioned above, the Bahamian scholar of popular culture Ian Strachan, one of the founders of Caribbean anthropology, Melville Herskovits, an early political ecologist, Fernando Ortiz, the inventor of "creolization," E. K. Braithwaite, scholars of contemporary Caribbean identity, Stuart Hall, Maximillian Forte and Virginia Young, the cultural ecologist Julian Steward, and the contemporary anthropologist Bill Maurer. Mine is an attention to knowledge production and the generation of social and natural forms not necessarily tied to historical, overt, or symbolic oppressive practices, and yet it is an attention to forms which have their own ways of producing possibilities and re-inscribing stakes. Intersecting with Caribbean Studies' attentions to transnational/diasporic/mobile/global populations and forms of citizenship and exclusion, I am attentive to forms of citizenship in the living laboratory- biological, sustainable, ecological and biocomplex. The development of the notion of the Bahamian living laboratory can be related to this reoriented and re-problematized Caribbean scholarship, becoming a tool for the critique of institutionalized formations of socioeco*logic* and scientific naturings that design the contemporary conditions of possibility and help to create a regional experimental space that is as unique as it is simultaneously repeating and global.

Islands By Design: studying, creating, and arriving at islandness

[23] See Rabinow, Paul & George E. Marcus. 2008. *Designs for an Anthropology of the Contemporary*. Duke University Press.

In the world of Caribbean offshore financial centers (OFCs), of which The Bahamas is a part, there is the sense that "offshore" is a place of no place. International finance does not seem to be tied to the identity of a place nor does it purport to substantiate the locatedness of a center. "Offshore" has come to mean the legally ambiguous space of the not here. And yet international finance is involved in many localized investments which do create and substantiate place as money is put to work in the not here, especially when these investments fund tourism and development. Though this dissertation is not about offshore finance and does not therefore delve into the intricacies of foreign investment in The Bahamas, I mention the place of no place because it simultaneously contrasts with and enables the design and place making capacities of the Bahamian tourism industry and occasionally the knowledges produced about place by the scientific community. The relation between islands as non spaces and designed places is a convoluted one, but it is a relation that must be kept in mind in the discussion that follows.

I will take this section of the introduction to explain my use of the concept of design as it relates to the scientific and social construction of islands and the themes of visitation, vulnerability, and biocomplexity. As mentioned above, the phrase itself, "islands by design," is the name of a Bahamian environmental assessment and design consultation firm whose projects have included the design plans and use concepts for large marinas and planned developments on several islands. Much like "living laboratory," I have borrowed this idea and redefined it to suit my purposes. I also borrow here from the History of Science including the history of Anthropology, and I pick examples from Island Archeology, Island Ecology, Tourism Studies and Urban Studies to talk about the power of design and the way it can engender various forms of experience.

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A columnist in one of The Bahamas' national papers stated in print in 2007 that, "planning is the key to sustainability," and notions of design and planning were conspicuous throughout my work with field researchers, conservation managers, and government officials. Conservation and management organizations are currently going through the process of designing and developing science based management plans for everything from individual protected areas to national protected area master plans with guidance and design models from international conservation organizations and consultants; The design of scientific field research projects is often as important a product as the research results when it comes to forms of knowledge created by research scientists and students; Design for the curricula and scope of a new degree program in "Small Island Sustainability" at the College of The Bahamas is currently underway; The newly created Ministry of Environment is redesigning the roles of its own governmental institutions, becoming a central player in the planning processes for projected social and economic development in the country; the Department of Sustainable Tourism is redesigning the ways in which the islands of The Bahamas should be marketed to foreign visitors and reconceptualizing the form tourism infrastructure should take in various locations; The Ministry of Tourism is considering how to redesign its "tourism product" to not only mitigate and adapt to threats of climate change but to discover ways in which to profit from a newly climate aware target traveler. This is to name only a few examples of the rootedness of design schemes in the Bahamian milieu. I note that design processes come prior to planning, that planning is an aspect of the enactment of thought and design, and the newspaper quote could more accurately say, "design is the key to sustainability."

"Design," as a term, implies the creation of plan, an intention, a pattern, a contrivance, and productive work to "create the form or structure of something."[24] This last implication is one of the most important for me, in that I would like to make the *creative* and *formative* aspects of field science, sustainable development, and environmental management explicit. Islands by design, then, references the multiple ways in which nature and natures, life and lives, matter and materials, places, spaces, and objects, etc. become conceptually and aesthetically formed and reformed as part of the work of science-based environmental, touristic, and sustainable planning in The Bahamas. The point is not only that natural science and scientific expertise is touted as the position of authority from whence ecological problems can be diagnosed and framed in certain circles- the point is also that natural science and scientific expertise is in the position to influence and set the terms for *how* solutions will be studied, formed, and enacted. Experts, albeit a somewhat motley crew with disparate backgrounds when it comes to nationality, discipline, realm of experience and outlook, can be considered the designers of the living laboratory.

I see the living laboratory as a site of great productivity in the development of the conditions of possibility. With the notion of islands by design, I am in essence proposing another direction for political ecology or environmental anthropology to take, or perhaps another set of tools to add to the rich set which this unruly sub-discipline already possesses. I think that focusing on and conceptualizing design is one way to attempt to describe the *work*, simultaneously abstract and material, that ecological, biological, and conservation scientists and managers variously do. This work influences the way that the world is perceived, how new kinds of relations are formed, how futures are imagined, and what should be done about it all. By examining how researchers, experts, and officials frame and design their projects and set up responses to problems, anthropology can open up new spaces for insight into the complexities of environmental politics, and the idea of islands by design helps me to do that in the purposefully particular place that is The Bahamas today.

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I note here that the study of islands in anthropology is not at all new. For example, prior anthropological work in the Pacific Islands has referenced the concept of the living laboratory in terms of islands as sites for the study of "dying cultures" and isolated peoples (see below). And I repeat that Caribbean islands have also historically been used as sites in which to identify and study active social processes- acculturation and creolization are only two famous examples (see Chapter 3). Islands, imagined as specifically natural and social spaces, have been imbued by many scholars with a mystique and significance that has perpetuated for many years and which continues to animate contemporary problems, especially those construed as socioecological.

Lemov (2005), when discussing laboratories, mentions *The New Atlantis* by Francis Bacon (1624) which describes an island "scientific utopia" where people control the weather, the sea, plants, and animals through processes of experimentation.[25] Lemov goes on to discuss the development of the conceptualization of these processes, considering how a certain turn of the century physiological scientist, Jaques Loeb (University of Chicago and University of California), envisioned "lab practices" on the very substance of life, creating a concept of life in the lab as explicitly "subject to design." This design is based on a "style of looking and inquiry"

[24] See Encarta World English Dictionary, "Design."

[25] Lemov, Rebecca. 2005. *World as Laboratory: Experiments with Mice, Mazes, and Men.* Hill and Wang. P. 11. Bacon, Francis. 1624. *The New Atlantis: A Work Unfinished*. No Publisher Given.

created in the lab, and it was a new attitude towards the creative possibilities of science.[26] I argue here that to conceive of an island as the site of specific processes and as the target of specific interventions is to engage in a particular style of looking organized around islandness. The Bahamas, as a nation of islands, is often subject to this style of looking and inquiry, and this style has made The Bahamas, and many small islands, famous in the world of ecological research.

Part of what I mean by islandness as a style of looking which affects island designs can be seen in the work of Young (1999).[27] She states that islands have been important for human life because the physical scale of islands is accessible to human beings. Islands have also been important for natural history, she claims, because their isolated populations produce evolutionary change and variety. She writes, "significant facts about nature and ourselves can be learned by examining these miniature worlds and their histories" because islands have simplified ecologies which reveal principles of evolution when compared to the continents.[28] Taking an all too common leap, she notes that the earth can also be considered an island in the universe, isolated from all other life, a super-organism in itself. Islandness here is tied to the fact that, "islands provide very useful information about the interaction of various forms of living things. Islands are small, encapsulated units that can be studied and understood in a way that is not possible when we are dealing with the complex interwoven relationships of life on a large contental landmass."[29] Islands are endlessly unique, with many endemic species, and for Young, observing islands implies observing the universal principles of human evolution. Understanding the "mysterious privilege of being alive" can come from understanding islands.[30] For Young, the importance of islands is self evident- one can *see* the special nature of islands and their importance for an understanding of the relationship between the planet and humanity.

This sentiment is echoed by the Hawaiian archeologist, Kirch, who writes, "islands are natural history's best shot at something approaching the controlled experiment."[31] He envisions islands as a microcosm of the Earth, as isolated little worlds, and he strongly advocates for the study of islands as laboratories for "the human dimensions of global change."[32] For Kirch, the best way to study global change is to seek out isolated model systems to study processes and relationships. Islands are useful model systems, and they are also useful for comparative purposes and for modeling the planet as one ecosystem- the "Earth Island."[33]

Islandness as a style of looking is profoundly influential, and Kuklick has explored the curious history of the way in which the study of islands has influenced the study of anthropology in terms of the unexplored relation between the island model of Darwinian biogeography and British Anthropology.[34] This is an important historical linkage between social anthropology and biology. She argues that anthropology, as a field science, began in the Pacific islands with a

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[26] See Lemov, 2005, P. 22-23.

[27] Young, Louise B. 1999. *Islands: Portraits of Miniature Worlds*. W. H. Freeman and Company.

[28] P. 10.

[29] P. 250.

[30] P. 260.

[31] Kirch Patrick V., 1997. "Microcosmic Histories: Island Perspectives on 'Global' Change." *American Anthropologist*. 99(1). P. 30-42. P. 30.

[32] P. 31.

[33] Following Bahn, Paul & John R. Flenley. 1992. *Easter Island, Earth Island*. London: Thames and Hudson.

[34] Kuklick, Henrika. 1996. "Islands in the Pacific: Darwinian biogeography and British Anthropology. *Amercian Ethnologist*. 23(3). P. 611-638.

biologist who became more interested in the people of the Torres Sraits than in the ecology he went there to describe and document. What followed was biological theory translated into an anthropological paradigm. This biologist borrowed analogies of isolation and the evolution of species, applying them to the study of the development of human cultures in isolated locales. Islands were considered key places to study natural selection, and they then become so for the study of human culture due to their isolation and vulnerability. One could speculate that the paradigm of social vulnerability and the threat of cultural extinction as an impetus for field research stems from this Darwinian salvage anthropology. Island humans were once and are again considered to be just as vulnerable as plants and animals. For Kuklick, islands became valuable for social science as "virtual laboratories for natural experiments in social processes."[35] She writes, "the isolated community was the sociological equivalent of a controlled laboratory in which he could establish the natural limits of individual accommodation to varieties of social order."[36] This is the Pacific island tradition of which Malinowski and Radcliffe-Brown are a part.[37] Pacific islands were examples of pure cultural forms and also ideal "contact situations" of the social evolution between the primitive and the modern and between island peoples.[38]

Further complicating the self-evidence of island significance, Malm (2006) critiques the 1990's characterization of the Earth as an island in space.[39] He notes that islands were a popular analogy, and he questions this analogy, noting that no island is truly isolated, that no island is actually "an island." Islands, he says, are integrated in global systems of human "migration and resource flow."[40] He goes on to note that islands have been seen as "natural models for population growth and regulation" since the 1960's, and that in theoretical ecology, all isolated systems are considered islands.[41] His argument is not that islands are vulnerable because they are isolated, but that they are vulnerable because they are *integrated* in fluctuating world markets which demand resource extraction and social change. Further, islands tend to be spaces of lack and deprivation *because* of their colonial histories, not because of their isolation. His point is that islands and their populations must not be considered fixed, they should be considered in an expanded world of connections. He notes that independence, a sort of imposed isolation from the sovereignty of other states, is not just a democratic right for islands states, but that it must also be recognized as an economic asset that generates income through the creation of offshore finance, selling passports, ship registry, and biotech access to island populations.

Islandness therefore, as style of looking or mode of conceptualization, can sometimes be considered an asset for specific business ventures. Islandness can also be a political asset for some states in international negotiations, for example in terms of the creation of Small Island Developing States as a block in the United Nations. Mol and Law (2002), when talking about human bodies state that, "in practice, if a body hangs together, this is not because its coherence precedes the knowledge generated about it but because the various coordination strategies

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[35] P. 617.

[36] P. 624.

[37] See Malinowski, Bronislaw. 1922. *Argonauts of the Western Pacific*. London: Macmillan. See also Radcliffe-Brown, Alfred Reginald. 1922. *The Andaman Islanders*. New York: Free Press of Glencoe.

[38] Kuklick, 1996, P. 625.

[39] Malm, Thomas. 2006. "No Island is an 'Island': Some Perspectives on Human Ecology and Development in Oceania." In: *The World and the Earth System: Global Socioenvironmental Change and Sustainability Since the Neolithic*. Alf Hornborg & Carole L. Crumley, Eds. Left Coast Press.

[40] P. 268.

[41] P. 269- 270.

involved succeed in reassembling multiple versions of reality."[42] This relates to the way in which islands, as a specific and coherent form or category of isolation, vulnerability, or natural historical significance, have been configured and strategically *designed* as significant entities with particular properties. As a result of these observations about the traits of islandness, I cannot think of The Bahamas as cohering *a priori* to the strategies that attempt to make it appear as a unified place and idea. As stated, I devote a large part of my attention in my chapters to some of these island making strategies that stem from the loose field of interdisciplinary policy-based environmental science and its linkages with the tourism industry. These developments do not depend on a preexistent island nature; rather, they depend on the confluence of arenas that benefit from *designing islandness* and that engage new publics or create new publics to engage in the process. One main point is that things could be otherwise.

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Thinking about islandness as a strategic mode of design in the living laboratory of The Bahamas means having a further discussion about the beneficiaries of island visualization and design processes. My focus in this dissertation is on design strategies created by the international and Bahamian tourist industry, the life sciences, and the burgeoning field of small island sustainability, and the ways in which these sectors work together to create newly productive confluences. These confluences, I argue, are part of what shapes The Bahamas today as a space for arrival and visitation- these interconnections help to define, in part, where one is going when one travels to these islands, where one has been when one leaves, and where and who one is when one lives there.

In 1988, Gunn described how tourism had grown to rely as much on land development as on promotion.[43] Tourist experiences were increasingly made possible by the "design of the land base," and arguably, for places like The Bahamas, the sea.[44] Design, according to Gunn at the time, resulted from the "policies and decisions made by many land owners and mangers," and those with the most design influence were "architects, landscape architects, engineers, sculptors, and interior designers. Also influential at times are philosophers, political scientists, economists, planners, horticulturalists, and painters."[45] Gunn prefers to focus on design rather than planning in order to "emphasize the creative and artistic manipulation of structures and landscapes for the purposes of better tourism. This word choice suggests that everything that impinges on the traveler's senses- what he sees, hears, feels, smells, tastes, and moves through and over- is the responsibility of the designer. This attitude transcends all property boundaries and ownership jurisdictions. It commands us to view our travel world as a whole, knowing full well that thousands of independent decisions cause and influence that totality…. These decisions dictate how the environment is experienced."[46] It is this explicit attention to designers as those with great responsibility in the living laboratory that I borrow from Gunn, though I argue that today, increasingly, science-based consultancies, environmental managers, global climate scientists, biologists, etc. design the ways in which the environment is understood, ways which necessarily affect how it is experienced. Additionally, architects and engineers cannot afford to ignore the

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[42] Mol, Annemarie & John Law. 2002. "Complexities: An Introduction." *Complexities: Social Studies of Knowledge Practices*. Duke University Press. P. 10.

[43] Gunn, Clare A. 1988. *Vacationscape: Designing Tourist Regions*. Van Nostrand Reinhold Company.

[44] P. 1.

[45] P. 3.

[46] Ibid.

predictions and practices of scientists, and must therefore incorporate scientific styles of looking and design strategies into their own designs.[47] The scientific vision and production of islandness becomes "built in" to island places and spaces, affecting the way people live in an island place as much as the way they envision and experience the fact of living there. Island cities and settlements, therefore, become important centers for new design experiments.

Holston and Appadurai (1999) point to the importance of cities as sites "for analyzing the current renegotiations of citizenship, democracy, and national belonging."[48] These writers attend to the ways in which citizenship has been de-linked from nationality and can now be attributed to an array of other anchors of identity, such as the urban city.[49] National citizenship is no longer the "identity which subordinates and coordinates all other identities."[50] They focus on the significance of place and location in a globalized world, and the creation of new social categories that come with these new forms of citizenship, mediated by labor and capital. These bring with them new conditions for claiming rights and for ruling the self, new conditions for work and residence, new privileges and managers, new dimensions to belonging, new performances of belonging and the self, and new forms of violence, exclusion, and violation. In The Bahamas today, living in dense island communities is a development and design problem, and designers- urban planners, architects, engineers, and sustainability scientists- are working to create an improved vision and blueprint for island living. Holston and Appadurai's work on cities, when combined with notions of biological citizenship described below, helps to frame the stakes of contemporary sustainable design efforts in these islands, where what might be thought of as a Bahamian lifestyle may one day exist as an example of the sustainable urban island lifestyle and mode of identification.

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To conclude this section I must mention some final orienting points for considering the living laboratory and the chapters that follow. The notion of problematization, as described by Rabinow (2003), is useful for conceptualizing contemporary fields of action, such as the environmentally oriented life sciences.[51] Rabinow modifies the late Foucauldian notion of

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[47] For a further discussion of the role of experts, see Kelty, C et al. 2006. *Collaborative Research: Agents of Mediation Between Science and the Public*. NSF Proposal No: 0433457. Kelty et al describe the current scene as one in which there is a "manifest complexity and multiplicity of relations between science and society in the contemporary world," (p. 3) and where new sciences create new dangers, potential threats, uncertainties, and inspiring possibilities. New decentralized, denationalized, and mobile publics are emerging today as well, publics which inform and are involved with scientific practices and processes in new and complicated ways (p. 6). Multiple *intermediaries* are called upon in this milieu, to mediate these new situations, social imaginaries, and regimes of living (p. 4). As mediators, these intermediaries have particular subjectivities and are "themselves the site of a certain re-imagination of social theories." (p. 5). They can be thought of, following Rabinow (1989), as contemporary "technicians of general ideas." See Rabinow, Paul. 1989. *French Modern: Norms and Forms of the Social Environment*. MIT Press.

[48] Holston, James. & Arjun Appadurai. 1999. "Introduction: Cities and Citizenship." In *Cities and Citizenship*. James Holston Ed. Duke University Press. P. vii.

[49] See also Broad, K. and B. Orlove. 2008. "Channeling globality: The 1997–98 El Niño climate event in Peru." *American Ethnologist*. 34(2). P. 285-302. This article discusses the way international climate models were used by the Peruvian media and government to influence Peruvian global political positioning and identification.

[50] P. 1.

[51] Rabinow, Paul. 2003. *Anthropos Today: Reflections on Modern Equipment*. Princeton University Press. See also Foucault, Michel. 1994. "Polemics, Politics, and Problematization: An Interview With Michel Foucault." *The Essential Foucault*. Rabinow and Rose, Eds.

problematization as a method which treats thought itself as a practice, rather than as a system, moving thought away from the discursive analysis of epistemological studies to "a more dynamic and heterogeneous project of subjectifying objectivity and objectifying subjectivity."[52] This is an intellectual movement away from the analysis of semiotic systems or underlying cultural codes and the notion of culture as a totalizing system as well as a movement away from phenomenology and the examination of lived, bodily experience. Here, both the thinker and thought are considered contingent occurrences. In this method, the object of thought becomes a domain of action, such as "the socioecological system" as object of intervention, or "the island"; domains of action are considered things. And it is not just the act or process of thinking which makes a domain of action an object of thought/available for thought. "In effect, in order for a domain of action to enter into the field of thought, it is necessary that a certain number of factors have been made uncertain, have made it lose its familiarity, or have produced around it a number of difficulties."[53]

In a way that closely follows Scott's own conclusions about Caribbean problems, mentioned above, Rabinow notes that historically conjunctural sites, the nexus of concepts and practices that are the contemporary realms of science, can be and are constantly turned into problems by those involved. Thought, then, is the explicit and specific *response* to such problems, and the form this response takes, necessarily multiple and contradictory, can be analyzed along with the thought itself. He writes that, "thought arises out of an encounter with a complex conjuncture…This elaboration of a given situation into a question, this transformation of a set of difficulties and troubles into problems to which diverse solutions are proposed as responses, is the point of problematization, the specific work of thought."[54] The act of analyzing this thought, this motion, and the way in which all the serious responses posed are *simultaneously possible* in a field of political, moral, and scientific power relations- this is the act of problematization. To put these ideas in my own terms, *in the living laboratory of The Bahamas, the relationship between people, their human nature, and their island nature has been problematized.* My living laboratory trope, filled out below, describes this "complex conjuncture" in this place. The chapters of this dissertation are one attempt to examine the multiple and convergent design of responses to these new questions in this problem space.

In order to consider the role of anthropology, a field which is no less involved in the design of its problems and objects than the scientist subjects of this dissertation, I turn to the work of Rabinow and Marcus (2008).[55] In this transcription of an ongoing conversation, these scholars consider transformations in the anthropological field. They note that there is no current agreement about "what is distinctly anthropological when the discipline is no longer primarily the ethnographic study of the faraway, cultural Other," and they recommend that anthropologists discover what else the discipline can be designed to do, though they advocate for respecting the conceptual continuity of anthropology over time. [56] Anthropology, for them, is still on the margins of the social sciences though they claim that science and technology studies "took anthropology beyond the subaltern subject without neglecting that condition of life or

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[52] Rabinow, 2003, P. 45.

[53] P. 47.

[54] Ibid.

[55] Rabinow, Paul & George E. Marcus. 2008. *Designs for an Anthropology of the Contemporary*. Duke University Press.

[56] P. 8.

perspective. It involved anthropology in a much more complicated space of research, equal to new perceived complexities in the world of the 1990s and beyond, with less of an anticipated path or frame of inquiry."[57] Rabinow and Marcus see one strength of contemporary anthropology as the ability to examine "elements in motion," the way in which current problems which shape our understanding of human life shift in real time, maintaining their own continuities and disjunctures with past processes.[58]

What I take from this is a way in which to conceive of connection to preexisting anthropological concepts while molding other concepts to fit a continually shifting object and problem of research. While it was once possible to think that one could describe this as a dissertation about the Bahamian style of environmental politics- about the ways in which Bahamian culture and institutional structures influence the success or failure of environmental research and conservation plans- this is not quite an adequate way to represent events in The Bahamas. The processes and designs of the life sciences are not the same everywhere, but they are not particular in The Bahamas because of something as amorphous as Bahamian culture. What is interesting is the creation of the particularities of events and experts and research objects, and the contingencies that make up the processes and problems in the Bahamian milieu- this creative nexus or living laboratory.

Following Hans Blumenburg, Rabinow (2008) advocates for the legitimacy of the present moment, the legitimacy of what he calls "the contemporary."[59] This is his "call to remain open to the present, against narratives of decline, disaster, and other forms of closure" while at the same time attending to what these narratives might make.[60] If, as he states, the "logos of bios is currently in the process of rapid transformation,"- if the forms of reason which ground our understanding of life are shifting- then, "a central question for us today therefore is: given a changing biology, what logos is appropriate for anthropos?"- how do we rationalize and relate to what we come to know as human?[61] An anthropologist of contemporary problems must be attentive to the question: "What difference does today make with regard to yesterday?" and they must observe those who make these differences matter, those who make a kind of reality.[62] This is Rabinow's version of watching "science in the making," a version that imbues my own anthropological observations and collaborations in The Bahamas with the sense that these islands constantly undergo a creative design process that creates a continually shifting future.

In the next section, I devote space to a consideration of the significance of field research as an active form of laboratory situation in The Bahamas and in the world. This section on the designed nature of islandness is intended to frame this attention to field research and to the kind of life and lives envisioned and enabled by forms of bioscience. New science-based understandings of biological life are caught up in the creation of islandness and islands as knowable and visitable places, and the living laboratory of The Bahamas is defined and parameterized by these design processes. In a sense, the knowledge produced about The Bahamas and its islands by the natural sciences is constrained by the designs of the tourism

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[57] P. 39.
[58] P. 113.
[59] Rabinow, Paul. 2008. *Marking Time: On the Anthropology of the Contemporary*. Princeton University Press.
[60] P. 13.
[61] P. 14.
[62] P. 24.

industry, concerned as it is with increasing arrivals, but the reverse is also just as true- the capacities of the tourism industry are constrained by the designs of the natural sciences.

The Bahamas As Living Laboratory: labs, fields, and lives

The world is full of what could be called laboratory situations, and this idea has been interpreted in a variety of ways by social scholars and scholars of science. Importantly, identifying laboratory arrangements involves the implicit or explicit delineation of the changing meanings, publics, styles of knowledge production, and forms of expert related to the laboratory situation in question. There is the iconic space of the scientific lab populated by highly educated scientists and technicians in white coats (usually physicists or geneticists) conducting experiments on the fundamental workings of nature. Other lab situations are more mundane, such as parks, zoos, or aquariums where zoological experts, volunteers, and guests observe animal and plant behavior in artificial settings. To this list I could add Reidy et al's description of the 19th Century European voyages of biological and geological exploration in which, "the world served as a laboratory. Large, uncharted landmasses became home to some of the most important science practiced in the mid-nineteenth century. These voyages provided the naturalists with scientific training that they could not have received from a university education, private reading, or immersion in scientific culture in the metropolis. Their descriptions of the world's astonishing diversity and the collections they amassed and brought to the European botanical gardens and museums transformed European consciousness, undermining eighteenth century conceptions of the fixity of species and forever transforming Europeans' views of their own place in nature."[63]

This section on the Bahamian living laboratory draws on selected examples from Science and Technology Studies, Laboratory Studies, the History of Science, and the Anthropology of the Life Sciences. Just as the Caribbean can be considered a laboratory situation for the development of social theories, it can also be considered a physical laboratory for the practice of bioscientific activity and the generation of capital.[64] The laboratory situations in The Bahamas depend on histories of struggle to concretize the region, its islands, and the people and processes in it. These arenas of the study of science help me to attend to the multiple and simultaneous ambiguities at work in designs for Caribbeaness and Bahamianess, the development of fields of research, the island field as site of research, and the power relations that create possible frames for lives.

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The study of scientific laboratories as special spaces for social production became a characteristic of the sociology of science beginning in the 1970's. Ethnographers of science sought to decentralize the analytic focus on human agency through the study of lab practices with an attention to the ways non human substances have a "material agency" in the production of scientific facts.[65] Latour and Woolgar's *Laboratory Life* (1986 (1979)) introduced readers to

[63] Reidy, Michael S., Gary Kroll, Erik M. Conway. 2007. "Natural History in the 19th Century." *Exploration and Science: Social Impact and Interaction*. ABC-CLIO, Inc. P. 130.

[64] For example, see Whitmarsh's biomedical Barbados. Whitmarsh, Ian. 2008. *Biomedical Ambiguity: Race, Asthma, and the Contested Meaning of Genetic Research in the Caribbean*. Cornell University Press.

[65] For a discussion of material agency, see Pickering, Andrew. 1993. "The Mangle of Practice: Agency and Emergence in the Sociology of Science." *American Journal of Sociology*. 99(3). P. 559-589. See also Traweek,

the daily lives of scientists involved in the construction of such facts. [66] Famously using the trope of an anthropologist in the field attending to "science in the making" they noted that all new laboratory activity hinges on previously constructed and accepted facts embodied in lab instruments and that laboratories undergo continual "microprocesses" of negotiation in their operation as a system of fact construction.[67] The vast amount of literature, documents, and "material dictionaries" produced by labs become important as part of the fact making process and the material arrangements of the lab produce a reality that would not exist without it.[68] They write, "It is not simply that phenomena depend on certain material instrumentation; rather, the phenomena are thoroughly constituted by the material setting of the laboratory."[69] The laboratory is therefore a space which embodies the work of other fields, reified in its arrangement and equipment, to legitimate the reality it produces; reality and nature are the byproducts of the scientific stabilization of facts in the lab, rather than the cause. In an important observation, Mol and Law (2002) note that laboratory experiments are "simplificatory devices: they seek to tame the many erratically changing variables that exist in the world, keeping some stable and excluding others from the argument."[70] Their point is that simplifications are used to justify action, yet they qualify this by stating that simplification should not be denounced off-hand as it is a *productive* force, especially when it comes to knowledge practices.

As mentioned above, the notion of The Bahamas as a living laboratory for certain sciences and disciplines is a framing concept for this dissertation. The phrase itself, "living laboratory," originated from an interview with a Bahamian government official who hoped that the international research community might increasingly come to see The Bahamas as a living laboratory for environmental research, and it is a concept I have borrowed and stretched to fit my own interests. This can be differentiated from Harre's (2009) use of the term "living laboratory" to describe how living things become crucial aspects of scientific laboratory experiments.[71] For Harre, living things are transformed, in the space of the lab, into instruments and apparatus for measurement, detection, simulation, and experimentation. An important part of the lab "has always been organic, apparatus and instruments constructed from living materials or materials that were once alive."[72] He provides the example of the fly, *Drosophilia*, and genetics research: the fly became a piece of lab equipment in that it was a means of producing specific kinds of knowledge as a standardized organism in a system of production; the fly was a designed artifact. Harre writes, "glass must be skillfully blown to become a flask. A length of copper wire must be rolled up in a certain precise way to become an induction coil. So too the living material must be

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Sharon. 1988. *Beamtimes and Lifetimes: The World of High Energy Physicists*. Harvard University Press as an example.

[66] Latour, Bruno & Steve Woolgar. 1986. *Laboratory Life: The Construction of Scientific Facts*. Princeton University Press.

[67] Latour and Woolgar, P. 41-44.

[68] P. 48.

[69] P. 64.

[70] Mol, Annemarie & John Law. 2002. "Complexities: An Introduction." *Complexities: Social Studies of Knowledge Practices*. Duke University Press. P. 2.

[71] Harre, Rom. 2009. *Pavlov's Dog and Schrodinger's Cat: Scenes from the Living Laboratory.* Oxford University Press.

[72] P. 3.

shaped and transformed into devices in the living instrumarium."[73] It is this experimentation with living things that he calls the living laboratory and he thus uses the phrase in a slightly different valence and for different purposes. My use of the term is also about living things, but as I will show below, it is about the production and manipulation of *ideas* framing life and living as much as it is about the scientific *use* of living things in The Bahamas today. His focus is on animal bodies and individuated organisms, while mine is on the way in which processes and systems are identified and designed as sites for experiments or environmental management and the way these "natural" processes are conceptually linked to other enterprises.

Following Latour and Woolgar, but taking them into the living laboratory of The Bahamas, this dissertation starts from the point that nature and its scientific forms, i.e. habitats, ecosystems, biodiversity, etc. are not at all given. These are the reified form of past scientific theories and practices made in other laboratory situations at other times. My research in The Bahamas has been centered around contemporary laboratory situations which can be very generally referred to as social science, ecological and environmental research, and sustainable economic development- processes of human life and living, non-human life and living, and economies of visitation and investment. A focus on current events in The Bahamas could very well entail investigating any one of these arenas, and these realms are discursively separate in that they are often discussed as separate categories of inquiry which can be related post facto. But an investigation of The Bahamas as a living laboratory, as a site for active experimentation and exemplification, requires the recognition that these categories are interrelated and co-constitutional. Therefore, I should say at this point that I am working within my own laboratory situation with this dissertation in that I am, as mentioned above, conducting a sort of experiment by bringing a host of scholarly angles to bear on the situations and events I was and continue to be part of and witness to.[74]

For my purposes here, I will define a laboratory as a physical, conceptual, and designed space in which ideas can be tested and processes evaluated through experimentation. A laboratory implies scientific research. A laboratory space also implies that matter and materials are manipulated as part of the process of experimentation to achieve a desired outcome or to discover what comes out of a given design process. A *living* laboratory extends the notion of the physical and conceptual space for scientific research into "the field"- into "real" time and "real" life processes *in situ*, though this is importantly no less designed. Manipulation can then become the act of influencing pre-existing components and factors and even creating the possibility for the existence of those very factors.

The living laboratory is thus a frame in which I call to attention the shifting relationship between fieldwork and the lab, which "traditionally" are separate physical and conceptual spaces- data in various forms is discovered, collected, and removed from the field, in which scientists are explorers and adventurers, and taken to the lab to be analyzed. A living lab merges the processes of exploration, discovery, collection, and analysis and alters what forms are acceptable and accessible as data. Field ecologists, biologists, and social scientists develop contingent relationships to fields based on specific forms of presence and practice. I have developed this observation in contrast to recent observations about the changing science of genomics in which the active presence of science in the field is said to have lessened and where scientists and students can "get in and out" with their data and samples without caring about the

[73] P. 15.

[74] I would like to thank Charis Thompson for helping me make this observation.

particular relationships and socialities of their field site.[75] I argue that today, the field and the lab are synonymous and "the island is a laboratory" takes on a holistic and socialized meaning for the field life sciences- the what counts as experimental material or the subject of field research is increasingly designed as an amalgam of natural and social systemic processes. As I describe below, this has implications for defining what manner and matter of "life" the life sciences produce knowledge about.

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Here I should say more about what I mean by field science in the living laboratory. I use the term in an expanded form and my attention to "the field" shifts from actual scientific field research in The Bahamas to social and entrepreneurial designs based on that work in this place to conceptions of what the appropriate field for contemporary anthropology has become or might be in this milieu. Latour and Woolgar note, speaking of disciplinary fields, that "rather than being a structure or an ordered pattern, a field consists of positions which influence each other in a way which is not itself orderly."[76] As the somewhat disjointed chapters in this dissertation show, The Bahamas, as a field site for a number of science-based productions, is decidedly disorderly. I hope that my disjointedness captures this sense of the living laboratory and that I will have shown that the ways in which disciplinary fields create The Bahamas as a field site are not purposefully coordinated, though this process does produce remarkable synergies at times.

In a chapter about ethnobotanical roadside collection in Mexico, Hayden (2003) wonders what makes an appropriate field for field science, who are the relevant and important figures in the field, what does the field reveal, and what does it hide?[77] In the first place, part of the cache of the field hinges on the play of the universal vs. the particular when it comes to the production of scientific knowledge about nature. Knowledge will have a different relevance depending on where it comes from and from whom, and sometimes the most specific sites produce the most universal, and therefore most important, forms of knowledge for the life sciences. For Hayden, roadside plant collection is a field form which is extremely localized, both physically and figuratively and as a methodology. In other words, these fields for scientific collection are "places made from passing through."[78] This ethnobotanical field produces knowledge made along with nature through practices of travel. In the field, then, fieldworkers can be thought of as "well traveled locals" with their own stories of how they got to that field and their own exposures and vulnerabilities, inclusions and exclusions.[79] Her point is that the complexities and stakes of the "particularity of the field" becomes a part of the process through which more "general" knowledge is made.[80] To say another way, particular kinds of places, understood as fields of research, are made, and what they are made to be determines what knowledge they produce. This is a key aspect of The Bahamas as a living laboratory for fieldwork and field science-based enterprise.

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[75] i.e. Helmreich, Stefan. 2009. *Alien Ocean: Anthropological Voyages in Microbial Seas*. University of California Press.

[76] Latour and Woolgar, P. 239.

[77] Hayden, Cori. 2003. *When Nature Goes Public: The Making and Unmaking of Bioprospecting in Mexico*. Princeton University Press.

[78] P. 162.

[79] P. 161.

[80] P. 162.

In *Landscapes and Labscapes*, historian of science Kohler describes the evolution of scientific field practices from the mid 19th to the mid 20th Centuries.[81] What he calls the "lab-field border" is a conceptual and practical space that I have found to be largely missing in the Bahamian living laboratory of the 21st Century, but his work on the development of ecological research is still quite relevant at a time where the lab-field border is increasingly absent. Kohler calls it a trait of "modern science" that "not only the objects but the objectives of laboratory work are often quite different from those of field biology. Experimenters analyze and reveal causes and effects; field biologists more often describe, compare, name, classify, map. In fieldwork spatial and locational ways of knowing have equal standing with casual reasoning. In labs there is one best way."[82] He states that, "the lab-field border in biology is of recent origin, probably no older than the mid-nineteenth century, when laboratories outgrew museums and herbaria as the premier places of modern science. Indeed, we could say that our concept of the 'field' was the by-product of the laboratory revolution of the 1840s and 1870s. The categories of field and laboratory were coinvented and are mutually (and changeably) defining…. The laboratory revolution made the cultural landscape in which field biologists now live. It created the lab-field border."[83] For him, labs are the authoritative seat of knowledge about nature, but as I observed and describe below, in terms of present day environmental productions, the field is the site of a form of holistic authority where located social relationships are an aspect and an outcome of the research.

