Chapter 5
Environmental Crisis and the Production of Alternatives: Conservation Practice(s) in the Galapagos Islands

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Introduction: Environmental Crisis and Conservation in the Galapagos Islands

Few causes seem to mobilize support today like biodiversity conservation. The United Nations named 2010 as the International Year of Biodiversity in recognition of the rapid rate of species extinction. Monitoring programs such as the online Encyclopedia of Life (EOL), founded by biologist E. O. Wilson, represent efforts across the globe to provide a digital compendium of conservation that accumulates and makes accessible scientific knowledge about all existing species and identifies those most at risk. And concern over biodiversity as a resource at risk—ecologically and economically vital, finite, and threatened by human activities—has also led to an explosion of environmental advocacy institutions, governmental and nongovernmental organizations (NGOs), and programs regulating the effects of human activity on nonhuman species (Sodikoff 2012).

Thus, it is not surprising that recent accounts on the state of conservation in the Galapagos Islands have stirred heated discussions about the future of conservation practice. For example, in a recent article in *Science* titled "Embracing Invasives" (Vince 2011), Mark Gardener, head of the Division of Terrestrial Science at the

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Charles Darwin Research Station (CDRS), the longest established research facility on the islands, is quoted as saying that "it's time to embrace the aliens" and that conservationists need to recognize the futility of chasing "original" landscapes and "optimize these new ecosystems." Vince's article generated a backlash of criticism against both Mark Gardener and the idea of accepting invasive species. As Vince herself suggests in the *Science* piece:

> …Gardener's decision to abandon the fight to preserve and restore indigenous-only species here has caused shock waves among the venerable members of the Charles Darwin Foundation, the 50-year-old organization that runs CDRS, with many of the old guard "very upset by the idea," Gardener says. William Laurance, a conservation ecologist at James Cook University in Cairns, Australia, is also concerned: "If people want to resign themselves to managing novel ecosystems—and it sounds like that's the reality they face on the Galapagos—then what we're doing is homogenizing the world's biota; setting the world on a geological epoch: the Homogocene."

Science's article and the ensuing debate highlight how concerns over change, continuity, and crisis dominate debates about the state of conservation and the need for action in Galapagos—a moral imperative. Conceptually, these "moral geographies" (Bryant 2001), or the spatial envisioning of what are believed to be proper ways of knowing, regulating, and acting upon how humans relate to nature, shape conservation decisions and effects. Solutions to biodiversity loss often lead with notions of scarcity and loss that are treated as objective quantitative categories, when they are actually normative qualifications that award moral standing and relative value within specific historical and geographical contexts (Escobar 1995; Leopold 1949; Neumann 2004; Peet and Watts 2006).

In Galapagos, a more nuanced approach to environmental crisis is necessary. The *Science* article cited above repeats a well-known rendering of the proper relationship between humans and nature, one where introduced species should be rejected, pristine landscapes protected, and original species or systems kept free of humans (Agrawal and Sawyer 2001; Cronon 1995; Holt 2005). This rendering ignores context, history, and social needs, all of which shape the social construction of biodiversity conservation and the impossibilities of making a purely scientific evaluation (Braun 1997; West 2006). As of 2011, 25,000 people live on the islands, due to a combination of homesteading programs in the 1950s and the attractiveness of the more recent, burgeoning tourism industry. Regional institutions and conservationists have presented conservation as an expost facto attempt to limit the presence of human residents (Quiroga 2009), while Galapagos residents insist that they have rights to the islands and could be co-caretakers of well-managed, biodiverse landscapes.

A closer look at the conservation landscape in Galapagos suggests that there is much more to the current story than a debate about whether conservation of original landscapes and species has reached a crisis or not. In this chapter, we offer an alternative reading of the state of conservation in Galapagos, based upon research on the terrestrial areas of the archipelago. Drawing on political ecology insights, we propose that conservation practices have multiplied and adapted to diverse locations, specializing in particular sites such that there is not *one* approach to conservation

but several, all of which sit in uneasy and unequal but productive tension together. These approaches incorporate perspectives from a diversity of groups, partnerships, and interests within the islands as well as with mainland Ecuador and beyond (Ospina and Falconi 2007). From eradication programs and policing of boundaries between people and protected areas to the recognition of multifunctional landscapes, conservation has taken many forms and engaged distinct views, interests, and actors. This somewhat chaotic, contested cobbling of approaches to conservation is not, however, indicative of failure (cf. Simberloff et al. 2011); rather, it is the product of negotiation, resistance, dispute, and accommodation between local residents, resource users, scientists, and park officials, some of whom now publicly acknowledge the need for a conservation science that does not separate humans from nature in an attempt to preserve valuable ecosystems (Gonzalez et al. 2008). Just as in nature, there may be value in diversity for conservation policy and science as well.

