
Fishing Practices in the Galapagos Islands: The Local Struggle Approached Through Two Political Ecology Theses

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Abstract: Overexploitation and illegal fishing continues to be a problem within the Galapagos Marine Reserve. Local compliance regarding conservation initiatives and the regulations governing the access to and use of marine resources is exacerbating these problems. The conservation and control thesis and the degradation and marginalization thesis from political ecology were applied to the current issues in the Marine Reserve as an attempt to understand behaviour motivation. Commonalities among these theses suggest a socio-political struggle where government and international agencies discredit local values and encourage the overexploitation of resources. Future managers should strive to understand and address these motivations; working with and encouraging the inclusion of local communities into management regimes to ultimately ensure compliance, community empowerment, and the long-term sustainable use of marine resources and the integrity of the marine ecosystems in the Galapagos Islands.

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Introduction

The Galapagos Islands are an archipelago belonging to Ecuador, located almost one-thousand kilometres west of the mainland. In the latter decades of the 1900s island residency and tourism grew at an alarming rate. Specifically, the population on the islands rose from approximately 2,000 residents in 1950 to almost 20,000 in 2006. Furthermore, the number of tourists visiting the islands went from approximately 2,000 per year in the late 1970s to an approximate 140,000 in 2006. As a result pressure continues to be placed on the islands' ecosystems because these increases are driving a higher standard of living and a growth in the Galapagos economy, which increases the demand and consumption of goods and services (CDF, GNP & INGALA, 2008).

In spite of growing challenges and economic pressures, the Galapagos Islands have maintained an estimated 95% of their original biodiversity. The islands provide a habitat for many endemic species. The converging oceanic currents also support an array of unique marine species which are estimated to be composed of one-fourth endemic species, or species found nowhere else in the world (Novy, n.d.). Much of the public policy and legal framework regulating the activities related to human population growth and demand have a central focus of conservation. Non-profit organizations that concentrate on conservation and sustainable development play a significant role in maintaining the integrity of the ecosystems (CDF, GNP & INGALA, 2008).

In 1998 the Galapagos Marine Reserve (GMR) was established, which encompasses approximately 138,000 km² of the relevant marine ecosystem (CDF, GNP & INGALA, 2008); this initiative helps govern the activities regarding access to the resources within the reserve. For example, the reserve helps to manage economic activities, including tourism and the artisanal fisheries. The GMR is a significant positive management initiative. Its implementation will help sustain the long-term functioning and integrity of the Galapagos Islands and its marine ecosystems. However, despite these conservation and management initiatives the Galapagos marine ecosystems continue to be degraded and the overharvesting of marine species continues to occur. For example, artisanal fisheries, which are defined by their small-scale implementation and simple technology, are targeting particular species. Furthermore, illegal and unreported fishing activities continue to occur at unsustainable rates (Ruttenberg, 2001; Taylor, Hardner & Stewart, 2008). The Environmental Justice Foundation (2005) estimated that illegal and unreported fishing made up one-third of all catches. Consequently, the overexploitation of target species and the illegal activities are directly affecting marine species by decreasing their abundance, but also indirectly by disrupting the balance of the ecosystem, causing a shift in the trophic level dynamics which has a cascading effect throughout the food web (Ruttenberg, 2001).

This paper examines the socio-political influences driving the current overharvesting and illegal fishing practices in the Galapagos Island marine reserves, which are often overlooked

practices but key aspects of environmental and resource issues. This examination will be achieved through the application of two political ecology theses that examine conservation and control, as well as the degradation and marginalization of small communities regarding the use of their resources. A political ecology framework has been used in previous research as an attempt to better understand processes like political power, economic development, and environmental change that transgress local rights and undermine communities in many different areas throughout the world such as in the Philippines, and countries in Central America and Africa (e.g., Derman & Ferguson, 1995; Escobar, 2006). The two theses within this framework will help guide a more focused application of political ecology as it pertains to the issue of overexploitation, illegal activity, and the degradation of the marine ecosystem in the GMR. Ecotourism will also be discussed as a method currently used to enhance the local economy and livelihood (e.g., Honey, 2008), and to relieve some of the pressure on the marine ecosystems by decreasing the need and reliance on the fisheries beyond the subsistence level. However, ecotourism can bring multiple negative consequences, such as the destruction of fish habitat. Therefore, although it helps alleviate some of the direct threats to the marine ecosystems, ecotourism is not a long-term solution. Other methods need to be implemented that integrate locals' interests so as to promote compliance, as well methods that diversify the local economic and employment opportunities in order to achieve the long-term sustainability and integrity of marine ecosystems while meeting the needs and livelihoods of the local people.