Kohler considers the work of those whose labor comprises the field when he describes "the new natural history" of academic fieldwork developed in the 20th Century through practices which combine field and lab work in the form of field stations and the science of ecology. He notes that ecologists feel this lab-field tension more than other scientists because they practice experiments in the field. This tension becomes "evidence of place" in that it is "embodied and experienced in particular tangible places."[84] Place becomes a tool of field biologists in that they work on place to create place; place becomes an object of their work. As Hayden also described, field biologists turn the uniqueness of natural places into an advantage, and this practice becomes even more obvious in The Bahamas where research and research related activities are all about the specificities of island and marine places. "Practices of place" is the phrase Kohler uses to describe this manipulation and creation of place. He states, "places are to the field what experimental setups are to laboratories. Recognizing the places where observation and comparison can reveal how nature works, and learning to read the spatial evidence of these processes, are the crucial skills of modern field practice, just as inventing the right experimental tools is the crucial skill of laboratory work. Practices of place define field biology, as experiments define lab science; they are what field-workers do that no one else does."[85] These practices involve the reconstruction of the histories of places and processes in places (see Chapter 5) and also observation and comparison (see Chapter 2). This is the invention of tools to read nature and the development of a "framework for knowing nature."[86] Hinting at one of the topics of this dissertation, Kohler does note that people and their activities have become part of

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[81] Kohler, Robert E. 2002. *Landscapes and Labscapes: Exploring the Lab-Field Border in Biology.* University of Chicago Press.
[82] P. 2.
[83] P. 3.
[84] P. 5.
[85] P. 212-213.
[86] P. 214.

this process of site selection in the later 20th Century as ecologists want to observe the effects of people on the environment at large scales. This is one way that environmental crisis becomes an opportunity in the living laboratory of The Bahamas, and a way in which the people living in a place become part of the process of knowing that place for field scientists.

Place is an ultimate object here for the justification of research and development and I note, relating this to the orientation of islands by design, that working in and on place comes to mean that places are designed in the process. The islands may be physical, but that does not mean they are immutable or natural. Field scientists must share the field with others who live and work in these spaces, but they also help frame the way these others experience and situate themselves in this place. Fieldworkers can internalize these others into the field and make them part of their fieldwork and this is a way to both stabilize the field and capitalize off its instability. I note that the field has become more "socially accountable" than the lab in some senses because it is more particular, more place based, more social, more of the world, precisely because it is *designed* to be accountable.[87] This observation rests alongside the work of one such author cited by Kohler, Knorr Cetina, who discusses the socialization of nature inside the experimental space of the lab and the way in which aspects of nature are brought into the lab for experimental purposes and become enculturated through that process. [88] In the 21st Century fieldwork in the living laboratory, the field has the authority of both nature and culture and research sites are chosen because they are *already* enculturated in particular ways. Expertise in the field is expertise in the particular in this way, and that is why anthropologists can come to seem so necessary to field science-based environmental research, as I will show in some of my chapters.[89]

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Much as I see this dissertation as belonging to the varied pantheon of Caribbean scholarship, I also see it as part of the disciplinary evolution of what is known as the anthropology of bioscience, a branch of science and technology studies.[90] The anthropology of bioscience can be described as the study of the life sciences in all their similar variation, though the field has tended to focus on genomics and reproductive technologies. This loose subdiscipline has brought about a revitalization in the analytic vocabulary and conceptualization

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[87] See Nowotny, Scott, Gibbons. 2001. *Re-Thinking Science: Knowledge and the Public in the Age of Uncertainty*. Blackwell. And also, Strathern, Marilyn, Ed. 2000. *Audit Cultures: Anthropological Studies in Accountability, Ethics, and the Academy*. Routledge. These works describe the introduction of social accountability into the academic sciences, institutional arenas that were previously seen as outside of the boundaries of social accountability. I should note here that the field has always been involved in enframings of accountability, especially in development circles, and that these designs for social incorporation are not necessarily new, though I argue that what is done with this sort of research might be.

[88] Knorr Cetina, Karen. 1992. "The Couch, the Cathedral, and the Laboratory." In *Science as Practice and Culture*. Andrew Pickering, Ed. University of Chicago Press

[89] For a related discussion of the conceptualization of place, see Moore, Donald S. 2005. *Suffering For Territory: Race, Place, and Power in Zimbabwe*. Duke University Press. Moore's concepts of environmental materiality in an articulated assemblage and the materiality of milieu are another way to consider the importance of location and localization practices. Moore calls "environmental materiality" an identifiable example of the way in which landscape becomes articulated with processes of visualization and territorialization. For him, landscapes are amalgams of nature and culture, are entangled in power relations. P. 22.

[90] This field is variously known as the social study of biotechnology, biosociality, biomedicine, biopractices, or bioscience. The emphasis on bio-ness refers to the centrality of emergent forms and formations of life or emergent practices of producing truths about life. Notions of nature as life are thus interestingly wrapped up in such bio-considerations, as discussed below.

of the relation between ideas of knowledge, nature, and value, and the traffic between anthropological and social studies of science, feminist kinship studies, and the anthropology of exchange has enriched the field and expanded the possibilities of analysis into previously uncharted territories, territories that are shown to be all too familiar or unfamiliar in distinctly important ways. The empirical site around which much if this revitalization and traffic has coalesced is the arena of the biosciences and biotechnologies wherein transformations of forms of life, property regimes, and processes of valuation have been of particular interest. It is from this ongoing conversation between and within studies of science, kinship, and exchange, here centered primarily around the biosciences, that I borrow a vocabulary and mode of approach to questions of emergent and evolving forms of field research.[91] This vocabulary fleshes out what I mean by "life" and "living" in the living laboratory, and it gels with the orientation towards the creation of islandness and the theme of arrivals because it allows us to recognize the scientific forms at play and at stake in Bahamian economies of visitation.

The anthropologist, Bamford, discusses recent changes in the life sciences in *Biology Unmoored* (2007).[92] She describes how the sciences have the potential to affect "our sense of who we are and where we came from; what it means to be human, normal, acceptable; ideas about love, sex, gender, and nurturance; our conception of our place in the organic world."[93] Biology has become an orienting device for Euro-Americans who now live within a biological paradigm which produces tropes "through which we have understood our relationship to other human beings and to nonhuman species. More than simply defining Euro-American kinship configurations, a biological framework has figured centrally in how Westerners define bodies, persons, gender, ethnicity, and the place of human beings in the organic world."[94] But, as a result of developments in biotech and genetics research, this biology is no longer grounded in an immutable nature. Instead, life has become a question of biosocial relationships in which human biology is modeled on culture rather than nature.[95] She writes, "biology now competes with the notion of culture as the most salient feature of what it means to be a 'people'," and simultaneously, what was once considered natural, the fundamental components of human biology, is now considered artificial or synthetic as a result of new biotechnologies which can create and manipulate human body parts and processes, from the genetic to the physiological level.[96] She goes on to say, "the growing ambiguity between 'nature' and 'culture,' between what counts as 'natural' fact and 'social' fact, promises to redefine the basis of personhood, perceptions of kinship, property relations, and how we view our connections to other life forms

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[91] I thank Cori Hayden for highlighting this traffic for me.

[92] Bamford, Sandra. 2007. *Biology Unmoored: Melanesian Reflections on Life and Biotechnology.* University of California Press.

[93] Bamford, P. 3. See also Carlson, Elof Axel. 2008. *Neither Gods Nor Beasts: How Science is Changing Who We Think We Are*. Cold Spring Harbor Laboratory Press. Carlson writes, "Science adds to our sense of who we are because we can now describe ourselves at anatomical, cellular, and molecular levels. We can follow our life cycle and from fertilization through embryonic organ formation and from birth to death. We can now inventory our genes and use that knowledge to compare our genes, and the sequence of nucleotides for those genes, with those of other animals, plants, and microbes . . . Science also forces us to think more deeply about values and applications of science to our bodies, to our environments, and to culture." P. 6. His point is that ideas about human nature vary with assessments of what it means to be human and that claims about human behavior effect social policy.

[94] P. 5.

[95] Bamford cites Rabinow: Rabinow, Paul. 1996. "Artificiality and Enlightenment: From Sociobiology to Biosociality." *Essays on the Anthropology of Reason*. Princeton University Press.

[96] P. 151.

on the planet."[97] Bamford highlights the fact that, as a result of these science-based permutations that make human biology malleable, human nature can now be considered subject to consumer choice, and she concludes that biology has become unmoored from nature.[98]

After establishing this unmooring, Bamford then goes on to consider the ethics of this traveling framework, of "extending biology as a worldview to other parts of the globe," specifically Melanesia.[99] Her analysis of biological relationships in Melanesia unites kinship studies with those of human-environmental relations "by virtue of their mutual embeddedness within a biological framework."[100] She argues that kinship studies and the study of human-environmental relations, what could be paraphrased as environmental anthropology, have been held separate conceptually in the academy of social sciences, and that they need to be united in order to critically track recent bioscientific developments in the world. Biodiversity is one example she uses. This global biological paradigm that travels with conservation projects culturalizes plants and animals, in terms of developing ideas of their utility and entry into market systems, and naturalizes people in terms of positioning them as endangered indigenous stewards of nature. She argues that the protection of nature through conservation programs has the effect of naturalizing capitalist economies through "green" programs, and this is a paradigm that does not necessarily fit easily into existing Melanesian frameworks.

This vision of a critical conceptual framework that interrogates the biological notions and socialities grounding human and non-human conceptions of nature is exactly what is required for an analysis of the contemporary living laboratory of The Bahamas, in which the study of socioecological scientific formations requires a tailored and specific analytic vocabulary. One of her central questions is also mine: "how do human beings conceptualize their relationship to other life forms when their ties to one another are subject to ongoing creation?"[101] I also agree that biotechnology has brought about some significant reformulations of the notion of life itself. This has been demonstrated in recent kinship studies, science and technology studies, and medical anthropology and this work challenges assumptions about relatedness within natural and cultural productions. I build off of Bamford in her diagnosis of the traveling life sciences as practicing a form of biological imperialism.[102] She looks at Melanesian culture to show how Highland people there conceptualize their world differently and outside the Western biological and biosocial frame, while I look to science in the making in The Bahamas to see what ongoing scientific creation there looks like and what it produces. The point for me is that we can also look to non-Western culture to find a state of socio-biological becoming coupled with institutionalized naturalizations. The study of the contemporary life sciences is just as anthropologically worthwhile in laboratory situations that can be firmly grounded in a Euro-American framework.

Thinking about laboratory situations and the development of a framework for considering human life is further conceptualized by Lemov (2005).[103] She writes about the ways in which 20th Century scientific laboratories combined theory and practice within the lab space, in terms

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[97] P. 153.

[98] Citing Strathern, Marilyn. 1992. *Reproducing the Future: Anthropology, Kinship, and the New Reproductive Technologies*. Routledge.

[99] Bamford, P. 7.

[100] P. 11.

[101] P. 29.

[102] P. 12.

[103] Lemov, Rebecca. 2005. *World as Laboratory: Experiments with Mice, Mazes, and Men.* Hill and Wang.

of experiments in human engineering, and she creates a history of how "the laboratory became the world and extended into it."[104] In this history, she describes how behavioral scientists took an engineering standpoint towards human life to develop a social science that attempted to control and manipulate human behavior. Lemov refers to these practices as the "soft power" of directing behavior by shaping the environment to create a reality. She also describes what she calls the "laboratory imagination" wherein labs created a reality through experimental design and observation.[105] Lab experiments came to influence the ways in which people (Americans) construct their lives (living environments) and subjectivities (sense of themselves) and this moved the social sciences beyond the insular space of the lab into the world. One example of this movement came when the science of behaviorism was joined with business when scientists became advertising officers. Lemov sees this as the science of behavior replacing a philosophical understanding of humanity with the primary focus shifted to what can be scientifically known. For her, the laboratory setting as one which "confers scientific authority" and makes the scientific manipulation of human behavior acceptable.[106] In the field of psychology, lab experiments allowed for the equation of observed animal behavior with that of human behavior and this would "eventually become central to the assumptions and architecture of modern life."[107]

Lemov reads this experimentation with and science-based design of the "lived environment" as a characteristics of a modern ethos in an era when the predominant attitude was that human beings could be remade to scientific specifications. Human beings were considered "life-forms within an environment" and this relation could be investigated scientifically in lab spaces through experimentation with lab subjects, mostly animals with the understanding that these represented human behavior.[108] The science of behaviorism was focused on action and change in the real world. Social science based techniques for measuring and manipulating what is human have been widespread in the 20th Century, and Lemov points out that through this measuring, they change what it means to be human. Scientists have come to deal in reality over abstraction: "to embrace the real, as a social scientist, meant to come into more direct contact with a greater number of social facts and a greater variation of human phenomena than had ever been possible before, so that a science of society could begin to work not through models or metaphysics but through the conditions and circumstances of ordinary people's ordinary lives."[109] Social science now, for some, includes disciplines like anthropology and biology, and is based in understanding and creating changes in social life outside of the experimental space of the lab in the real world. Fieldwork and direct experience are valued over theory.

For Lemov, the danger with all this is that all this engagement ends up "putting people at a distance as mere human material" and that this form of social science encourages stabilization and normalization.[110] She cites the WWII enlistment of anthropologists to make a "living laboratory" of Pacific islands to serve the project of human engineering as a particularly egregious example (her use of the phrase living laboratory). Importantly, she reads atomic bomb

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[104] P. 249.
[105] P. 7.
[106] P. 28.
[107] P. 31.
[108] P. 34.
[109] P. 48.
[110] P. 67.

testing in islands as designed to be analogical to tests in a laboratory, and her main argument is that the movement from lab or field site (a controlled space) of predictive assumptions to the rest of the world is an illusion because these lab actions are also part of the world; these practices "*stimulate* reality."[111] These experiments *already* work because they are performed in a context with rules and with specific intended goals. As a result, Americans now lead an "experimental life" in which "immanent possibility is coupled to an imminent slavery."[112] This observation is important for my purposes here because it relates to Scott's notion of conscription as an aspect of the contemporary conditions of life (see above).[113] For Scott and Lemov, then, what is at stake today are the ways in which contemporary authoritative institutions contingently transform the conditions of possibility within which we define ourselves as subjects, and for Bamford, this pertains to the way we are made to understand our relationships with other forms of life, life forms that are also subject to the conscripting processes of the life sciences. What is at stake in the living laboratory is much more than a merely human nature.

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To begin to conclude this subsection, I think a further explanation of the importance of "life" is in order. My own focus on the notion of the living laboratory of The Bahamas moves our attention beyond the gene and beyond the human to think about emergent forms of connection, but it is important to note that to call the living laboratory simply environmental or ecological is also insufficient. I would like to put forward that the form of reason and mode of connection that animates the living laboratory of The Bahamas is *biocomplex*, but the "bio" of biocomplexity is not the same "bio" as biodiversity or even that of notions like biosociality or biopolitics.[114]

Referring to the practices of the ancient Greeks, Agamben draws our attention to their distinction between categories of bare life/life understood as the animate body or organism (zoe) and qualified life/life understood as a form of human political citizenship (bios).[115] Rabinow clarifies that "the former referred to the simple fact of being alive and applied to all living beings per se; whereas the latter term indicated the appropriate form given to a way of life of an individual or group. Philosophic discussion employed the term bios, since the status of life as brute existence was simply not a question worthy of extended ethical or political reflection."[116] For Rabinow, this designation between "bare" or "brute" life and the "socialized" or "civilized" life of human society, which was perpetuated in the West through the mid 20th Century and WWII, has been undergoing a recent transformation. His example is contemporary genetic research, or genomics, and he writes, "My claim is that the identification of DNA with 'the human person' as a self-evident synechdochial relationship- the part literally stands for the whole- constitutes a 'spiritual' identification"; life as genetic property has become a matter of subjectivity.[117] The fundamentals of life as produced by contemporary bioscience have altered the biopolitical distinction between zoe and bios, decentering bios as the locus of political

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[111] P. 241.
[112] P. 247.
[113] Scott, David. 2004. *Conscripts of Modernity: The tragedy of Colonial Enlightenment*. Duke University Press.
[114] The biological definition and genealogy of the term "biocomplexity" is provided in Chapter 6.
[115] Agamben, Giorgio. 1998. *Homo sacer: Sovereign Power and Bare Life*. Daniel Heller-Roazen, Trans. Stanford University Press.
[116] Rabinow, Paul. 1999. *French DNA: Trouble in Purgatory*. University of Chicago Press. P. 15.
[117] P. 16.

intervention and importance. Additionally, the human centered "bios" of the concepts of biopolitics and biopower themselves have been destabilized in the living laboratory, replaced with a holistic notion of life that is as yet inadequately defined. My interest in developing the notion of the living laboratory of The Bahamas builds off Rabinow's move to explain the merging of bios and zoe in the milieu of genomics, bringing this concern into the milieu of current environmental politics. In this dissertation, I would like to keep this merger or reframing an open question, and my use of biocomplexity is a sort of stand-in term for the expansion of bios to become zoe in the transformation of bioscientific sociality. I do not use the term biocomplexity as a descriptor of reality per se; instead, I mean it to describe how relationships between the human and the non-human understood through ideas of life are holistically reconfigured through current scientific practice.

This biocomplex focus allows me to critique recent scholarship on biopolitics as too human centered, too heavily engaged in the implications of bioscience for an understanding of human *bodies* to speak to transformations of more general conceptions of life understood in a *planetary* and ecosystemic frame. Turning to the work of Nikolas Rose (2006), I note that his attention is on the prospect of technological and scientific change in the genetic sciences becoming not only a question of moving beyond the social, and I argue that it is now a question of moving beyond the human as well.[118] However, what Rose refers to as a newly molecularized "vital politics" of health that has exceeded the scope of the regulation of the national social population and has become a question of human life itself is exactly that: it is still a question of *human* life. I do not mean to say that my trope of the living laboratory is not concerned with the development of island logics that shape what it means to be human today, this is an anthropological dissertation after all, but I would like to create a space for the utilization of all this insight on the biosciences that can also attend to the ways that science can formulate nature (including and especially human nature) as environmental, ecological, geological, and planetary *in addition* to the bodily, the genomic, and the molecular. The notion that human citizenship has thus become a question of human biology, community, population, lineage, race, and species, not of membership within a nationally defined social body, as explicated by Rose and Novas through the term biological citizenship (2005), is so far only telling half the story.[119]

Returning to the idea of biosociality, a term from Rabinow utilized by Bamford (above) to describe the mode through which human biological relationships are increasingly enculturated by genetic science, I note that there are several aspects of this term that I would like to keep in my own analysis of the living laboratory.[120] The idea that an increasingly manipulated human nature frames human social identities and relationships, shifting the studiable and knowable social as the ground for forms of reason within modern society combined with the notion that nature has become increasingly operationalized and instrumentalized and that new identities and new practices arise out of new scientific truths is key. Further, Rabinow's observation that

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[118] Rose, N. 2006. *The Politics of Life Itself: Biomedicine, Power, and Subjectivity on the 21st Century.* Princeton University Press.

[119] Rose, N. & C. Novas. 2005. "Biological Citizenship." *Global Assemblages: Technology, Politics, and Ethics as Anthropological Problems*. Blackwell. See also: Mallard and Paradeise. 2009. "Global Science and National Sovereignty: A New Terrain for the Historical Sociology of Science." *Global Science and National Sovereignty: Studies in Historical Sociology of Science*. Routledge. These authors describe the ways in which the natural sciences "reorder both nature and politics" and how "contemporary scientific knowledge practices" are intrinsically involved in the way nation-states position their citizens and imagine international relations. P. 10.

[120] Again, see Rabinow, Paul. 1996. "Artificiality and Enlightenment: From Sociobiology to Biosociality." *Essays on the Anthropology of Reason*. Princeton University Press.

nature is no longer a constraint on the spread of capitalism due to this increasing enculturation and that new knowledges modify labor and life practices and processes is essential. However, as Helmreich also notes, the bios of biosociality no longer refers to the realm of the distinctly human.[121] Helmreich explains that emergent configurations within the realm of the marine sciences point to conceptualizations beyond biopower[122] or biosociality.[123] The scientific construction of the ocean as site of bioproespecting and as "a resource for new life-giving biotechnology that might be used for both medicine and for planetary healing" forces the conceptualization of individuality and subjectivity to be connected to the planet's ocean systems, and this is what Helmreich cleverly refers to as the "politics of salinity" or "gaiasociality."[124] "Gaia" refers to the gendered notion of the holistically functioning and life sustaining processes of the planet, processes imagined to have a kind of life of their own. This is an example of the scientificalization of the figure of the "earth mother." However, while I do observe transformations in what has been described as the bios of biosociality, I do not find that contemporary events necessarily fit with the frame of gaiasociality in that I do not see an implicit or explicit gendering or animating of the conceptualization of biological and planetary relations. Therefore, I prefer to use the term biocomplexity to connote this arena of shifting connections within life understood as a form of relation, rather than gaiasociality (see Chapter 2 for more on biocomplexity).

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The government official who mentioned the phrase "living laboratory," himself a water resource scientist, considered The Bahamas to be a living laboratory in the sense that the archipelagic country, consisting of roughly 300,000 people unevenly spread over 700 carbonate islands surrounded by over 100,000 square miles of marine space, has become a site for critical field research in the natural sciences. This field research is largely, but not entirely, conducted by foreign scientists from foreign institutions whose work is increasingly bent on using the particular characteristics of The Bahamas- framed as biological, geological, ecological, and social (or some would say socioecological)- to demonstrate and/or explain and/or predict processes of global import. The Bahamas, in this arena, has become a site which can be variously made to stand as a living scientific example for the conjoined processes of climate change, species invasion, protected area planning and management, fisheries decline, etc., processes which are identified as simultaneously natural and cultural and, as an outcome of their social nature, their biocomplexity, imbued with the immediacy of crisis and scientific opportunism. The seemingly specific and unique attributes of the country allow for the development of projects with seemingly universal significance and scope, projects designed to produce information which addresses the perceived problem of global environmental decline. The government official encouraged this view of the country and the continued development of field research projects that come with it because the research provides the government with

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[121] Helmreich, Stefan. 2003. "Life@Sea: Networking Marine Biodiversity and Biotech Futures." *Remaking Life and Death: Toward an Anthropology of the Biosciences*. Franklin and Lock. Eds. School of American Research Press. See also Helmreich, Stefan. 2009. *Alien Ocean: Anthropological Voyages in Microbial Seas*. University of California Press.

[122] Helmreich, 2003, p. 231, following Foucault, Michel. 1976. *The History of Sexuality, vol. 1*. Vintage Books.

[123] Ibid, following Rabinow, 1996 (see above).

[124] P. 232.

information it does not currently have the ability to collect on its own, and because the work helps put The Bahamas on the map as an important global place.

My own field research in the islands of The Bahamas has provided me with several empirical examples and instantiations of people, projects and designs which make and make use of aspects of The Bahamas for scientific research and/or science-based productions. To reiterate, I hope that my chapters will show that the notion of The Bahamas as a living laboratory is in no way uniform- that scientists, researchers and managers have divergent ideas of what the living laboratory is and how to use it. I also hope that my work will not essentialize or attempt to solidify any representation of The Bahamas as a cohesive or coherent place or moment- I will not define The Bahamas as an entity/country, or the Bahamian environment as an idealized or uniform object/landscape, or Bahamians, scientists, or fishermen as cultural groups or holistic communities. Rather, the chapters are an attempt to tell several stories together in order to show how certain people have variously *produced* these and other ideas together as things that work in the world. My own use of the idea of the living laboratory is much more trope than theory, more orientation for attention to specific problems and aesthetics than definitive explanation. These chapters don't exist as cases which prove the existence of unifying truths about The Bahamas or scientific research there; rather, they are juxtaposed together in the hope that relevant insight into the production of life in the contemporary Bahamas will come out of considering their similarities and their distinctions.

Thinking about The Bahamas as a designed island field and living laboratory opens many doors and raises many questions. If we generally recognize, as laboratory ethnographies and field and park studies have taught us, that science practice and the production of knowledge is political, then we must also recognize that the living laboratory is by definition imbued with stakes and challenges. I argue that the natural science research, science-based environmental management practices, and entrepreneurial experiments that unfold in The Bahamas are arenas for the production of specific forms of nature which include ideas for forms of human nature that manifest themselves in management and/or research design. Similarly, conceptions and expansions of ideas of biological and social life lead to designs for living under the rubric of what is called simply, "sustainability." Thinking about the living laboratory can also raise questions about national sovereignty, global positioning, and scientific capacity building- about the kinds of scientific productions and problems that help make The Bahamas variously mapable, capable or discoverable or even cultural and historical. The living laboratory is a problem space and frame, one that does not have specific national boundaries, but within which nationalist projects can take particular shape. Relatedly, the living laboratory frames my interest in the ways in which the life sciences have become an arena for the creation, empowerment, and reorganization of institutions, involving new organizational collaborations and new forms of scientific engagement with design in the tourism industry of The Bahamas, shaping particular forms of nature and natures as marketable and valuable. The living laboratory is a space for study, an object of study, and a space for collaboration. It is a frame in which to think about science studies beyond "cultures of science" or national science or postcolonial science alone- a frame to talk about complex situations of knowledge production in a place where the terms and stakes take particular shape around fieldwork, nature, and life.

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The 6 main chapters of this dissertation present and interrogate various design aspects of the living laboratory of The Bahamas. Chapter 2 describes the Bahamas Biocomplexity Project

and examines biocomplexity as a traveling frame for the consideration of human and non human relationships, expanding definitions of life, and the role of social science in natural scientific research. Chapter 3 delineates the particularity of the Bahamian tourism industry and the ways in which "honest tourism" has the capacity to influence the way the islands and their environments become visible, valuable, and visitable. Chapter 4 describes how the Bahamian island of Eleuthera has been made into an educational island for visiting students and the ways in which this research center produces islandness as a platform for the salvation of the planet. Chapter 5 explores Bahamian underwater caves called blue holes and the performance of a scientific and cultural history that might create another visitable island feature. Chapter 6 introduces the invasive lionfish and compares this marine threat to that of fishermen who are said to be contributing to the overfishing of Bahamian waters in order to demonstrate the way marine science naturalizes transgressive figures, defines boundaries, and exploits fragility. Throughout these chapters, the themes of arrival and visitation, island vulnerability, and biocomplex relations, both implicit and explicit, are interwoven with scholarship from my three main interlocutory fields of Caribbean Studies, Science and Technology Studies, and Environmental Anthropology.

I hope that this dissertation will stand as a small monument to the problem space of The Bahamas as it was in the first years of the 21st Century, and that other people in other islands will recognize the ripple and repetition of these frames through their own spaces and in their own lives.

Chapter 2. Building Biocomplexity: The science and sociality of a proposed Marine Reserve Network



Google Earth Satellite Image of the Bahama Islands, 2008.

Beginnings

In that summer of 2002, when I first traveled to The Bahamas to work on the American Museum of Natural History's Bahamas Biocomplexity Project (BBP), my assignment was to live and work with a team of researchers (there were six from various institutions on this initial phase of the project) and to administer the pilot surveys that the project planners had created to people I had never met. The surveys sought to statisticalize the extent of community environmental interaction and perceptions of environmental change and marine protected areas (MPAs). My first time in the field lasted one month, and required that I live in a small rented house in the small settlement of Cherokee Sound on the island of Abaco. Cherokee was selected by the designers of this pilot study for a variety of reasons. The community had a long history of what was described as "interaction" with the marine environment. Historically, Cherokee was a boat-building town, and most people in the community had at one point derived their income from this practice along with commercial fishing. Cherokee was also described as a relatively closed community in that few people left the settlement to live elsewhere. I was told that this meant

that most of those interviewed were representative of the community and had not been greatly influenced by living in other locations. Cherokee Sound was adjacent to a wide range of what the project referred to as "ecological zones" including deep-ocean, mangroves, reef systems, blue holes, flats, and pine forests.

My own research activities as a social science field technician consisted of maintaining and codifying formal field notes while in the settlement, participating in community activities and activities such as fishing, conducting structured interviews in which I asked a short list of pre-set questions- questions that centered around the primary ways people interact with the environment, how the local environment had changed over time, and the extent of environmental education in the community. Most of my time was spent administering the complicated pilot survey to willing, if slightly bored participants.

After graduating from college, I entered my doctoral program in anthropology. In the summer of 2005, I again traveled to the Bahamas to administer these same socioeconomic surveys for the BBP, and to plan for my upcoming dissertation research. This time, the survey format had been revised and my new location was one of several surveyed by the BBP. Again, I lived and worked with a team for one month, though this time I was one of three researchers, one of whom was an undergraduate student at the College of the Bahamas. We were located in the settlement of Tarpum Bay, a coastal community on the island of Eleuthera chosen for its close proximity to a proposed marine protected area, part of a proposed Marine Reserve Network (MRN) in the country.

Again, I administered and critiqued the surveys, taking care to survey at least 10% of the town population of 230 households in order to have a reasonable sample size for the project. I also practiced as random a sampling method as was possible in such a small community, eschewing snowball sampling methods for more varied encounters. As a team, we entered our survey data on-site into a computerized database, discussed research and sampling strategies, and shared information we learned individually in our daily excursions into the settlement and the surrounding area. Individually, we canvassed sections of the town, gave one-on-one surveys to participants, and wrote up our own field notes for the project to keep as a record. Together, we produced an analysis of our field season and submitted it to the project coordinators.

These two trips to the Out Islands of The Bahamas were my first taste of life in the living laboratory, though I wouldn't have thought of them in those terms at the time. I had volunteered to be a technician of general ideas, to use a phrase from Rabinow, to test a language for re-imagining the conditions of possibility, and to act as a designer of plans for the conception of contemporary life processes.[125] I consider these experiences to be strange ones in the sense that I was a stranger in this new scientific world of human and environmental interaction. I struggled along with project participants to understand what the questions meant, what answers were acceptable, which stories were relevant and which were not. My student desire to please both the project designers and the research subjects meant long periods of wrestling with completed surveys, attempting to make my entries fit into the template, and long conversations about the meaning of data with my teammates.

It was during these field seasons that I also began to consider the relationship the BBP engendered between the surveyor and the surveyed. On the one hand I had little time to develop rapport or understanding between myself and the people I approached to survey because there was pressure to collect as many surveys as possible and only a few weeks in which to collect

[125] Rabinow, Paul. 1995. *French Modern: Norms and Forms of the Social Environment*. University of Chicago Press.

them. I felt conspicuous, foreign, and presumptuous for approaching people and asking them to participate in the research project and sign the consent forms. On the other hand, these surveys brought me into public meeting places and private homes, they announced our presence in the settlements, and they opened a door into an arena of public controversy over protected areas that might not have otherwise come up in conversation between Bahamian citizen and visitor. I began to see that as a representative of scientific designs involving these communities I was part of the play of arrival and visitation, and also part of the tension between interest and resentment this play inspired on the Out Islands.

These strange BBP experiences in The Bahamas were quite formative- they would come to shape both my interest in anthropology and my ideas for this dissertation about The Bahamas, though in the summer of 2002 I would never have thought to write *about* the BBP itself as a possible subject of study. All the chapters in this dissertation are different, but what this chapter shares with the others is a sense of wonderment with the seemingly endless possibilities for contemporary applications of science and a sense of confusion concerning the anthropological role in what are construed as environmental problems. I chose the BBP and biocomplexity research as the opening chapter because it was through the BBP that I began to recognize the ways in which The Bahamas is scientifically designed as an island living laboratory, and because this chapter most readily exemplifies the contemporary remediation of the study of "bios," of life and living systems, by the environmental sciences. I envision this chapter as contributing a critique to the fields of biocomplexity, coupled natural and human systems, and human and environmental interaction, as well as contributing to literature on cultures of nature and contemporary biopolitics. Though tourism is not the explicit subject of this chapter as it is in others, that industry is still related to the work described here in that the scientific imaginaries and material realities of biocomplexity research as a mode of island representation make their way into the visual economy of the country and into ways Bahamians and visitors might be asked to think about their connection to the island ecology. They also represent how the tourism industry is framed as ecologically sound in this milieu. The satellite image which opens this chapter is similar to remote image representations favored by the BBP along with GIS imagery, favored because it highlights the planetary scale of the Bahama Islands, as well as the shallow banks, deep ocean channels, and exposure to Atlantic weather systems.

Biocomplexity

In order to continue the explanation begin in the introduction of what biocomplexity might mean as an idea and what it might do in terms of design, this chapter must really begin far from The Bahamas in Baltimore Maryland, 1998, at a plenary session of the 49th Annual meeting of the American Institute of Biological Sciences (AIBS). Rita Colwell, the director-designate of the National Science Foundation, was addressing the audience and describing what would become a major research agenda at the NSF: biocomplexity.[126] Colwell defined biocomplexity as the 21st Century response to the increasing vulnerability of the planet due to "our human power to inflict irreversible damage." Biocomplexity referred to the "complex chemical, biological, and social interactions of our planet's systems," she said, and from these "subtle but very sophisticated interactions and interrelationships, we can tease out the principles of sustainability." She

[126] Colwell, Rita. 1998. "Balancing Biocomplexity of the Planet's Living Systems: A Twenty-first Century Task for Science." *Bioscience*. V. 48 (10). Pg. 786.

expanded the notion of environmental crisis to evoke not only responsibility, but also opportunity for the science community to extend its horizons. Biocomplexity was not only going to be a new research program, it was also seen as a "key to social understanding," an understanding that had been missing from most prior environmental research. Colwell situated biodiversity as the research paradigm of the 1990's and the goal of enumerating and sustaining biodiversity, of recognizing and "maintaining the plant and animal diversity of the planet" as a very important goal. But understanding biocomplexity, she said, "speaks of a deeper concept" and "this message is one that we have to take to the larger scientific community and ultimately to the public."

Colwell also focused on the practice of environmental research itself. The scientific community, in order to trace the complex interrelations of life, must reach across disciplines, she said. "It will take biologists, ecologists, physical scientists, computer scientists, engineers, and surely those in the behavioral sciences (read social sciences) to understand the signals for survivability." Scientific collaboration across disciplines would lead to more applicable and robust forms of environmental knowledge production, she said, and thus, interdisciplinarity is at the root of biocomplexity research. In order to communicate between disciplines, Colwell advocated the development of a scientifically "universal language" as well as an increased focus on the enhancement of "predictive and preventive capabilities" in terms of environmental degradation and risk.

In 1999, the NSF began soliciting for and funding research projects under the category of biocomplexity research, and in 2001, at another panel at the AIBS annual meeting, biocomplexity research was refined and situated further as the NSF's ongoing programs were described to a curious audience. The panelists proposed a tentative definition for the term, with the presumption that this definition would be modified in the future. Biocomplexity is "properties emerging from the interplay of behavioral, biological, chemical, physical, and social interactions that affect, sustain, or are modified by living organisms, including humans."[127] This came in response to the need to address questions of increasing breadth and complexity, and it could be considered both a research focus and a program.

It is precisely breadth and complexity that was missing from the sciences in general, sciences which had become ever more reductive in the last decades of the 20th Century, emphasizing more and more specialization as a result of tight monetary and temporal constraints. Complexity, in this prior research environment, had been an obstacle to overcome and vast efforts had been expended in reducing complexity to simple observable or calculable studies undertaken by lone scientists or small groups of researchers. Minimizing complexity had been the "hallmark of reductionist science," the panelists said. This reductionism informed the majority of scientific knowledge to date. The results of these projects did not yield "robust" information for "real-world situations," which are complex and uncertain. Biodiversity, as a concept and research paradigm, was also configured as reductive, devolving into the collection and cataloguing of biological data on living entities, providing few hints towards the relevance of this data within larger systems of ecological interaction. These larger systems were said to be in crisis, threatened by intensified population growth and pollution, becoming increasingly vulnerable. Biodiversity, as the planet's valuable collection of genetic information, was reframed as being sustained by biocomplexity, which moves concerns for the preservation of biodiversity into a broader context of global processes that are mediated locally.

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[127] Michener, William K. et al. 2001. "Defining and Unraveling Biocomplexity." *Bioscience*. V. 51 (2). Pg. 1018.