We make two additional arguments about this multiplicity of conservation. First, the diversity in conservation approaches is a product of struggles over governance. Clashes between those who have different visions of conservation and development have historically produced periods of extreme tension. For example, in demanding better access to marine resources, fishermen have gone on strike: in 1994, the national park offices were invaded and vehicles lit on fire; in 1997, strikes again threatened governance; in 1999, the house of the director of the Galapagos National Park Service (GNPS) was torched; and in 2001, violent confrontations took place between residents and park representatives. These moments do not represent either scientific disputes or "riots of the belly" where people protest conditions of bare necessity (Thompson 1971). By almost any measure, life in Galapagos is considerably easier, more secure, and better off than life on the mainland. Rather, the conflicts point to the struggles and negotiations between different views on the ideal use of and access to resources. As political ecologists suggest, labeling these at-times-violent struggles as *the* problem does not offer a resolution to crisis. Instead, these moments should be examined as ways in which aspects of political life are taken up and reconfigured through environmental claims; struggles over environment are simultaneously struggles over social identity, belonging and exclusion, and rights (for example, see Peet, Robbins and Watts 2011).

Second, conflicts provide the potential for resolution. Moments of extreme tension—what are dubbed "crises" locally and in the popular press—become potentially generative times and spaces in which new attitudes, alliances, resources, and approaches have been discovered and partnerships made. It is during the aftermath of "crisis" that negotiations between different interest groups have been most evident. And each negotiation has its particular spatial and social characteristics, representing distinct ethical complexities.

This chapter draws on field research conducted during the summers of 2007, 2008, 2009, and 2011 to elaborate on the state of conservation practice in Galapagos. The coauthors interviewed 105 local residents, including farmers, fishermen, tourism providers, municipal leaders and administrators, employees and officials with the Galapagos National Park, local organizations, and conservationists with different agencies, including the Charles Darwin Research Station.

These interviews were transcribed, written out, and analyzed for dominant themes and perspectives. All direct quotes are presented anonymously to protect the identities of research participants as promised. In the case of quotes from highly visible figures, such as park officials and local politicians, we indicate the use of real names. In addition to the interviews, we attended meetings, visited farms, analyzed farmers' markets, and observed people at work in various occupations.

The next section of this chapter presents our theoretical framework for thinking through crisis as both constituting and constitutive of change. We discuss the specific role that crisis has played in creating new spaces for conservation during the brief history of the Galapagos National Park, which celebrated its 50th anniversary in 2009. We then elaborate on what those spaces look like by discussing four different conservation approaches at work in the islands today. The four projects include: (1) the project to eradicate goats introduced in large numbers on the island of Isabela, which was widely hailed as a successful one that established a clear separation between the park and human-occupied areas; (2) the Galapagos National Park's Plan for Total Control, which focuses on monitoring the spread of invasives across the border between the protected areas of the reserve and the inhabited farmland; (3) the project from the Charles Darwin Research Station to calculate the human footprints of different actors or groups across the islands, which represented the station's efforts to become more involved with social issues; and (4) projects promoted by both the municipalities of San Cristobal and Santa Cruz as well as a local nongovernmental organization called FUNDAR (Foundation for Alternative Responsible Development) geared toward increasing organic and agroecological farming practices that together would constitute "working landscapes" along the border between the agricultural areas and the park.

We use these projects as windows onto the diversity of conservation as it is taken up in distinct sites, rather than as an attempt to describe or represent conservation in its entirety.

Background: The Galapagos as a Case Study of Conservation

The Galapagos Islands are widely known for their biological uniqueness and natural beauty. Free of humans and predators for most of their history, these "enchanted islands" have developed some of the most unique life-forms on the planet, highly adapted to their harsh surroundings and living in ecological isolation. It was not until Charles Darwin's famous visit in 1835, however (a visit which helped inspire the theory of evolution by natural selection), that this archipelago began to receive international recognition. In 1959, the Galapagos National Park was formed, and in 1973, the archipelago was incorporated as the twenty-second province of Ecuador.[1]

[1] State-government representation in the archipelago includes rural associations, municipal governments, and governorship.

UNESCO designated the Galapagos as a World Natural Heritage Site in 1978 to honor the "outstanding universal value" of the "magnificent and unique" natural features of the islands and to ensure their conservation for future generations.