Sea Cucumber Artisanal Fishery

Artisanal fisheries are an endeavour meant for subsistence or small-scale commercial purposes. Although these fisheries tend to employ traditional fishing methods, technologies, and boats, external forces such as global market demands and economic incentives have demanded higher outputs despite their original intent (Ruttenberg, 2001). The exploitation of the sea cucumber is a good example of the consequences of higher output demands in the Galapagos Islands.

The Galapagos Islands' remote location made permanent human settlement unattractive until the late 1900s. The growing interest of the Galapagos as a tourist destination encouraged population migration primarily in the 1980s. However, in the 1990s immigration to the islands was exacerbated by the lucrative export fishery that was approved by Ecuador (Camhi, 1995). The commercial fishery overexploited the sea cucumber populations from the shores of mainland Ecuador. As a result, this fishery was legalized in the Galapagos Islands in the early 1990s. The sea cucumber fishery quickly became the most profitable fishery in the Galapagos Islands. For approximately six years this fishery continued to exploit sea cucumbers at an unsustainable rate until finally its population was critically depleted. Beginning in the later 1990s individuals such as scientists and fishermen would survey the sea cucumber population

in sites around six of the islands where the sea cucumber fishery was legal. After analysing the reports, a total allowable catch (TAC) was set to help manage the fishing efforts; in particular, the amount of sea cucumbers allowed to be harvested. For example, in 2004 the TAC was set at four million individual sea cucumbers with a minimum length of 20 centimetres. During the fishing season that year, two of the fishing grounds were to remain closed because of their significance as nursery grounds for undersized sea cucumbers. However, the artisanal fishing sector made a complaint against these regulations. After much rioting and other incidents the fishing season was postponed but it was decided that one of the proposed area enclosures be opened. As well, the minimum catch length was lowered to seven centimetres (Torral-Granda, 2005). This example provides evidence that the fisheries in the Galapagos Islands are important to the local people and communities as a means of economic gain. Unfortunately, it is unclear whether these individuals or communities are aware of, or understand the negative impacts such as disruptions to the food web or trophic-level dynamics that these over-exploitive fishing practices have on the functioning and integrity of the marine ecosystems. Or is the case a lack of economic and financial opportunities?

Illegal Activity

Illegal fishing activities commonly occur in the Galapagos Islands. For example, the severe depletion of one species of sea cucumbers due to overfishing has encouraged license holders to illegally harvest other sea cucumber species. Furthermore, other non-license holders have been caught with the illegal possession of sea cucumbers. However, illegal activity is extensive, extending beyond the sea cucumber industry. For example, foreign fishing vessels licensed to fish tuna from Taiwan, Japan, Korea, and some Latin American countries have been caught illegally longlining for sharks within the Marine Reserve (Camhi, 1995). Additionally, Ecuadorian fishing vessels have also been caught with the illegal possession of sharks and shark fins. The shark fin industry is lucrative and the demand for the fins in the Asian market is incredibly high, providing little incentive for compliance of policy and legislation (Verlecar, Desai & Dhargalkar, 2007). Despite the designation and intent of the Marine Reserve, the Ecuadorian government has felt the pressure of the global market demands and considered reversing long-standing policies that protected sharks within the Galapagos Islands (CDF, GNP & INGALA, 2008). Fortunately, the direct fishing of sharks remains illegal in the GMR. However, in recent years the Ecuadorian government abolished the prohibition of the use and export of sharks and their fins under the circumstance that sharks were captured as bycatch in a legal fishery. Although the government banned the use of gear and practices that would increase the likelihood of bycatch in other fisheries, the reinstatement of this legislation is controversial and could hinder conservation efforts in the GMR (Galapagos Conservancy, 2007).