The panelists prescribed a form of research for a biocomplexity paradigm, stating that biocomplexity questions needed to be approached in an interdisciplinary manner and that they were different from typical research questions. The complex interactions that occur in the "real-world" on multiple scales can only be understood through "combined efforts of scientists" from many disciplines who are allowed to work at the relevant "temporal and spatial scales." Emergent technologies and methods are also applied to these questions, such as "advances in geometry, graph theory, topology, control theory for chaotic systems, and novel approaches for managing and modeling uncertainty." Mathematics, they said, is considered the most fundamental language for an understanding of "biocomplex systems." As Anna Tsing writes, "The common assumption is that everything can be quantified and located as an element of a system of feedback and flow."[128]

The Bahamas Biocomplexity Project

One research program that successfully met the NSF's biocomplexity funding criteria in 2000 was the Bahamas Biocomplexity Project (BBP), a large multi-year proposal that situated itself as a mediator between two institutional milieus.[129] The first was that of the NSF's biocomplexity research program, as just described, with its concerns with interdisciplinarity and the production of more socially robust and politically relevant knowledge. The second was the ongoing and highly political marine conservation scene in the Bahamas at that time, which I will describe. I hope to highlight one of the ways in which scientific research practices manipulated and produced their own social reality in order to create the commensurable information required by the BBP.

In 2000, the Bahamian government announced its political intention to create a Marine Reserve Network (MRN), which would initially include five protected areas within the borders of the archipelagic nation. These areas, following the trends in international conservation science, were to be designated as "no-take" reserves, areas in which the extraction of any form of marine resources is prohibited, and they were a response to the concern over perceived environmental degradation. The announcement of the MRN project came after two years of planning meetings and negotiation sessions between the Bahamas Department of Fisheries, now Marine Resources, and environmental non-governmental organizations (ENGOs), including the Bahamas Reef Environmental Education Foundation (BREEF) and the Nature Conservancy of the Bahamas (TNC), who fear that sustained over-fishing is leading to the destruction of the Bahamian coral reef system, biodiversity loss, declines in fisheries productivity, and who predict that the Bahamas will go the way of the rest of the Caribbean and lose species diversity and valuable commercial fish stocks. The proposed reserves are located near the clusters called the Berry Islands, the Exuma Islands, the Bimini Islands, and the larger islands of Abaco and Eleuthera and were thought up largely as a response to the declining populations of Nassau Grouper, Caribbean Spiny Lobster, and Queen Conch, the primary commercial species in the region, described as the Bahamian "holy trinity."[130]

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[128] Tsing, Anna. 2005. *Friction: An Ethnography of Global Connection*. Princeton University Press. Princeton, NJ. PAGE NUMBER.

[129] See http://bbp.amnh.org/website/home.html

[130] Center for Biodiversity and Conservation. 2005. "Bahamas." American Museum of Natural History. http://research.amnh.org/biodiversity/center/programs/marine.html.



Map of proposed Marine Reserves. Image by The Bahamas Reef Environment Education Foundation (BREEF), 2010

The BBP, a loose entity made up of researchers from fields including anthropology, biology, oceanography, physics, economics, and mathematics, stepped into this scene to conduct long-term, multi-phase research on these proposed marine reserves, their feasibility, and subsequent systemic effects to produce policy recommendations for the Bahamian government as well as detailed and predictive models of coral reef functioning that could possibly be transferred for the management of other reef systems.[131] The "Social Working Group," lead by an environmental anthropologist and an environmental economist, was supposed to go about "assessing patterns of resource use and attitudes about resource conservation among stakeholders," using survey technologies to compile comparable data sets from communities situated near proposed reserve areas or those identified as having an economic reliance on fishing.[132] Anthropology, as a discipline representing the behavioral sciences, was enlisted here in order to make sure that the knowledge produced for the modeling project reflected the cultural reality of the Bahamas. Anthropology was seen as the disciplinary voice of the local, as the discipline that would legitimate claims to social truths made by the BBP.

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[131] See Mumby, Peter et al. 2006. "Fishing, Trophic Cascades, and the Process of Grazing on Coral Reefs." *Science*. Jan. 6. Pg. 98-101.

[132] See American Natural History Museum, BBP website, "Social Working Group": http://bbp.amnh.org/website/swg.html

The findings of the Social Working Group have been recently collated, summarized, and published separately from the other BBP working group results and projects in an article that stresses the necessity of socioeconomic assessment as an aspect of environmental management.[133] The authors, Broad and Sanchirico, focus their analytic attentions on the quantification of what they describe as socioeconomic variables and environmental perceptions of individuals and communities that have been gleaned from the fieldwork. Variables, for these social scientists, are those traits that can be pinned to particular individual or community entities and then compared across a number of individuals or within communities. They assessed specific variables found within the completed fieldwork data, such as the "demographic variables" of individuals surveyed, i.e. their age, number of children, level of education, marriage status, gender, occupation as either in tourism, fishing, or other, household income, if the mother was from the specific settlement, if past generations of their family had been occupational resource users like fishermen or farmers, if they had heard of marine reserves or been to a reserve meeting, and how frequently they went to the sea to use marine resources.[134] These variables were calculated for five particular communities, identified as small islands or specific settlements on larger islands, and in total across all 485 survey participants. Perceptions are also understood here as variables, but they are variables that pertain to participant's responses to particular management oriented ideas around "environmental conditions" such as the state of local marine conditions, the level of threat to the marine environment, and the state of the enforcement of fishing regulations. These "perceptions" where then paired with variables such as the participant's household income, fishing reliance, tourism reliance, and whether they thought there should be a local marine reserve put in place in the area.[135] The demographic variables are described as concrete "material aspects of life" while the perception variables are described as individual and community "perspectives." When statistically linked, the material aspects of life can be shown to have more or less influence on a certain perspective in a certain place, and this data, when collated for specific communities, can become a management tool.

Assessing scientific social assessment

The BBP is a prime example of ways in which "the social" becomes implicated in contemporary conservation science projects in the living laboratory of The Bahamas and elsewhere. It is my contention that in order for an increasingly necessary sociality to become scientifically implicated in the production of such peculiar politics, it must first be assessed and formalized, which implies that it must be conceptually formed and designed- that is, *made assessable* in the first place. The development and deployment of the BBP's social science survey and the results gleaned from the data demonstrates the potential possibilities and pitfalls of this work. Based largely on my strange experiences with the project, I have come to see the socioeconomic survey as a powerful example of the way in which biocomplexity research activated certain instrumental notions of individuality and community as sociality bolstered by a certain notion of anthropology.

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[133] Broad, K. James N. Sanchirico. 2008. "Local Perspectives on Marine Reserve Creation in The Bahamas." *Ocean and Coastal Management*. 51(11) P. 763-771.
[134] Ibid. Table 2. "Descriptive Statistics."
[135] Ibid. Table 4. "Pairwise Correlations."

The survey itself was concerned with statistically elucidating the connection between prevailing local economic conditions in an area and the variety and intensity of marine resource extraction conducted by individuals within that area as well as what they thought about the appropriateness of such extraction- all part of what the project refers to as "human and environmental interaction," mentioned above. One of the defining features of the survey's demographic variables is the categorization of each person interviewed by their current occupation, with a focus on either tourism or fishing, and the occupational history of their parents and grandparents, with a focus on "resource use." Following Julia Paley, this can be thought of as an articulation of subjectivity, activated in spatial and temporal frames, wherein occupation is tied to particular extractive activities, appearing later in the survey, involving notions of self-interest centered around livelihood.[136] These interested notions are productive of idioms of personhood based on an assumption that individuals have rights and claims to extract value from the material environment, and that the form these claims to value take represents what distinguishes one person from the next and one settlement from the next in terms of perspective and perception. In the language of conservation and development, people making similar claims- having similar perceptions linked to specific variables- can then be lumped into stakeholder groups, and these groups then become instrumentalized actors- or, in the case of the BBP, groups based on occupational interest create the category "commercial fisher" or "tourist employee," and groups based on location become "communities" which have their own distinctive traits depending on the stakeholder groups within them. These groups are made distinctive and therefore amenable to targeted management.

Following Hayden, I would like to point out that it is not the identification of interests which explain social processes- i.e. the explanation that fishermen have particular interests in marine resources- rather, it is the analytic assembly of interests, values, and interested persons that is itself processual and worthy of study.[137] Thinking in this manner allows the analytical focus to come off of assessing the extractive traits of those who fall within a given occupational category or who manifest a predetermined variable, and shifts it to the consideration of the work such notions do for those who would deploy them, such as the social scientists of the BBP. Interest, value, and variables then become ethnographic objects. Such a focus helps demonstrate that "*there can be no production of value without processes of subject formation*," and the persons and communities defined by occupation produced by the BBP demonstrate the instrumental creation of a realm of inclusion and exclusion dictating the ways in which people are recognized and assessed within a particular paradigm, in this case nascent biocomplexity research.[138]

The socioeconomic surveys employed by the BBP, rooted as they are within a particular logic, instrumentalize and activate particular figures of the local, rural, and of the Out Islands, usually in occupationally evaluative terms and variables that come to stand for a sort of personhood. Fisherman becomes an occupational category that signifies particular extractive activities for self-interested gain and claims to tradition, lineage, and subsistence, all accumulations of value, which are different from activities connected to the category of tourism employee. Tourism and fishing have become construed here as existing in an inverted

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[136] Paley, Julia. 2001. "Making Democracy Count: Opinion Polls and Market Surveys in Chilean Political Transition." *Cultural Anthropology*. V. 16(2). Pg. 135-164.

[137] Hayden, Cori. 2003. *When Nature Goes Public: The Making and Unmaking of Bioprospecting in Mexico.* Princeton University Press.

[138] Ibid. PAGE NUMBER. My italics.

relationship, with fishermen hypothesized to be less likely to support marine reserve creation and tourism employees more likely, based on what are described as different forms of interaction with the marine environment which are linked to diametrically opposed perceptions of that environment and what to do with it. Further, when and if the individual survey results are statistically aggregated and linked to the other forms of BBP research, community and locality may become reactivated as sites which also have a self-interested nature and attendant claims and rights to accumulate value. To evoke Julia Paley again, statistics becomes a tool for social diagnosis, wherein research subjects become the object of study and are prevented from acting as authors- their participation becomes drastically proscribed. Interviewers, such as myself, who struggle to fit the given answers to survey questions into the format of the survey mode of information in order to create variables, also become produced as objects of the survey, standing in as representatives of the double legitimacy of anthropological social research and the transparency of the survey method itself.

The Social Working Group and its publications are part of the orchestration of socially robust knowledge that comes with contemporary environmental management practices.[139] The sociality of the research must be demonstrated, as Strathern would say, and it must be stabilized. What has been produced here by the BBP is a socioeconomic assessment which does this work of stabilization and demonstration in order to make Bahamian social forms which are manageable and an environmental management apparatus which has socially responsible options. As a participant myself in this social scientific design project, I wonder about the possibilities for targeted management mentioned by Broad and Sanchirico. It is one thing to show that there are a diversity of perspectives held by rural Bahamians about the marine environment and that management should recognize this diversity, as these authors argue, but it is quite another to make this diversity demonstrable, numerical, and localized- to operationalize constructed variables and orchestrate this data into a tool for targeting specific groups and communities for conservation education, economic development based in ecotourism, and various other forms of environmental management.

Two expert interviews

I will use this space here in this chapter to make the point that critiquing the BBP and the rationales behind this and similar projects does not necessarily mean that one loses sight of the years of work that has gone into making socially accountable biology and ecology. For many scientists and social and community advocates, concepts like biocomplexity and the very existence of a social working group in an environmental project point to a victory over biological thinking that was decidedly asocial, based in notions of pristine nature, and which pitted local people as enemies of conservation. I include two example interviews here that I conducted with scientists on the front lines of the reconceptualization of contemporary biological practice. Their work has also paved the way for the simultaneous reconceptualization of sociality within these scientific paradigms.

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[139] Strathern, Marilyn. 2005. "Robust Knowledges and Fragile Futures." *Global Assemblages: Technology, Politics, and Ethics as Anthropological Problems*. Ong and Collier Eds. Blackwell.

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Dr. Rita Colwell

In 2008, as part of the research for this dissertation, I left The Bahamas and traveled to Washington DC to conduct interviews with two individuals whose work involves designing the conditions of possibility for the contemporary life sciences. The first was the same Dr. Rita Colwell who initiated the Biocomplexity funding program at the NSF, though she has since left that institution and is now Chairman of Canon US Life Sciences, Inc. and Distinguished University Professor both at the University of Maryland at College Park and at Johns Hopkins University's Bloomberg School of Public Health. In her office at the University of Maryland, Dr. Colwell reiterated the relevance of the biocomplexity concept for the sciences today.

Dr. Colwell's experience and development as a scientist- as a microbiologist, geneticist, and oceanographer- demonstrated to her that science is holistic rather than reductive, and that this view is the base from which she considers science, engineering, and technology. Biocomplexity, a concept she developed as director of the NSF, was explicitly designed to prioritize information technology and to focus developments in that arena on the environment, and it was designed as a concept that married these interests without coming off as controversial for particular Congressmen- without coming off as "environmental." She sees biocomplexity is a means with which to think about the potential interactions of the natural, social, and human sciences, with the goal being the development of a "science-based decision making process with complex variables taken into account."

For Colwell, the holistic approach to understanding climate change and sustainability "is all biocomplexity" thinking, and she said that, further, "even the National Institute of Health has adopted this in its own narrow way, but they call its systems biology- studying the biocomplexity of the human being." Additionally, the US Environmental Protection Agency now "takes biocomplexity from the intact human being out into the environment." She stated that in 1998, when she launched the concept, she didn't realize just "how prescient she was." Biocomplexity was much "more than an ecology program": it was including the human dimension to the bacterial and fungal. Dr. Colwell sees biocomplexity as a conceptual triumph, a triumph which came with a doubling of the NSF budget, both things she is very proud of.

Biocomplexity, in her opinion, should maintain what she called the "biological perspective" that "humans are one species in a complex environment with checks and balances from mother nature, like any other species. This perspective will come out of climate models with a biocomplexity approach." And when it comes to biodiversity as a concept, she says, "diversity does not take into account the complexity of the environment." Biocomplexity is, for her, the logical next step in environmental logic.

Dr. Colwell said that she wants to see the creation of an Earth model that operates for 30 years into the future that is about more than just climate, that would, "build on the complex interactions of all ecosystems and the sun and moon and asteroids, etc along with how the planet functions in its diverse environments from which springs biodiversity." Science is then for her, at its most basic, the study of "how things work" from the molecular to the worldview. The focus can go from "atomic structures and quarks and particles to how molecules form and function to systems and organs and entities (ours and animals) to the planet Earth's function in a lonely and expansive universe." Her goal is to convey to the public that "we are part of an extraordinary adventure- and there are things we can do to maintain the gift of life we have been given." Not surprisingly then, Colwell feels that expertise is necessary to assist in decision

making, and she criticized the Bush Administration in the US for allowing science to "have no voice." Science, for her, is not rigid, and does not appeal to those who cannot tolerate uncertainty. Science "is a continuous exploration that is improved and refined" as knowledge continually evolves.

Dr. Michael Mascia

My second DC interview was with Mike Mascia, Senior Social Scientist at the World Wildlife Fund, in his office at the WWF headquarters in Washington DC. While not directly affiliated with the BBP, Dr. Mascia studies what he calles "environmental politics and policy, the social dimensions of biodiversity conservation, and marine conservation" and advocates interdisciplinarity as a mode of scientific approach to these topics. In the mid-1990s he began looking to bring biology and social issues together in his own interests because he considered his work on Caribbean marine protected areas to exemplify a perfect arena for the institutional development of social science and biology together, and such sociological ideas as common pool resource theory, political economy, and new economics were frameworks that elucidated relevant issues in that vein.

As a student, he was frustrated with "the lack of a home for social science within conservation groups," which is why he helped create the Social Science Working Group (SSWG) aspect of the Society for Conservation Biology (SCB). He thought that the biological science of the SCB prior to this was too opaque, and so Mascia, along with Brosius and Dobson, applied for and got a three year (which became a 4 year) MacArthur grant to "advance the field of conservation social science." He took that money to the World Wildlife Fund (WWF), but he feels that the organization is now at a crossroads and must decide whether to actually build the capacity necessary to do serious social science, or whether it will maintain its "human face of conservation" rhetoric which he considers to have a macro-economic policy and livelihood enhancement focus but little rigor.

Mascia finds social science to be "an added value" to conservation science, and his efforts have been to attempt to make that value visible. He notes, "anyone can do a survey. If you aren't technically trained you don't know the difference between a good one and a bad one. This is the difference between being a social scientist or not." He thinks that the real work for social scientists comes after the sites for conservation have been identified using biogeographic methods. The challenge is in "not producing a quick and dirty product that you can get with GIS and remote sensing and the seductiveness of maps. There is false precision here." Good conservation social science, for him, is "based in theory and empirical, conservation relevant, useful for policy and practice, qualitative and quantitative, and based in either anthropology, economics, or sociology."

"Social" is a fairly anthropological idea, for him, which he defines as "what we think, do, and construct- patterns of behavior, social institutions, and physical things," and "culture" necessarily implies anthropology. He notes that the term "social" can encompass a lot and is used in what he calls, "big tent conservation. You could have social phenomena that are not cultural to the extent that things are not embedded and traditional."

Dr. Mascia is currently involved in a project to standardize the assessment of the "where and how well" of conservation projects and their effect on people. He has had to figure out what to measure and how to measure it. His 5 "social categories" for contextualizing conservation strategies in a location are: economic well-being, health, political empowerment, education, and

culture, and each of these domains has indicators nested within them. He hopes this standardization of social assessment will "give insight into conservation strategies in a given place." He calls this "a coarse effort to put people on the map and to affect planning strategies." He notes that not all social interests and impacts are the same, and he feels as though the conservation community (what he referred to as "we") stereotype these things.

Mascia says that he wants to find some conceptual nuance and have it recognized formally, but that it has to be a science- it has to "move past anecdote and ideology and have data and inform a conversation about win-wins and trade-offs." He thinks that anthropology, as a social science, has the potential to see the uniqueness in every situation, but that policy goes in search of emergent general ideas and principles so as not to have to start fresh everywhere. Despite this policy pattern requirement, he sees conservation as a process whose "social impacts or implications can be inconsistent with societal values" and he thinks about "the way the whole enterprise is carried out as an organizational apparatus around the doing of conservation." He notes that sometimes the conservation solution can be worse than the initial conservation problem.

He told me candidly that, "conservation is social engineering- it's complicated. What is just varies from context to context and person to person- in the middle it is blurry." He tries to show the WWF that people are not just threats- he tries to reconceptualize them. He sees the SSWG as his "biggest success" because it has legitimated a space for social science within a biodiversity oriented organization, and leadership is now understanding and looking for more collaborative opportunities. His biggest failure has been not pulling off the same thing at WWF because the organization values different "currencies" and capacity building and supporting processes are not valued. "Very few people operate at the macro-scales we are talking about, and yet this is the scale that WWF operates in and collects data in. These are different dimensions of context," and for him, the social science of the micro suffers as a result.

He is "drawn to" complex systems ideas: feedback loops between social well-being, institutions, the environment, etc. and he thinks that the idea that parks are imposed and that people always get the shaft is a "bogus- stereotype." Local people "co-opt conservation language to achieve political economic ends which happens enough not to be ignored." Conservation, he feels, is a social phenomenon that persists through cultures and over millennia. Parks and conservation are not new ideas. What we see now is a "cultural battle over how we want to carry out this ancient enterprise. Power issues are at play and raise the stakes." He thinks that the "future of conservation is large-scale local action," but this means giving up control, and he feels that bureaucracies like the WWF don't do this well.

The challenge for interdisciplinary work, Mascia says, is the clear definition of the question, i.e. knowing the problem. Also, this sort of work requires constructive working relationships. He thinks conservation is a great site for interdisciplinary work because "feedback loops and dynamics in rural areas are quite clear" and there is a need for that viewpoint. He told me that he thought the BBP project privileged modeling too much and certain data over other data- that it *wasn't holistic enough* despite the project design.

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The key points to be gleaned from these discussions are several and require some explication. I see these two interviews as exemplifying and rationalizing the operationalizations described above, and these experts provide a window into the reason and logic upholding the social stabilizations and life imaginaries of biocomplexity research and projects like the BBP that

run through the milieu of The Bahamas today. In the frame provided here, engaged science is at its best when it strives for holism as this provides the strongest grounding for decision making on a policy-oriented scale. The drive to create a predictive science is powerful for this reason. As an ethical exercise, biocomplexity research must contribute to problems that are centered around uncertain and risky futures. Expertise is here configured as central, and experts from multiple disciplinary backgrounds focused on a project or problem are considered more useful than singular disciplines or generalists. Interdisciplinarity is a critical part of biocomplexity research as an ethical configuration, and there is the sense that the appeal of complex system ideas is based on them being more appropriate to the world as lived, and as therefore more just.

Here we also see justifications for the institutionalization of the study of the social and the biological together. Of course these experts realize that socioecological ideas are not radically new ways of conceptualizing the world, but importantly they do see them as relatively new to conservation organizations and environmental policy fields. They recognize that more work has to be done to establish this style of thought in academic and organizational arenas, and they are willing to go to great lengths to enable this institutionalization.

Sociality, or "the social," undergoes some important manipulations and enframings here too. "Social" is the preferred signifier in these realms of thought precisely because it lacks the specificity and loaded meaning of "cultural." The study of the social encompasses or internalizes more people than that of the cultural, and contemporary environmental problems are seen here as involving all manner of people and practices that are not identified as having a necessarily cultural (i.e. traditional) purpose. The standardization of social categories and social indicators is seen as necessary for the targeting of conservation efforts, for the efficient exercise of social study for policy intervention. Yet, these experts, and those of the BBP, recognize that these internalizations of people into conservation designs and research efforts is not fluid or easy- the stereotyping effect of standardized social categories is seen as a necessary evil. Additionally, there is the recognition that constructing sociality is part of the "doing of conservation," and that the creation of empirically demonstrable and calculable social forms is part of the ethics of biocomplex research. Nuance and anecdote do not do enough justice to the problems at hand.

Crucially, these interviews also demonstrate remediated notions of life and grounds for subjectivity within the biological sciences. There is a way to consider the human organism as biocomplex, but the next logical step in this frame is to consider the human in larger biocomplex systems of regional and planetary feedback. Human life, the scientific facts that comprise how a human comes to function as a living organism, has been exploded into a wider cosmology of interconnection, scientifically demonstrable as part of far reaching global processes. The step in an environmental logic from the study of diversity to complexity is another move which upholds this expansion of life and the reconceptualization of people as more than simply threats to other life forms. Humans, especially those involved in research projects and policy interventions which attempt to act within this frame, are factually constructed as connected to other organisms, elements, ecological systems, and biogeochemical processes. The biocomplex attempt to understand the "dimensions of context" and influence the intimate within the big picture requires that people are asked to construe their own actions and positions as part of interconnected processes. I will take up these considerations again in the final section of this chapter.

Beyond the stabilizations of sociality described above, biocomplexity comes packaged with other tensions that need mentioning. As these experts imply, an *a priori* knowledge and agreement about the problem in question as a parcticular kind of problem necessitating

intervention is a prerequisite for interdisclipinary work, and this does not leave room for disciplinary contestation as to the nature of environmental problems or the existence of them in the first place. Social science is brought in after targets have been identified and problems construed. This points to the fact that the interdisciplinarity espoused here is not an equalization of disciplines. Biocomplexity research privileges certain sciences over others, especially mathematics and those disciplinary methods amenable to modeling, potentially creating a sense of frustration amongst researchers and those social scientists whose work cannot be made quantifiable or compartmentalized in variables.

Caribbean Questions: the Caribbeanization of the world

Can we think of biocomplexity, of the refashioning of lives, problems, and subjectivities the concept evokes, as a Caribbean problem? Some authors have made moves to think about the logic and rationality behind the very notion of the Caribbean itself as a concept evoking certain complexities, systems, and socialities. I think it is appropriate to revisit Benitez-Rojo again and *The Repeating Island*, mentioned in Chapter 1, and his proposal to investigate "Caribbeanness" more broadly, eschewing situated study in order to "reread" the Caribbean and think of the region beyond what he sees as the reductive ascriptions of fragmentation and heterogeneity within Caribbean studies.[140]

The Caribbean, for Benitez-Rojo, is best thought of as a cultural "meta-archipelago," and the last great meta-archipelago at that, having no boundaries and no center, only a constant flow "outward past the limits of its own sea."[141] But this region is also a great machine, a machine of machines, he notes, the machine of the plantation economy, built by the Spanish to work for Europeans, secured by the Spanish fleet, *la flota*, another machine.[142] This Caribbean machine repeats itself continually, reproducing the Plantation, a certain type of society, over and over, and the cultural meta-archipelago reproduces an illusion of totality in its people, the "Peoples of the Sea proliferating incessantly while differentiating themselves from one another, traveling together towards the infinite. Certain dynamics of their culture also repeat and sail through the seas of time without reaching anywhere. If I were to put this in to words they would be: performance and rhythm."[143] For Benitez-Rojo, the Caribbean is *the* paradigmatic site of contact and diaspora, having always been involved in processes of supersyncretic fluidity and continual global dynamism.

Writing on the prevalence of Caribbean tropes in contemporary anthropology in *Recharting the Caribbean*, Maurer notes that the region has long been the site of anthropological studies which seek to destabilize fixed and essential notions of culture, and that the Caribbean has become an example and symbol of the "postmodern" condition, of the continual revision and rearticulation of culture.[144] He cites Benitez-Rojo on this subject, and also James Clifford on the

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[140] Benitez-Rojo, Antonio. 1996. *The Repeating Island: The Caribbean and the Postmodern Perspective*. Duke University Press.

[141] Ibid. P. 4.

[142] Benitez-Rojo takes his trope of machines from Deleuze and Guattari and modifies it to think of the Caribbean as a "flow machine" Ibid. P. 18.

[143] Ibid. P. 16.

[144] Maurer, Bill. 1997. *Recharting the Caribbean: Land, Law, and Citizenship in the British Virgin Islands*. University of Michigan Press.

notion of the inventive "Caribbean experience" as contrastive to "monolithic" notions of culture held by such theorists as Levi-Strauss.[145] This reasoning is problematic for Maurer, however, because it unwittingly promotes other forms of exclusion through the invocation of hybridization and recombination implied by the notion of "Caribbeanization."[146] [147]

In critiquing the then popular notion of globalization as Caribbeanesque hybridization, Maurer relies on the work of Marilyn Strathern and her critiques of hybrid discourse as depending on Western idioms of genetic biological kinship, idioms which tie people to naturalized notions of identity (for another discussion of Maurer on Caribbean identity see Chapter 5).[148] The idea of persons as hybrids relies on the language of ancestral tradition, of unitary identity, a unity which is metaphorically altered with reference to the language of genetic recombination. The scholarly language "ultimately rests on ideas about 'natural' substances from which variations are called forth by cuttings, mixings, and rerootings," and an attention to this trend is deeply important for Maurer, because biogenetic explanations seem to be everywhere.[149]

Maurer's own work concerns the study of state citizenship in the British Virgin Islands (BVI), and the ways in which concerns over land and law come to highlight ideas about nature and the naturalization of the population in a decidedly transnational country. In the BVI, a large part of the national population are "non-belongers," meaning that they are denied the rights granted to full citizens as a result of naturalized notions of inclusion. He writes, "Here is where I see the Caribbean reflected in the world, as states rely on exclusionary politics, as 'free trade' initiatives foster the movement of money at the expense of the people, and as nationalist and anti-immigrant sentiments justify the exploitation of and criminalization of migrants whose labor is nonetheless necessary for regimes that exclude them. This is the nature if the 'Caribbean experience' and its global reinscriptions."[150] It seems that if the globalized world is becoming more Caribbean, it is not becoming more creolized in the positive sense, or more callaloo in the romanticized political sense- it is in fact becoming more hostile and exclusive.

Biocomplexity, as a concept delineating certain holistic connections and relationships, plays into the work of both these authors and their concerns with conceptualizing the Caribbean. To think about biological and social relationships in The Bahamas as biocomplex systems and therefore as calculable and potentially predictable and modelable relates to the tropes identified by Benitez-Rojo. What the BBP designers and Benitez-Rojo share is a concern for the processual, for the discovery of some sort of rhythm and relation within seemingly chaotic and

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[145] Ibid. P. 10. See Clifford, James. 1988. *The Predicament of Culture: Twentieth-Century Ethnography, Literature, and Art.* Harvard University Press.

[146] Ibid. P. 11.

[147] The similar problem of "creolization as fiction that invents the Caribbean" is relatedly critiqued by Khan, Aisha. 2001. "Journey to the Center of the Earth: The Caribbean as Master Symbol." *Cultural Anthropology*. 16(3) pp. 271-302., who writes, "An iconic Caribbean cannot produce (indeed does not seek to produce) description or explanation. And a paradigmatic 'creolization' can, against intention, reproduce certain forms of knowledge about a people or a place- knowledge that is both elusive and, on the surface, persuasive." P. 274. An analysis of the tropes that have come to stand in for the region as "archetypes of Caribbeanness" are discussed by Edmondson, Belinda J. 1999. "Introduction: The Caribbean: Myths, Tropes, Discourses." *Caribbean Romances: The Politics of Regional Representation*. Edmondson, Ed. University Press of Virginia.

[148] Strathern, Marilyn. 1992. *Reproducing the Future: Anthropology, Kinship, and the New Reproductive Technologies*. Routledge.

[149] Maurer. P. 11.

[150] Ibid. P. 12.

disparate events. For Benitez-Rojo, these events are sociocultural, while for biocomplexity practitioners, they are socioecological; Benitez-Rojo sees the islands of the Caribbean as repetitive in terms of their participation in a global history, while the BBP and other projects create their own sort of "meta-archipelago" out of The Bahama islands, the repeating island, linking proposed marine reserve sites, sites of human settlement, and populations of mobile species in a scientific program of research intended to project its findings into the future, creating an infinite number of possible scenarios out of patterns of life and livelihood.

If biocomplexity research can be related to the *Repeating Island* in terms of what might be made in the contemporary Caribbean- in terms of productions that might potentially remake the region, Maurer's work leaves us with a sense of caution concerning the danger of biological explanations. His attention to the naturalization of certain ideas of biological kinship and the way these become tied to social policy points to the dangers faced by research participants in science projects like the biocomplexity project, to the exclusions hidden within a seemingly expanded and internalizing notion of life. As I hope to have shown above with my own attention to the BBP survey apparatus, attempts to make the region an example of a biocomplex system might also rigidly proscribe the forms of sociality made visible and targetable and the political and policy options available to those who participate in the program as community members and as stakeholders.

The expanding "bio" of biocomplexity

This chapter has been focused thus far on new biological designs, and this is also the subject that most explicitly approaches my concern with the question and aesthetic of "life" in the living laboratory- the question of what it means to be *alive* today, the shape of this life, and where these understandings come from. The biocomplexity project can be thought of as one contemporary instantiation of the life sciences putting the remediation of human life and the social into high relief, but the conceptual gymnastics transforming the concept of life today are arguably at work in the examples in all my chapters. I argue that the science of conservation and policy oriented biology and ecology is continually involved in the ongoing process of redesigning, re-inscribing, and sometimes even removing the boundaries of nature and culture, expanding the multiple possibilities for thinking about human and non-human figures and relationships in the present and the future. As I stated in the Chapter 1, forms of life understood as nature or natural, are appropriated or reformulated to redefine and implicate life understood as human and social, expanding the meaning and referent of the prefix "bio."

To begin where I left off in the previous chapter, these moves transform the notion of biopolitics, as loosely described by Foucault, and the related notion of biosociality, as conceptualized by Rabinow, shifting the focus from an explicit attention to the formal knowledge politics of the human body and human organization to an attention to new conceptual linkages between the life processes of living organisms and the living practices of human societies.[151] [152] Health, perhaps more productively thought of as vitality, is now a question of planetary systems and complex environments, arenas in which, as later chapters will show, the non-human plays a

[151] Foucault, Michel. The Birth of Biopolitics." in Rabinow, P. and N. Rose Eds. 2003. *The Essential Foucault*. The New Press.

[152] Rabinow, P. 1996. "Artificiality and Enlightenment: From Sociobiology to Biosociality." *Essays on the Anthropology of Reason*. Princeton University Press.

central role. The bio of biocomplexity points to a series of connections and relationships between chemical materials, organisms, socialities, and systems- life becomes a biogeochemical and social totality, a cosmology, a holism. And within this expanded view, instrumental and political connections between the constructed realms of economics, science, and culture are designed anew.

Again to reiterate statements made in the introduction for the purposes of this chapter, my attention to biocomplexity is also related to Helmreich's "symbiopolitics" and "gaiasociality."[153] His concern with the microscopic, molecular, and genomic explorations of the open ocean and deep sea point to an expansion of the concept, "bios," and a proliferation of the possible points of social connection, but his focus is not directly on human life as *re*biologized or reinscribed in a socially conscious ecology; gaiasociality is not biocomplex in that the term does not necessarily allude to the calculability and scientific predictability of this new holism.[154] Following Rabinow, I note that biocomlex figurations of anthropos, of the human, may come to depend on the emergent "logos of bios," such as the logic of biocomplexity research, becoming less the moralized figures of the steward of life's diversity or the self-interested despoiler of the environment, and more a figure of a calculable, abstractable, and dynamic variable embedded in the systemic functioning of planetary life itself. Relations within this anthropological frame are constituted as biocomplex, with complexity potentially reconstituting the notion of sociality, a sociality activated in specific ways. I venture to call the form of identification, relation, and possibility for subjectivation within the biocomplexity assemblage and emergent in the living laboratory of The Bahamas simply "biocomplexity" for lack of a better term.

[153] Helmreich, Stefan. 2003. "Life@Sea: Networking Marine Biodiversity and Biotech Futures." *Remaking Life and Death: Toward an Anthropology of the Biosciences*. Franklin and Lock. Eds. School of American Research Press.

[154] Rabinow, P & Carlo Caduff. 2006. "Life- After Canguilhem." *Theory, Culture, and Society*. 23. P. 329-331.

Chapter 3. Climate Change and the Tourism Product: Climate as an idiom for travel markets and island lives



The islands of The Bahamas depicted in The Bahamas Logo, Bahamas Ministry of Tourism

The "tourism product"

In the foreword to the book, *History of Tourism in The Bahamas*, the Honorable Paul Adderley summarizes the nation's history in a few key sentences. He writes,

> *We have been populated entirely by strangers to these Islands, foreigners who were uprooted both white and black from their natural social and economic environment. We were prepared for over 300 years to engage freely in what were illegal activities on a massive scale. We were Pirates for well over 50 years in the 17th and 18th Centuries. Today piracy may seem a romantic interlude, but it was after all an illegal activity. For as long as 200 years late into the 19th Century Wrecking had been the favourite activity of Bahamian seamen, sometimes legitimate but more often illegal. It spawned a boat building tradition in which free black men and white men excelled; sometimes providing the most public revenue. Blockade running, another illegal activity, generated unprecedented income for The Bahamas during the American Civil War. Many*

> *Bahamian modern day fortunes had their beginning in profits earned from illegal bootlegging in the 1920's when The Bahamas was launched on her fourth and most prosperous era of illegal activity. After the bootlegging era honest tourism gave The Bahamas a major industry not tinged with criminality…. Indeed it produced an innovative approach to the development of the Bahamian Archipelago with the promotion of the policy of creating tourism anchor properties in all the inhabited Islands of The Bahamas, as the catalyst for the future economic prosperity of the Nation.* [sic][155]

These words eloquently describe the complex history of enterprise in The Bahamas. This is a tale of the perils and opportunities presented by traffic and travel through this place. It is also an example of the prevailing official attitude towards the tourism industry held by the Bahamian Ministry of Tourism. Tourism, in this frame, allows these disparate tiny islands to function in that it provides a formal legal economy, cash, and needed infrastructure; tourism is the reason The Bahamas can exist today as an independent nation. For the Ministry of Tourism, one of the most prestigious branches of the Bahamian government, tourism is much more than an opportunity to bring marginal Bahamian citizens into a global capital market, it is *the* flagship industry, the foundation of the Bahamian economy, and it is normal to hear officials publicly say things like, "the goal is to become the premier tourist destination in the world."[156] Here, the dominant flavor of tourism has been mass market, especially in Nassau, where thousands of cruise ship passengers arrive on some of the world's largest ships, and where giant hotels offer inclusive package deals including airfare for stays of 3 or 4 nights. Beyond this, I argue that for the Ministry, tourism has historically been a special idiom in which The Bahamas legitimates itself as nation separate from the Caribbean region while strategically aligning itself as a regional tourist destination. This chapter describes the strength and scope of tourist designs in the country and the development of recent possible plans for refashioning the industry involving a science influenced rearticulation of the relationship between visitation and vulnerability.