Over the past three decades, dramatic changes have occurred in the terrestrial and marine ecosystems of the Galapagos. As a result of the international recognition and popularity of their unusual and endemic species (e.g., giant tortoises, marine iguanas, and ground finches), the Galapagos Islands have become home to a rapidly growing ecotourism industry. In 1990, the number of visitors to the islands was 40,000, and by 2010, the number had increased to 190,000. Since the 1970s, the islands have also drawn thousands of new residents attracted by the promise of lucrative opportunities linked to construction and tourism. From 1990 to 2001, Galapagos province had the highest population growth rate in the country at approximately 6%. For these new residents, the promise of profits was a welcome change from economic crisis, social upheaval, and political volatility on the mainland.[2]

By 1999, Ecuador's GDP was nearly equal to its debt load (at $13.75 billion), poverty was at 40%, and nationwide unemployment increased to 15% (Jokisch and Pribilsky 2002, p. 76), considerably higher than unemployment in the Galapagos Islands (Ospina 2006). Increasing numbers of Ecuadorians moved into the coastal communities and highland agricultural zones that comprise the 3% of the archipelago that is available for habitation (Boersma et al. 2005). In a place valued by many for its unique landscapes and biodiversity, demographic growth and economic development are seen as "invasive" or as resulting in the spread of unwanted species (introduced flora and fauna such as blackberry, guava, and goats). Concerns about the spread of invasives and fear for the survival of native species have historically led to fortress conservation policies that pit local inhabitants—Galapagueños—against GNP authorities and conservation scientists (Macdonald 1997). Farmers and fishermen argue that they, as residents of the islands, have rights to the resources. But conservation scientists affiliated with the CDRS and World Wildlife Fund and employees with the GNP have argued that more stringent regulations and effective sanctions are necessary because the growth of the local population and local economies—associated with the growth in tourism and fisheries—leads to unprecedented overharvesting of resources, pollution, habitat change, and introduction of invasive species (Watkins and Cruz 2007).

These kinds of socio-environmental conflicts have reshaped the nature of the debate on the islands, in part because the conflicts themselves have led to the production of new laws to regulate human–society relations in the Galapagos. The increase in population prompted a UN investigation in 1996, upon which the

[2] Ecuador fought a costly border war with Peru in 1995 and bled another US$2 billion in economic damages from El Niño floods in 1997–1998, which crippled banana exports and infrastructure. In addition, the price for petroleum, Ecuador's most lucrative export, fell to a near record low about that time. In early 1999, then-president Jamil Mahuad consolidated, closed or bailed out 16 financial institutions during a banking crisis, and antagonized the citizenry by freezing the majority of bank accounts (in an effort to stop capital flight) and agreeing to dollarize the economy as a concession to the IMF (the sucre as a result was devalued 66%).

islands almost lost their World Heritage status, but the Ecuadorian government enacted special legislation—the *Special Law for Galapagos*—to more tightly control human migration from the mainland and the introduction of invasive species to Galapagos. As a recent director of the Charles Darwin Research Center said, the Special Law was "more of a vision than a law"; it attempted to resolve the growing tensions between conservation and development by restricting migration to the islands, fortifying the existing institutional structure, and implementing new channels for participatory management. Under the umbrella of the Special Law, the Galapagos Marine Reserve was created in 2001 to regulate the extraction of marine resources in the islands. The Special Law provides a legal comanagement framework through which state institutions, the GNP, and local actors negotiate conflicting interests over marine resources. The law also provided more resources for the island residents and administrators, as all non-Galapagos visitors were subsequently required to pay a US$100 entrance fee. This money is divided between the Galapagos National Park (45%), the municipalities of each island (25%), the town mayors (10%), INGALA (10%), SIGAL (5%), and the armed forces (5%). These actions were received favorably by UNESCO, and the committee agreed not to revoke World Heritage status. Between 1998 and 1999, UNESCO approved over US$4 million in funding for the park.

Less than a decade later, however, the islands were in trouble again. On April 10, 2007, the Galapagos Islands were officially declared to be "at risk" and UNESCO placed the archipelago on its list of World Heritage Sites in danger. Ecuador's President, Rafael Correa, publicly decried the "institutional, environmental, and social crisis" that plagued the islands and declared that conservation would become a "national priority."[3] We elaborate more on the nature and result of this crisis in the sections that follow.

Pulp Fictions of Conservation: A Theoretical Framework

In her analysis of indigeneity in Brazil (1998), anthropologist Alcida Ramos draws on the term "pulp fictions" to elaborate on the complex ways in which identifications are negotiated even as unequal power relations shape the terrain upon which representations do their work. In Ramos' case, superstitions, myths, and romantic idealizations of indigenous peoples in Brazil represent collectively held beliefs about the "proper" and moral relationship between different categories of humans and nature. The belief that indigenous peoples are natural stewards of the land is a discourse that is widely accepted by those who equate indigenous peoples with "raw nature." The underside of this belief is that indigenous peoples are "wild" and untamed, not responsible for what they do and not entirely capable of negotiating

[3] For news reports of President Correa's statement, see http://news.bbc.co.uk/2/hi/americas/6543653.stm.

the modern world. Although this discourse is essentializing, it can be strategic; indigenous groups also appropriate the narratives of "raw nature" as a tool in the fight to control territory. How the discourse works—or what work it performs—depends on the sociopolitical context and the relations between different actors engaged in its production and consumption.