Management and Surveillance

The Galapagos National Park Service (GNPS) is an administrative body responsible for the management of the GMR and the natural resources within it. The Marine Control and Surveillance Unit of the GNPS and personnel provided by the Ecuadorian Navy patrol and monitor illegal activities in the Marine Reserve. Patrolling is conducted at sea and in coastal waters, as well as with an air unit. The Reserve and fisheries within the GMR are also controlled by the local level Participatory Management Board (PMB), which regards the users of the GMR, and the national level Inter-Institutional Management Authority (IMA), which implements policies and monitors, evaluates, and approves management plans and strategies for the GMR. The GNPS within this system administers and manages the human use of the GMR (CDF, GNO & INGALA, 2008).

Illegal activity within the GMR is thought to be declining. This abatement may be the result of the established monitoring efforts put forth by the GNPS. However, while it has decreased, illegal activity is still occurring. Furthermore, there is continued overexploitation of marine resources by license holders within the fishery. These behaviours could be occurring as a result of mismanagement or the lack of management regarding access to and the use of resources within the GMR. It could be that there is a lack of incentive or alternative economic opportunities or the knowledge of opportunities for individuals within the local communities. Education and the incorporation of the local input into GMR management decision-making may be necessary to achieve the long-term integrity of the GMR and the sustainable use of its natural resources. The use of political ecology concepts may be beneficial in understanding environmental and resource management problems.

Political Ecology

Political ecology is a tool or framework that can be used to address and understand environmental and resource issues. Political ecology provides an interdisciplinary way of approaching problems that connect politics and economics with environmental control and ecological change. Robbins (2004) states that

political ecology seeks to expose flaws in dominant approaches to the environment favoured by corporate, state, and internal authorities, working to demonstrate the undesirable impacts of policies and market conditions, especially from the point of view of local people, marginal groups, and vulnerable populations. It works to 'denaturalize' certain social and environmental conditions, showing them to be the contingent outcomes of power, and not inevitable. As critical historiography, deconstruction, and myth-busting research, political ecology is a

hatchet, cutting and pruning away the stories, methods, and policies that create pernicious social and environmental outcomes (p. 12).

Robbins also introduces several theses that can be applied to environmental and resource issues with the goal of better understanding the origin or influence of the issue. The conservation and control, and degradation and marginalization theses are going to be discussed in this paper.

Conservation and Control

Robbins (2004) definition of the conservation and control thesis is:

control of resources and landscapes has been wrested from local producers or producer groups (by class, gender, or ethnicity) through the implementation of efforts to preserve 'sustainability', 'community', or 'nature'. In the process, officials and global interests seeking to preserve the 'environment' have disabled local systems of livelihood, production, and socio-political organization. Related work in this area has further demonstrated that where local production practices have historically been productive and relatively benign, they have been characterized as unsustainable by state authorities or other players in the struggle to control resources (p. 150).

The conservation and control thesis is underlined by four theoretical foundations. First, conservation efforts reflect a hegemonic government that has a primary goal of territorializing an area and controlling the communities that surround it. Also, state policies and conservation regimes often disrupt traditional system regulations regarding use and access to resources. The thesis is also underlined by the theory of nature as a social construct that is void of people. This theory is based on the idea that conservation often attempts to create discrete, spatially bound units, which in and of itself is problematic.

Degradation and Marginalization

Robbins (2004) definition of the degradation and marginalization thesis is:

otherwise environmentally innocuous local production systems undergo transition to overexploitation of natural resources on which they depend as a response to state development intervention and/or increasing integration in regional and global markets. They may lead to increasing poverty and, cyclically, increasing overexploitation. Similarly, sustainable community management is hypothesized to become unsustainable as a result of efforts by state authorities or outside firms to enclose traditional collective property or impose new/foreign institutions. Related assertions posit that modernist development efforts to improve the production systems of local people have led contradictorily to decreased sustainability of local practice and a linked decrease in the equity of resource distribution (p. 131).