In order to perform this task of maintaining the lion's share of the economy, the Ministry of Tourism is charged with developing a specific object that is publicly and explicitly referred to as the Bahamian "tourism product." In 1991, Jefferson and Lickorish defined a tourism product as "a collection of physical and service features together with symbolic associations which are expected to fulfill the wants and needs of the buyer."[157] In what is an amazing and deeply fascinating move, The Ministry of Tourism extends this definition to encompass the entire country, its islands, cities, and settlements, its ecology, its human population, its terrestrial, coastal, and marine environment. These all must be managed, organized, and understood as "features" which evoke appropriate "symbolic associations" in order to deliver the best product possible to a potential visitor. A large part of this huge task, for the Ministry, involves reflexively accounting for its own existence and repeatedly placing tourism at the center of Bahamian history and national development.

The term "solipsistic" refers to the belief that one's self is the only reality, and while it is usually used in a pejorative sense, I use it here to allude to the incredible generativity of the

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[155] Adderley, The Honorable Paul L. 2007. "Foreword." *The History of Tourism in The Bahamas: A Global Perspective*. By Angela B. Cleare. P. 17-18.

[156] 10/23/07, *Tribune*

[157] Jefferson, A. and Lickorish, L. 1991. *Marketing Tourism: A Practical Guide*. Longman, Harlow.

Ministry and the way in which this organization, much like the life sciences I refer to throughout this dissertation, is profoundly creative in its designs for Bahamian life.[158] One recent text which I think demonstrates the Ministry's inherent solipsism and creativity is the aforementioned *History of Tourism in The Bahamas: A Global Perspective*, by Angela Cleare, a long time employee of the Ministry, currently the Senior Director of Product Development and Family Islands.[159] I cite her text extensively in this section in order to show exactly how this work exemplifies a specific take on Bahamian history and the development of the idea of the Bahamian environment within that frame.

Cleare describes the country as one that has been blessed with a "natural environment that makes The Bahamas one of the best places in the world to live and play. Our geography and climate have been conducive to the development of an enviable service economy with tourism as its centerpiece." Today, it is argued that this marketing of the natural environment of The Bahamas is increasingly essential, in large part because there are many more possible destinations in the world than ever before, and the competition for visitors has increased in intensity in the Caribbean region and the world. Further, tourism is clearly the centerpiece of the official and economic life of the capitol, and employees of the Ministry of Tourism have considerable presence in national politics and media. According to Cleare, "the nation is fortunate to have been headed by a series of political, technical, and professional leaders, assisted by contracted agencies and consultants, along with pioneers in the private sector who have effectively steered the course of this industry. They realized that these natural attributes provided a basis for development, and that they could be used in the skillful marketing of the tourism product."[160] These tourism "pioneers" are some of the most recognizable names in Bahamian history, some of the most powerful figures in government, some of the wealthiest members of society, and national partnership with foreign marketing firms and add agencies has become the rule.

If "honest tourism" is king in The Bahamas today, it is also often re-inscribed into past events of national significance. The continuous history of arrival and migration in The Bahamas, alluded to in Adderley's forward, is perpetually appropriated by the Ministry of Tourism whose staff makes efforts to situate the centrality of Bahamian tourism in the history of the Americas. Christopher Columbus, in this frame, becomes the "first recorded tourist to the Bahama Islands" in the 15th Century, landing his Spanish ships on the Island of San Salvador, welcomed by the indigenous people- described as the first "hosts."[161] Beginning with this arrival, the frequently cited important events in Bahamian colonial history are described as precursors to contemporary tourism. Pirates were the "notorious" visitors of the 17th and 18th Centuries; rebels traveled to the Bahamian colony during the blockade running era of the American Civil War to purchase arms and hire vessels to run them to the Southern states; the British Loyalists in the early 19th Century set up a nascent infrastructure which would later provide the foundation for visitation; revelers traveled to The Bahamas during the American Prohibition Era to drink and mingle in bars, spurring the development of the hotel infrastructure in Nassau; the Duke and Duchess of Windsor put The Bahamas on the word map in the 1940's when they arrived to govern the

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[158] Solipsism is defined as "belief in self as only reality" by the Encarta World English Dictionary. http://encarta.msn.com/encnet/features/dictionary/DictionaryResults.aspx?refid=1861710225

[159] Cleare, Angela B. 2007. *The History of Tourism in The Bahamas: A Global Perspective*. Self-published?

[160] Ibid. P. 19.

[161] Ibid. P. 35.

colony, attracting the sophisticated and wealthy international set to the country. This is the Ministry explicitly reorienting the history of the islands around economies of visitation.

The decades of the 20th Century are now being characterized by the development of the tourism industry in that period in a linear teleology culminating in the present day era of supposed massive tourism success. It is frequently noted that in the late 1930's, the annual visitor population exceeded that of the native population for the first time. As the "Riviera of the Western Hemisphere," The Bahamas created the Development Board in the 1940's- the precursor to the Ministry of Tourism, charged with the duty of "selling the colony."[162] In the 1950's, advances in aviation meant more affordable travel and the heavy promotion of The Bahamas as a destination for Americans seeking sun year round. The recognizable promotional strategy developed by Stafford Sands, a major "tourism pioneer" of the time, of marketing The Bahamas as a "beach holiday and vacation paradise," is still prevalent today.[163] In the 1960's there were huge increases in the tourism budget and the idea was developed that the country has a "competitive advantage as an archipelago" in that each island can be visited separately (more on that below).[164] In the 1970's, after gaining independence from Britain, The Bahamas was the only Caribbean member of the International Union of Official Travel Organizations (IUOTO- which became the United Nations World Tourism Organization- UNWTO- in 1975), which lead to the use of statisticalized tourism measures, "global industry standards," and the invitation of major research consultancies, such as the Interpublic Group of Companies, who helped define The Bahamas as a destination and develop marketing strategies which fit this definition.[165] This market research also identified an "absence of cultural identity" in The Bahamas, which has been a subject of much debate ever since.[166] In the 1980's tourism became defined as the "world's largest industry," and the Caribbean Tourism Organization (CTO) was formed to promote the region.[167] This was the era in which the slogan, "its better in The Bahamas" became widely promoted on T-shirts to the extent that I found one in a thrift store in San Francisco nearly 30 years later. This was also the era on which, in order to differentiate itself from other Caribbean countries, the Ministry developed the feature of Bahamain Junkanoo, marketed as a festival of indigenous music and dance, which was an example of "culture fully integrated into tourism promotions."[168]

Importantly, in the 1990's, the American Carolyn Jones Agency was hired to conduct an internal tourism awareness campaign which explicitly targeted Bahamian citizens and their attitudes towards working in the service industry, entitled "Bahamas: Our Pride and Joy," with the emphasis on developing a more visitor friendly Bahamian subjectivity described as "dignity in service" (more on this below).[169] In the present decade, with annual visitor populations numbering in the millions in a country with a population of approximately 300,000, The

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[162] Ibid. P. 97.
[163] Ibid. P. 128.
[164] Ibid. P. 158.
[165] Ibid. P. 172.
[166] Ibid. P. 211.
[167] Ibid. P. 229.
[168] Ibid. P. 233. Junkanoo has been a Bahamian folk and musical tradition which can trace its roots back to the slave period, but the Bahamian government has funded the event and influenced its promotion as a tourist attraction over the Christmas and New Year holiday season.
[169] Ibid. P. 267.

Bahamas has become "the undisputed leader in market research," devoted to continual product improvement.[170]

An essential point for me is that the development of the self-reflective and solipsistic tourist industry in The Bahamas is crucial to the development of the living laboratory of The Bahamas and to the creation of a notion like a Bahamian environment. This is because, as mentioned above, the history of the development of the Bahamian "tourism product," including the development of Bahamian "hosts," is also packaged with a history of Bahamian environmental protection, and I describe certain moves here to show how these ideas have become married in the frame of the Ministry. The1950's was both the era of year-round tourism promotion and the decade in which The Bahamas became a "leader in conservation" in the region with the creation of the Exuma Cays Land and Sea Park (ECLSP), and the Inagua National Park for the protection of a breeding population of Caribbean flamingoes. At the same time, the Bahamas National Trust (BNT), "a unique collaboration of the private sector, scientific interest, and government," was created to manage these areas, and together the ECLSP and Inagua are said to "serve as models for conservation in the region."[171] While the promotion of The Bahamas as a mainstream American tourist destination has not been discursively tied to the creation of these parks or the BNT, Cleare, who I am using as a stand-in for the Ministry in general, creates the connection here, stating, "the success of tourism is linked to a healthy environment," and including a section entitled, "The Environment" in her chapter on the 1950's.[172] The period of 1992 to the present is also significant enough for Cleare to describe it in a chapter, entitled "Environment, Technology, and Innovation." She cites as centrally important the fact that The Bahamas is signatory to Agenda 21, the program of action which came out of the 1992 United Nations Conference on Environment and Development, also known as the Rio Earth Summit, and the fact that the first Conference of the Parties of the Convention on Biological Diversity was hosted by The Bahamas in 1994, making late 20th Century environmentalism a large part of the play of arrivals and visitation in the country.

It is now possible to say, as Cleare has done, that, "biological resources are being protected because their touristic value has been discovered."[173] The "tourism product" of The Bahamas is now recognized as crucially based on the natural resources of the islands and these resources have been scientifically identified as extremely and increasingly vulnerable. This has not necessarily been the response to climate predictions in other small island regions. The Maldives have been shown, by some calculations and indices, to be the most vulnerable in terms of sea-level rise, and all the small islands in the Pacific are categorized as extremely vulnerable. The Commonwealth Vulnerabilty Index (CVI) calculated Vanuatu as the most vulnerable nation in the world, with 17 of the most vulnerable 25 being small island states.[174] Small islands in the tropics in general are classed as especially vulnerable to warming temperatures, despite the most extreme temperature rises occurring at the poles. The calculated vulnerability of atoll islands places them near the top of most indices, and the Maldives and Tuvalu are the most vulnerable atoll islands.[175] In terms of the Maldives', island vulnerability is said to predispose them to

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[170] Ibid. P. 343.
[171] Ibid. P. 125.
[172] Ibid. P. 122.
[173] Ibid. P. 34.
[174] See http://www.unescap.org/MCED2000/pacific/background/vulnerability.htm
[175] Hamilton, Clive. 2003. "The Commonwealth and Sea-level Rise." *The Round Table*. 371(1). P. 517-531.

frequent damage from storm and wave surges, damage which has the potential to increase as an effect of climate change. This vulnerability is there construed as having implications for the economy and island livelihoods, to the extent that climate change has become an issue of human wellbeing and state sovereignty.[176] In other regions, climate change is linked to the vulnerability of small islands which are further link to the risk of the migration of wealthier and skilled sectors of the population. This can lead to remittance dependency and a lack of qualified people remaining in the country of origin.[177] In The Bahamas, in stark contrast, some of the most public rhetoric about island vulnerability to climate change is about the loss of attractiveness to the tourist industry. This is the essential paradox of tourism in the living laboratory, and yet this is a paradox that the Ministry of Tourism and the global tourist industry are attempting to make into an advantage. With moves that are both explicit and fascinating, both the Ministry and foreign consultancies are designing means to make a profit from island fragility. This means that the particular "tourism product" of The Bahamas is now characterized by what I call the play of visitation and vulnerability.

Diversification: branding an archipelago

Today, on the narrow streets of downtown Nassau, the Bahamian capital city, the most visible form of tourism is mass Euro-American visitation- American visitors were 87% of arrivals in 2004- facilitated by international cruise ships or by air.[178] Cruise ship visitors, enjoying a multi-destination tour of the Caribbean, sleep on their boat and spend an afternoon in Nassau, thronging the streets of downtown during the height of the tourist season. Those who arrive by air usually have booked short vacation packages with large resorts, which provide their guests with all their food and entertainment requirements for the few days they are in country, as mentioned above. The most visible example of this is the major resort destination, Atlantis, owned and operated by Sun International Hotels, Ltd. since 1999, a South African based multi-national corporation.

The Atlantis Resort and Casino dominates one end of tiny Paradise Island, just to the north of New Providence, accessible from the city of Nassau by bridge. It has been called the crown jewel of the "tourism product," the non-civil service anchor of the employment economy for the island of New Providence (where two thirds of the nation's population lives), and the business model for several other planned resorts around the country on a number of islands. Yet this resort anchor model, lauded above by the Honorable Paul Adderley, has been showing cracks for some time. As Cleare notes, this model is overly dependent on a single American market, tying the Bahamian economy too closely to that of the US, making the country too dependant on foreign imports to meet the food needs of so many visitors, allowing much of what the visitors spend to stay in the pockets of the foreign resort owners, and the Ministry of Tourism is now taking steps to "diversify the tourism product" from the major resorts on the islands of New Providence and Grand Bahama.

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[176] See Ghina, Fathimath. 2003. "Sustainable Development in Small Island Developing States: The Case of the Maldives." *International Coral Reef Action Network (ICRAN), World Conservation Monitoring Centre (UNEP-WCMC)*.

[177] See Julca, Alex. Oliver Paddison. 2009. "Vulnerabilities and Migration in Small Island Developing States in the Context of Climate Change." *Natural Hazards* (Online).

[178] Bahamas Ministry of Tourism. 2007. "Stopover Visitors by Country of Residence." Research Department.

Diversification is a common theme throughout the history of the island country and the Caribbean region, whether the topic be tourism, agricultural and industrial production, government programs, or educational opportunities. Diversification of the tourism industry in The Bahamas today means the recognition that development must be "sustainable" and fit environmental and social conditions on a given island.[179] There is a widespread agreement in government that the "destination mode is changing" from the mega resort of the compulsive traveler, based on the desire for sun, sand, and sea, and that small, mixed-use, eco-friendly resorts are gaining in popularity for the traveling public. The current argument from the Ministry of Tourism is that The Bahamas, as a product, must be adapted to this changing market.

The aforementioned Department of Sustainable Tourism has existed within the Ministry of Tourism since 1994, and it is mandated to make sure that tourist development in the Family Islands fits the capacity of that island with the recognition that most of the Bahamian islands have small populations, fragile fresh water resources, and limited infrastructure, and could therefore not easily support a large multi-use resort.[180] In a recent effort to determine what manner of tourist development is appropriate for the various islands, the Department hired a marketing consultant firm, with funding from the Inter-American Development Bank, to visit the islands and "brand" them for types of tourism, i.e. eco-tourism, small scale resorts, bonefish guiding, etc, the idea being that a potential visitor can find whatever sort of experience they desire in the islands of The Bahamas and that each island can support a viable tourist economy, thus providing employment and luring people back to the islands from the capital.[181]

I met with the Director of Sustainable Tourism in November of 2007, in his office in a Ministry building in downtown Nassau, coincidentally located across the street from the popular Pirate Museum. As a secretary lead me to the office of the Director, I noticed that the Department of Sustainable Tourism employed several people occupying cubicles on an open floor. Once I was situated in his office and introductions had been made, the Director told me that this branding exercise would be completed with "stakeholder participation," and he made an analogy that the exercise was precisely akin to Proctor and Gamble's massive branding campaigns for their thousands of products.

"Marketing," he said, is "tied intimately to the practice of brand development and the demands of the market." He saw the marketing of The Bahamas as the same in that it was a product, a brand to be groomed, developed, and pitched to focus groups and the like. He noted that currently, "the whole country is perceived as a product of New Providence and Grand Bahama," but that this product must be expanded to include the many other islands. He hoped, when we spoke, to look at target tourist markets to "match" the Bahamian island destinations with visitor countries.

Branding, as a concept for conceiving of the multiple Bahamian islands, is not a recent invention of the Department of Sustainable Tourism. As mentioned above, the 1950's and 60's saw an explicit attention to the development of The Bahamas as a marketing strategy for tourism, and Cleare describes how, in 1968, with the help of a marketing consultant firm, the concept was created that "The Bahamas was not one product, but three, each appealing to a different segment of the travel market: Nassau with its "foreign" flavor; Freeport, Grand Bahama, a swinging casino destination, and the Family Islands- remote undeveloped, and unspoiled. A media

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[179] Cleare, Angela B. 2007. *The History of Tourism in The Bahamas: A Global Perspective*. P. 392.

[180] The Family Islands are all the inhabited islands besides New Providence, the site of the capital city. They are also referred to as the Out Islands, depending on the situation.

[181] The results of this exercise have not yet been made public.

strategy was developed with this in mind."[182] And again in 1971, a series of brochures was developed which highlighted four Bahamian islands, Eleuthera, Abaco, Andros, and Exuma as specific, unique destinations.

The remainder of this chapter describes and investigates an example of the contemporary branding and creation of what could be thought of as "climate-friendly islands" and the sort of partnerships that might be made with international scientists in these ongoing branding exercises and in other attempts to green the country's image and development designs. As Rosemary Coombe notes, following Baudrillard, brands do not signal a constant or uniform product- instead, they "mobilize connotations of affect" centered around desire rather than utility or use value; the appeal of a brand does not lie in the product itself, and brands work when they sufficiently and consistently produce the desired affect.[183] In the Bahamian living laboratory, there are plans in which science-based contributions to the "tourism product" might now mobilize affect around branding based in island vulnerability to climate change. Tourism officials and consultants have marshaled knowledge produced about this specific form of nature and purposefully aligned it with affect in order to target populations for travel markets and reorient the subjectivities enrolled in these markets and the function of the market itself. Like the transformation of our understanding of natural entities and forms of human and non-human nature scientifically enrolled in biotech markets, scientific productions in concert with the redevelopment and redesign of the Bahamian "tourism product" may come to point to relevant transformations in markets for travel. I had direct experience with one example of climate science-based interventions in the diversification of the tourism product coming from the World Tourism Organization to The Bahamas; what was being sold to the Ministry of Tourism was not revised anchor models, but a marketing package for climate change.

Climate Change and the Carbon Neutral Destination: tourism as vector and victim

Delmedico and Guillemot have compiled a brief and broad history of the institutional genesis of the notion of climate change, rooting it in the post WWII marriage of meteorology and new calculators for large-scale weather forecasting systems.[184] Global circulation models, developed by scientists at Princeton in the 1950's, "were the forerunners of present day climate models" and circulation of the atmosphere was a major scientific problem.[185] In the 1970's, climate modeling converged with weather modeling, utilizing the development of new computers and satellites, and the scale of these scientific models became conceptualized and operationalized as global, rather than regional. It was possible to imagine climate as an object with dynamic variables and physical processes based in the fluid mechanics of the atmosphere that could be calculated or "parameterized."[186]

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[182] Cleare, Angela B. 2007. *The History of Tourism in The Bahamas: A Global Perspective*. P. 184.

[183] Coombe, Rosemary. 1998. *The Cultural Life of Intellectual Properties: Authorship, Appropriation, and Law*. Duke University Press. P. 56.

[184] Dalmedico, Amy D. and Helene Guillemot. 2009. "Climate Change: Scientific Dynamics, Expertise, and Geopolitical Challenges." *Global Science and National Sovereignty: Studies in Historical Sociology of Science*. Mallard et al Eds. Routledge. This piece may not be detailed enough for climate science experts, but I do think that the main points are relevant.

[185] Ibid. P. 197.

[186] Ibid.

Since its inception and prior to the "discovery" of climate change, climate modeling has always been about "the needs of society" in terms of assumed relevance of weather forecasts and the dynamic effects of climate on agriculture, etc., but in the 1980's, with the developments of the earth sciences, such as geochemistry and paleoclimatology combined with climate modeling, anthropogenic climate change was born.[187] The "research themes and methods" from these scientists validated the models of the climate physicists, making them increasingly socially relevant as the exemplars for anthropogenic climate change also known as global warming.[188] In the 1980's, the World Meteorological Organization (WMO) designed its World Climate Program which hosted meetings that would lead to the creation of the international expert organization known as the Intergovernmental Panel on Climate Change (IPCC), "comprising several hundred scientists and whose mission was not only to keep governments updated in the current theories in the field, but also to review national or international policies linked to the issue of greenhouse gases," and now adaptation and mitigation strategies for the projected effects of global warming in particular places and arenas of action.[189] Delmedico and Guillemot write that "climate change has been transformed from a complex scientific topic to a political issue with national, economic, social, an diplomatic ramifications involving conflicting economic interests, conceptions of law and equity, and perceptions of the future," and they note that the IPCC is therefore particularly interesting as an international body because its evaluation process is controlled by scientists.[190] Scientists are here construed as essential experts, with the appropriate knowledge to inform sound policy.[191] [192]

Currently, climate change is framed as a global problem and crisis which manifests itself locally in potentially catastrophic ways. "Acting locally," or dealing with these local potentialities, means reimagining global connections and taking steps to create or redesign complex processes of influence, formally referred to in international forums like the IPCC as adaptation and mitigation procedures. The science of climate change, both information and scientists interested in the possibilities and opportunities for research resulting from the threat of climate change, become embroiled in the process of designing these procedures. In the Bahamian living laboratory, increasingly characterized as vulnerable due to its small island nature and coastal zone status, some conservation scientists and environmental managers are now considering partnering with the tourism industry to develop and design what might become a climate conscious tourism product. I argue that climate, which has already been created as a socially accountable scientific object in the international arena of global warming described above, has been reframed by the tourism industry, and the Ministry of Tourism workshop I attended was one sales pitch for this reframing.

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[187] Ibid. P. 198.

[188] Ibid. P. 199.

[189] Ibid. P. 200.

[190] Ibid. P. 212.

[191] Mallard and Paradeise say that in the IPCC, what "shifted, without apparent public polarization and controversy, (was) the identity of the problem that scientists were supposed to solve from "climate" to "impacts" and eventually to "development." Mallard and Paradeise. 2009. "Global Science and National Sovereignty: A New Terrain for the Historical Sociology of Science." *Global Science and National Sovereignty: Studies in Historical Sociology of Science*. Mallard et al Eds. Routedge. p. 33.

[192] See also Lahsen, M. 2005. "Seductive Simulations? Uncertainty Distribution Around Climate Models." *Social Studies of Science*. 35. P. 895-922. for a discussion of climate modelers themselves.

As I mentioned at the beginning of this chapter, the 2008 workshop at the Wyndham Hotel ballroom in Nassau was officially hosted by The Bahamas Ministry of Tourism, the Caribbean Tourism Organization (CTO), and CARIFORUM's Caribbean Region Sustainable Tourism Development Programme (CRSTDP). The "Regional Workshop" was lengthily entitled "Climate Change-ing the Industry? The International Policy and Market Response to Global Warming and the Challenges and Opportunities that Climate Change Issues Present for the Caribbean Tourism Sector." The CTO had invited a middle-aged British consultant, Dr. Murray Simpson, from Oxford's University Centre for the Environment, to deliver a power point presentation to the audience of NGO employees, government officials, and members of private consulting firms.[193]

Dr. Simpson wore a suit and was evidently comfortable speaking in front of an audience. His slides echoed his words, listing his main points with succinct bulleted sentences on a subdued background. In his presentation, Dr. Simpson made a number of connections, implicitly linking IPCC science with plans for the Caribbean and Bahamian "tourism product." The weight of his evidence for the reality of climate change rested on a brief overview of current climate change science, demonstrated through charts and graphs published by the IPCC which described the increase in global atmospheric temperatures and the projected increase in surface temperature over the 21st Century. This was connected to the world tourism sector's contributions to global greenhouse gas emissions, 75% of which are said to stem from the transportation of tourists around the world, and which are calculated to be 5% of all world emissions as estimated by the IPCC in 2005, placing the world tourism industry as the 5th largest emitter after the US, China, the EU, and Russia on global emissions lists.

What is crucial to note is that in workshops like this, the international tourist industry is at pains to frame tourism and tourist economies as both "a vector and a victim" of climate change. This was done here through the use of the Caribbean as an example of a tourist region that has not significantly contributed itself to global warming through the production of industrial CO2 emissions. Instead, it is the travel technologies associated with the regional tourist industry of the region that most certainly have produced high levels of emissions. Dr. Simpson's slides which listed possible industry wide adaptation and mitigation solutions were quite vague and hard to grasp as actual and particular practices that could be carried out by specific people, especially considering that the threats necessitating adaptation are almost all future oriented and large-scale, but it became quite clear what the explicit message of his presentation was about when he arrived at his idea of the "carbon neutral destination" as an adaptation and mitigation strategy. As he described it, in order for a location to sell itself in a tourism market which has now been constrained by carbon, tourism officials must perform three steps: they must measure and assess emissions produced by visitor travel, accommodation, and activities and devise means to reduce these within the country; they must "decarbonate" by switching to energy efficient practices or alternative energy sources; and they must offset their remaining emissions using offset purchasing options approved by Gold Standard Certified Emission Reductions, his certification body of choice, registered with the UNFCC. Tourists and other travelers, Dr. Simpson reasoned, would be willing to pay a small offsetting fee as part of their travel expenditures, knowing they were contributing to the state of carbon neutrality they were visiting.

[193] Dr. Simpson, we were told in the program, was also the Principal of Sustainable Solutions Worldwide, a tourism consulting company.

The target of this "carbon neutral destination" is the "green tourist," a visitor sensitive to environmental problems and the predictions of climate scientists, and the design of desirable "green tourism" infrastructure consists of things like water conservation, energy efficiency, renewable energy, and the general decreasing of the tourism emissions carbon footprint. The Caribbean region, in promoting this green tourism, is here being encouraged to sell itself as a carbon neutral destination to tap into the "global eco-sensitive market" which requires "tremendous policy interventions" in the ways in which the country operates generally, necessitating an "enabling policy environment" and "partnerships with industry and government." This green tourism is touted as a "unique labeling and branding platform," the promotion of which would require partnerships with regional insurance companies and international climate science communities to better define the future climate risks for the region.[194]

Climate change, described in this room in 2007 and likely in others since, is said to be creating new realities for the global tourism industry and the industry of the region. The Caribbean, and small island regions in general, have been identified as "tourism vulnerability hotspots" characterized by warmer summers, sea level rise, increased extreme weather events, fresh water scarcity issues, marine biodiversity loss, an increase in disease outbreaks, political destabilization, and travel cost increases from mitigation policy. This consultant excitedly configured the Caribbean tourism industry as "crucially interdependent" on climate, creating climate as the very nexus grounding the economic development and the maintenance of local livelihoods in most Caribbean nations. Tourism is also configured as dependent on Caribbean resources in terms of actual existing hotels, infrastructure, national amenities, water, energy, financial services, the healthy environment, and food supplies, and these resources of Small Island Developing States (SIDS) are seen as the most vulnerable to climate change.

In this frame, the development of "sustainable destinations" becomes absolutely crucial as a form of sustainable economic development in the region. Sea level rise, the increased rate and strength of Atlantic hurricanes, coral bleaching, coastal erosion, and changes in rainfall patters all become detractors from the existing natural resources of Caribbean tourism, detractors which will catastrophically lead to the "loss of attractiveness of the region as a destination, the loss of employment in the industry, increased industry insurance costs, increased operating costs, and changes in patterns of tourist travel patterns and flows." This practice of placing the Caribbean tourism industry at the center of the climate change crisis is, in essence, predicting the loss of economic life as it is known in The Bahamas today.

In my view, the extreme dangers to the industry are supposedly clear but the solutions are not yet quite so evident, and it is the job of many experts, such as the consultant described here, to attempt to solidify specific strategies to assuage these dangers. As an aside, I note that in order to do so, expertise must be crafted. This consultant listed his own seminar series and report commissioned by the CTO as evidence of the dangers of climate change for the region, explicitly aligning himself as an internal expert in this fairly new arena of climate change and Caribbean tourism.

These notions of the "carbon neutral destination" and Caribbean "green tourism," based as they are in the projections and calculations of IPCC climate science, are particularly attractive for The Bahamas because they have the potential for "greening the image of the country and the

[194] These points were further made by Dr. Ulric Trotz, of the Caribbean Community Climate Change Center (CCCCC), in the following workshop presentation. He was a representative from within the region and his talk was entitled " Climate Change and Tourism in The Caribbean: Threats and Opportunities."

region." As I have discussed above, institutions in The Bahamas are already quite savvy when it comes to branding and fashioning the country as a particular kind of destination, but the Ministry of Tourism was presented in this example with a novel opportunity to diversify the tourism product away from the compilation of affect associated with the sun, sand, and sea brand to a marketing strategy involving selling the very vulnerability of the islands. Beyond the nascent eco-islands branding idea hatched in the Department of Sustainable Tourism, this is a scheme where explaining how visitation negatively effects the country's fragile resources and asking visitors to pay a fee to protect these resources may actually result in the attraction of more visitors on a "carbon free vacation."[195] This "threat" of climate change is not just an opportunity for the global scientific community to expand its horizons and conduct socially relevant projects on a massive scale- it is also construed as an "opportunity" which could make the region a leading example of new, visitable approaches to climate change mitigation and adaptation measures if Caribbean countries like The Bahamas were to adopt offset funding and alternative energy technologies. It seems that in this situation tourism is not only a "vector and victim" of climate change, it might also be a "vector and victim" of new experiments in green travel enterprise.

Caribbean Questions: paradise discourse and climate change?

Ian Strachan, discusses what he calls, "the myth of Caribbean paradise" in his book *Paradise and Plantation*.[196] He writes in his preface, "It is in The Bahamas that this myth finds a beginning, and it is this myth that has served as the primary subject of tourism's special language in this region. The notion that we live in 'paradise' has been one of the central myths of Bahamian life."[197] This "special language" of shockingly blue water, colorful reef fish, lone figures on an empty white sand beach, etc. comes from television commercials and magazine advertisements which, he argues, are the primary venues for information about the Caribbean in the rest of the world and, perhaps more importantly, within the Caribbean region itself. This is potentially problematic because "tourist advertising, which maps and commodifies the region for the world consumer, is not usually *of* the Caribbean. It is usually the work of foreign advertising firms enlisted by the tourist ministries of the local governments, and contains scenes that Americans and Europeans want to see of the 'islands,' as they are homogeneously known."[198] Further, this advertising and branding has concealed the quotidian lives of Bahamian and Caribbean people, erasing them from the product. Many islands of the Caribbean, including The Bahamas, are no longer desired for their colonial resources. They are now valuable, he says, because of the natural resources of sun, sand, and sea and the branding potential therein. He states, "Its citizens

[195] Post, James. 2008. "Carbon Free Vacation." Informational pamphlet advertisement for Paradise Bay Resort, Grenada. This pamphlet advertises the purchase of carbon offsets for air travel in the form of trees planted in Ethiopia to tourists who fly to Grenada and make a reservation at the resort. They advertise 40 trees planted for a "typical transatlantic flight" which they claim is an offset bargain.

[196] Strachan, Ian Gregory. 2002. *Paradise and Plantation: Tourism and Culture in the Anglophone Caribbean*. University of Virginia Press.

[197] Ibid. P. ix.

[198] This quote comes from the article on which the book is based: Strachan, Ian. 2000. "Columbus' Ghost: Tourism, Art, and National Identity in the Bahamas." *Encuentros*. June. 37. P. 1, his emphasis.

seem compelled to show the metropolitans what they have always wanted to see; Caribbeans have resurrected paradise for the people who invented it."[199]

Strachan, taking a decidedly different tone than Cleare, goes on to describe 100 years of what he calls "paradise discourse" in the Bahamas, focusing on art, music, and Bahamian popular media. Not only has the ceaseless promotion of the Bahamas as tourist destination greatly influenced Bahamian artistic production, it has also, he claims, become internalized by generations of Bahamians who now actively use such paradise discourse overtly to benefit from the tourist industry and who, perhaps unconsciously, use its language and symbolism in the formation of a national identity. Strachan believes that this is part and parcel of what it now *means* to be Bahamian in this post-independence world, where tourism is the largest source of private sector income and employment for Bahamians, and he presumes that this dependence on the tourist industry is primarily due to the nation's proximity to the United States and economic isolation from the rest of the Caribbean. He writes, "Tourism has afforded Bahamians a level of material prosperity envied throughout most of the region, and this, of course, stands as its principle virtue."[200] Furthermore, Bahamians do not have much refuge from the tourist. All Bahamians will encounter tourists repeatedly, whether on the central and densely populated island of New Providence, or in the surrounding islands.

This Bahamian paradise discourse comes packaged with and is articulated through the application of two major themes: the promotion of the exotic and the cultivation of a colonial past, themes Strachan summarizes as "paradise and plantation." Both themes are attractive to the typical Euro-American tourist, the former producing notions of adventure and excitement, the latter producing more restful ideas of innocence and simplicity. Both combine to provide the tourist with an experience of *difference*, the notion that he or she has gone somewhere and done something unfamiliar, thus solidifying the familiar and taken-for-granted in their lives back home. This tradition began, Strachan says echoing Cleare (above), with the landing of Columbus on San Salvador and his subsequent introduction to the Taino people, who were described at the time as inhabitants of paradise.

Here we have an example of a Bahamian author writing about the regional tourism industry and the way in which the development and advertisement of the Caribbean and The Bahamas as a brand and particular product has made its way into everyday attitudes and experiences- the very *idioms for life* of an entire region of people. I would further argue that in The Bahamas, this is done through more explicit means than tourist advertising. Cleare describes the targeted campaigns of the 1990s to change Bahamian attitudes towards their participation in the service industry, mentioned above, and while I lived in Nassau from 2007-2009, I saw many explicit examples of the Ministry attempting to inculcate a positive attitude towards tourism and a recognition that tourism is the defining industry of the islands from the Bahamian public. There were television commercials during prime time on Nassau channels which reminded Bahamians to be kind to tourists, to smile, and to be helpful and courteous, and to make sure to maintain the environment because the cleanliness of the beaches and wetlands was a reflection on the cleanliness of the country and its people. There were advertisements in the print media- in all the city newspapers- and on banners on light posts during tourism promotional weeks which highlighted individuals as outstanding representatives of the country

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[199] Strachan, Ian Gregory. 2002. *Paradise and Plantation: Tourism and Culture in the Anglophone Caribbean*. University of Virginia Press. P. 2.

[200] Strachan, Ian. 2000. "Columbus' Ghost: Tourism, Art, and National Identity in the Bahamas." *Encuentros*. June. 37. P. 2.

and the industry. And there were messages on the radio, in the form of short recorded messages and radio talk shows with Ministry guests which articulated these same ideas.

I note that these attempts at inculcating a positive and appropriate attitude towards tourism go even further than public messages. The Bahamahost program, begun in the 1970's to produce a "better informed and more highly skilled" class of taxi driver in Nassau was extended to the all members of the hospitality industry and then to "everyone else who came into contact with visitors."[201] The program consists of 60 hours of lectures about historical and cultural topics that might interest visitors, and the program is still in operation today.[202] In the 1980's, the Organization of American States (OAS) cited the program as one of the most effective in the Caribbean, and Cleare describes it as an especially "innovative programme."[203] It is arguable that the Caribbean "myth of paradise" has been most successfully and strongly, some would say innovatively, developed in The Bahamas as the foundation of the sun, sand, and sea tourism product. Where then does the development of the "carbon neutral destination," as a brand based in climate conscious consumerism, come into play in this Bahamian mythology?

Climate change in the living laboratory

The direction the Ministry might take these pitched designs is not yet known, and as yet there have been no official Bahamian advertising campaigns or branding ventures which explicitly take up climate change and carbon reduction as a selling point for the country or any of its islands.[204] And yet, I argue that the myth of Caribbean paradise may dovetail all to easily on the surface with the myth of a carbon neutral destination in the living laboratory of The Bahamas. Both notions refer to a protected and special place designed for a guilt free getaway, and both loosely imply the sense of getting closer to nature, of participating in nature. In some ways that may be too hard for advertisers to ignore, climate science-based carbon neutrality may serve to shore up the sun, sand, and sea paradise that has already become a somewhat iconic Bahamian brand. This carbon neutral paradise would simply be advertised as innovatively better than the other sun, sand, and sea options available in the travel market; sun, sand, and sea might be reinterpreted as solar, geothermal, and hydrological.

On the other had, the Department of Sustainable Tourism, through its branding exercises conducted by consultancies, may decide to use carbon neutrality as a diversification point, designing some less developed islands to exemplify the theme over others. Some islands may be more effectively and affectively associated with the tension of vulnerability and visitability that carbon neutral destinations connote. It would certainly take feats of mitigation and re-branding to turn the Atlantis Resort and Casino, truly Las Vegas style in its design, size, flashy excess, and energy consumption, into a carbon neutral site.

Regardless of what the Ministry of Tourism and its Department of Sustainable Tourism choose to do with this sales pitch from the CTO- it is always possible that they may not choose to do anything- Strachan shows us through his work with popular media that advertising actions

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[201] Cleare, Angela B. 2007. *The History of Tourism in The Bahamas: A Global Perspective*. P. 217.