We borrow this conceptual strategy to elaborate a similar argument about conservation in Galapagos: conservation policies inherently represent a perspective on the appropriate relationship between people and the environment. These perspectives are fueled by different interests that struggle for physical and symbolic space such that what appear to be clear and straightforward "problems" (e.g., goats and blackberry take over landscapes and thus must be eradicated) are actually intensely disputed renderings of socio-natural relationships. Different institutions and groups have different perspectives on the relationship between humans and nature, and so conservation necessarily has multiple meanings. Just as the myth of the noble savage became something different for different groups in the Brazilian Amazon, solutions to resolve the environmental crisis in the Galapagos are adapted and modified through their engagements with local scientists, managers, residents, and target species. Mixed results or unexpected developments remind us that there is no guarantee of the appropriateness of one conservation approach over others in such a diverse and dynamic archipelago (Atkinson et al. 2008; Gardener et al. 2010b). As declarations of ecological crises become more frequent in light of contemporary threats such as climate change and biodiversity loss, our goal is to contribute to the development of approaches that facilitate comparative analysis and a better understanding of crisis as a discourse, a space, and a site for the negotiation of new positions, identities, and frameworks for governance.

Political and human ecologists have highlighted the subjective nature of crises such as natural hazards: the experience and evaluation of any given "crisis event" depends in part on a person or group's relative exposure to risk (Blaikie et al 1994; Pelling 2003). Ultimately, it is clear that a crisis does not exist objectively, independent of humans: a crisis is a relationship between humans and their environment and between individuals with differential political power. With all of the rich studies investigating the nature and causes of environmental crises, there has been less systematic research on crises as a set of productive processes. Environmental "crises" are moments of conflict around human–environment relations that demand urgent action for a resolution. In response, the language, methods, and strategies of quantifiable conservation science are commonly used to frame the need for disciplining an "unruly terrain" that requires management and intervention (Crush 1995). A dominant discourse emerges which presents the causes, consequences, and correctives for the crisis. Although most media reports and official communications reiterate this discourse—through representations of loss, chaos, and devastation (cf. Bassett and Zuéli 2000)—there are, of course, other competing understandings of the problems and solutions associated with the crisis situation. As in the Galapagos, these views are based in differing ways of knowing and perceiving the situation, shaped by a multitude of interrelated factors, including people's relationship to the resource base and their political, economic, and sociocultural position

(Lu, Valdivia and Wolford forthcoming). Thus, crisis should not be taken as given but deconstructed to enable the incorporation of different possible interpretations and experiences.

Oftentimes, crises are formalized through a commonsensical discourse of "better governance" (the diversity of opinions notwithstanding) based on the identification of a suitable knowledge base and definition of the dynamics of causality, effects, and remedy; the next step is the management phase. Political maneuverings result in laws and policies that start to effect tangible and concrete changes and impacts in people's lives and the landscape. Environmental management practices that draw on notions of resource scarcity often see crises emerging from institutional failures, that is, from breakdowns associated with the regulation of society and territory, such as tenure insecurity, weak political institutions leading to open access, and inability to achieve the collective action needed for conservation (Hardin 1968; Ostrom and Nagendra 2006; Guyer and Peters 1987; Turner 1999). It is often in moments of crisis that new spatialities of management—or conservation territories—are delineated, organized, and regulated in an effort to govern human–environment relations. In what follows, we show how ongoing crises in the Galapagos have been translated into mandates for action and better governance.

The Production of Policy: Four Different Attempts to Manage Ecological Crisis

The Special Law of 1998 brought more money to the park and local residents and, according to park administrators, was responsible for enabling the restructuring of the park administration and training of employees and administrators. The ongoing crisis on the islands was explained to us variably in 2007 and 2008 as a "perfect storm" of machinations on the mainland, the chaos of the short-lived presidency of Gutierrez, institutional overload, rising demand in the form of tourism, and demographic pressure (see Lu, Valdivia and Wolford forthcoming).

The UNESCO designation of the islands as a World Heritage Site "in danger" came on the heels of unrest already occurring on the islands and local attempts to refashion the primary institution on the islands responsible for administration and oversight: the Galapagos National Park Service (GNPS). One GNP manager argued that the new management plan for the GNPS came out of a "terrible moment of crisis" that began as early as 2003. The GNPS had historically been the focal point for tensions on the islands as local residents argued that the park service was overly punitive in restricting access to living space and natural resources (in our interviews with local residents, this complaint was still very evident). In an attempt to attend to these tensions and negative perceptions, the GNPS organized community meetings to discuss its own structure and potential reorganization. The meetings brought together local residents and officials; a total of over 400 people met between 2004 and 2006. While the focus of the GNPS remains the conservation of the "indigenous environment of the islands," many of its policies emphasize sustainable livelihoods and conservation.