This thesis is based on two primary assumptions. First of all, once environmental and resource systems reach an undefined threshold, the resilience of that system may decline and the progressive degradation may be almost, if not completely, irreversible. The second assumption is that as a result of competitive global trade, unregulated markets, and declining economic margins, individuals are being forced to extract from the ecological system to balance losses. The pattern is appropriation of resources for capital and a place in the global market. Consequently, however, developing countries often have national debt with global lending agencies, such as the World Bank. As a result the accumulating degradation of the environment and natural resources for debt repayment exacerbates the decline of the economic margin. The cycle continues as countries are unable to repay their debts, further increasing their need to degrade and export their resources for capital.

Applying Conservation and Control

Human population on the Galapagos Islands increased rapidly in the latter half of the 1900s. The growing population was due partially to the overexploited and collapsing fisheries off mainland Ecuador, driving individuals to reside on the islands where the fish populations were plentiful. The increased pressure on the Galapagos marine resources and the indirect pressures of a growing human population generated much concern for the Galapagos' valued marine ecosystems. The designation of the GMR in the late 1900s was a conservation initiative to mitigate increasing pressures. To this day, the GMR attempts to manage and control the activities that occur within it as well as the access and use of its natural resources. However, as indicated overexploitation of marine resources and illegal activity within the Galapagos Islands is increasing. Researchers try to understand this behaviour regarding the conservation initiatives and attempt to control the rights to marine resources.

Conservation efforts aim to define spatial boundaries and maintain direct control over resources. However, resources, particularly marine species, defy spatial boundaries and social and political scale. Unfortunately, attempts at conservation result in locals being denied or receiving only limited access to common resources. In the Galapagos, artisanal fisheries may be used as a means of subsistence and a provider of livelihood for the local communities. Due to the characterised nature of the Galapagos Islands, any use of the resources may be construed as negative. As a result of this characterisation organizations and other authorities come and try to protect the ecosystems and their resources. It is not always the case that locals are being destructive. Unfortunately conservation bodies take a snapshot of the current practices with little regard for the traditional and historical practices and behaviours that are employed by the locals for a means of subsistence and culture. Discrediting traditional practice and shifting local rights over resources likely deters cooperation of conservation efforts. However, if individuals and communities come to understand the premise of conservation efforts—that sustaining the resources into the future is in their best interest—they may be more likely to comply. A community-based conservation initiative where locals can help control and participate in resource management regimes may also be a useful integration tool to increase understanding, cooperation, and compliance.

Ecotourism as Integration

Ecotourism has grown rapidly on the Galapagos Islands during the last two decades of the 1900s, and continues today. Ecotourism is meant to be a small-scale endeavour that allows local inclusion. As was mentioned, ecotourism is the interface at which conservation efforts and educational initiatives are strengthened and local livelihood improved. Also, local communities are able to regain some control over the resources. Furthermore, ecotourism opportunities allow communities to capitalize on their natural resources. Therefore, by integrating local resource users' input into conservation strategies and local participation in the general management of marine resources through ecotourism individuals may be less likely to participate in illegal and over-exploitive behaviour of marine resources (Honey, 2008).

In the mid-1980s Ecuador had agreed to a free-market and structural adjustment policies put in place by the international lending agencies at an attempt for the country to pay off some of their national debt. Therefore, the national government was encouraging ecotourism as it had rapidly grown into a lucrative industry that helped Ecuador with their economic development. Unfortunately, ecotourism does not mitigate overfishing. Ecotourism acts as a promoter for immigration to the islands and the popularity of the Galapagos as a tourist destination (Honey, 2008).

Applying Degradation and Marginalization

As mentioned, in the mid-1980s Ecuador went through a national structural adjustment program. Third world countries are loaned money by the World Bank, the International Monetary Fund (IMF) and other lending agencies as a way of stabilizing their economy. Many countries are unable to repay this debt. As a result, loans are renegotiated on the condition that the countries undertake a structural adjustment program that encourages a liberalized market regime and the export of natural resources (Barlow, 2007; Perreault, 2005). However, as indicated, the mainland fisheries were exploited to collapse, forcing the Ecuador government to open profitable fisheries in the Galapagos Islands. The overexploitation and illegal activities that are taking place in the GMR are potentially being driven by the national debt situation and the government's push for economic gain and a place in the global market.