[202] I learned that it now has environmental components, designed in part by some NGO's in the country, but I was unable to participate in the Bahamahost program to see for myself or learn exactly what was discussed.

[203] Cleare, Angela B. 2007. *The History of Tourism in The Bahamas: A Global Perspective.* P. 402.

[204] Though there are several private resort ventures in the country which currently advertise themselves and their special efforts to use solar energy and sustainable design.

will likely have some sort of influence on Bahamian subjectivity. This science-based vocabulary might one day be used by Bahamian people to describe their every day lives and their ideas about life itself. I wonder how these moves within the tourism industry might come to influence what it means to imagine oneself as the representative of a small, dependant place under threat of immanent climate catastrophe? How might this change what it means to imagine oneself as a host in the vulnerable yet visitable islands, and how might this affect the conditions for opportunity?

Climate change has been defined and its parameters configured in a number of coordinated international arenas and organizations known by their acronyms: IPCC, éCLAT, GEF, UNWTO, UNFCC, UNEP, WMO, etc., and several countries and international NGOs have now begun programs to assess and manage climate change at a bounded national level.[205] Mitigation measures, even outside of the explicit realm of tourism, are part if the enhancement of a nation's image, and there are models for carbon neutral designs set by Costa Rica, Scotland, Norway, and Sri Lanka, though these are currently being reviewed.[206] But along with these moves there is a sense that the Caribbean and The Bahamas have been presented with a great potential for transformation resulting from the fact that this is a unique and ground-breaking time for tourism. The opportunities almost seem to outweigh the potential threats in this region, and the institutions organized around the production and protection of the Bahamian environment seem to agree that these opportunities come in the form of scientific and economic expansion under the aegis of tourism. The Director of the Nature Conservancy (TNC) of The Bahamas said, at a 2008 Friends of the Environment Science Alliance meeting I attended in Abaco, that The Bahamas is a model in that it is "a country of islands," grappling with sea level rise and climate change. She said that the country is "in a good position to make serious national change" through "little initiatives" like the reduction of fossil fuels, and that tourism and development in the country must pay attention to climate change, and "scientists could play a bigger role by focusing the research they do on these concerns."

Exploring this sentiment in another arena, Dalmedico and Gillemot describe climate change as a regime in which "scientific knowledge production methods (are) deployed to resolve an issue- not merely technical issues but those organically linked to industrial practices, economic choices, political and legal regulations, or ethical and social debates."[207] While I do think that climate change is a rich example of what Nowtony et al describe as the socially accountable production of knowledge, in terms of the way the climate change concerns of climate scientists have influenced industry and national publics whose concerns have in turn made their way back into the research projects of the scientists, I do not think it works best to describe climate change as a regime. This connotation is too close to a notion of oppressive and

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[205] These examples are part of why I find it strange that Anthony Giddens might say in his most recent book (see next footnote) that there is "no politics of climate change" (P. 4) - climate change is nothing of not political, from the realm of international negotiation to the way people conceive of their own existence. He is trying to make a statement concerning the fact that there is no explicit and concerted "innovation" for dealing with climate change, but there seem to be innovations running all through the discussion, especially in terms of how to think about markets and nature.

[206] Giddens, Anthony. 2009. *The Politics of Climate Change*. Polity Press. P. 78-79.

[207] Dalmedico, Amy D. and Helene Guillemot. 2009. "Climate Change: Scientific Dynamics, Expertise, and Geopolitical Challenges." *Global Science and National Sovereignty: Studies in Historical Sociology of Science*. Mallard et al Eds. Routedge. P. 195.

repressive governance, which is not the case here. Rather, I prefer the term global assemblage, developed by Ong and Collier.[208]

Ong and Collier's notion of the global assemblage is a useful anthropological concept which I think provides a provisional schema for thinking about such "abstractable, mobile, and dynamic" phenomena as climate change and its construed relationship with the "tourism product" of the Caribbean and The Bahamas.[209] Their concern is with a category of phenomena that are not strictly conditioned by specific "social, cultural, or economic determinations," phenomena that have become universalized, decontextualized, highly flexible, and which are potentially recontextualizable anywhere, adaptable to the particularities of the setting.[210] The conditions of a global assemblage determine and are determined by the articulation of specific technologies/techniques with political institutional forms and ethical regimes of living in a highly contingent manner.[211] Global assemblages, like the assemblage of diverse elements associated around the problem and crisis of climate change, are emergent, in the process of formation and solidification, and organized around particular stakes. Individuals and collectivities- i.e. scientists, consultants, government officials, Bahamian citizen hosts, anthropologists- are positioned within the elements that make up a global assemblage- their relations are transformed or reengineered within it. Anthropological inquiry within these assemblages, therefore, can take the form of an attention to the tensions and dynamics that arise within these shifting spaces, an attention to the thought, practices, and problems of actors, and to the minor histories that situate elements within these global formations. Within this frame climate change becomes so much more than a global science with local impacts. Thinking about climate change as an assemblage requires an attention to the reorganizations of basic social and international relations, ideas, material practices, and in some cases, migrations.

The Bahamian living laboratory, as space of active experimentation, has become variously and generatively entangled in this climate change assemblage of international bodies, models, scientists, bureaucrats, consultancies, climate articulated vulnerable natures, individuals, and groups. However, the contingent history of the Bahamian tourism industry, this particular conjuncture described above, might allow climate to become amenable as a marketing package and international climate science to be oriented around touristic development. While it is a government body, the Ministry of Tourism is run as a business, as Strachan also notes, and this business, working with and within this global assemblage of climate change, has the potential to solidify particular forms.[212]

Tsing helpfully critiques climate science, stating that climate change creates a form of "global nature" through expert's strict adherence to climate models on a global scale where the local disappears, and yet in the contingent frame of The Bahamas, the local does *not*

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[208] Nowotny, Scott, Gibbons. 2001. *Re-Thinking Science: Knowledge and the Public in the Age of Uncertainty*. Blackwell.

[209] Ong, A. and S. Collier. Eds. 2005. *Global Assemblages: Technology, Politics, and Ethics as Anthropological Problems*. Blackwell.

[210] Their depiction of 'global' is distinguished from conventional references to globalization, a concept they claim has pointed to broad generalizations at the level of structural changes in economic systems, society, or culture.

[211] "Assemblage" is here heuristically understood as an uneasy "ensemble of heterogeneous elements" in a particular problem space of historical conjuncture.

[212] Strachan, Ian Gregory. 2002. *Paradise and Plantation: Tourism and Culture in the Anglophone Caribbean*. University of Virginia Press. P. 8.

disappear.[213] Instead, the local, in the form of a carefully designed Bahamian locality, already understood as the tourism product and specifically branded as vulnerable paradise, has great potential to be rearticulated as a Bahamian climate conscious destination or diversified as a particularly branded multi-island product- this is *visitable* nature which depends on localization as much as globalization for its cache.

Delmedico and Guillemot, thinking in the frame of a regime, critique climate modeling, stating that, "the method on which the modeling is based mainly consists of the numerical resolution of a mathematical problem whose initial state is given...This method when used in a political context erases the past, normalizes the present, and globalizes the future."[214] Yet thinking in the more open terms of a global assemblage allows us to also see how climate models, in a situation like the Bahamian living laboratory, ground specific interpretations of time, linking pasts, presents, and futures as interrelated states. This is a vision of ancient geologic cycling, contemporary anthropogenic crises, and uncertain, risky climatic futures which will play out unevenly across the globe. And we cannot only wonder about modes of oppression, repression, and victimization which might stem from these science-based assemblages- we can also consider how organisms and natures, individuals and attitudes might be positioned and designed within such situations. As Agrawal has briefly noted in another way, the government of nature, including the government of climate change, is also the government of human practices through regulation, and regulation is profoundly productive.[215]

The researchers in this chapter, the scientists whose work activates these climate-based exercises in the rearticulations of Bahamian and Caribbean tourism exemplified here, are far away- they are the scientists of the IPCC. But what are the stakes for those people enrolled in the specific climate change milieu of the Bahamian living laboratory? If product re-branding might come to mean something for people construed as hosts, people who are already targeted by the Ministry of Tourism, what might it mean for people construed as environmental managers, scientists, and researchers in the contemporary Bahamas? While it was too early at the time of research to know what opportunities and doors this idiom opens or closes for them, one cannot help but wonder.

I think that these collaborations between climate entrepreneurs and the tourism industry could play into the productive tension between notions of The Bahamas and those of the Caribbean region. As Coombe notes, distinction is also necessarily the quality of being in a relationship.[216] The Bahamas, as a national tourism product, is always in a relationship with the Caribbean as a regional product, with the Ministry constantly engineering distinction from it, positioning the country in a "social system of difference."[217] The brand of sun, sand, and sea is one example of the engineering of distinction which has lost its edge for the Ministry, now representing the entire region, no longer the exclusive domain of The Bahamas, if it ever was. Yet Ministry officials recognize that marketing The Bahamas brings attention to the region, and

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[213] Tsing, Anna. 2005. *Friction: An Ethnography of Global Connection*. Princeton University Press. P. 101-106.
[214] Dalmedico, Amy D. and Helene Guillemot. 2009. "Climate Change: Scientific Dynamics, Expertise, and Geopolitical Challenges." *Global Science and National Sovereignty: Studies in Historical Sociology of Science*. Mallard et al Eds. Routedge. P. 213.
[215] Agrawal, Arun. 2005. *Environmentality: Technologies of Government and the Making of Subjects*. Duke University Press. P. 228-229, 230.
[216] Coombe, Rosemary. 1998. *The Cultural Life of Intellectual Properties: Authorship, Appropriation, and Law*. Duke University Press. P. 62.
[217] Ibid.

visa versa; branding the Caribbean also influences the collection of affect associated with The Bahamas. Science-based climate conscious branding of the Caribbean as the world's first carbon neutral region might influence this tension in interesting ways which cannot yet be known, as might the diversified multi-island brands creating choices under the flag of The Bahamas.

One might also be allowed to wonder about what is specifically happening to notions of nature within this sales pitch. Hayden, writing about biodiversity protection and idioms of bioprospecting, finds that nature is configured as a "public good" regulated by "market mechanisms" for some in development.[218] She further notes that the nature of sustainability is neoliberal- the argument in some sustainability circles in the 1990's being that the market can manage resources better than the government. Nature is internalized in the market process, and subsequently people are internalized into nature through concomitant idioms of participation and accountability. This is biodiversity producing both objects and subjects, and she writes, "This kind of nature is distinctly amenable to new kinds of inventories, partnerships, and alliances."[219]

While I will return to this discussion in more depth in **Chapter 6**, I mention Hayden's work on neoliberalism's nature here because views like this make it paradoxically possible to imagine that the tourism industry might "save" the Bahamian environment. A form of nature made amenable to market processes is configured by Cleare, above, as the foundational "blessings" of The Bahamas which historically root the tourism industry, which anchor The Bahamas as a brand. This is, as I have stressed, a visitable nature, and in the arena of travel markets, it may become increasingly neoliberal. Within the climate change assemblage as it intersects with the contingent history of The Bahamas living laboratory and the development of the tourism product, carbon neutrality may become an arena for protecting the Bahamian environment, through reductions in regional emissions and the maintenance of attractive natural resources. Tourism and its valuation of attractive resources, of vulnerable paradise, becomes legitimated by climate considerations in this possible schema, and the particular subjects of neoliberal projects, the people and figures internalized here, become the visitor- measured in arrivals and expenditure, the host- measured by the degree to which they exhibit the appropriate attitudes, the investor- measured in tax revenue, dollars, and jobs created, and the stakeholder- measured by participation- for showing up.

In this chapter, what I have attempted to describe are the current stakes of the tourist industry, based as they are on the framings of that industry's history. I have also hoped to show that the very substance of the stakes for visitation are redesigned within this pitch made in that ballroom at the Cable Beach Wyndham Hotel. Strachan's paradise discourse may expand to find its legitimacy in climate science because this notion of climate may no longer be seen as amorphously global, and the tourism industry may come to desire an island oriented vulnerable nature, with science and subjects internalized in the whole process. For better or for worse, these actions would make a perfect sort of sense within the historically contingent Bahamian living laboratory, home of "honest tourism."

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[218] Hayden, Cori. 2003. *When Nature Goes Public: The Making and Unmaking of Bioprospecting in Mexico.* Princeton University Press. P. 48.

[219] Ibid. P. 49, P. 59.

Chapter 4. The Educational Islands: Eleutheran adventures in the age of sustainability



Island School students and staff on a field trip in Eleuthera, photo by author, 2008.

Islands for education, islands as educational

In 1648 the Eleutheran Adventurers, a group of Puritan English religious dissidents, left Bermuda, then under the rule of the Anglican Church, and sailed to seek their fortune in The Bahamas. History has it that these people endured a perilous journey to the island of Cigateo and renamed it Eleuthera, the island of freedom. This small group was the first European effort to formally colonize the Bahamas, as no long-term colonies were established while the islands were under Spanish control. The arrival of Columbus to The Bahamas in 1492 is possibly the *most* famous story of arrival, but the Eleutheran Adventurers legend is also a famous settler story in the country today, and many people trace their lineage back to these first English settlers. The Spanish were said to have killed and enslaved the indigenous population of the islands years before, and the Adventurer's arrival in Eleuthera begun the transformation of the "empty islands" into a place of civilization. The site of the Adventurer's first camp, Preacher's Cave, is a national protected area today, and this group sets the tone, as it were, for discussing present day

Eleutheran adventures in the realm of science education and the sorts of transformations envisioned through sustainable designs for living.

It can be argued that tourism and its infrastructure represents a contemporary attempt at settlement of sorts. As mentioned in the previous chapter, the Bahamian model has come to be the tourist resort enclave, carefully situated in a prime location on a beautiful island as an economic "anchor." The resort comes to be a corporate outpost or offshoot of the economy of the metropole, and lucky guests are flown or shipped in to the specific destination and flown or shipped out again after a few days of all-inclusive fun. The island of Eleuthera, in the middle of the Bahamian island chain, has had its share of experience with this sort of resort development. South Eleuthera, especially, has seen several large enclave resorts come and go, precipitating the familiar cycle of Out Island boom and bust.[220] The southern end of the long and skinny island is dotted here and there with old developments in ruins. Evidence of the collapse of this glamorous island travel mecca, which thrived in the 1950's through the 70's, is all around, carved into the limestone. Overgrown driveways lead to rotting and vacant bungalows; the sprawling plan of an old golf course can be identified under the dense tangle of bush; weedy airstrips provide opportunities for drag racing or bicycle speedways for children. It was in this economically depressed environment, this "emptied" island, that the Island School was developed.

This chapter develops the notion of the living laboratory through an examination of the way one specific island, Eleuthera, has been designed as an educational mecca and model system for visiting students, researchers, and investors. Focusing on the Island School and the Cape Eleuthera Institute, both aspects of the Cape Eleuthera Foundation, I discuss the ways in which private experiential and scientific enterprise produce this "educational island" along with future-oriented environmental subjectivities and transformative ecologies. I hope that this chapter contributes to literature on environmental education, science tourism, colonial science, and environmentality.

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The national educational system of The Bahamas is run by the Ministry of Education, and each island in the Commonwealth of The Bahamas consists of a school district or a number of districts, depending on population numbers. Each district provides public primary and high school education for island children. The Eleuthera and Current Island District has approximately Bahamian 2,500 students and eleven Primary, Three High and two All Age Schools, and a teaching staff of approximately 180.[221] It is my understanding that most Bahamians attend public school through high school, at which time many enter the full-time work force. For those able to continue in their education, a number on the increase, some attend the College of The Bahamas (COB) in Nassau on the island of New Providence for an Associates Degree, while the elite are sent, and the best students obtain scholarships to, foreign universities in the US, UK, and Canada.[222] The Ministry of Education creates national curricula for all subjects, grades, and ages, and these curricula are taught in all the public schools.

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[220] Saunders, Gail and Michael Craton. 1992. "The End of the Old Regime, 1763-1783." *Islanders in the Stream: A History of the Bahamian People: Volume 1: From Aboriginal Times to the End of Slavery*. University of Georgia Press.

[221] Please see the Ministry of Education website: http://www.bahamaseducation.com/eleuthera.html

[222] The College of The Bahamas now offers a few Bachelor's Degrees in specific subjects, including Small Island Sustainability, but it has not yet received University accreditation, though it may do so very soon.

The public schools in The Bahamas and on Eleuthera are primarily staffed by Bahamian women trained in Education, and some of the more remote islands have trouble obtaining and retaining teaching and support staff for their schools. During the colonial era, many schools were staffed by white British teachers, many of whom traveled to the remote islands of The Bahamas for that purpose. A public school education consists of basic reading, writing, mathematics, and biology though some schools have more of an emphasis on specialized disciplines and high school courses provide more advanced exposure to chemistry, foreign language, physics, etc. There have also been successful efforts made by the Bahamas Reef Environment Education Foundation (BREEF) and the Bahamas National Trust (BNT) to include curricula on the Bahamian marine and terrestrial environment and ecology in standard public education, and BREEF runs an annual teacher training field course for Bahamian teachers towards this end.



Girls waiting for the jitney after school in Nassau, photo by author, 2008.

The various islands of The Bahamas are also home to a number of scientific research stations created, with government permission or partnership, by foreign and domestic organizations for the field education of foreign and local students alike, as well as for the development of situated field research within the country. This list includes that Bahamas Environmental Research Center (BERC) on the island of Andros, the Gerace Research Center on the island of San Salvador, and the Perry Institute for Marine Science in the Exuma islands. The

Island School, created in Eleuthera in 1999 by teachers from a private high school in New Jersey, is one of these. It has now become an educational semester abroad program for US, Canadian, (and a few Bahamian students) from 250 schools. The campus is located on Cape Eleuthera on the southern half of the island, just East of the central island of New Providence. Students pay to live in small dormitory style buildings and to take "place-based" field classes in the Bahamian marine, terrestrial, and social environments, including reef studies, aquaculture, waste management, social study and archeology.[223] These courses are not connected to the Ministry of Education's curricula. Students also participate in a one or two night "home stay" program with residents of the Deep Creek settlement nearby. These programs are designed to "connect students to place" and make them aware of their position within that place. The faculty are almost all American college graduates, with a much higher percentage of male teachers than in the Bahamian system and with one or two exceptions. The cooking and maintenance staff are mostly Bahamian residents from the area. Along with Bahamian public school administrators, the Island School states that it is hard to attract qualified Bahamians to teach on a rural island because of the remote location and low pay, but unlike the Bahamian public school system, the Island School has turned this island location into an enterprise.

I have visited the Island School on a number of occasions, most notably in May of 2008 when I was invited to stay for a week at the behest of the outreach coordinator, whom I met in Nassau. He thought my dissertation research was interesting, and he wanted me to speak to the students at the school as part of their continuing rotation of guest speakers. In exchange, I could stay at the School for a week, participate in the cycle of daily life, conduct a few interviews, and observe whatever I liked.

I flew by small jet from Nassau, arriving at the tiny airport in Rock Sound, South Eleuthera, at 7am on a Monday morning, but the School's day was already well underway. The day begins with collective morning exercise at 6:30am for the students and faculty (with a half marathon and super swim on the following Sunday of that week, beginning at 5:30am), followed by chores, communal breakfast, guest speakers/project research, class (math, art, tourism and development- the week's theme, systems), communal lunch, more class, SCUBA/community outreach/advisory meetings, 1 hour and 45 minutes of free time, communal dinner, then independent study until bedtime around 10pm. In other words, the schedule is busy, very structured, and the routine is physically palpable, becoming ingrained very quickly.

On my first day, I was given a tour of the facilities, which cover several acres of arid and rocky land by the sea on Cape Eleuthera. The very first thing I was shown was the waste management system, of which everyone is very proud. The School septic tank has been linked to a simple "biodigestion system" wherein human waste feeds the plants displayed in the center of campus through an underground mechanism. The tropical garden was tall and lush when I visited, though my tour guide noted that one could occasionally catch a whiff of the "fertilizer" from time to time. I was told that this was only a small, low maintenance example of the School's waste management plans and that they hoped to design ways of turning waste into energy through the extraction of methane gas for cooking and electricity, even to extract water from it. The whole campus, I was informed, is explicitly designed to be or become self-sufficient in terms of the production of energy and certain resources.

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[223] Much of the archeology is based in the work of Bill Keegan on Lucayan sites. See Keegan, William F. 1992. *The People Who Discovered Columbus: The Prehistory of the Bahamas*. The Ripley P. Bullen Series. Florida Museum of Natural History.

I was told that it is all quite simple: the School has an agreement with the Bahamas Electrical Corporation (BEC) wherein it can produce its own solar power and connect to the island's public electricity grid through an inter-tie system which allows it to pump power into the grid during the day, and pull power off the grid at night, when the sun is not shining. This has come to work so well, I was told, that the School actually stabilizes energy in the area. The School also produces its own water from water cisterns collecting rainwater, though it has a "back-up" well field for times of drought. They do not purchase water from the government, unlike most people on the island and in the country who purchase drinking water from private corporations and those who are provided with household water as a public utility. They even get their internet and phone services by satellite from New Jersey, avoiding dealings with The Bahamas Telecommunications Corporation (BTC) altogether. The School must import most of its food, however, though they grow their own lettuce and occasionally slaughter a pig as a form of demonstration for students on the hidden processes of consumption.[224]

In addition to the designs which help make the School "self-sufficient," there are other designs which are largely for the student's hands-on education and for the purpose of demonstrating "the possibilities of what can be done" in an island setting. I was shown an aquaculture site wherein students and interns maintain and propagate populations of edible fish, such as Talapia. In an aquaponics area, students learn how the waste from the aquaculture fish tanks can fertilize the growth of hydroponic vegetables, vegetables which purify the water, water which is then funneled back into the fish tanks (much of the lettuce eaten at the School is grown in this manner). There is a plant nursery in which both native and non-native plants are grown for the purposes of School landscaping, and there is an orchard, irrigated from the School's water supply. There are large composting bins, divided into various categories and mode of decomposition. There is a pig farm. The campus furniture is made in a woodshop from the wood of the Casuarina, an invasive pine which can be found in abundance throughout The Bahamas, and the facilities showcase a number of green buildings, one with a living roof, and a few with earth-bag construction in lieu of cement.[225] Seaweed is collected and used as additional plant fertilizer. There is a wind generator, down for servicing when I visited, which could produce up to 15kw. Lastly, there is a small biodiesel production shed wherein cruise ship cooking oil is transformed into diesel for campus vans and machines through a simple procedure involving the separation of glycerine. This is also sold to faculty and staff at $3.50 per gallon- at least a dollar less than the price of gasoline on the island.[226]

The site-based demonstration projects are also linked to a number of ongoing scientific research projects involving the marine and terrestrial ecology of the island in various ways. The students participate in projects designed by the Cape Eleuthera Institute (CEI- a center for scientific research by visiting science professionals), completing various tasks and working in groups. At the end of each semester season, students present their work in a research symposium to island leaders, representatives from national environmental organizations, and other interested parties. Some student research project examples include aquaponics for sustainable food production, as mentioned above, archaeological analysis and GIS mapping of historic Lucayan

[224] I was told that the School tries to buy groceries locally, but that there is usually not enough to be found on the island to feed 100 people consistently. The guide told me the School spends $20-30 thousand per month on food alone.

[225] The Casuarina is also known as Australian Pine.

[226] The price of Island School biodeisel fluctuates with the price of oil because their production process uses methanol which is tied to the price of oil. This price reflects the conditions in May of 2008, but it changes often.

sites, coral reef ecology and the recovery of Long-spined Sea Urchins, offshore aquaculture with Cobia for potential commercial farmed fish production, patch reef monitoring, and local shark population assessments.[227]

The week I visited the Island School was designated as Tourism and Development week for the students, and classes and activities were geared toward explaining this topic in a place-based way. I accompanied students in a field trip to two nearby resort developments, Cotton Bay and Cape Eleuthera Resort, where we were given tours of the premises and two separate sales pitches from the property managers. I sat in on several guest speaker presentations on campus, a few of them by people from Eleuthera itself. Before each short presentation, students were admonished by faculty to think of the speakers from the island as a lesson in "living history." I was also told that students listened to a recording of a Rock Sound town meeting as part of their studies, as an example of community responses to proposed changes, and I was informed that they read Ian Strachan's *Paradise and Plantation* as an example of a Bahamian author critiquing the tourism industry.[228]

I provide all this information here to demonstrate only some of the ways in which the School is quite different from the style of public education institutionalized by the Ministry of Education. The private Island School has actually come to use its island setting to maximum advantage for elite education. Through the process of educating its student visitors and adhering to its mission to be "much more than a place of learning. (To be a place where) students are active participants in the educational process; students have to think like scientists, cultural historians, and teachers…. they face real problems and challenges in and out of class," the Island School has turned the island of Eleuthera, its ecological systems, its people, and its challenges for island residency into a classroom for the inculcation of designs for life and living and the production of future designers.[229]

Science, tourism, and knowledge production

Beyond the regional notion of the North American student as the "spring breaker," the Island School is an example of the development of a notion that I call the "educational islands": tourism designed around a particular sort of teaching and learning with a particular target, the malleable student who is a potential future leader, teacher, or foreign investor. Importantly, a person from the Ministry of Education who lives in Eleuthera noted that the School kids might be visiting students now, but they might also be potential investors in Bahamian development later, and should be treated as such. Thus, the Island School is a site where scientific field research and conservation education implicitly mix with the tourism industry of The Bahamas in ways well beyond the frame of Tourism and Development Week. For a decade, students and faculty from North America have traveled to Eleuthera in small numbers, usually with no prior experience of The Bahamas.[230] They go there to be a part of the School's mission to create, "a community that fosters the development of responsible, caring global citizens by restoring a sense of wonder and

[227] These examples come from the 2009 Island School website: http://www.islandschool.org/research.html

[228] Strachan, Ian Gregory. 2002. *Paradise and Plantation: tourism and culture in the Anglophone Caribbean*. University of Virginia Press. See Chapter 2 for a more detailed discussion of this text.

[229] The School's mission statement comes from this site: http://www.islandschool.org/about_us_mission.html. My parentheses.

[230] The Island School celebrated its 10-year anniversary in February of 2009.

respect for biotic and cultural complexity." [231] They go to experience life on a remote (though increasingly less so) Bahamian island, to immerse themselves in the cool shallow sea and dry heat of the bush, and to have a unique sort of adventure that promises to improve their own understandings of themselves, their fellow adventurers, and the fate of the globe through a scientific field education.

The School imagines that the planet and the student's own subjective lifestyles are malleable, improvable, and receptive to positive change based in knowledge, and students go to the Island School to learn about these linked systems. This is a form of "science tourism," an undeveloped arena of scholarship, and it is as individualized as it is globally conscious. The location for the adventure, the island of Eleuthera- with its bush, mangrove, reef, and beach ecosystems and particular social history, is instrumentalized here in curious ways. Through the framing and practice of specific field studies and projects, mentioned above, students learn that the Bahamian landscape is comprised of local people, animal species, marine and terrestrial ecosystems, and processes of natural and anthropogenic dynamic change which cause the availability of natural resources to be uneven. They learn that science is the language with which to speak truth to the uninformed in order to influence the creation of "good" policy decisions, and they are charged with demonstrating the scientific validity and social relevance of their projects.

This is an example of what the authors of the 1989 article, "Science Tourism in Costa Rica," might have referred to as a blending of "soft" and "hard" nature tourism.[232] "Soft nature" is the realm of ecotourism, they say, with some education mixed with mild adventure. "Hard nature" is the realm of professional researchers, professors, and students who travel to study "serious science," usually tropical biology.[233] The advantages of the science tourism of those interested in "hard nature," the authors say, is that it tends to be complimentary with natural resource conservation, tolerate limited physical infrastructure, provide educational benefits to the host country in terms of environmental education, and is a generally "wholesome activity."

This is one of the few publications from the loosely defined anthropology of tourism that mentions scientists as tourists, and it is somewhat dated.[234] For these authors, scientists can be considered visitors because they benefit the industry with their money, their return trips, and travel recommendations to friends and family. They are considered here as "early explorers" of areas which may become more widely visitable over time. This form of tourism is relevant to small countries, the authors say, because of their desire to attract "special interest segments" of the travel market.

The Island School, and the students and faculty it attracts, is very much an active part of the tourism industry of The Bahamas, the play of arrivals and visitation, as are all visiting researchers, including myself. While research centers complicate things in that they often funnel earned money out of the country, back to the center's place of origin- for the Island School, this is the US and New Jersey- I will point out that this is not much different from the dominant form of foreign owned and operated resort tourism that is so widespread in the country and the region. There are a great many forms of science tourism, from the single researcher who camps alone in his field site to situations like the Island School in which students and faculty travel en mass to a

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[231] See http://www.islandschool.org/about_us_vision.html

[232] Laarman, Jan G. et al. 1989. "Science Tourism in Costa Rica." *Annals of Tourism Research*. V. 16, p. 205-215.

[233] Laarman et al refer to this science tourist as "Caucasian, male, and highly educated." P. 213.

[234] See also West, Paige. 2008. "Tourism as Science and Science as Tourism: Environment, Society, Self, and Other in Papua New Guinea." *Current Anthropology*. Vol. 49, No. 4: pp. 597-626.

center in Eleuthera to live and work on the Cape, and I would like to develop an academic attention which can think about this relationship and what it creates.

The anthropology of tourism provides some means with which to begin. Stronza notes that tourism has been relevant to anthropology because of its ability to effect almost all peoples of the world, its major economic importance, and its theme of cultural contact, but the sub-discipline has primarily channeled these interests into two main themes: the origins of tourism, with the focus on the tourist, and the impact of tourism, with the focus on local people.[235] Following Smith, she defines a tourist as "a temporarily leisured person who voluntarily visits a place away from home for the purpose of experiencing a change."[236] While the students, faculty, staff, and interns in question at the Island School are employed or employed in activities, they can still be said to be traveling for the purpose of experiencing a change- though this change comes through the act of voluntarily participating in scientific knowledge production wherein the act of learning and researching, of producing knowledge and learning about the place of its production, comes to justify the experience.

Stronza further notes that the subdiscipline comes with a certain set of key assumptions. One is that tourism is a "vector" from the tourist's point of origin to their point of visitation, and that this vector brings a sense of imposition or oppression wherein local people become passive recipients who lose their culture as the price of participation, or who commodify their culture to satisfy tourist expectations. Stronza critiques this assumption, hoping to inspire new questions and "new research objectives" for the anthropology of tourism. Instead of the constant focus on local impacts, she asks us to consider why "hosts" participate in tourism and in what ways. She also wonders what actually motivates tourists to travel, and she desires a greater "appreciation of what tourism is." Anthropologists, she notes, are becoming "critical to tourism projects around the world" because their localized skills are needed for improved tourism planning and implementation.

The case of the Island School is a good place for me to test Stronza's attention to a reoriented examination of tourism. What is at stake in this arena in Southern Eleuthera is not necessarily the loss of culture for Bahamians in the vicinity, nor is it necessarily that people are forced to commodify their lifeways for tourist consumption. And the tourism described by MacCannell, of the leisured Euro-Americans seeking escape from their superficial, modern existence, is not what is at work here on the Cape.[237] The stakes here are more complex in that they are about the production of *visitable* complexity itself, as a scientific form, through the generation of a tightly constructed island experience. They are about the development of new forms for visitation and situational education, and about the very ways island dwellers and developers should conceive of and design their living spaces, infrastructure, and mode of educated self-awareness. This takes on even more pointed meaning when representatives from the Island School describe planet Earth itself as an island.

Freedom 2030: mixing education with enterprise

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[235] Stronza, Amanda. 2001. "Anthropology of Tourism: Forging New Ground for Ecotourism and Other Alternatives." *Annual Review of Anthropology*. V. 30. p. 261-283.

[236] Smith, V. Ed. 1989. *Hosts and Guests: The Anthropology of Tourism*. University of Pennsylvania Press.

[237] MacCannell, D. 1976. *The Tourist*. Schocken Publishers.

The Island School is a branch of the Cape Eleuthera Foundation, created in 1996 by an American family with financial investment interests in the country, and it is an umbrella organization, supporting several other ventures.[238] Another branch of the Foundation was Cape Systems Ltd., started in 2005, which develops "sustainable alternative energy industries" for profitable application in island settings. Cape Systems was considered to be a natural extension of the work done at the School, but it is the business end of the spread and a revenue-generating arm of the Foundation's "entrepreneurial model." The website notes, "as a wholly-owned subsidiary of a not-for-profit corporation, Cape Systems is able to provide support to environmental and social projects through the Island School that are aligned with its ongoing missions of education, research and outreach. In this way we are creating a model of applied business practice, rooted in sustainability, and tied to the education of future leaders. Cape Systems is building these models on the foundations of evaluation, quality service, and cutting edge technology embedded in 8 years of regional experience."[239] In other words, in order for the designs developed at the School to be considered viable and "sustainable" they must be shown to be profitable.

The scientific practices created on this educational island are explicitly linked with enterprise, and not at all surprisingly the most visible enterprise, and the one most missed in the area, is tourism. *Freedom 2030* is the title of Cape System's most ambitious design to date- it is a blue print for the proposed future development of Eleuthera by the year 2030, with Cape Systems situated as the prime mover. The full title for the proposal is, *Freedom 2030: Eleuthera- An Island to Reinvent the World*, and it is touted as "a tremendous opportunity to make a real impact in island energy systems and brand both Eleuthera and The Bahamas as a cutting edge destination that is truly engaged in sustainability."[240]

The "opportunity" comes from the "strange confluence" created by the inefficiency and expense of Eleuthera's island energy system, and by the fact that Eleuthera, the proposal authors say, is small enough to be managed as a whole. In other words, the island is ripe for redesign. Eleuthera's standard means of producing energy comes through the importation and consumption of oil and gas resources from other nations, yet the proposal points out that the Caribbean's main resources are the sun, the wind, and the ocean. What Cape Systems tries to show in the proposal is that a change in the means of powering the island would affect the cost of energy, potential carbon taxation, vulnerabilities to climate change, the tourism industry, and quality of life for island residents. Knowing that there are only 8,300 people on the island (not counting tourists in season) with known electrical and gas consumption, and that the island has a "fantastic solar resource" in its clear, sunny weather, Cape Systems proposes that it would theoretically take only a small surface area of solar panels to power the whole island. They note

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[238] See www.capeeleutherafoundation.org. The Foundation also supports the Cape Eleuthera Institute, created in 2003, a center for island ecological research, which brings in students and researchers who want to make use of the Institute's facilities and unique island location. "The mission of the Cape Eleuthera Institute is to build relationships, provide resources, conduct research, and develop sustainable industries in South Eleuthera, The Bahamas, and the Caribbean. Through partnerships and information sharing, we are creating models of resource management and development that enhance learning, conservation and economic prosperity" (http://www.ceibahamas.org/visiting-programs.html). The final branch of the foundation is Deep Creek Middle School (DCMS), created in 2001, a small, private middle school for Deep Creek students with teachers hired through the Island School. This is "the only independent middle school in The Bahamas."

[239] See http://capesystemslimited.com/about-history.html.

[240] Cape Systems Ltd. 2008. *Freedom 2030: Eleuthera- an Island to Reinvent the World*. http://freedom2030.org/Welcome.html#. Delivered at the Climate Change and Tourism Conference, February 2008, Nassau Bahamas. See Chapter 2.

that wind turbines could be placed on ridges or in the shallow sea. The proposal sites the Island School as its best example of success, noting that it generates 60% of its own energy and they feed energy back into the BEC grid, as mentioned above. They further propose that the development of a large biofeul plant would produce many jobs and generate carbon credits. There would be large expenditures of money required up front to fund this massive project, by government or private industry, but their argument is that these are "low-maintenance systems" and there are few costs after set-up. In this design, the same geographic and demographic features of the island itself that are utilized to make an educational experience for student visitors at the Island School are used by Cape Systems for the creation of a "cutting-edge model" and business proposal. Photos of tanned and smiling students in the sun and sea on the Island School website give way to green and blue satellite images of the entire Planet, then The Bahamas, then Eleuthera in the *Freedom 2030* proposal.

Caribbean Questions: colonial models and laboratory situations

During my time at the Island School, in rare moments of down time, I had several conversations with staff members about the School's functioning and purpose. Some in the Island School staff, while generally pleased with the rigor and organization of the School, were critical of the mode of teaching that goes on there. One person went so far as to tell me, "there is nothing neo-colonial about the Island School- it is a straight up colonial model." They told me that the students were not ever explicitly asked to reflect on their own positions as visitors and students in the country, and that they are more often focused on spreading the conservation ethos with a missionary zeal.