When Rafael Correa was elected president in 2006, his call for a new constitution provided further opportunity for the restructuring of the GNP. According to interviewees, new components of the park management plan outline the need for participatory conservation methods as well as a more technical section that provides the institutional support for park guards and managers to receive training or professionalization so that the GNP no longer has to depend on external institutions such as the Charles Darwin Research Station for scientific guidance; as we elaborate below, CDRS is the research arm of the Belgian-based Charles Darwin Foundation (CDF). As a park service administrator said, "before, we used to monitor penguins just because we were told to monitor them and now we monitor them because we know they're an important part of the ecosystem."

The park service still does not have enough staff, which forces employees to negotiate conservation priorities on the ground "as they go." The head of park management emphasized the park's "mistica de trabajo" (work culture) with single individuals in charge of multiple areas and not enough *piernas* (legs, or people). He expressed hope for the implementation of the new management plan of 2005, which provides the conceptual and technical tools to create more partnerships between park and people and local institutions. These partnerships do not constitute formal targets, as they might have in the past, rather the new plan privileges process over specific deliverables; the plan "…doesn't have deadlines, we will construct the plan as we go." The focus on process complements a parallel move away from species' specific conservation efforts to more ecosystem management. Interviewees suggested that a growing number of park employees believed that the time had come to focus on restoration and control rather than eradication: "time to start putting things in [not just tearing them out]." A former park director argued that the park could focus on eradication in other [uninhabited] islands but should strive for *control* in inhabited/large ones.

The focus on process, ecosystems, and control necessarily implies greater collaboration with local residents. The Special Law provided the *impetus* to form committees of farmers and park employees who would meet to discuss invasive species eradication and control on private land, but it is the new management plan that provides the institutional *tools* for doing so. Additionally, there is a normative shift as park employees increasingly recognize the value of participatory management, emphasizing that the park needs to be visible in the community. Organizers with local associations largely agree that the park is now working with formerly marginalized residents, such as farmers, and is more responsive although there are still "hard liners" who argue that the park should not be involved in "social" issues. Even leaders of the fishing cooperatives agree that participation could work. The president of one of the main fishing cooperatives on San Cristobal argued in 2009 that the new leaders of the park were more open to dialogue, and so the fishermen were trying to not strike or actively protest but were waiting to see whether collaboration would work. The president argued that the fishermen and the park were natural partners in conservation, but they needed to find approaches that would allow the fishermen to be "productive."

At the same time, the main scientific unit on the islands, the Charles Darwin Research Station, also saw the crisis of 2007 and the "at-risk" designation as a sign

that more social science was necessary. The CDRS is the research branch of the Charles Darwin Foundation, a Belgian-based, international nonprofit organization founded in 1959. Its mission is to "provide knowledge and assistance through scientific research and complementary action to ensure the conservation of the environment and biodiversity in the Galapagos Archipelago."[4] To that end, the CDRS was created in 1964 and located on the main populated island of Santa Cruz. The station has approximately 120 affiliated staff and researchers who gather and disseminate scientific data on biodiversity, climate change, ecological restoration, and more. The station also operates several internationally famous tortoise breeding and repatriation programs. In 2008, over 270 scientists worked at the station in various temporary capacities. The station's activities are funded by governmental organizations (22% of total funding in 2007), sales of services and goods (20% of total funding in 2007), and private charitable donations (58% of total funding in 2007).[5] Until recently, it was widely argued that the station neglected study of the social or human environment. A former employee of the station said that the station studied and watched over the protected areas and that the problems in the social sector were seen as not as serious and knowledge of the underlying issues was idiosyncratic and anecdotal, not systematic.

In an attempt to negotiate the tension between conservation and development in response to the at-risk designation, there are now an increasing number of policies and programs intended to promote conservation. Some of these new programs rely on participation, and some continue the focus on territorial management, with strict separations between protected and residential zones. In what follows, we describe four different sites of conservation. Evolving over time, shaped by various moments of crisis, the four conservation sites are stitched together unequally, with vested interests supporting each one. The alliances that support each approach are in constant flux, as the interests and actors involved are negotiating, shifting, and making things up as they go—even as they work in a broader structural context that itself moves beneath their feet. For example, the notion of "working farm landscapes" supported by a local grassroots organization FUNDAR had very little space on the islands. The organization was sustained mostly by the enthusiasm and dedication of a small staff, and their work represented a significant divergence from other institutions that were geared more toward conservation than livelihoods. In 2009, however, the NGO received US$3 million in funding from the European Union, and the increased revenue plus the general shift within the park toward an acceptance of farmscapes as potential conservation landscapes has given the organization a more substantial profile on the islands. Increasingly, FUNDAR has gone from a relatively marginal and radical institution to one that actively collaborates with the park and the station on participatory projects such as household recycling and anti-dengue campaigns.

[4] See the CDRS website at http://www.darwinfoundation.org/english/pages/interna.php?txtCodiInfo=3.

[5] See the 2007 Annual report, p. 40, at http://www.darwinfoundation.org/english/_upload/anual_report_2007_1.pdf.

These three institutions—the GNPS, the CDRS, and FUNDAR—form part of the web of governance that runs through the following examples of attempts to negotiate the crisis of 2007.

Invasive Species Eradication

Eradication refers to the elimination of every individual of a species from an area in which recolonization is unlikely to occur (Myers et al. 1998). The project to remove goats from the island of Isabela is a paradigmatic example of conservation as eradication.[6] This project, known as "the Isabela Project," began when funders of the Charles Darwin Foundation realized the extent of the goat problem on the largest inhabited island. Seen as a moral imperative to "save" nature, the Isabela Project articulates a clearly spatialized hierarchy of idealized positions, fixed in both time and place. Isabela is an island that conservationists value because it is still almost entirely "intact." The CDF began to focus attention on the goat problem in 1995, and in 1997, the Galapagos National Park together with the CDF held an international meeting with scientists who had worked in similar ecosystems. These scientists were recruited to help brainstorm ways of addressing goat eradication and ecosystem renewal. As one of the leaders of the project said, "We put out a call to the world and said, we're the Galapagos and we need help." Scientists responded, with over two dozen people in attendance from Australia, New Zealand, Argentina, the USA, Europe, and more. Several ideas were discussed and rejected. One idea was the classic biological approach of introducing plants with hormones that when ingested by the goats would cause sterility. This idea was rejected because, once sterile, the goats would still have many years ahead of them during which native plants would be eaten with voracity. Another idea floated was to bring in the Ecuadorian military to hunt the goats, but this was rejected because it was physically difficult to navigate the terrain and vegetation on the northern end of the island. It was also, as the former project leader cited above said, difficult to trust people you did not know because "who knows what they might do to a tortoise?" A third idea brought up by local residents was to hire local fishermen and hunters to kill the goats; this idea was favored by the residents because they could eat the goat meat and be paid for their labor, but it was rejected on the grounds that it would take too long and be subject to the same problems as the military eradication proposal.

In the end, after an intense week of discussions, the idea settled upon was to bring in advanced-warfare helicopters and trained sharpshooters who would take down the goats from the air. Most of the goats would be easily located by sight, but the rest would be tracked down with the use of Judas goats equipped with GPS monitors so that when these unwitting traitors found hidden goat communities, the helicopters would be close behind. Many of the Judas goats were females who had

[6] See http://www.darwinfoundation.org/english/_upload/isabela_atlas.pdf.

been given hormones to send off mating signals to unsuspecting males. This high-tech project was funded through an international collaboration that brought together the two island institutions—the GNP and the CDF—with USAID, the World Bank, the Global Environment Facility, Zanders Sporting Goods (for the automatic weapons), and several smaller donors. A total of 140,000 goats were killed over 2 years with approximately US$18 million in funding. Although perhaps an extreme example, the Isabela Project illustrates the attempt to separate life-worlds—humans from the environment and invasives from the pristine realm of the "untouched" landscape (untouched except for the marauding goats that were exterminated for being in the wrong place at the wrong time).

Control of Invasive Plant Species

Blackberry (*Rubus niveus*) and guava (*Psidium guajava*) are considered two of the most problematic introduced plant species in Galapagos due to their aggressive reproductive strategies. Gardener et al. (2010a, b) suggest that, in the rural areas of Galapagos, complete eradication of these species might not be possible due to excessive cost and limited access to private lands. Instead, "indefinite" control and containment of the extent and location of invasion might be the most viable solution. Since 2008, the Galapagos National Park Service has worked with farmers to provide tools, herbicides, training, and educational programs that will allow them to recognize and treat invasive species on their land. This "invasive-maintenance" project falls under the new GNPS Plan for Total Control, which places high priority on the transition area between the park limits and the inhabited areas.[7]As of the summer of 2009, eight households were participating in this project, but many more were expected to sign up in the coming months. The project is a three-way collaboration: the GNPS provides the training, tools, and chemicals (approximately US$70,000 as of July 2009), the municipality provides money for refreshments, and the farmers provide their labor. According to the head of the Resources Division at the park, the GNPS now works most aggressively around the urban areas and in the zones of "impact reduction" surrounding the agricultural and livestock areas in the highlands. The GNPS also now considers it a priority to support land use practices in the agricultural areas that might help to control the spread of invasive species. According to the GNPS document outlining its new approach, there is now a consensus among Galapagos institutional actors that agricultural policies need to be designed that take into account the "multifunctional and multidimensional role of agriculture" and promote sustainable rural livelihoods (SIPAE 2006: 4–6). As such, the GNPS now supports the following policies: the transfer of technologies applicable to the ecological conditions of the islands, fostering ecologically sensitive

[7] See the somewhat dated project description at http://www.Galapagospark.org/programas/desarrollo_sustentable_agropecuario_especies_invasoras.html.

production for both subsistence and profit, strengthening the institutional and associative structures within the agricultural sector, and controlling and eradicating the species and pests that affect agriculture, while helping farmers to manage and restore key soil, water, and energy systems.