I mention these criticisms in order to bring this discussion of the educational islands back to an engagement with Caribbean Studies and the subject of the perpetuation of colonial models in the postcolonial present. My question is, is this an appropriate frame for the consideration of research stations and science tourism in the region, such as the Island School and its partner organizations on the Cape? Considering the history of The Bahamas, a former British colony, and the Caribbean region, an exemplary site of European colonial interventions and arrivals, what can by learned comparing this past with contemporary productions?

In order to think about this Caribbean question, I must first consider what is meant by "colonial model." One version of this term comes from a conversation in the history of science about the development of the sciences in the colonial period. The seminal work on this subject is that of George Basalla and his three-phase typology of the spread of Western sciences throughout the world, one phase of which is the "colonial model."[241] Harrison notes that, "Basalla posited a universal model for the diffusion of Western science, from an initial phase of exploration—in which colonies provided raw data and materials for scientific analysis in the West—through to formal colonial dependence and, ultimately, to independence."[242] Krishna, discussing Basalla, describes in his historical investigation of British colonial India that one category within the colonial model is that of the colonial "gate keeping" scientists, the holders of

[241] Basalla, George. 1967. "The Spread of Western Science." *Science*. Vol. 156. no. 3775, p. 611-622.
[242] Harrison, Mark. 2005. "Science and the British Empire." *History of Science Society*. V.96(1).

authority who discriminated against Indian scientists and generally refused to grant Indian scientific work the designation of knowledge.[243]

I must note that the staff member who described the Islands School as a "colonial model" did not elaborate on what was specifically meant by that designation, and one could assume that they were referring to a structure of dominance and dependence in which the visiting researchers, students, and faculty have the authority of knowledge production and that this assumes that Bahamians do not, that they lack the appropriate scientific information with which to make responsible decisions. But one could also assume that the phrase, "colonial model" also refers to the generativity of social and scientific production in that period- to the ways in which colonial institutions in The Bahamas and the Caribbean created the region and the islands as recognizable resources while designing the mode of life lived by conscripted groups within that frame.

Recent cultural geography takes the "postcolonial present" of particular sites as a point of departure.[244] This allows us to engage with the effects of specific conditions of the colonial era in critical ways that consider the powerful productivity of the past and present moments together. For authors like Braun, the postcolonial is not a transcendent era, but one in which colonial relations exist in the present. Such colonial relations are local in effect and particular, not a universal condition, though they are enabled by universalizing discourses. The Island School staff member was making a pointed statement about the current role of the Island School in perpetuating historical inequities of knowledge creation and possession in the region, and the School does privilege the production of what could be called "Western" or "Euro-American" science. I further note that this is somewhat problematically tied to what I consider to be a moral argument about the regional dissemination of this knowledge in the form of mandatory "outreach," and this is especially problematic when the moral imperative is tied to the desire to make outreach profitable. However, In addition to these observations, I think one can take the staff member's statement as an imperative to stress the powerful productivity of the collaborations, productions, forms and ideas coming out of contemporary field research stations. The endeavors of the Island School and Cape Systems to make the island of Eleuthera into a site for field study and an experimental space, described above, are also comparable to the arena of "classic" Caribbean scholarship, also conducted in colonial times, which I think highlights an attention to production and generativity.

My loose definition of "classic" Caribbean scholarship spans the middle 20th Century and marks the demarcation of the Caribbean as a visible scholarly region, a response to its prior invisibility and "non-place" status for social science.[245] In 1937, Melville J. Herskovits published *Life in a Haitian Valley*, his ethnological description of the routine "phases of life" in one rural Haitian village.[246] This was an attempt to "seek beneath the surface" of daily life and

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[243] V.V. Krishna. 1992. "The Colonial 'Model' and the Emergence of National Science in India: 1876-1920." *Science and Empires*. *BSPS*. V. 136. Patrick Petitjean et al Eds. Kluwer Academic Publishers.

[244] Braun, Bruce. 2002. *The Intemperate Rainforest: Nature, Culture, and Power on Canada's West Coast*. University of Minnesota Press.

[245] The Caribbean was often seen as "too close to home" for anthropological study prior to the mid-20th Century, and lacking in tribal or primitive societies (see, Trouillot, 1992. "The Caribbean Region: An Open Frontier in Anthropological Theory." *Annual Review of Anthropology*, V. 21, 19-42). Initial anthropological work in the region, lead by Herskovits, centered around the problem of the "New World Negro," and initial regional sociology was the result of Caribbean sociologists themselves practicing the training they had received at colonial or foreign universities.

[246] Herskovits, M. J. 1937(1971). *Life in a Haitian Valley*. Anchor Books. Herskovits, a student of Franz Boas at Columbia University, was a founder of African American studies in the US, and much of his work is focused on the

practice in order to get at an understanding of the "real" country and people.[247] In studying the African heritage of Haitian rural peasants, Herskovits followed Boaz, relying heavily on his notion of acculturation: the idea that when two separate cultures continuously meet, they exchange cultural forms and technologies, developing a historically contingent mixed culture out of the union over time. This idea was a ground breaking response to prior notions of cultural contact, in which it was assumed that only the more "savage" or "primitive" culture would take on the traits and habits of the more "advanced" culture. The approach used in *Haitian Valley*, was to qualitatively measure assumed historical changes from the presumed baseline cultures, the foundations of Haitian society: African and French European cultures.[248] Thus, detailed knowledge of the two original cultures was considered necessary for the comprehension of contemporary Haitian life, as much as the consideration of the historical particularities of past slave society. The point here is that Haiti and the Caribbean became a testing ground for the development of the theory of acculturation; the region's history and its people became subjects of anthropological experimentation and investigation.

To cite another example, a decade later, the Cuban sociologist and functionalist, Fernando Ortiz, published *Cuban Counterpoint*, a study of "the economic, social, and cultural aspects resulting from the interplay of influences between Africans and Latin Americans."[249] He hoped to critique the concept of acculturation in the region, developing an alternative notion of transculturation which moves beyond notions of conversion and submission to norms, promoting the co-production of the "new reality of civilization" out of cultural contact.[250] In this frame, the Spanish colonists who ventured to the New World were not passive emissaries of European culture- they were already undergoing a process of transculturation, which began as soon as they decided to leave for the Caribbean. This study centered on the development of the tobacco and sugar economies in Cuba as the site of much of the direct processes of transculturation that the Spanish experienced with the "natives" they encountered, and later with the African slaves they brought in to labor. "Counterpoint" refers to the dialectic relation between these two modes of production in Cuba, and the way in which these modes delineated the social forms that could exist around them. Sugar was the cash cow, the respectable mode of production, while tobacco production was the production of vice, the opposite of sugar. "Out of the agricultural and industrial development of these amazing plants were to come those economic interests which foreign traders would twist and weave for centuries to form the web of our country's history, the motives of its leaders, and, at one and the same time, the shackles and the support of its people. Tobacco and sugar are the two most important figures in the history of Cuba."[251] The history of the production of these plants explained the transculturation of the Cuban people, and this was a decidedly more ecological and materialist analysis than that made by Herskovits and his search for survivals. Cuba was configured as an amalgam of material ecology and sociology in this

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condition of the "New World Negro" in both the US and the Caribbean. By "phases of life," Herskovits refers to the formal categories of birth, childhood and adolescence, mating and marriage, property, wealth, and family, and religion that interested American anthropologists of the time.

[247] Ibid. P. 3.

[248] P. 323.

[249] Ortiz, Fernando. 1947. *Cuban Counterpoint: Tobacco and Sugar*. Alfred A. Knopf. Quotation from Malinowski's introduction, p. ix.

[250] Acculturation, Oritz noted, was a Eurocentric term which connoted the acculturation to the Western elite ideal, despite references to give and take.

[251] Ibid. p. 4.

investigation, and while Ortiz's terms and conclusions are dated when compared to the Eleutheran social and ecological exemplifications made by the Island School and Cape Systems, there is a similar sort of development of the field at work.

Finally, in his 1971 consideration of the development of Jamaican society, E.K. Braithwaite developed the famous notion of creolization as a "culture action" and social process through which strangers, to an environment and to each other, met in a situation of asymmetry and developed a peculiar "new" social construct.[252] Creolization is, "an obscure force, working upon an entire section of society, which makes them all conform to a certain concept of themselves; makes them perform in certain roles which, in fact, they quickly come to believe in."[253] This process was said to began for West African slaves after they crossed the middle passage, during their period of "seasoning" in which new slaves were renamed, branded, and forced to learn how to function in a slave society.[254] Plantation work was seen as the next step in the creolization process, a situation in which a slave became identified with his work and eventually came to take pride in it and accept it as his lot. Thus, creolization in this schema is also a process of socialization through which some slaves came to appreciate and even emulate European colonial life as "mimic-men." Creolization was also a "two way process," through which white society slowly came to integrate African slave culture into their social systems, such as the Army and the household, albeit in a subservient position, where they influenced elite language and lifestyles, and produced the growing colored population on the island through covert liaisons. "Creolization, then, was a cultural process that took place within a creole society- that is, within a tropical colonial polity based on slavery."[255] Jamaican society, in this frame, was not considered to be an appendage of British society, nor was it an imitation of the metropole. Jamaican society was a "viable, creative entity," which has always been much more than a "collection of autonomous plantations" or social groups.[256] Creolization is "a way of seeing society, not in terms of white and black, master and slave, in separate nuclear units, but as contributory parts of a whole. To see Jamaica (or the West Indies generally) as a 'slave' society is as much a falsification of reality, as the seeing of the island as a naval station or an enormous sugar factory."[257]

Much as Stronza notes that tourism is interesting for anthropologists in part because of its "laboratory situation" in terms of cultural contact, this section shows how the Caribbean has long been a laboratory situation for anthropology and ideas about human social change, a claim introduced in Chapter 1.[258] My examples taken from Caribbean scholarship show how Haiti, Cuba, and Jamaica have been configured as experimental field sites for the development of theories of acculturation, transculturation, and creolization and my argument in this section is that these scholars used their Caribbean field sites for the production of particular ideas about a more general human nature based in regional history, its capacity for change, and the specific social processes and forms that result from this nature over time. These productions were explicitly political, with Caribbean islands situated as experimental arenas for the refutation of

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[252] Braithwaite, Edward K. 1971. *The Development of Creole Society in Jamaica, 1770-1820.* Clarendon Press.
[253] Ibid. P. 8.
[254] P. 109.
[255] Ibid.
[256] Ibid.
[257] P. 114.
[258] See introduction and Stronza, Amanda. 2001. "Anthropology of Tourism: Forging New Ground for Ecotourism and Other Alternatives." *Annual Review of Anthropology*. V. 30. p. 261-283.

prior anthropological claims about racial inferiority and as locations for the development of potential national and ideological futures. To the productions of this "classic" Caribbean scholarship, these colonial and anti-colonial models, we might now add the contemporary designs of the Island School and the formation of Eleuthera as a laboratory situation and educational island that is created through processes of visitation.

I have compiled these three main examples here in order to stress that describing the Island School as a "colonial model" both does and does not explain the powerful designs produced at the educational center. I do not mean to downplay the perpetuation of knowledge and information inequity or the rather narrow-minded assumption that the center ought to be the foundation for Eleuthera's salvation (or that of the country or the world for that matter). Nor do I mean to downplay the statement that the staff member might have been making in speaking to me about their problems with the School and its mandate. These observations lead to important criticisms that the School must entertain if it is ever to seriously come close to fulfilling its mandate, and importantly, they also open the door for an attention to all of this *creativity* in the educational islands, a creativity which has always pervaded the living laboratory of The Bahamas, a creativity that grows out of the constant play of arrival, departure, experience, and visitation. Now, with the Island School example, we see that Eleuthera is not an educational island for everyone in the same way. Arguably, Bahamian public school students are not visitors to an island experience, they are not formulated as environmental subjects in the same way as Island School students (discussed below), and they are not part of the entrepreneurial schemes of the center. Therefore, I have come to think that visitation, also colonial theme, is an *essential* aspect of what makes Island School science work and its propositions possible.

Eleuthera: "an island to reinvent the world"

Eleuthera's "islandness" is a large part of what makes it such an exemplary place as a site of visitable field research and experimentation. And it is the significance of this "islandness" that is a large part of the situated particularity that the Island School and Cape Systems hope to capitalize on in their various ways. The island is a curious sort of unit, one which connotes a strange interplay of separation and interrelation. The scientific productions of the Island School, as an educational center, explicate the vulnerability of island systems, the geographically determined locality of island organisms and communities, and the accessibility of the field for those who have the right kind of knowledge. The island is where one arrives as a visitor to learn how to manage and imagine larger global systems, where the tourist becomes transformed into a global student as a result of this visitation. The productions of Cape Systems, as a model for enterprise, attempt to demonstrate that the challenges of the island are the challenges of the world, that the planet is itself an island, and that the appropriately redesigned island, informed by science, can become our common future. The island, much like the carbon neutral destination of the previous chapter, is the visitable site of ecological, social, and economic salvation.

Through the contemporary productions of the Island School, Eleuthera becomes a living laboratory for the design and development of scientific and touristic enterprise. As a contemporary revisitation of the Eleutheran Adventurers, the scientists, students, and teachers act as though they were "early explorers" who will open up the "empty" Bahamian frontier to new

forms of scientific visitation and responsible intervention.[259] What is designed and produced here by these branches of the Cape Eleuthera Foundation is both a business model, promoting the "triple bottom line" of economic, environmental, and social development, and a concomitant scientific understanding of the behavior of living systems and respectful regimes for living.

Recent scholarship around national forms of biotechnology and the production of genetic medicines becomes implicitly relevant here, though my own interest is in other forms or formations of "life."[260] The changing epistemic language of the life sciences are central to an understanding of current articulations of nature and value. Though authors like Sunder-Rajan would refer to these changes as the reordering of life under the sign of biocapital, I would extend this attention, speaking of centers like the Island School, to the related reordering of life under the sign of sustainable futures. The central theme that this attention calls into focus is that the facts and truths produced by science about nature, articulated here as the facts of island life, are now conjoined with the speculative tendencies of contemporary economic markets. Sunder-Rajan helpfully writes, "forms of corporate PR are now tied to the production of scientific fact which is supremely authoritative and is moreover in this case fact about 'life itself.' Therefore, simultaneous to exploring the rhetorical and discursive apparatus of corporations is the need to explore the sorts of scientific facts genomics provides," and, I would add, the sort of facts contemporary conservation or sustainability science provides.[261] These facts point to a new "ensemble of techniques, practices, and institutional structures."[262] Within this articulation of life and value under biocapital, life becomes a "business plan," existing in a form as something which can be invested in. Nature, in this sense, is scientifically produced as life-as-form-of-fact and articulated with processes of valuation in what Sunder Rajan calls the recent domain of "venture science." Specific and scientific knowledge produced about nature determines, in large part, the form in which nature's articulation with value can take, enabling the ways in which it can be variously internalized in market calculations.

I see these moves at work in the living laboratory of The Bahamas today, and the *Freedom 2030* proposal devised by Cape Systems is but one exemplification of life scientifically produced as a business plan. Under the sign of sustainability, with its explicit future orientation, Eleuthera is produced as an island form of fact, and its living ecological and social systems are articulated in ways that allow them to be invested in. *Freedom 2030* is not just a proposal for a more efficient way to power the island- it is explicitly a business model, proposed to entice investment from the Bahamian government and private enterprise in island appropriate alternative technologies mediated by Cape Systems. And as I have mentioned here above, the science tourism of the Island School itself could be considered another model for enterprise, though this time it is the parents of prospective students and potential donors who are being sold a visitable form of nature as island life.

In this chapter, I have argued that we must take the entanglements and imbrications of science seriously and think about their current productions and products. Authors like Raffles note that ecology, "has long been a worldly science," and scientists have long been involved in solving practical problems in multiple and diverse fields.[263] This practicality has lead to the

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[259] This is an allusion to Laarman's work on tourism, mentioned above.

[260] Sunder Rajan, Kaushik. 2006. *Biocapital: The Constitution of Postgenomic Life*. Duke University Press.

[261] Ibid. P.135

[262] Ibid.

[263] Raffles, Hugh. 2002. *In Amazonia: A Natural History*. Princeton University Press. P. 158.

technical recognition, in fields like conservation science, of the fact that extractive and exploitative interests, including tourism, have the most at stake in protecting certain ecological resources. This in turn has lead to conjunctures and strategic alliances between ecologists and business, of which *Freedom 2030* is but one recent example. For Raffles, ecological appeals to economic rationality depend on the shared view of evenly unfolding time and a desire for sustainability limited by notions of perpetual crisis, primitive accumulation, and particular cultural and economic logics in partnerships with business. As an example he states that people must desire "forest based futures" in order to partner with ecological desires for forest conservation. Such ecological "pragmatism," Raffles notes, comes from "the politics of negotiating multiple publics," and such negotiations imbue forms of nature with "transformative translocality."[264] Forms of nature possess a translocality which "creates anew those with whom it comes into contact" by interpolating them into a set of translocal conversations or debates.[265] These conversations are driven by "crisis ridden rhetorics of biodiversity and habitat conservation, the combative confidence of the neoliberal assertion of entrepreneurial rights, and the authoritative expansion of natural scientific expertise into the realm of social policy."[266] To go back to the forest example, this replaces the fetishization of wood as a commodity with the scientific fetishization of "tree-ness." Management projects, within this enframing, "aim to produce a cosmopolitan tree with a localized meaning and specificity, a richly situated yet mobile identity."[267] Management projects are therefore an "affective work of creation," built on human and nonhuman collaborations, alliances based on historical contingency.[268] This discussion of "tree-ness" as scientific fetish is part of what is at work in the production of Eleuthera's "islandness." *Freedom 2030* and the investment in island environmental education provided by the Island School are a form of this pragmatism configured as a business plan and entrepreneurial model for student tourist visitation and sustainable development, and Eleuthera, as an educational island, performs this translocality of which Raffles speaks. Eleuthera is the island of the brochure, the grounding of the traveling power point presentation.

Recent work on the concept of nature is also relevant to mention here. For example, when nature is articulated as biodiversity it becomes framed as the bank of genetic information and repository of value. This is a formation of nature that Hayden argues is most suited for market-based mediation, for internalization by the market.[269] The scientific circles that produce ideas of nature as biodiversity in some parts of the world, the domain of conservation biology, simultaneously produce the ground on which it is possible to think of "saving" nature with economics, of saving biodiversity through prospecting or preservation programs that depend on the existence of sustained biodiverse nature as an arena of exploitation. Nature, in this guise, can be internalized by economics and can become part of management plans, much as life becomes a business plan for Sunder-Rajan. These plans, ostensibly designed to secure the production of

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[264] Ibid. P. 159.

[265] Ibid.

[266] Ibid, P. 160, following Hawkins (Hawkins, Ann. 1993. "Contested Ground: International Environmentalisms and Global Climate Change." *The State and Social Power In Global Environmental Politics*. Columbia University Press)

[267] Ibid.

[268] Ibid.

[269] Hayden, Cori. 2003. *When Nature Goes Public: The Making and Unmaking of Bioprospecting in Mexico*. Princeton University Press.

value through specific forms of resource extraction as intellectual property, are highly inclusive and productive in other ways. The mandated participation of local people within these management schemes, a common mode of economic development, internalizes them into the domain of nature and the production of value. The educational islands, involving the enterprising of island ecology and the internalization of traveling students and local communities, is thus a framework creating both objects and subjects, nature and human nature within domains of biological knowledge production, mediated by market logics of travel and sustainability that articulate nature and values in strategic ways.

The people used as "living history" lessons by the Island School, and the Eleutheran settlements and their energy consumption practices dissected by Cape Systems have been internalized into the business plan of the educational islands. I have discussed the internalization of "local" people in scientific productions in Chapter 2, but I would now like to turn towards the configuration of natures and subjects Hayden mentions and Raffles' alludes to in considering affect. This attention to the *affectivity* of management and design is slightly different than Agrawal's attention to subjectivation I describe below. It could be considered a slightly more subtle argument concerning the possibilities provoked by science-based projects.

In considering the Island School and its productions beyond the business plan into the related realm of affect, I have begun to wonder what can be learned from an anthropology of education? If part of the School's mandate is to produce "future leaders" and responsible consumers or investors who understand the environment and can make "good" policy decisions, then how do we think about who these future designers might be? Agrawal can help us to think about the production of what he calls the "environmental subject."[270] The goal is to show that, when considered together, "changes in knowledges, politics, institutional arrangements, and human subjectivities concerning the environment," elucidate a new approach to "the study of environmental relationships," an approach which he terms "environmentality."[271] Just as "political ecology" is a play on the field of political economy, which it hopes to extend to encompass other concerns and political regimes, "environmentality" is a play on the Foucauldian notion of governmentality, a concept Agrawal hopes to extend to the examination of what he dubs "environmental subjects."[272] The environment, in this frame, becomes a particularly politicized form of nature, a form which results from the careful calculations of both the state and the local community, "regulatory communities," which were in turn shaped by the state within "governmentalized localities."[273] In other words, "the government of nature lead to the birth of the environment."[274]

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[270] Agrawal, Arun. 2005. *Environmentality: Technologies of Government and the Making of Subjects*. Duke University Press.

[271] Ibid. P. xii. In joining the consideration of the produced environment with the analytic of governmentality, Agrawal purposefully differentiates himself from Luke (Luke, Timothy. 1995. "On Environmentality, Geo-power, and Eco-knowledge in the Discourse of Contemporary Environmentalism." *Cultural Critique*. 31: 57-81) who uses the term "environmentality" to describe negative forms of domination, control, and supervision by transnational environmental organizations. Instead of replicating this argument, an argument he ascribes to Ferguson (Ferguson, James. 1990. *The Anti-Politics Machine: "Development," Depoliticization, and Bureaucratic Power in Lesotho*. Cambridge University Press) and his subject of underdevelopment, Agrawal stresses the "positive aspects of power involved in government and the production of new subjects" (Agrawal, p. 237 n. 49).

[272] Foucault, Michel. (1978) 1991. "Governmentality." *The Foucault Effect: Studies in Governmentality*. Burchell, Gordon, and Miller. Eds. University of Chicago Press. P. 87-104.

[273] Agrawal, P. 66.

[274] Ibid. P. 201.

The environmental subject, the result of particular articulations of nature, productions of, knowledge, and ascriptions of value, is a contingent sort of actor/agent, not an a-historical form. For Agrawal, there are three of what he calls positive "modes of subject formation."[275] These interdependent modes are 1) subject formation through practices of scientific inquiry that target specific types of subjects, 2) through disciplinary practices such as the differentiation of the sick from the healthy, and 3) through practices of self-formation through thought. The understanding of subjectivity is the most important aspect of the analytic of environmentality, an analytic which, when combined with the shifting production of knowledge, politics, and institutions around environmental governance and management, becomes one specific "optic" for analyzing environmental politics.

The great benefit of this Foucauldian approach, one that relates to my above argument about the generativity of past and present regional models and to Scott's notion of the conscript which I lay out in Chapter 1, is that it allows the analyst to consider individuality as the *complicit effect* of power, rather than as the thing power constrains. The institutionalization of strategies of power and regulation, the combination of knowledges and practices that form transnational and global/local environmental assemblages, result in changing conceptions of the self and conduct. Such an analytic focus allows for the unification of the political economic analysis of institutional change with the analysis of transforming subjectivities.[276] Using this rubric, the development of Island School student's environmental subjectivity takes shape. The School, as an educational institution and research center, *does* set out to influence subjectivity, though they would not use this language, and in my time there I came to think of it as a sort of boot camp for the inculcation of science-based ideas about life and how to live it through the generation of visiting subjects figured as future leaders, investors, and consumers. This subjectivity is oriented around a sense of global citizenship with designs for managing biological and cultural complexity. Just as island residents are figured as local, just as they are localized through the models produced at the center and through the politics of visitation, so are the visiting students and staff globalized as environmental subjects. As a way of concluding this chapter, I would like to highlight again that one aspect of the educational islands is that there is a travel market for the production of such subjectivities and that both science and subjectivity are produced here through travel. Through the operations and arrivals of the School and the Foundation, Eleuthera has become a testing ground, (colonial) model, and educational arena for the development of future environmental leaders and the invention of sustainable solutions.

[275] Ibid. P. 221.
[276] Ibid. P. 220.

Chapter 5. Down the Blue Hole: Science history and the development of cultural heritage tourism in The Bahamas



Sawmill Sink blue hole, Abaco, photo by author, 2008.

Going to extremes and back again

This chapter continues the conversation on contemporary relationships involving the field sciences and the tourism industry in the living laboratory. The prior chapters included examples of projects or institutions which explicitly or implicitly developed this union, creating new ways in which to envision, visit, and approach these islands while remediating existing regional imaginaries in the process. This chapter on blue holes provides another valence on the subject of science and tourism, and it is envisioned as an exploration of the ways in which the biological and social field sciences can contribute to the Caribbean project of nation building and identification through the development of a *science-based* historical narrative. It is also an example of the ways in which this endeavor might become part of the process of developing alternative sites of expansion for tourism- literally designing new places and practices of visitation which unite the industry's attention to culture and ecology as new arenas to explore.

The examples in this chapter come from my experiences as a visitor in Abaco and Andros, two large islands in the Northern Bahamas. In Abaco, I became a participant observer in a performance of "science history" involving blue holes, and my labor was a necessary part of

the show. In Andros, several months later, I was directly involved in and responsible for collaborations concerning the very nature of anthropological participation, as a social field science, in such laboratory endeavors. This chapter is also intended to highlight, along with Chapter 2, the uncertain role of the arriving social scientist, student or otherwise, in contemporary designs in the living laboratory. But before I go on, I must first describe the phenomenon that is a Bahamian blue hole.

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I have known of the existence of blue holes as a geological phenomenon since my first visit to The Bahamas in 2002. One day a Bahamian fisherman friend of mine took me by boat out into the wetlands surrounding Cherokee Sound, Abaco, and pointed out large dark holes in the sea floor as we cruised slowly down the mangrove channels. These holes frightened me a little because I was told that they boil and breathe, connected to the tidal action of the surrounding sea, and that they can suck swimmers in and drown them. Later on that same trip, my supervisor, the American anthropologist mentioned below, took me out to act as lookout while he dove with SCUBA gear into a lonely blue hole in the middle of the mangroves. "If I don't come back in forty-five minutes" he said, "drive this boat back to town for help." He seemed unconcerned that I did not know how to operate the outboard motor. In 2005 in Rock Sound, Eleuthera, I was shown another blue hole, this one in the middle of town, resembling a lake with vertical rocky banks. The settlement had built stone steps down one side in order to allow for safe swimming. This lake was said to be bottomless, and it was full of ocean fish, even grouper, so people knew it was somehow connected to the sea. Later, I was told that this blue hole was not bottomless, and that old cars and refrigerators had been salvaged from its depths in periodic clean-up efforts.

In February of 2010, the US Public Broadcasting Station (PBS) aired a prime time NOVA program entitled, *Extreme Cave Diving*, introducing American viewers to Bahamian blue holes and the scientific fieldwork and exploration done within them. The show defined blue holes as "underwater caves that formed during the last ice age, when sea level was nearly 400 feet below what it is today," and the caves were described as "little-known treasures of the Bahamas," and as "one of Earth's least explored and perhaps most dangerous frontiers."[277] An interdisciplinary team of researchers, including an anthropologist, photographer, microbiologist, paleoecologist, underwater cave explorer, and a Bahamian archeologist, touted here as the first Bahamian to dive into one of the most unexplored blue holes, were described as "astronauts" of "inner-space," delving into a Bahamian attraction well outside the familiar realm of sun, sand, and sea.[278] Blue holes were figured as vitally important because they acted as "time capsules": the deepest layers of the caves are anoxic (without oxygen) and this feature preserves the remains of whatever creatures, human and non, that might have fallen into the holes, these "aquatic tar pits," over the centuries.

The Bahamas was once a "thriving Eden" of diverse species and verdant plant growth, though today the islands are arid and sparsely inhabited by terrestrial creatures, and one aspect of this cave exploration is to bring up evidence that can explain this shift in island life from the "lost world" of the past to the present day. Another aspect of the underwater exploration described is the search for fossil remains of new species that have not yet been catalogued by

[277] NOVA. 2010. "TV Program Description: Premiere Broadcast on PBS: Tuesday, February 9, 2010." http://www.pbs.org/wgbh/nova/cavedive/about.html

[278] Disclosure: This anthropologist is also on my dissertation committee and it was he who invited me to participate, knowing that I was interested in the subject.

science. To date, the remains of an ancient tortoise, crocodile, lizard, owl, boa, and flightless bird species have already been discovered. 33 are said to be species that were not known to have inhabited these islands, and 3 are said to be new to science. The dive team has also discovered human remains in the holes, possibly of Lucayan origin, dated to be 800 years old, and there is speculation that the die off of species was related to the presence of humans in the islands.[279] The island chain lies near the Gulf Stream in the Atlantic Ocean, a movement of oceanic water that has important implications for the planet's climate cycling, and stalagmites in the blue holes, long spears of sedimented limestone that hang down into these underwater cavities, hold a microscopic record of the ancient climate and the activities of the Atlantic Gyre. These spears can be read much like glacial ice cores in other parts of the world in order to mine for climate history and determine how fast the ancient climate changed. All of these aspects of the holes were framed in the show as "the secrets of the planet's history."

Blue hole exploration is more dangerous than any other kind of marine archeology because of the lack of vision due to darkness and silt, the depths which can cause nitrogen build up in the body, the narrowness of the cave passages, the unknown length and end point of many of the caves, and the prevalence of cave-ins. In the NOVA special, the underwater photographer even found the remains of an unnamed and long dead cave diver in one of the holes they shot. In the face of this danger, cave divers are characterized as intrepid and brave explorer experts, risking their lives in the name of science, and in this example they were filmed in their dive gear, covered head to toe in wet suits, tubes, re-breathers, weight belts, fins, and masks.

I have offered this description of blue holes and the NOVA special in order to provide a frame for the events of the remainder of this chapter. The above description is one which suits the exploration and discovery theme of many PBS science specials, and one which dovetails with the famous colonial figure of the adventurer scientist. I would now like to complexify this description by relating it to my own experience with blue hole research in The Bahamas, introduced above.

In the remainder of this chapter I hope to show that what is designed here, in these instantiations of the living laboratory, on television and in and around the blue holes of Abaco and Andros, is a frame for scientific action, broadly understood, in which the mysterious- the deep, the dark, the forgotten, the unknown- is brought into the harsh light of the sun and the field lab, and eventually onto the itinerary of the island tour, should events occur as some participants hope they might. Away from the TV screen, in The Bahamas itself, these mysteries, these blue holes, are in the process of being made familiar, preservable, and variously but specifically vulnerable, valuable and visitable in order to stand as a symbol of vital planetary secrets, but also as sites of specific historical and ecological forms of national heritage with possible applications for "cultural heritage tourism."

Cultural heritage tourism is a new regional buzzword marking an attention to the diversification of the tourism product into the market for Diaspora tours (for those identifying as of African decent and other groups) and Caribbean history. This is an idea that is seen as another arena in which to benefit the "tourism product" of The Bahamas because of the potential to attract a whole new range of visitor, but it must first be developed and produced in an accessible and understandable way, and the knowledge produced and islands designed by a collaborative science focused on features like blue holes may have an integral role in this development, in part because marketing Bahamian environmental features through the creation of science-based

[279] All this information has been taken directly from what was reported on the television show.

protected areas and attractions falls within the designation of cultural heritage tourism/niche tourism with help from institutions like the Antiquities Monuments and Museums Corporation (AMMC), introduced below.

Abaco: a performance of natural and national history

The Northern Bahama Islands are sticky and warm in December. The afternoon sun feels intense, the winds have disappeared, and the long thin shadows cast by the spindly pines provide insufficient shade for sweaty, tired bodies. In Abaco, an island a few hundred miles North of New Providence, the island seat of the Bahamian capital city, the pines grow together in curious forests, sticking straight as a ship's mast out of the short patches of dry underbrush, golden grasses, and rocky ground. In some places, the trees seem evenly placed, as though planted so as not to touch or overshadow any of the others, and there is the illusion that one can see through the forest for miles. If there were only a breeze it would flow freely through the open air between the trunks.

In December of 2008, I went to the pine forests of central Abaco to participate in the film project that would eventually become the NOVA special, and while I went in the capacity of a student anthropologist investigating the film production, I found I had become a volunteer sound technician, filling an empty role. At the time, I only knew that the project was centered around recent discoveries made in several of the island's blue holes- what I understood to be amazing water filled sink holes whose depth, inaccessibility, and biological characteristics make them perfect repositories for all manner of interesting objects. I was just one of a number of participants in what was a consciously interdisciplinary endeavor. There were a number of American scientists in attendance who did not make it into the television special, including a marine cave zoologist and a cave microbiologist; there was the American film crew, which consisted of the director, a young camera man, and suddenly myself; and there were the hosts and coordinators of the project: a Bahamian paleontologist from Friends of the Environment, an environmental non-governmental organization based in Abaco, and the aforementioned American anthropologist from the University of Miami who helped organize and mobilize the whole operation. Finally, there was a Bahamian marine biology student in attendance, on island from the University of Miami for this project.

My time with the film production was exhausting, yet pleasant. I list the players here and in the next section in an impersonal manner in order to protect their identity, but I do not wish to render them as automatons, identifiable only through their disciplines or through the loaded and obfuscating designation of scientist. Each person was involved because they had experience in the region or because they were interested in interdisciplinary work on caves, and there were efforts made to make sure the visitors had a suitably enjoyable time while on the island. The shoot was permeated with a sense of adventure and of exploration, a sense which had to do with the shared nature of the experience as much as with the nature being investigated. We all had some fun being filmed, we were housed and fed, we all got along reasonably well, and the work was interesting and challenging as cave diving and even filming tends to be. We all seemed genuinely interested in one another and in the promise of collaboration- developing a more holistic design for producing knowledge about blue holes.

Blue holes have particular speleological characteristics, and they are of particular interest to those interested in caves as "natural laboratories."[280] Once interesting because some posses a controlled physical environment like that of a lab, blue holes are now interesting because of their unique social as well as physical "placeness," and they point to the existence of the field as important site of knowledge production.[281] Blue holes are either submerged holes in the ocean, resembling deep blue orifices in the sea floor, or terrestrial holes filled with water, resembling a dark inland lake or pond.[282] The work I participated in mostly involved terrestrial blue holes, but another blue hole scientist who is not affiliated with the team I worked with has written that all blue holes in The Bahamas, terrestrial or marine, were generally formed by the same "cave formation recipe."[283]

I have come to find that blue holes provide much opportunity for speculation- speculation about the potential bio-prospecting of natural marine products from cave adapted animals, about the secrets of climate change hidden in their preserved carbon, about the life cycles and habits of ancient or extinct plant and animal life, about the chemical conditions of the early Planet Earth, about the past practices and migrations of people through the islands and their ability to change ecosystems. Standing on the edge of a deep and lonely terrestrial blue hole in the pine forests of Abaco, accompanied by a team of experts preparing to probe the depths with their bodies and with an array of other instruments, one could not help but feel that there was something special at work.

Blue holes are now in vogue in The Bahamas and in Abaco, amongst visitor scientists but also increasingly amongst domestic scientists, in part because over a year prior to the convening of this film collaboration, another collaboration of sorts had taken place in Abaco at a blue hole called Sawmill Sink, an event which had proven to be a quiet revelation to the scientific community of The Bahamas and to regional scientists generally. Exploratory cave dives in Sawmill Sink revealed a trove of archeological and paleontological remains, including the fossilized bones of ancient birds, bats, turtles, crocodiles, rodents, humans, as well as plant fossils (all mentioned above), all remarkably preserved in the anoxic salt water layer within the sink hole, a layer free from destructive bacteria and air. The scientists involved in the exploration of this blue hole have begun to tell a particular story about the pre-Colombian Bahamas and the Caribbean, claiming that Sawmill Sink is the first area in the West Indies where such a collection of fossils has been found and in such good condition. From this fossil record, various scientists have been able to determine that a species of terrestrial crocodile and a giant tortoise once lived in The Bahama Islands, going extinct, they suppose, after the arrival of predatory human populations. They have also been able to determine that the climate and island habitat has changed drastically, once allowing for open grasslands where now there are the dream-like pine forests. An American herpetologist involved in the Sawmill Sink excavations

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[280] This exact phrase is used in, Moore, George W. 1964. *Speleology: The Study of Caves*. D.C. Heath and Company. P. 3.

[281] See Ch. 1 and Kohler, Robert E. 2002. *Landscapes and Labscapes: Exploring the Lab-Field Border in Biology*. University of Chicago Press.