In many ways, this project situates the conservation work of the GNP in new areas; the park is acting outside of its direct spatial jurisdiction (the 97% of the terrestrial area of the archipelago that is protected) to shape practices in the private properties under the governance of local municipalities. And yet, the change is not as drastic as it appears; the park is not conceptually reworking the border between nature and society as much as it is physically and symbolically moving that border forward by several hundred meters to include the farmland in the protected areas of the reserve.

Ecological Footprints

While the previous two examples focus on target species, other conservation approaches focus on human activity. A focus on self-regulation is fundamental to this approach. Of all the institutions on the islands, the CDRS is probably most emblematic of a "fortress conservation" approach that separates humans and the environment. When pushed by the most recent crisis to reevaluate its approach to the social system on the islands, the station began the "Human Footprint" program, which is currently one of the station's three flagship programs.[8] This is a new program designed by Christophe Grenier, the station's first social scientist. Grenier intended to continue the station's tradition of conducting robust, mechanistic science, but instead of studying ecological processes in isolation, he would work to quantify a series of indices for social processes to help different groups on the islands (e.g., taxi drivers, farmers, tourism operators, and restaurant owners), assess, and then self-regulate their environmental footprint.[9] Reflecting a global push toward sustainability, which recognizes the presence and needs of inhabited environments and attempts to balance these with conservation imperatives (Chambers et al. 2000), the Human Footprints project is one of the station's new areas of concern (Mark Gardner, Director of Terrestrial Science, July 25, 2009, personal communication). The station increasingly recognizes the need to incorporate the social system into its analyses, but it is clearly difficult to change gears in practice (Gardener and Grenier 2011).

In November 2008, the organization held a workshop in Galapagos with participants from the various conservation organizations in Galapagos as well as invited international experts in the field of restoration ecology. Over the course of several days, the experts debated projects and programs to foster conservation in and of the highland areas.

[8] http://www.darwinfoundation.org/english/pages/interna.php?txtCodiInfo=85

[9] As of 2010, Grenier is no longer with the Charles Darwin Station.

The final report presented 13 projects, representing the key areas of research for the humid and very humid zones of the inhabited islands. The proposed project areas were grouped under three independent research themes: (1) the spatial distribution, function, and value of different vegetation states; (2) the process of degradation; and (3) a toolbox for restoration. The third theme was the most tightly linked to human activities although the station largely reserved its analysis for abandoned farm lands, arguing that these areas were the primary conduits of invasive species from the inhabited areas to the protected ones. The station's focus on changing human behavior represents a significant shift for the organization; the incorporation of social science reflects a new concern with the ways in which humans connect with the natural world. It is this inseparability that appears as both a potential weakness and strength; if people are intimately embedded in the natural world, they must choose to either destroy it or save it. For the station and for much conservation policy, recognizing the role of humans in protecting the environment means refashioning human subjects to become better stewards.

Rural Environmentality

Agrawal (2005) introduced the term environmentality to describe the institutional and cultural technologies through which individuals develop an environmental consciousness aligned with nature protection, self-regulation, and collective resource governance. Such an approach is currently in place in Galapagos, through new projects that are attempting to bring farmers into closer collaboration with the Galapagos National Park and local grassroots organizations in an effort to align the concerns of agriculture and conservation. On the main inhabited island of Santa Cruz, there are approximately 1,200 farmers who own land in the highland agricultural zone. These farmers are incorporated into three primary towns: Santa Rosa, Bellavista, and Cascajo. There are also several unincorporated communities governed by *juntas* (committees) that sit on the periphery of the agricultural area. The highlands of Santa Cruz are classified as a humid zone (mean annual precipitation of approximately 1,845 mm) with soils up to 1 m deep of basaltic origin, well weathered, and sandy loam in texture (Wilkinson et al. 2005). The native vegetation in the highlands has been cleared for agriculture and grazing. With respect to farming conditions, the highlands receive water during the wet season, but groundwater is scarce and limits the crops that can be grown. Many farmers subsist on extensive cattle ranching although manioc, corn, watermelon, and tree fruits are also common. While most of the farmers have been there for only one generation, some are descendants of the original colonists in the early 1900s (and in the 1800s, although few of the families from that period remain). Land in the agricultural areas of Santa Cruz is privately held, a result of the waves of state-sponsored colonization that took place during the 1960s where the Ecuadorian state allocated 100 ha plots to people willing to come and settle this "national frontier."

Examples of new initiatives with farmers include the agreements with municipalities to reforest a native tree, scalesia (*Scalesia pedunculata*), intercropped with

coffee. A major proponent of these projects is FUNDAR. Created in 2001, FUNDAR is a local Ecuadorian nonprofit organization with a permanent staff of five people. The organization "plans and executes projects for the creation of a new paradigm that integrates conservation and responsible development. We open spaces for discussion, debate and reflection for change. We promote personal development, equality, social and environmental ethics, participation and strengthening of local abilities."[10] FUNDAR is funded primarily by international conservation NGOs such as the World Wildlife Fund and the Nature Conservancy, but as mentioned earlier, the organization received a large grant from the European Union in 2008 to work on sustainable agriculture projects with local farmers. This project centers on a community garden within a nature preserve (called Pájaro Brujo) located in the agricultural highlands and maintained by FUNDAR in which agroecological production methods are used to grow vegetables and trainings in these methods are provided to local farmers.

By the summer of 2011, several families had participated in the garden project. FUNDAR activists were also hoping to create a local farmers' market for organic produce to instill local pride in fresh, local produce and to make agriculture a viable activity for both conservation and development. Without the option of making a profit from farming, there is no future for the sector. The majority of small farms are run by elderly people subsisting off of retirement funds and farming because it is a way of life, rather than a way of making a living. As one of the directors of FUNDAR said in 2011:

> The agricultural zone is key because of the need for capacity building and the role [the farmland] plays in invasive species. Farmers don't have training, they prefer to sell lands rather than work them… Owners of some of the small farms came here in the 20s, 30s, and 40s… They were the first colonizers, brought here by the government for territorial presence and national security. They got received 100 hectares each. But these were poor people, with little fluid capital, and they lacked the sufficient economic resources to manage so much land. They did what they could, and the rest of the area became prone to invasive species. People saw the benefit of selling part of the land, subdividing it to sell to foreigners for the "vacation farms." Agriculturalists are land rich but money poor. The agricultural zone will be lost over time.

Park officials argued that it was difficult to get permission to work in the farm areas, and it is only recently that collaboration has become easier. More money from local economies and administrative resources is being put into farmland conservation projects, usually done through agreements with local municipal leaders or associations. The agreements are what allow the work to go forward: "Otherwise, we wouldn't be able to do anything." These projects present the farmland of the islands as multifunctional, working landscapes wherein nature and society are mutually constituted in everyday practices of digging, planting, raising, and exchanging. It is not clear what kind of articulations these everyday practices are generating, but they represent recognition of the inability to separate

[10] From FUNDAR's website http://www.fundarGalapagos.org/portalj/index.php?option=com_content&task=view&id=12&Itemid=26.

nature and humans, and they give value to the various ways in which livelihoods and biodiversity conservation might emerge together if each were seen as crucial to the other.

Leaving the Conclusion Open: Adaptive Radiation of Conservation Practice?

Conservation policy is often written out in boardrooms, discussed during workshops, or illuminated in laboratories, but it is enacted on the ground and embodied in local people and communities. In Galapagos, new policies are depicted, as in the article by Vince, as either "embracing" invasive species or continuing the fight to eradicate them. This language positions "dirty" or contaminated landscapes against pristine ones and ascribes a scientific value to each (Geist et al. 2011; cf. Raffles 2011). The reality is rarely as neat and effective as the policies on paper.

These brief examples of different conservation policies in Galapagos highlight diverse articulations of knowledge, ecology, and governance. Debates over the "best way" to do conservation on the islands are misleading; in fact, actors from conservationists and park rangers to local tourism operators and farmers are negotiating constantly from different material and social positions to shape policies for particular spaces or resources or people within what are too broadly thought of as "the islands." The multiplicity of these positions has over time given rise to both conflict and temporary resolution manifested in new policies or programs or conservation practices, what we refer to as "pulp fictions" of the appropriate relationship between people and nature. In the case of Project Isabela and the Plan for Total Control, attempts to separate people and nature manifest spatially in borders and high-modern technologies of containment and control. In the case of the Ecological Footprints, attempts to recognize the role of humans while privileging nature manifest in new subjectivities fashioned through the internalization of moral imperatives. In the case of the new agricultural projects promoted by FUNDAR and the GNPS, attempts to integrate humans and nature manifest spatially in diversified working landscapes and living borders. All of these positionings represent ongoing negotiations and temporary resolutions in a space characterized by discourses of crisis. They illustrate the difficulty of characterizing "the" approach to conservation in the islands and suggest that perhaps the archipelago is as much a living laboratory for social science as for the biological sciences.

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