[282] For a discussion of the inadequacy of the name, "blue hole," as a scientific descriptor, see Schwabe, Stephanie et al. 2006. "Blue Holes: An Inappropriate Moniker for Scientific Discussion of Water-Filled Caves in The Bahamas." *12th Symposium on the Geology of The Bahamas and other Carbonate Regions*.

[283] Schwabe, Stephanie et al. 2007. "Making Caves in The Bahamas: Different Recipes, Same Ingredients." *13th Symposium on the Geology of The Bahamas and other Carbon Regions*. See also Poucher, Sandra and Rick Copeland. 2006. *Speleological and Karst Gloassary of Florida and the Caribbean*. University Press of Florida.

situated the relevance of the discoveries for science by saying, "The fossils from Sawmill Sink open up unparalleled opportunities for doing much more sophisticated work than ever before in reconstructing the ancient plant and animal communities of the Bahamas. It helps us to understand not only how individual species evolve on islands, but how these communities changed with the arrival of people because we know that changes in the ecosystem are much more dramatic on islands than they are on continents."[284]

The film project was proposed after these discoveries were made in Sawmill Sink, and while I struggled to operate the sound equipment, including the comical and unwieldy boom microphone, I began to realize that what we were all participating in was a scientific demonstration. Out in the pine forest, at the edges of a deep, water filled hole patrolled by dragonflies and swallows, the well-outfitted divers, the scientists and their copious equipment, the piles of wires and the plastic tubs of tools, were all performing for a film about the complex science of blue holes and the excitement of discovery. But the performance was more than just motions in front of the camera and the bringing up of muck- we were all, cameras and student anthropologists included, putting on a particular kind of show that was not as much scripted as it was designed.

This notion was further spelled out for me when the Director of the Bahamian Antiquities, Monuments, and Museums Corporation (AMMC), arrived in Abaco to visit our film site and make a statement on camera with a blue hole in the background, a statement that never made it into the final version of the TV show. Established by government in 1998, the AMMC is a quasi-governmental organization whose mandate is to preserve the material and cultural heritage of The Bahamas in order to maintain and develop a sense of national history and to make this heritage "have a direct impact on the economy of The Bahamas" by opening it to tourism.[285] Some things construed as environmental and natural get caught up in this mandate in interesting ways because the AMMC is a body which has co-jurisdiction over certain protected areas that contain archeological, cultural, paleontological, or biological artifacts. On camera, in a brief and staged conversation with a member of the project team, the Director stated that blue holes represent the "science history" of The Bahamas and the world, and that blue hole scientific research develops this history. He further noted that interdisciplinary international research teams can participate in capacity building, networking, and setting an example within the country, and that work such as this can help show that it is "imperative to define government ownership of these important blue holes so as to avoid disputes and guarantee preservation." Then, to help cement this collaborative and productive relationship between the scientists and the AMMC, a new species of cave shrimp found in this particular hole by the team zoologist was presented to the Director, to be named after him.[286]

Straining to capture all that was said with the heavy boom microphone, I witnessed this unabashed political move to tie the AMMC to future Blue Hole research, to inspire formal conservation of Bahamian blue holes, to demonstrate collaboration with Bahamian authorities, and to thank the Director for participating in the film project. In this performance, both blue holes and the briefly noted cave shrimp were tied to the construction of a Bahamian ecological

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[284] University of Florida. "Fossils Excavated From Bahamian Blue Hole May Give Clues Of Early Life." *ScienceDaily* 4 December 2007. 22 June 2009 http://www.sciencedaily.com-/releases/2007/12/071203173039.htm

[285] "Antiquities board gets new mandate," Bahamas Information Services, 1 September 2006. http://www.bahamas.gov.bs/bahamasweb2/home.nsf/vContentW/9B43DE2FC68D86D8852571DC00728D60!OpenDocument&Highlight=0,AMMC

[286] *Speleonaushonia tinkeri*- do NOT publish without permission or prior scientific publication of this name.

and cultural history wherein the understanding of how The Bahamas may come to represent and know itself as a nation, on the scale of evolutionary and geological time, is mediated by field science and the various disciplines which design the field in question. In other words, we were performing the production of a scientific natural, regional, and planetary history designed for use in a particularly Bahamian national history. However, the significance of this history and its implications for *heritage* tourism were not clear to me until I did some further work with blue holes the following year. This work was deeply contrastive with my participation in Abaco, in that required that I take a major role as a social scientist and participate in the development of a cultural history.

Andros: an enactment of anthropological collaboration

In June of 2009, I paused in my dissertation writing to return to The Bahamas to help co-lead a group of Bahamian students on an ethnographic exploration of social life and blue holes in Andros, another island in the Northern Bahamas. Andros, the largest island in the Bahamian archipelago and the island with the largest stores of fresh water, is blue hole country.[287] With well over 100 documented terrestrial blue holes, Andros may have more blue holes than any other location in the world.[288] The same loose collaboration which gave rise to the NOVA blue hole film project in Abaco (made up in part by the University of Miami, the AMMC, and now including The College of The Bahamas) sponsored my participation in Andros, and this additional work was intended to begin to fill the gaps in the interdisciplinary data that had been done in the holes thus far. There was a marked absence of social field science about blue holes to accompany the biogeochemical investigations, and the project creators felt that the interdisciplinary rationale behind the project necessitated some sort of social inquiry. I was therefore asked to go to Andros, along with another American graduate student of anthropology working in the country, to pilot some ethnographic methods for the study of blue holes, and to make this project available as an educational opportunity for Bahamian college students.

Andros in June is decidedly not like Abaco in December. June is the rainy season, and that June was especially rainy, characterized by thunderstorms and great gray masses of cloud. The pine forests of Andros were filled with lush, damp underbrush, land crabs scuttled in dead needles and rocky holes, and buzzards circled continually or perched on the edge of vision, ruffling wet feathers.[289] There was no filming on this trip, no film crew, no natural scientists, and our focus was resolutely on the four students, their development as researchers, and their ability to collect viable social data. We asked them to take an open-ended set of questions into interviews with residents of settlements in Central and Northern Andros. The interview questions asked about names, memories, and stories of blue holes, ideas about their creation and current relevance, and the past and present uses of blue holes for people who grew up in their vicinity, sometimes for generations.[290] We asked that the students select people to interview

[287] It has been pointed out to me by Dr. Kenneth Broad that the fresh water aspects of blue holes have been drastically underplayed in my own work and in the work of those people I describe in this chapter.
[288] This has not been officially demonstrated, but is often speculated in blue hole circles.
[289] All of the larger islands of the Northern Bahamas have stands of Caribbean Pine forest, though not all of these forests are as large as those in Andros and Abaco.
[290] I assisted in creating the list of questions for the project and in designing the project generally.

based on quota sampling methods, but that they privilege elderly people, or people who had lived on the island for many years. The students heard some remarkable stories.

While any collated data or specific narratives from the interviews belongs to the students who collected them or to the AMMC, as per our informal project agreement, I can briefly describe some of the parameters of the student's results. We heard many stories delineating the fear of blue holes for people who live around them. In a region where a number of people who live by the sea do not know how to swim, many people in that part of Andros have lost relatives and friends to the holes, their bodies lost in pits that some describe as "bottomless." The holes are also filled with mermaids- harsh creatures who can drag a person down and hold them in the depths for years or drown them to exact revenge for the murder of fish.[291] But we also heard stories from people who used the holes as sites for swimming and diving, for washing clothes in their youth, and for catching land crabs, a regional delicacy and Androsian staple. We learned that taxi drivers already take visitors to the holes to swim, and that they have been increasing in popularity for the last few years as visitors become more adventurous and as dive operations make them more accessible. All these things and much more we documented with audio recorders, interview spreadsheets, and student notes.

We were, in effect though not explicitly, creating the beginnings of a social history of a geographical feature, we were demonstrating the sociality of a "natural" form by documenting its interrelations with island people, looking for changes over time and between generations. As anthropologists, the other graduate student and I were lending our particular form of expertise to this endeavor of producing a science-based understanding of the global and national importance and valuation of these mysterious holes. As part of the interdisciplinary project, we designed a template, not only for producing a social history of an aspect of Androsian life, but for assessing this aspect in the rest of the country as well. Our questions are transferable, purposefully so, and if funding is found or made available, as some hope it will be, more students will interview more people on more islands in the country about the presence of blue holes in their lives in order to create a national record and environmental history.

This aspect of the project was conducted for the AMMC, and I argue that this social work done in Andros aligns with the AMMC's mandate to make its designated resources and monuments "impact" the Bahamian economy in ways that the NOVA special cannot. By developing the cultural history of blue holes in Andros, we were developing a social narrative that, when interwoven with the natural science research done by the team, would animate this "science history" of blue holes and make them a specifically Bahamian feature for the local "tourist product." In the next section I will introduce Caribbean questions of identity and nationalism in order to compare and contrast these with the current blue hole productions of The Bahamas.

Caribbean Questions: national identity, history, and interdisciplinary field science

The question of national history and identity has been a central concern in Caribbean Studies in the late 20th Century, with much of the focus on the development of national historical narratives.

[291] We were also told about a half shark half octopus like creature called the Lusca who is said to make the holes bubble and "breathe" and to devour swimmers and divers, but it is interesting to note that the only people who mentioned this were foreigners who worked in dive shops catering to tourists and research visitors, though they described them as though they were widespread local legend.

I would like to consider this major theme of Caribbean Studies in relation to the natural science-based historical narratives "discovered" inside the Bahamian blue holes, this "science history" the Director mentioned in Abaco so briefly and which I was enlisted to expand upon in Andros. This requires a few examples from Caribbeanist scholarship.

In discussing Trinidad, another island nation formerly colonized by the British, Maximilian Forte notes that engendering patriotism as a national form of self-consciousness requires imagining the nation as having ancient roots.[292] The discoveries in the blue holes of The Bahamas are also about imagining ancient roots, but this is not quite what Forte describes in Trinidad, where the promotion of the indigenous Carib identity, with its concomitant narration of a primordial history from a pre-Colombian past to the postcolonial present, is a project of the re-appropriation of a silenced history, the revival of an "extinct" representation of identity, and the promotion of a political nationalism.[293] The problem of the rise of a "reengineered" indigeneity in the Caribbean hinges on a form of invention that occurs as a direct result of the creolized "postcolonial erasure of primordiality" in the region.[294] In other words, the popular promotion of a creolized Caribbean (creole here is understood along the lines of Braithwaite's notion of continual socialization through encounter, signified by the polarity of Africanness vs. Europeanness), implicitly denies the existence of any one pure and linear Caribbean heritage, and the figure of the Amerindian has become a symbolic force in Trinidad that challenges or supercedes this view as an alternative claim to creole territorial legitimacy.[295]

What may not be obviously similar between Forte's Trinidadian Caribs and the work done in Bahamian blue holes, but what is vitally important to note here, is that both milieu deal in creating national narratives based in ideas of biological (foundational/authentic) nature. What seems importantly different is that the "political economy of tradition" Forte describes is based in the symbolism of human blood and descent, while the "science history" alluded to by the Director of the AMMC is rooted in the complex interpreted interrelations between ancient and contemporary humans, non-human organisms, and their biogeochemical surroundings. But perhaps these realms are not so different. In The Bahamas, in these blue holes, the possible ancient Lucayan remains are not directly linked to any existing populations of people within the islands, and interestingly, instead of inspiring an indigenous movement within a milieu of national identity politics, these remains have already been used to create a narrative about anthropogenically driven island extinction, another sort of historical narrative involving foundational relations that fits with the politics of preservation in the country.

Continuing the analysis of Caribbean national identity and historical narrative, Virginia Young provides us with an ethnographic analysis of the island nation of St. Vincent, and what she identifies as the unusual phenomenon of a homogenous national identity.[296] Caribbean

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[292] Forte, Maximilian. 2005. *Ruins of Absence, Presence of Caribs: (Post) Colonial Representations of Aboriginality in Trinidad*. University of Florida Press.

[293] The promotion of an indigenous Carib identity in Trinidad is unusual, considering most anthropological and historical literature on the region, including work in Trinidad, has espoused the fact that the original Amerindian inhabitants of the region were all removed or killed soon after European "discovery." This notion is one of several which supposedly upholds the uniqueness of the Caribbean region in the world, a region with no aboriginal populations, a region whose history is one of migration and foreign encounter with equally foreign others.

[294] P. 25.

[295] Braithwaite, Edward K. 1971. *The Development of Creole Society in Jamaica, 1770-1820*. Clarendon Press.

[296] Young, Virginia Heyer. 1993. *Becoming West Indian: Culture, Self, and Nation in St. Vincent*. Smithsonian Institution Press.

ethnology does not generally focus on the "culture of whole nations," but she has found that this approach proves meaningful in St. Vincent, where there are regularities in social forms and values to be discovered both in the structures of village life and at the level of the nation.[297] Referencing the sociological debates of the 1960's and 70's over the applicability of notions of creole society vs. notions of plural society, Young notes that creole models of a unified social continuum have largely won out in the study of the region, and that they can be productively applied at the national level through the investigation of the "ideological systems and culture" of individuals living in a majority Afro-Caribbean middle-class nation with a shared history of slavery and black/white encounter.[298] National identity in St. Vincent comes from this particular history of shared creole culture and historical narratives of Afro-European encounter, which should be separated from the political rhetoric in the Anglophone Caribbean which espouses a "merely" politicized West Indian identity.[299] Yet it has been postcolonial political independence which, "has nurtured the self consciousness of unity and group identity" in St. Vincent and the Caribbean region.[300] One could argue that in Young's depiction of St. Vincent, the question of conflictual or negotiated identity politics is a non-issue as some have argued for The Bahamas, a nation with a similarly homogenized Afro-European popular historical narrative, though this is not often referred to there as "creole."[301]

Again, the scientific productions around blue holes are relevant here in terms of producing national individual and collective natures, the grounds for identity, but it remains to be seen how the natural history discovered down the holes will play out in the ideas of life and living that pervade an individual sense of self or a sense of collective nationalism identifiable through allusions to ecological heritage. This thought dovetails with Maurer's work on ideas about nature, kinship, and citizenship in the British Virgin Islands (BVI). If, in Caribbean countries like St. Vincent and The Bahamas, national identity is largely homogenous and based on a shared sense of history in which there are no "indigenous" rights or ties to the nation, then what other narratives come to ground and naturalize the presence of people within a national boundary? Maurer writes about the way a creolized "network of technologies" has come to take the place of this ground in the BVI, technologies that come stabilize " 'ethnic' stereotypes; 'races' and communities bound to 'places'; 'families' and 'genealogies'; 'land' and 'country'; 'classes' and 'parties'; 'states and 'societies'; 'individuals' who owe nothing to society, and 'nations.'"[302] His attention is to the legal systems which reify certain understandings of blood and kinship as a tie to land and citizenship rights, but it is not a far cry to also recognize that the natural sciences in The Bahamas, including the amalgam that is blue hole research, act as

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[297] P. 1

[298] Braithwaite, Lloyd. 1957. "Sociology and Demographic Research in the Caribbean." *Social and Economic Studies*. 6(4): p. 523-571; Braithwaite, Edward K. 1971. *The Development of Creole Society in Jamaica, 1770-1820*. Clarendon Press; Smith, M. G. 1965. *The Plural Society in the British West Indies*. University of California Press.

[299] P. 7

[300] p. 187

[301] This is in stark contrast to the "multiple metaphorics of mixing," of which Creole is a part, that make up the Caribbean region for authors like Aisha Khan. Khan, Aisha. 2001. "Journey to the Center of the Earth: The Caribbean as Master Symbol." *Cultural Anthropology*. 16(3) pp. 271-302; --- 2004. *Callaloo Nation: Metaphors of Race and Religious Identity Among South Asians in Trinidad*. Duke University Press.

[302] Maurer, Bill. 1997. *Recharting the Caribbean: Land, Law and Citizenship in the British Virgin Islands. University of Michigan Press*. P. 263-264.

technologies providing alternative grounds and narratives for the national identification with place.

In contrast to these discussions of specific national historical narratives, Stuart Hall identifies two modalities of a specifically black Caribbean regional identity: identity as being and oneness and identity as becoming and discontinuity.[303] The first notion of identity is a sort of fiction that "is the truth, the essence, of 'Caribbeanness' ", which underlies the more superficial differences within the region and which gains its social usefulness from its "rediscovery" by various Caribbean leaders.[304] The second notion of identity is the opposite of the first in that it stands as the other side of oneness- it is the recognition of "the ruptures and discontinuities which constitute, precisely, the Caribbean's 'uniqueness'."[305] Identities, for Hall, result from the way in which people are *positioned* by productions of history, and the way in which they position themselves within historical narrative. In other words, they do not spring from any cultural essence.

This chapter has been similarly interested in the technologies that might facilitate such positionings, though my own attentions tend to want to turn this Caribbeanist scholarship towards the socioecological designs produced by life scientists and their narratives about the significance of location and the historical rootedness of geological features, narratives and designs that are becoming increasingly crucial for an understanding of the contemporary region in an era of planetary consciousness. I must note here that, often times, it is assumed that self-described multicultural or multiethnic small nations struggle for a cohesive national identity, but the reasons for why an imagined national unity is necessary are unclear, beyond the fact that some think this lends itself to political stability. Yet if we concede that the political desire for a Caribbean identity or even a specifically Bahamian national identity can become a question in itself- an object of interest, not a taken-for-granted necessity, then we can see that one aspect of the development of blue holes, of a science-based eco-cultural historical feature, might be a response to pressures from the tourist industry to redevelop the "tourism product" and the identities elicited therein. This has implications for understandings of Bahamian life that may globalize conceptions of blue hole nature while simultaneously creating an interpreted sense of local heritage. Questions about whether Bahamians intrinsically *need* a complexified or historically enriched national sense of identity become irrelevant.

Tourist landscapes, historical context, and insider/outsider perspectives

I think it is appropriate here to take a moment to consider a branch of tourism studies which privileges formalized notions of landscape, tourism, and identity as analytic categories. When considering blue holes as a topic for discussion, I realized that there is an entire body of scholarship devoted to the study of tourism and landscape which contributes to my own investigations. I have come to think of the interdisciplinary design of blue holes as potential tourist attractions and sites of knowledge production about natural and cultural life- as an aspect of the living laboratory- in ways that build off of this work on tourism.

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[303] Hall, Stuart. 1994. "Cultural Identity and Diaspora." *Colonial Discourse and Postcolonial Theory*. Williams and Chrisman, Eds. P. 392-403. Columbia University Press.
[304] P. 393.
[305] P. 394

The edited volume, *Landscape, Tourism, and Meaning*, in the series "New Directions in Tourism Analysis," espouses a theorization of tourism in a formalized sense.[306] Tourism, for these authors, is a particular form of social relation that is deeply rooted in the commodification of place. It is the practice of reading and interpreting subjective meaning in the landscape, of "deciphering identity from clues in the landscape of a place," that have been built up in the landscape over time.[307] [308] The geographic context of the region is an aspect of this process of identity formation of place- the "histories, cultures, power relations, aesthetics, and economies all combine at a place to create context."[309] These authors also theorize an insider/outsider dichotomy for reading places with insider (local) perspectives being specific, and outsider (foreign/tourist) perspectives being broader in their contextualizations and ascriptions of meaning. They point to the possibility for conflict and misunderstanding that arises out of this dichotomy. Lastly, they differentiate between historic landscapes- sites for learning about the specific human histories of a place- and pure nature landscapes- sites for the appreciation of a wilderness aesthetic.

The work of the previous chapters in this dissertation makes clear that tourism can be considered a particular form of social relation, and I think that my own attentions, within the frame of the living laboratory and the blue hole example of this chapter, complexify the study of tourism, contributing to the discussion begun in *Landscape, Tourism, and Meaning*, my foil for this section. The practices and ideas of those *designing* tourist markets through international scientific and institutional collaboration, even when many of the participants in these collaborations are not explicitly interested in promoting tourism, and of those *envisioning* target tourist populations such as those imagined through the frame of cultural heritage, conceptually challenge the primacy of "the tourist" as an actor/agent. It is my contention here that tourism, as a dynamic economic industry, actively creates new collaborations and aesthetics, practices and forms as part of the contemporary milieu of The Bahamas, and the involvement of the AMMC and the demonstration of the blue hole film project within the country is an example of this.

The idea that tourism is the reading of cultural meaning in the landscape is also challenged by my concept of islands by design, developed in Chapter 1. To view landscape as exemplifying the dominance of certain practices of commodification as opposed to practices of cultural production can be a somewhat obfuscating frame, and what is interesting for me is the way that landscapes, fields, life forms, selves etc. are collaboratively configured. What is at stake for us in this chapter on the development of blue holes as a natural and cultural feature is not a homogenization of meaning, but rather a proliferation of ways in which to think about the interrelations between field knowledge and island industry, international science-based travel and global, regional, or national positioning, the nature of Caribbean tourist markets and markets for particular forms of nature. What is interesting about blue holes, in my own framing, is that they are not just static landscapes which can be read for a contextual cultural meaning and which

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[306] Knudson, Daniel C. et al Eds. 2008. *Landscape, Tourism, and Meaning*. Ashgate Publishing Limited.

[307] P. 1.

[308] The notion of landscape these authors utilize comes from cultural geography and rests on a focus on human agency, cultural meaning, and perception based on insider/outsider positions, an aversion to environmental determinism, an appreciation of symbolism and iconography, the production of space through power relations, the collective construction of landscape aesthetics, an attention to discourse and contestation around categories like class, race, and gender. See Greer, Charles et al. 2008. "Landscape Perspective for Tourism Studies." *Landscape, Tourism, and Meaning*. Ashgate Publishing Limited.

[309] P. 5.

represent the build up of specific power relations in place. What is interesting about blue holes is that they are actively, dynamically, and contingently created as sites for ongoing scientific discovery and the revision of what it is possible for the social relations of tourism to be.

The distinction between insider and outsider meanings or perspectives of place can also be rearticulated here. In the islands in which I participated in blue hole studies and demonstrations, there was a continual interplay of national, regional, and global specificity and generality that cannot be pinned on to anything so dichotomous as insider/outsider. Remember that the field science practiced in and around these holes was largely conducted by foreign experts (I find the notion of the expert, whether insider or outsider, to also have conceptual relevance) with important exceptions, but that that this work was done in conjunction with and under the auspices of several Bahamian institutions whose interest in the project and relationship to the holes is predicated on trying to develop a sense of globalized locality and visitable "placeness." I find these *ascriptions* of locality and specificity and the creation of dichotomies to be part of what is worth studying about the tourist industry and its evolving relationship with the field sciences in The Bahamas.

Finally, I think that the work done on blue holes in The Bahamas explodes the dichotomy between historicized landscapes and natural landscapes as tourist places. The blue hole projects I described above are involved in the process of creating a science-based interdisciplinary mode of apprehending these features wherein the microbiological processes of deep time, the ancient cycling of the island ecosystems and changes in climate, the evolution and extinction of island organisms, and the human history of the region and individual settlements come together to legitimate access- if not to the holes themselves than to information about them- as well as national conservation under the auspices of a unique Bahamian heritage and universal ecological importance. This helps to make the point that moves to protect particular places in The Bahamas do not hinge on the conservation of wild nature, but rather they hinge on the protection of particular and designed understandings of other forms of relation based on vulnerability and visitation.

Making the underground matter in the living laboratory

As discussed in Chapter 1, the enlistment of field sciences, social and biological, as a means to solidify and legitimate territory, resources, and ideas about life is often attempted through the development of situated and located forms of knowledge production- what Kohler would describe as the deployment of "practices of place," in which the specificity or reality of place is created through experimental manipulation and the development of scientific tools designed to "read how nature works."[310] These are practices of authentication grounded in the notion that "nature" itself is the pinnacle of authenticity. Colonial cartographers, surveyors, botanists, natural historians and the like dissected the surroundings, enumerating, charting, and depicting organisms, spaces, objects, people, processes, and ideas, attempting to legitimate the reach of rule based on certain forms of knowing. I note that here, contemporary forms of nation building continue these practices, though the disciplines in question are multiple and varied, basing notions of the nation on what can be made known about the nation- on what can be scientifically demonstrated. These practices continue to be highly generative.

[310] Kohler, Robert E. 2002. *Landscapes and Labscapes: Exploring the Lab-Field Border in Biology*. University of Chicago Press.

As I have alluded to previously and as was made concrete in the examples of this chapter through my own work in The Bahamas, the life sciences and the social sciences are bedfellows when it comes to designing natures. My experience with interdisciplinary blue hole investigations in The Bahamas makes this interrelation explicit. The moves made here, which combine the expertise and authority of a number of field disciplines in one project, including marine zoology and anthropology, create a holistic vision of blue holes as an active, necessary, valuable, and potentially visitable feature of Bahamian history and Bahamian ecology, with hopes that they may become emblematic of some form of Bahamianized global/regional identity as part of the AMMC's mandate to develop heritage destinations.

It is this hope that I think frames what is specifically worth knowing about what is going on in The Bahamas. The Bahamas is of course not the only place in the world where archeological, ecological, and geological features are developed and exploited for the international tourist industry, but I would argue that there are few parts of the world where tourism is so pervasive and so central to the economic viability and sovereignty of a nation. This is in large part why my emphasis here has been on the historical and heritage interests of the tourism industry, embodied by the AMMC, even though many of the player's interests in the blue hole research aren't directly related to tourism, and even though tourism seems to be largely in the background for spectacles such as the NOVA television special. One could read these events as interdisciplinary scientific research both redefining and rediscovering environments and creating possibility for the grounding of new identities within them, but these identities, these blue hole based ecological and social histories, are now valuable in global market that has interests in what it means to be Bahamian. I was there in Andros, helping a home grown science to unfold, training young people to conduct and recognize ethnographic authority, all the while aware that one of the domestic drivers of this interest in blue holes was, and likely always will be, tourism.

Relatedly, this is an example wherein scientific understandings of nature as life- as historic, processual, social, and dynamically interrelated- may become useful for understanding the lives of Bahamian people- as historic, processual, social, and dynamically interrelated. As my section on Caribbean regional and national identity formation alluded to, the stakes for blue hole research involve nothing more or less than the way various Bahamians and various visitors come to conceive of and value their relations to their surroundings, to one another, and to other organisms. While the social science aspect of the blue hole project, the ethnographic endeavor, was not overtly identified as "environmentally oriented," it was conceived of as concomitant with natural science, in order to expand the perspective of what could have been the production of a wild or human-less feature. The inclusion of this realm of expertise and knowledge production points to an opening for an expanded form of biological citizenship, wherein the foundations for identification and collective cohesion move beyond the consideration of merely human biology.[311]

Nature and culture are elided- even exploded- in this arena in specific ways that are amenable to the diversification of the particular formation that is The Bahamas in a global tourist market. These field exercises, exercises in which I collaborated, point to the development of blue hole specific scientific practices of place in which the tools for assessment from each discipline combine to form an array through which blue holes become knowable and desirable- it

[311] For a discussion of the term "biological citizenship" as a question of human biology, see Rose, N. & C. Novas. 2005. "Biological Citizenship." *Global Assemblages: Technology, Politics, and Ethics as Anthropological Problems.* Blackwell.

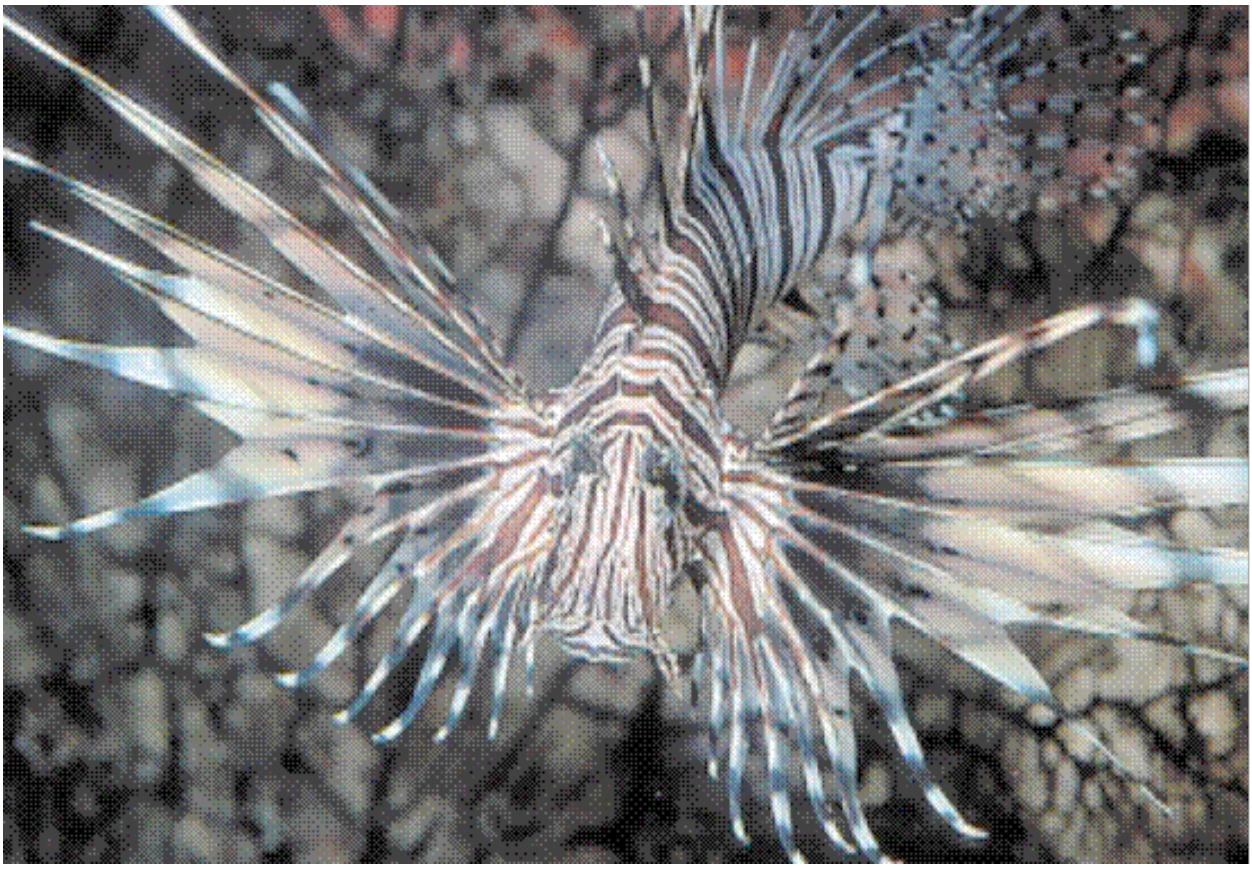
is not that their nature becomes more cultural and therefore marketable, but that the work done by holding these two categories distinct is no longer useful.[312] The marketable specificity the tourism industry searches for in order to diversify the Bahamian "tourism product" benefits from the universal globalism and simultaneous conjoined locality of place and purpose in the scientific narrative found in the holes, but the social histories I helped produce are no more or less culturally specific than the natural histories I helped perform.

I will conclude with a discussion I had with the team microbiologist, an American, who explained that her interests were geo-microbiology, a recent field, and environmental microbiology with a "deep time" focus. She examines environments on the modern earth and extrapolates these as reflecting the biota and geochemistry of the early earth because "microbes don't leave very good fossils." In her opinion, this blue hole project was an effort that would be difficult for a strictly "nationalist science" or domestic Bahamian science alone because one needs a quorum of scientists to study these things and each discipline's work cannot be conducted in isolation. Also, she speculated that the pace of science moves too fast and that no one nation could keep up with all the new developments in research and theory. Collaboration, therefore, was good for science in that it developed a curiosity about a lot of different things-about attempting to approach a bigger picture. For this scientist, collaboration was the most fun thing she could possibly do, but she also mentioned that this project was not the most cutting-edge work out there for a microbiologist, and that she normally wouldn't participate in such things outside of her own research area except that at was part of the television documentary and was a fruitful team effort.

I mention this conversation to reiterate the point that all these productions around blue holes stem from the authority of expertise and that this expertise is required for the creation of valuable, marketable, and visitable natures. Paleontology, biology, microbiology, geology, etc. are all forms of expertise that can describe a historically specific Bahamian ecology, but the interdisciplinarity of this blue hole project, the collaborative "big picture narrative" aspect of it, creates something far more valuable in contemporary travel markets than any one disciplinary revelation alone. The point is not that it is cutting-edge research for a geomicrobiologist, the point is that it is a cutting-edge collaboration for the nexus that is science and tourism in a place like The Bahamas.

[312] For a discussion of social nature in the lab, see Knorr Cetina, Karin. 1999. *Epistemic Cultures: How the Sciences Make Knowledge*. Harvard University Press.

Chapter 6. The Aquatic Invader: Figuring fishermen, fisheries, and lionfish?



The invasive lionfish. Photo from The Department of Marine Resources, Bahamas, 2010.

The lionfish

Early mornings are quiet in the parking lot of Nassau's Poop Deck Restaurant. Cars are rarely parked there at 8am, and I felt conspicuously alone as I waited with my borrowed vehicle for the others to arrive. It was already too hot to sit in the car, considering it was August, and so I stood looking out at the boats anchored in the harbor marina, watching them bob with the waves. I may have started to doze. But when the student arrived, a bit late as usual, I was instantly alert. We were going to look for lionfish.

Soon we were out on the water with a boat and driver borrowed from the Department of Marine Resources. That day I was assisting a young Bahamian with her field study of lionfish attraction to artificial reefs around the island of New Providence. The study was a main component of her Master's thesis for a degree in Zoology at a Canadian University. Her time was limited, and the work was hard, and so I had volunteered to help spot the reefs in the shallow water, to save her energy as she swam behind the boat, weighted with dive gear. From my vantage point on the bow of the 20-foot boat, I could make out the distinctive blob that was the

artificial reef on the sandy bottom and point it out to her in the water. The reefs, made of cinder blocks tied together in regular bunches, had been laid out in a grid pattern on the sea floor, but they were far enough apart that they could not be seen through a mask in the water. It was startlingly easy to swim past one, even if you were certain you knew where it was. The student had laid these reefs some weeks earlier, and she was now investigating them to see what species might be found living in their crannies and holes. She hoped that the maroon striped and elaborately finned lionfish might be found lurking there, which would help prove her hypothesis that lionfish are attracted to artificial structures in near-shore waters on the sea floor, such as wreckage and boat debris. At each reef, she would dive down, assisted by SCUBA gear, and make note of what was found there- the species, its size, abundance, density, etc. On that day, over a span of several hours, she found some tiny Nassau Grouper among the blocks, and many small reef fish, but the lionfish was nowhere in sight. I had to admit to being a bit disappointed.

The lionfish is a beautiful, enigmatic creature and a dangerous one. It has long wavering spines that protrude from the airy fins on its back and belly, and each spine is loaded with venom. I have heard that getting pierced with the spine and injected with venom is extremely painful, and potentially hazardous for the very old, the very young, or the infirm. Some fishers say it will put you on your back for a day. But this is not what makes the lionfish such a threat or the object of scientific interest- the lionfish is unwelcome in Bahamian waters because it is an invasive marine species.

The lionfish moved from the category of introduced species to the rare category of marine fish invasive when it was discovered that it reproduced rapidly, ate voraciously, competed for reef space with native fish, and had no natural predators in Bahamian waters. First observed in The Bahamas in the mid 1990's, it became established in no time, and soon became a common site for fishermen and recreational divers, especially since 2006.[313] These same observers were wary of the venomous fish, but then rumors spread that someone had found a dead grouper in the belly of a lionfish, one of the "holy trinity" of Bahamian commercial species, and it soon became a threatening figure, contributing to the ruin of an already vulnerable fishery and a coral reef environment that some fear has become increasingly invasible.[314] The graduate student's artificial reef field experiment is designed to test this notion of environmental invisibility- to discover just how vulnerable the near-shore waters of the central Bahamas might be to this curious fish.

Thinking about lionfish in The Bahamas as invaders in a vulnerable archipelagic fishery has a remarkable parallel in descriptions of regional overfishing, descriptions in which fishermen are the invasive species, and the fishery in question is the Caribbean's collection of disappearing ocean life. This observation leads me to wonder about the form of the vulnerable fishery and the threatening figures of fishermen and fish which are said to capitalize on this vulnerability. It also leads me to wonder about the anthropological and scientific fieldwork which, working together, call fisheries, fishermen, and fish into being today. This is my final example of a contemporary laboratory situation in The Bahamas, one which perfectly exemplifies the themes of this dissertation: arrival/visitation, vulnerability, and biocomplexity. The lionfish is at once a recent arrival to the islands, a threat to biodiversity and the marine resource economy, and an iconic species for scientific research which produces ideas concerning biological life and social

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[313] Albins, Mark A. et al. 2008. "Invasive Indo-Pacific lionfish (*Pterois volitans*) reduce recruitment of Atlantic coral-reef fishes." *Marine Ecology Progress Series* (in press).

[314] The Bahamian holy trinity consists of nassau grouper, queen conch, and spiny lobster. Together, these species uphold the commercial fishing industry in the country.

categories. I envision this chapter to add to the literature on animals, threats, and environments begun by authors like Charis Thompson and Stefan Helmreich.

Engaging with Maritime Anthropology

Maritime anthropology is most commonly associated with investigations of the lives of people who both live by and live off of the sea, and much of the work done in this vein has been concerned with explicating fishing practices and concomitant forms of social organization around those practices. Today, much of what might be called maritime anthropology greatly exemplifies the focus of environmental anthropology, as the sciences of conservation and management and the social sciences become increasingly interconnected. The notions of traditional or cultural forms of sea tenure and fishing knowledge and the anthropological fight to refute the vision of the ocean as a universal commons, ripe for corporate exploitation, have been especially important, and I will explicate some of the most relevant basic tenants of maritime anthropology here, following arguments made by the anthropologist, Bonnie McCay.[315]

McCay notes that the anthropology of fishing communities and their practices has become attentive to the technical features of marine and coastal environments, and the effects of human activities on those environments are now included within its frame. As is discussed below, I see this development of the last several decades as one particular orientation for conceptualizing a relationship between nature and culture, the famous anthropological problem, though here the problem has carved itself an aquatic niche. Further, maritime anthropology has increasingly become a form of applied anthropology because its practitioners are involved in national and international efforts to protect or improve what are currently termed "marine resources." As I will discuss below, maritime anthropology is often an example of what I might call, following Marcus, a "support science," bolstering the designs of other natural sciences.[316]

Fishing, a central concept for McCay, is conceived of as a productive activity that takes place in multi-dimensional space and which depends more on natural processes over managed ones in contrast with agriculture and industrial manufacturing, and the major uncertainties of environmental conditions surrounding fishing practices lead to what are identified as "high-risk" situations which have major consequences for localized forms of social organization and cultural representation. Fishing is construed here as closer to nature, and one could argue that this anthropological sub-discipline has traditionally been theoretically based in a form of structural Marxism combined with environmental determinism, creating a particular sort of cultural ecology wherein anthropologists are "explicitly or implicitly concerned with what there is about a wet and fishy productive regime that defines the social, cultural, and economic life of fishing communities"- what specificities of nature define specificities of culture.[317] McCay states that it is a mistake to equate fishing with what other anthropologists might identify as hunting and

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[315] McCay, Bonnie J. 2001. "Environmental Anthropology at Sea." *New Directions in Anthropology and Environment*. Altamira Press.

[316] Marcus, George. 2002. "Intimate Strangers: The Dynamics of (Non) Relation Between the Natural and Human Sciences." *Anthropological Quarterly*. 75(3): 519-526.

[317] McCay wrote in the late 70's that anthropological studies of fishing and "fisherfolk" are concerned with ecological approaches along the lines of Steward's "cultural ecology" wherein environmental variables are used to explain fishing lifestyles. McCay, Bonnie. 1978. "Systems Ecology, People Ecology, and the Anthropology of Fishing Communities." *Human Ecology*. V. 6(4). P. 397.

hunter-gatherer social networks because fishing allows for a wide variety of integration into a number of social organizations, sociopolitical and economic systems and an examination of fishing calls for great specificity in this regard, though, arguably, hunting is no longer thought of in such narrow terms either.

Sea tenure, another central concept for McCay, refers to the ways in which local communities and societies "conceptualize, allocate, regulate, and defend rights to marine resources" contrary to the notion that the sea is an "open-access frontier."[318] Maritime anthropologists argue that "the sea as global commons" is an imposed idea, and that access to marine resources is usually restricted by particular institutions which make great efforts to mitigate conflict. Sea tenure studies have greatly contributed to the spread of participatory management projects designed to protect marine resources and are now included in community-based management projects. These studies are seen as strong counterpoint examples to the "tragedy of the commons" notion.[319] McCay notes that it is unwise to assume that all forms of sea tenure are conservation oriented, however, and that anthropology can be used to dispel these assumptions.

Importantly, McCay sees maritime anthropology as most relevant when it is used as a tool for social impact analysis. Social impact analysis, the most common form of applied environmental anthropology, assesses the impacts of policy changes and major events on communities, groups, families, and individuals and is often mandated by law as an aspect of projects involving drastic change and intervention. She argues that modern fisheries management, a development in the North since the 1960's, is intended to be a rational, science-based system of control by the state with special control over "common pool resources," and that social and cultural factors are now seen as important within forms of effective scientific management. Anthropologists are increasingly called to complete these assessments, this sort of collaboration becoming accepted as a matter of course.

My own work owes a great deal to the work of McCay and others in this field, though I hope to revise the scope and conceptual foundations of maritime anthropology. I wish to expand the attention from fishing communities- their practices, forms of tenure, and their social organization to focus on the very concepts engendered by science-based notions of fisheries- their management, research, and conservation design. Following Helmreich, who has taken his own maritime interest into the realm of marine microbial science and genetic prospecting, I would like to investigate the work done to delineate the figures and values drawn from forms of life in the sea, and the complicated sets of relations imagined and produced by specific experts, including anthropologists.[320] My site in this chapter is the Bahamian living laboratory for all things fishy or fishable, and my interest is in the instrumental forms created when the conditions for imagination and production are determined by the now familiar living laboratory notions of threat, vulnerability, and opportunity.

What is natural about fisheries?

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[318] McCay, Bonnie J. 2001. "Environmental Anthropology at Sea." *New Directions in Anthropology and Environment*. Altamira Press. P. 258.

[319] Hardin, Garrett. 1968. "The Tragedy of the Commons." *Science*. 162.

[320] Helmreich, Stefan. 2009. *Alien Ocean: Anthropological Voyages in Microbial Seas*. University of California Press.

The Merriam-Webster Dictionary defines a fishery as a nebulous entity with multiple components. It is simultaneously the occupation of catching fish, the organized industry of catching fish, the season for catching certain fish, a place for catching fish, a fishing establishment, the legal right to take fish in a certain place, or the technology used to catch certain fish.[321] All these meanings depend on the situation at hand, but what I found striking in these definitions, and what I had never considered before, is that a fishery is decidedly *not* a "natural" entity. A fishery is never solely defined by what is said to be natural, rather, it is defined by what certain people can or might do in order to remove fish from the water, and by what people consider to be "fish" in the first place, and by where it is or is not appropriate to fish. In other words, defining who, what, where, and when makes a fishery. Fishing then becomes an equally nebulous activity, and fisherfolk, those who fish, become a part of an entire creative and political process involving making fisheries, a process of calling them into being, of naturalization and externalization from what is said to be cultural. Fisheries, in my view, are not dependent on some essential nature- they are dependent on design.

I have never seen scholarship which calls into question the very existence of a fishery as a social or biological concept, but I am interested in thinking about all the things that a fishery is said to be and in what fisheries might become: from the Bahamian Sea Garden of the late 19th Century, to a knowable and manageable natural entity, an invasible and vulnerable ecosystem, a regional database, a site of commercial or subsistence production, a frame for conceiving of socioecological systems, a global model, the locus for the planetary collapse of marine biota, etc., as well as all the work these various notions perform. I am interested in thinking critically about the form fisheries concepts take in The Bahamas, and the ways in which "the Bahamian fishery" or single species fisheries, such as conch, grouper, and lobster, have been designed or redesigned as a site or sites of environmental contestation in the living laboratory. In what ways are the nation's waters and sea life localized, universalized, or naturalized to legitimate conservation or exploitation, in what realms do these become the terms with which to think about fisheries, and in what sense can a fishery be both a site of action and form of logic?

While this chapter is not intended as an investigation of the historical development of fisheries design in The Bahamas or elsewhere, I will make some generalizations and assumptions about this development in order to think about the role of experts in defining fisheries and their components. One assumption I am making is that before maritime anthropology was concerned about its connections with environmental management, conservation, and fishing communities, it was concerned with economic development and fishing communities. My guess is that current figures of fisheries, fish, and fishermen likely find aspects of their contemporary form in this conjunction, and that anthropologists have been involved in defining these figures along with scientists, economists, and development practitioners for decades.

By way of example, I bring up Rodman, an anthropologist writing in the 80's, whose work involved investigating the people of development projects, in this case island fishery

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[321] http://www.merriam-webster.com/dictionary/fisheries

fish·ery. Pronunciation: \ˈ fi-shə-rē\. Function: noun. Inflected Form(s): plural fish·er·ies. Date: 1528. 1: the occupation, industry, or season of taking fish or other sea animals (as sponges, shrimp, or seals) : fishing2: a place for catching fish or taking other sea animals3: a fishing establishment ; also : its fishermen4: the legal right to take fish at a particular place or in particular waters5: the technology of fishery —usually used in plural.

development projects in Melanesia.[322] In effect, she was involved in the project of explaining island villagers to governmental fisheries developers who wanted them to become fishermen in a new deep-sea fishery so that they could participate in capitalist markets and diversify the island economy away from copra production. In her work, Rodman made a distinction between cultural values and material dollars, between villager's values and capitalist value, and cited both these variables as constraining the spread of capitalism in Vanuatu- large scale commercial fishing was not culturally appropriate nor economically viable compared to copra production. For Rodman, fishing is a development enterprise imbued with notions of island fishermen both having values and recognizing value, with fishable species having value as potential products in a market, and fisheries being the site of both social values and market value that may or may not be amenable to capitalism, that may not become commercial. While it is quite interesting to note here that the attempted development of artisanal fisheries in this example was an economic diversification strategy, not the maintenance of traditional village livelihoods, Rodman's investigation of the social impacts of development planning produces figures and terms which are amenable and integratable into a development discussion. Her anthropological investigation upholds a particular vision of value and values, fisheries and fishermen. "The problems and prospects of making a market," do not seem to involve the anthropological questioning of the figures and forms enrolled in this market.[323]

Moving from the realm of economic development to sustainable development, conservation, and management, another example comes from a recent review article on fisheries and anthropology by Colburn et al, writing about the United States.[324] Like McCay, they refer to the issue of applied anthropology and fisheries management as a "new growth area within applied anthropology" largely involving the completion of social impact assessments as components of environmental impact assessments.[325] The main analytical frameworks for this applied form of maritime anthropology address shifting forms of cultural identity and the social responses to change of individuals, households, communities and regions. They explain that fisheries management is faced with challenges construed as the decline in marine resources and changes in marine environments due to global factors such as climate change, and these challenges are construed as affecting fishing communities and their relationship between identity and the environment.

Colburn et al also provide a useful institutional history of marine management in the US at the federal level. They state that the National Marine Fisheries Service (NMFS) hired its first anthropologist in 1974 following the development of the notion of maximum sustainable yield and the idea that this notion required that "we would manage people- fish don't listen to you."[326] Anthropological work for the Fisheries Service was oriented towards examining the impacts of regulations, becoming a full-blown program in the 1990s as a result of lawsuits against the agency. This lead, they say, to the introduction of what is known as the NMFS "communities standard" as part of the Fisheries Act which states that "conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of

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[322] Rodman, Margaret C. 1987. "Constraining Capitalism? Contradictions in Self-reliance in Vanuatu Fisheries Development." *American Ethnologist*. 14(4). P. 712-726.

[323] Ibid. P. 722.

[324] Colburn, Lisa L. et al. 2006. "Anthropological Applications in the Management of Federally Managed Fisheries: Context, Institutional History, and Prospectus." *Human Organization*. 65(3). P. 231-239.

[325] Ibid. P. 231.

[326] Ibid. P. 232.

overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for sustained participation in such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities."[327] This sort of sociocultural analysis of the community impacts of fisheries policy was partnered with the economic analysis of natural science-based fisheries conservation projects, and social science was purposefully *integrated* into natural science to "support the mission" of the "stewardship of living marine resources through science-based conservation and management and the promotion of healthy ecosystems."[328] In the US, this integration takes the form of social science manuals and regularized social impact assessment procedures, and more recently, the goal has shifted to producing predictive models for conceptualizing the future impacts of fishery management on communities using social indicator variables and developing community profile data in order to strategically develop adaptation measures. The authors state that social science can only become more necessary in the future as complex problems develop involving management pressures and fisheries in crisis.

In this example, it seems that applied anthropologists have been quite instrumental, at least in the US, when it comes to influencing design for the forms and figures of institutionalized fishing and to making what was construed as natural more cultural, or at least more social. The unit of anthropological analysis in this arena has become the community, an assessable community organized around a similar sort of "wet and fishy" cultural ecology mentioned by McCay, and a community that is susceptible to disruption by environmental and regulatory change. The notion of a sustainably managed fishery, of a more socially responsible fishery, necessitates social impact assessment, requiring expertise that can demonstrate a specific sociality for these natural systems in crisis and legitimate community as the site of management.[329]

Expert conversations about threatening marine species, human and non.

The conceptual package of the Bahamian fishery seems to come loaded with cultural notions about fisherfolk, characterized most often in The Bahamas as fisher*men*, their communities, and their object of desire, fish, which denotes a large range of natural species including the aforementioned lobster, conch, and grouper, but also turtles, rays, sponge, snapper, dolphin fish, marlin, crabs, reef fish, deep sea fish, etc. In The Bahamian living laboratory, I am specifically interested in the concepts of *over*fishing combined with the growing concern about invasive exotic marine species, i.e. the lionfish described above, both of which are said to drive so much detrimental environmental change and lead to fisheries collapse. The ways in which fishermen and certain fish species are characterized or figured within scientific fisheries studies and management designs directly determines or even necessitates policy recommendations and action plans, the orchestration of nature and culture.

In the varied research and management circles in which I studied, circles involving the Department of Marine Resources, the Bahamas National Trust, The Nature Conservancy of The

[327] Ibid. P. 233.
[328] Ibid.
[329] For another discussion of the creation of community as a site of environmental management in forest conservation in India, see Agrawal, Arun. 2005. *Environmentality: Technologies of Government and the Making of Subjects*. Duke University Press.

Bahamas, and Bahamas Reef Environment Education Foundation, "Bahamian fishermen" come to wear many conceptual hats. They are often considered as a ubiquitous national group, or as discreet community units located in settlements throughout the country, rendered separate from "the Bahamian public" or "Bahamian society." They are either made into a timeless social category along with their practices, "fishermen" signifying a somewhat vague universal occupation, or they are configured as localized opportunists whose exploitative activities increase with need. They are sometimes described as a specific "stakeholder" in the game of constantly negotiated national fisheries management politics, a stakeholder which is performed and produced at various times, but which is curiously absent at others. At other times, they are rendered knowable through recourse to economic understandings of the self-interested individual as explanation for human behavior, and maintaining the "livelihood" fishermen are said to require has become a prime concern, though the appropriate form this livelihood should take is in question.

In the Bahamian living laboratory, fishing was once considered a noble activity, allowing people to make a living outside of the service economy, but this attitude has changed in management circles.[330] Today, fears of overfishing are increasingly cited as the justification for fisheries studies, and fishermen are more often construed as people who lack information about overfishing, information which experts possess, information which can be passed to the fishermen if the right channels could be found, rather than as possessors of specific and specialized local knowledge.[331] It seems to be implied that once this group is in possession of the correct information, and once this information has been made understandable, then they will naturally change their practices. Beyond the fact that there tends to be little public or published discussion of the reasons behind the high demand for fish or "fisheries products," and the fact that "fishermen" seem to bear the brunt of conservation policy interventions in the country, I am interested in thinking about the ways in which the varied figurization of fishermen allows for their portrayal as malleable cultural entities, both the transgressive site of danger in the contemporary marine milieu, as well as a strange source for hope in a sustainable future designed around community, if only they could be informed.

The lionfish has become another equally malleable and cultural figure that captures headlines and my own interest. Native to the Indian Ocean, many scientists and managers fear that it has become "established," a dangerous condition in the language of invasion because this means it will be nearly impossible to eradicate, as mentioned above. Helmreich provides a discussion of invasion biology in the islands of Hawaii and the role of human agency in species introduction as well as the agency of species described as invaders.[332] He attends to systems of classification and the ways biologists define native and alien species, noting that it is a contest to "calibrate what will count as alien and native." Nature and culture have been "put into flux by

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[330] Fishermen are described as outside of the trend of disdaining agriculture and work in tourism in LaFlamme, Alan G. 1979. "The Impact of Tourism: A Case From the Bahama Islands." *Annals of Tourism Research*. April/June.

[331] Some examples: Gascoigne, Jo. 2002. "Grouper and Conch in The Bahamas: Extinction or Management? The Choice is Now." www.macalister-elliott.com/media/reports/1651R03A.pdf; Chiappone, Mark at el. 2000. "Groupers (Pisces: Serranidae) in Fished and Protected Areas of the Florida Keys, Bahamas, and Northern Caribbean." *Marine Ecology Press Series*. 198. P261-272; Clark, S. A. et al. 2005. "The Harvest of Juvenile Queen Conch (Strombus gigas) off Cape Eleuthera, Bahamas: Implications for the Effectiveness of a Marine Reserve." *Proceedings of the Gulf and Caribbean Fisheries Institute*. no. 56, P. 705-713.

[332] Helmreich, Stefan. 2009. "Alien Species, Native Politics: Mixing Up Nature and Culture in Ocean O'ahu." *Alien Ocean: Anthropological Voyages in Microbial Seas*. University of California Press.

the very idea of alien species" with the designation of invasive as the social judgment of harm- the insinuation of culture. He also notes that there is a specifically Hawaiian politics of invasion which is rooted in indigenous politics and what he calls a particular "archipelagic imagination" of the sea as mobility- indigineity in Hawaii means being both native and mobile. Biology has become an idiom for imagining cultural systems and the ground for a notion of "strategic" nativeness. Helmreich usefully shows that ideas about what is native or not can change over time and that invasive species are able to "undo our concepts of the natural" and the cultural with the global attention to constant mixing and motion. He also shows that biologists produce the contexts which allow their classifications to make sense. This is science producing forms of nature/culture- producing specific place through the imagination of space and the strategic proscription of what should and should not be in it.

Unlike Helmreich's discussion of mostly microbial invaders, the very visible and dramatic looking, venomous lionfish is arguably figured as much more trangressive enemy than alien. The Caribbean and Bahamian politics of invasion does not often hinge on the language of aliens, but it does on the language of invaders and visitors- these shifting categories of belonging. The evolution of science-based public media about invasive species in the last decade in The Bahamas demonstrates the development of the fish as a threatening enemy figure. Early fliers designed by the Bahamas Environment Science Technology (BEST) Commission show no images of marine species, just close up pictures of green invasive plants, a cute juvenile raccoon, and a passively perched Eurasian dove. Contrastingly, a more recent invasive species poster created by the Bahamas National Trust (BNT) has a large, dramatic photograph of a mature lionfish on a reef, the fish and its dramatic spines and fins taking up most of the frame. Another flier made by the Department of Marine Resources (DMR) has a photo of the spiny fish and the words "Do not touch!!!" printed in bold letters. Currently, the Nature Conservancy of The Bahamas (TNC) website has a page devoted to the lionfish, saying, "colorful tropical fish are fun to watch in an aquarium or home fish tank. But what happens when exotic fish are released into the wild — and start taking over the seas?... A popular aquarium species called the lionfish has been found in increasing numbers in The Bahamas, threatening to displace native fish and disrupt local fisheries."[333]

Part of what anchors the transgressive qualities of both these Bahamian figures- fishermen and lionfish- is not so much the natural/cultural realm of strategic nativity as it is the play of nature/culture in the metaphorics of impact. Fishermen are said to negatively impact the marine environment by taking too much, while lionfish compound this problem as a consequence of unintended human-caused species introduction. These figures of dangerous anthropogenic change disrupt what is often construed as the natural fishy order. But, as Head notes, the metaphor of "human impacts" once popular as a terminology for a cultural ecology that countered the notion of pervasive and monolithic environmental determinism, has now become an impoverished means with which to think about ecological connection, about human and non-human natures, with humans and human behavior consistently taking too much of the analytical focus.[334] The notion of disruptive people versus a stable and balanced ecosystem or an essentially natural environment has long been under attack, and the issue about what to do with ideas of the human and the natural are undergoing transformations in ecological circles.

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[333] Sundaravadanan, Arathi. 2009. "The Bahamas: Stopping the Lionfish." http://www.nature.org/wherewework/caribbean/bahamas/features/

[334] Head, Leslie. 2007. "Cultural ecology: the problematic human and the terms of engagement." *Progress in Human Geography*. 31(6). P. 837-846.

Ecologists are attempting to reframe their language and their focus- new ecology, urban ecology, and restoration ecology are some disciplinary examples, as are terms such as socioecology- but they have as yet been unsuccessful, according to Head, in that the human and the cultural still holds a distinct conceptual position. Yet without these notions of human impacts and social impacts, these particular framings of nature and culture even in such an "unnatural" arena as fisheries management, fishermen and lionfish would not be such powerful figures in the living laboratory and there would not be that dynamic tension which accompanies the very idea of anthropogenesis and environmental change which helps maintain a strategic arena of design and action.

Caribbean Questions: cultural ecology

The analytic method of cultural ecology which anchors the natural and cultural conceptions of maritime anthropology has its roots in the Caribbean region and Julian Steward's Puerto Rico project, an interdisciplinary study published as the *People of Puerto Rico* in 1956.[335] This team project was the first of its kind in the Caribbean, commissioned by the Puerto Rican government in an effort to bring social science to bear on the social and economic problems of the country as part of a welfare mode of government. Funded by the US Rockefeller Foundation, the project was also an attempt to develop a program for interdisciplinary area studies, a burgeoning mode of organization for American social science research, post WWII. Critics would later say that this was the strategic study of areas involved in US international economic interests.[336] The project was one of the first anthropological studies of major populations, and the method used was that of community study, the targeting of small and localized segments of the national society. Though the method of data collection was localized, the theoretical scope was seen as importantly new: "Anthropology has needed to broaden its frame of reference, to view its subject matter in the larger context of modern nations, because it has also been participating with its fellow social sciences and with the humanities in new interdisciplinary approaches to contemporary world areas."[337]

Despite the expanded scope and interdisciplinary character of the research, like many Caribbean anthropological endeavors before it the project was still concerned with explaining cultural change, though here the concern was with cultural adaptation to contemporary influences, such as the encroachment of the US in economic and political realms and the current production of agricultural products. Puerto Rican culture, the team concluded, was made up of many subcultures based on class, social hierarchy, and sociocultural organization. The main concept the anthropologists felt they contributed to the project was that of the holistic notion of culture, though theirs was a revised notion in which "culture" was purposefully kept generalizeable, understood as the socially transmitted and learned "ideas, attitudes, traits or overt behavior, and suprapersonal institutions," with differences expected at each level of society.[338] This was differentiated from the "tribal" notion of culture, which was said to assume a

[335] Steward, Julian, Robert Manners, Eric Wolf, Ellena Padilla Seda, Sidney Mintz, and Raymond Scheele. 1956. *The People of Puerto Rico*. University of Illinois Press.

[336] Barth, Fredrik et al. 2005. *One Discipline, Four Ways: British, German, French, and American Anthropology*. The Halle Lectures. University of Chicago Press.

[337] Steward et al. P. vi.

[338] Ibid. P. 5.

monoculture for all members of society, and which could not be transported to the study of dynamic and contemporary society. For the Puerto Rico project, there was a need to distinguish types of cultural organization within a larger frame of national culture in order to retain "culture" as an operational concept. Steward wrote, "just as a mammal has a respiratory, circulatory, nervous system and other features not found in unicellular life, so national societies have institutionalized, supracommunity features not found in a tribal society."[339]

The main question ordering their investigation in Puerto Rico was the way in which different subcultures came about on the island, and the analytic used to explore this was what they coined cultural ecology: the focus on determining environmental factors to explain cultural change and processual adaptation. For them, observable adaptations in Puerto Rico involved land use and the exploitation of the environment, and the primary objects of study were agricultural technologies and concomitant social processes in the rural regions. Eric Wolf, then part of the team, studied coffee and tobacco producers, while Sydney Mintz studied sugar producers. It should be noted that the Puerto Rico project did not consider itself a success for area studies in that they were unable to develop a method for the total integration of disciplinary data, citing the different scales of investigation as a major obstacle to this goal.

Though area study as an organizing principle for US scholarship has declined, and despite the fact that the degree of environmental determinism involved in this analytic method has not remained static, the basic connections between Steward's Puerto Rican work and that of contemporary maritime or fisheries anthropology are clear: what has survived is the basic notion that certain productive situations delineate the modes of labor and social organization that accompany them. These situations are best examined at what has become known as the community level of a larger national or regional system, and adaptation is one possible impact of natural or social change. Fisheries anthropologists take the community as their unit of study, examining the social processes and organizational structures that are said to stem from maintaining a livelihood from certain natural marine ecologies and fisheries exploitations, explaining or predicting the impacts that policy change or environmental change might have on the community in question. I note that the notion of the fishery itself is one that is perfectly amenable to such a mode of analysis.

Steward's work on Puerto Rico originated one popular way of conceiving of the relationship between nature and culture in the Caribbean, and indeed this method became ubiquitous as the foundation for several disciplines, but today cultural ecology can be reframed as a Caribbean question. Developments in maritime anthropology show that it is not a far step from using a form of cultural ecology as a method for analyzing the impacts of economic development to using it as a method for analyzing the social impacts of fisheries conservation management design. And as an observer of contemporary scientific practices, I train my analytic focus on the work this method does in framing the conceptual orderings of fisheries scientists and managers in the living laboratory of The Bahamas- in a country and region in which the notion of sustainable fisheries as social fisheries has become increasingly important.

Both dangerous and delicious

[339] Ibid. P. 6.

Interrogating the idea of invisibility in The Bahamas, the problem which occupied the field experimentation of the student I assisted, is not a new activity. In fact, discussion of anthropogenic plant, animal, bird, and amphibian invasion is a characteristic of island natural history. In 1978, zoologist David Campbell stated, "particularly since the arrival of Columbus in The Bahamas a half millennium ago, the Islands have been invaded by a host of animals and plants, some stowaways, others intentionally introduced."[340] Lionfish as aquatic invaders are only the most recent instantiation of this ongoing discussion of island vulnerability, invasion, and transgressive danger, though invasion in the marine environment comes with its own framing of transgression and salvation in what some biologists construe as "an era of global change."[341] Accordingly, the general scientific response to the fish can be summarized by Albins et al: "It would be prudent for affected nations to initiate targeted lionfish control efforts as soon as possible. Concerted and sustained efforts to reduce densities of lionfish at key locations, including potential 'choke' or dispersal points, as well as particularly vulnerable or valuable reef areas, may help to mitigate their ecological impacts."[342]

In order to tackle this perceived synergistic problem of overfishing, potential fisheries collapse, and enemy species, the fisheries management organizations in The Bahamas have proposed a novel solution: they will make the lionfish a part of the Bahamian fishery. In other words, the figuration of a threatening fish requires efforts to manage the menace, but those in charge of managing the Bahamian fishery are not advocating the complete destruction of the species, which may prove impossible. Instead, they are designing means to internalize the fish into the realm of the familiar. Along with the creation of a national lionfish database as part of the Bahamas National Lionfish Response Project (BNLRP), they are advocating for the lionfish to become a commercial or recreational fish species as part of the viable Bahamian fishery, to be eaten at home or even sold in restaurants. 2009 saw the successful enactment of what the Bahamas National Trust called the first Lionfish Control Project, wherein fishers were invited to enter in a two-day long lionfish catching tournament, with cash prizes given to the boat to catch the most lionfish, the largest lionfish, and the smallest lionfish. The tally, weigh in, and prize distribution was held a restaurant in Nassau where lionfish were cleaned, cooked, and served as part of the event in order to demonstrate that they are edible and enjoyable to eat. The official advertisement read as follows, "July 18, 2009 – Saturday. BNT Lionfish Control. The Bahamas National Trust hosts a Lionfish Control Project. Register July 16 at Green Parrot East Bay St at 6 pm. A $50 minimum donation from participants who fish is encouraged. See a Lionfish capture and cleaning demonstration. On July 18 at 3 pm check-in at Green Parrot, off load your catch and sample Lionfish cuisine; cash prizes awarded."[343]

A Nassau daily paper, *The Tribune*, covered the event, stating that, "enthusiasm is growing for the fish as a source of food." And Dr. Braynen, Director of the Department of Marine Resources, was quoted as saying, "it has helped to expose even more people to the fact that lionfish can be used as food and we think this is perhaps the best avenue that we will be able to pursue to reduce the numbers of lionfish in the environment by turning them into a fish that

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[340] Campbell, David. 1978. "The Invasion of the Exotics." *The Ephemeral Islands: A Natural History of The Bahamas*. Caribbean Press. P. 56.

[341] Cox, George W. 1999. *Alien Species in North America and Hawaii: Impacts on Natural Ecosystems*. Island Press.

[342] Albins, Mark A. et al. 2008. "Invasive Indo-Pacific lionfish (*Pterois volitans*) reduce recruitment of Atlantic coral-reef fishes." *Marine Ecology Progress Series* (in press). P. 5.

[343] This advertisement was published on the Nassau-Weekly Informational website. www.nassau-weekly.info.

people see as a food source, that commercial fishermen will want to take and that people will want to buy."[344] This is what I would describe as an example of science-based management organizations explicitly designing a fish by allowing this species to become a fishable aspect of the national fishery, by making it a model species that signifies the vulnerability and value of the Bahamian marine environment. The fish has become a scientific "totem animal."[345] This move works as a double internalization for the malleable figures of fishermen and lionfish: the lionfish is no longer construed here as the enemy invader- it has become internalized into the fishery as a commodity species, and the fishermen who fish this species will no longer be construed as transgressive overfishers- they will be *sustainers* of both the fishery and their own livelihood, internalized into lionfish management plans. The metaphorics of impact, of detrimental human impact on the external environment and the detrimental social impacts of management planning, become more mild in this scenario, and the distinctions between the strictly natural and cultural have the potential to become less sharp, less loaded with meaning for ecologists, managers, and social scientists alike, though this does not mean that there are not other conceptual processes and figurations at work with serious stakes.

I also note here that before these internalizations could take place, the work of externalizing lionfish from Bahamian aquatic nature and construing fishermen as in a state of dynamic tension in relation to sustainable Bahamian fisheries, described above, had to necessarily take place. These malleable figures are designed together in the living laboratory, by a fisheries science which increasingly relies on the support of applied anthropological terms, on social science, on notions of education, outreach, ideas of sustainability, on the language of livelihood and community-based cultural ecology and the shifting relations of nature and culture construed therein. I further note that The Bahamas is quite different from Hawaii and my analysis different from Helmreich's, though we are in productive conversation. The lionfish is becoming a fishery, part of a fishery, a fish- in the sense that it can be fished- and this is not the language of aliens and natives- though it may be of the exploitation of visitors- a theme from tourism. In this chapter, the lionfish has become a representative figure for the notion that fisheries are designed and for the creativity of fisheries management in the living laboratory. These fish have been designed to be both dangerous and delicious.

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[344] *The Tribune*. July 20th, 2009. "Over 800 Invasive Lionfish Are Caught in Half a Day." P. 1 and P. 10.

[345] For a brief discussion of research animals and totem animals in bioscientific research see, Thompson, Charis. 2010. "Asian Regeneration?: Nationalism and Internationalism in Stem Cell Research." *Asian Biotech*. Forthcoming. Aihwa Ong and Nancy Chen, Eds.

Chapter 7. Conclusion: channels to global markets, channels through environmental problems



Sunset over Current, Eleuthera, photo by author, 2008.

In these chapters, I have followed Mol and Law (2002) in wanting to "make a space, define outlines, sketch contours- and then to walk through what has been laid out."[346] As has been made evident, there is no one unified scheme or theory that this work represents or presents, no one field or concise problem. Instead, this has been an effort to trace the form of recent phenomena made manifest in The Bahamas today, and the chapters can be seen as some partial examples of this confluence of practices and events. Yet there are real threads that unite this work that I hope have become clear. The Bahamas is a field site for scientific research that is made possible and meaningful because of the continual play of arrivals and visitors to the islands, and this play is most visibly concretized by the current practices of the tourism industry, of which the sciences are a part. As the Ministry of Tourism knows very well, and as officials will not hesitate to tell you, without "honest tourism," The Bahamas would not exist as a sovereign state, would not have a nationalistic sensibility, would not be one of the most

[346] Mol, Annemarie & John Law. 2002. "Complexities: An Introduction." *Complexities: Social Studies of Knowledge Practices*. Duke University Press. P. 7.

accessible and visitable places in the Caribbean, would not be on the map. What I have found fascinating is that the reverse is also becoming true in this archipelago- the traveling life sciences are actively involved in providing an alternative language for defining what these islands are, what islandness is, who island people are, and how residents and visitors relate and are related to the non human world. The Bahamas is has always been an evolving destination, and this destination is becoming more vulnerable and biocomplex. This has the potential to be a powerfully creative conjuncture. Tourism needs a new language with which to describe The Bahamas in the constant game of differentiation involving global markets, repeating islands, and non place spaces, and the sciences provide a possible option, a path to take, a channel.

So in the living laboratory of The Bahamas biocomplexity is a channel, but it is also a form of conscripting sociality, and as I hope to have shown, this has implications for those who call The Bahamas home, for those whose lives are in part determined by all the accumulated generations of visitation and constantly remade anew. I have argued that social assessment has become a particular and complex demonstration of socially robust knowledge in natural resource management and in expanding conceptions of the scope of biological science. The practicality of assessment, the "concreteness" of it, the science of it, makes it authoritative, even when it is a simplification. The point is not just that assessment simplifies how people actually live into a small number of odd and contingent variables, though that is always a critique, the point is that assessment is also the demonstration and internalization of particular notions of human nature and value into a holistic cosmology that excludes alternative forms. Assessment attempts to put these internalizations to work in arenas that are increasingly programmatic of social policy within environmental management and development decisions and increasingly productive of valuation within entrepreneurial designs.

Related to this, one thread I have loosely mentioned in many of these chapters is that anthropologists are increasingly seen as the authoritative site for collecting research about local people and disseminating the results of that research within research projects in order to responsibly integrate management decisions into local lives and local livelihoods into management plans.[347] This is in some sense the sort of work I was asked to do in The Bahamas- to produce information which might influence policy or perception, to imbue zoe with bios, so to speak. By now I hope that I have shown that producing information about nature/culture relationships is always a potentially fraught endeavor on a number of levels, no matter how cutting-edge the research or how socially responsible the intent. Another role for an environmentally oriented anthropology- concerned as we should be with complicating and exploding notions of nature/culture- a role that exists alongside that of targeting and integrating local people, has been the investigation of the demonstration and orchestration of socialities and naturalizations within institutional settings. This attention highlights the implications of design. In this dissertation, designs have been made in the name of biocomplexity research, tourism development, island education, science history, and fisheries management, creating new conceptions of that management, of notions of life, of scientific collaboration, and of the understanding of "environmental" problems.

An anthropological attention to biocomplex productions, then, is not an attention to "new" environmental problems. Instead, it involves the recognition that ideas of environment are scientifically produced through specific emergent processes that evolve and which are at their core ideas about life and human life and how to conceive of and manage this life.

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[347] There are those who argue that anthropology and social science are not included *enough* in scientific endeavors, and I would agree with that too.

Anthropologists should not take designations of environmental problems for granted, nor should they necessarily take them at face value. The opportunities for collaboration are increased if anthropologists are careful about the stakes and terms they choose to engage with and if they are conscious that they are participating in designed situations wherein forms of exclusion and inclusion are based in scientific research. This research must be recognized as potentially creative of new forms, figures, fractures, and holisms, as well as of potential unnoticed exclusions and management tyrannies.

Charis Thompson has said that "science is everywhere and nowhere all at once," and I think that this is an appropriate sense of the living laboratory.[348] Her work also highlights the regional and local differences in the way that science is practiced and recognized as science. Science operates within patterns and on patterns, within problem spaces and on problem spaces, and as I have shown, science has always been a large author of Caribbean questions. The living laboratory of The Bahamas is such a milieu for the operation of scientific practices, and its one that you can visit.

[348] Thompson, Charis. 2010. "Asian Regeneration?: Nationalism and Internationalism in Stem Cell Research." *Asian Biotech*. Forthcoming. Aihwa Ong and Nancy Chen, Eds. P. 129.

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