Robbins (2004) defined marginal communities as "those at the fringes of social power, with little bargaining strength in the market and little force in political process [over] ... important resources" (p. 77). Economic marginalization of individuals and communities further exacerbates the degradation of resources. Specifically, locals are disempowered and given little opportunities for financial subsistence. Therefore they are often forced to partake in destructive activities and behaviours that degrade their marine ecosystems and the resources within them. A lack of financial incentive for local individuals is likely significantly correlated with a lack of compliance for sustainable decisions as no other options are available for these individuals to meet their economic needs.

Problems regarding livelihood stability, resource degradation, and compliance with conservation efforts will not be resolved until the driving motivations and issues are understood. The two political ecology theses discussed are a good foundation for understanding these problems. However, future management regimes should address imbalances between local and state input to management and work to empowerment local marginalized communities.

Future Management

Overexploitation, illegal activities and use of marine resources, and a lack of compliance with conservation initiatives and regulation efforts continue to occur within the GMR. Increased surveillance and enforcement have decreased negative behaviours slightly. However, it is important to understand and change the motivations for these behaviours and decisions in order for them to stop completely. Education may be a tool with which motivation could be changed. Specifically, helping the local people understand the importance of conserving their resources and the integrity of the marine ecosystems may change their values and perceptions, thus, indirectly changing the rationale from which their decisions are made.

Co-management of marine resources may also be an effective tool as it promotes the integration of the local individuals and communities into decision-making processes regarding access to, the use of, and control over resources. This approach shifts management regimes that are typically a top-down governance process, to regimes that are an integration of government authority and local values, knowledge, and tradition. Co-management provides an opportunity for the empowerment of local communities in decision-making processes (Viswanathan et al., 2003). Ultimately, shifting the typical power regimes within management may help with compliance as local communities will be directly involved with the conservation and regulatory efforts, which provides incentive for cooperation. Participatory management is already undertaken in the Galapagos Islands where the local people are given the chance to share the responsibilities of conservation efforts. An example of this is the ecotourism industry. Although ecotourism has a large economic incentive, as was mentioned, this practice generates more destruction to the integrity of the ecosystems and island heritage than is offset by financial gain. Therefore, ecotourism and participatory management are not the long-term solution. Rather, initiatives need to be made to incorporate locals in the holistic process of management, not just in the conservation endeavours.

Finding economic opportunities besides ecotourism may also be an effective management strategy. For example, diversifying the fisheries will alleviate fishing pressure on already overexploited species as it provides a larger array of fisheries from which local communities are able to meet their subsistence and financial needs. Fisheries will need to be meticulously controlled and monitored to prevent the same situation that is presently occurring in the local fisheries. Furthermore, providing other economic opportunities not only decreases the dependency on the lucrative species, which are being overexploited and harvested illegally, it will also act as a deterrent for increasing immigration to the islands indirectly by easing the promotion of ecotourism. Thus, this strategy will help eliminate destructive behaviour while encouraging the long-term sustainable use of marine resources and the integrity of the marine ecosystems.

Conclusion

Illegal fishing, overexploitation of marine resources, and the destruction of the marine ecosystems within the Galapagos Islands currently persists. Understanding the motivations for this negative behaviour is important if this situation is to be changed. Two political ecology theses provide a better understanding of the behaviour and motivation of resource users. The conservation and control thesis helps identify the struggle locals face with being denied or limited access to resources as a result of conservation efforts. Discrediting local behaviour, especially for subsistence or traditional and cultural purposes, deeming it destructive and denying them access to common resources is likely resulting in a lack of compliance of

regulations and conservation efforts. Helping local communities understand the importance of conservation initiatives and including them in resource use regimes will promote cooperation. Ecotourism is commonly used to achieve conservation. However, despite the lucrative nature of this industry, ecotourism continues to disrupt ecosystem integrity and exacerbates already destructive behaviours in the Galapagos Islands. Degradation and marginalization is the other thesis that can be used to understand the current issues regarding the Galapagos ecosystems and its marine resources. Specifically, third world countries are continually being pushed to the economic margins. National debt that many of these countries endure creates opportunities for international lending agencies to encourage these countries to export resources for economic stability, debt repayment, and a place in the global market. The presence of these lending agencies within countries in debt, such as Ecuador, further disempowers marginal communities and creates economic incentive for them to overexploit and degrade their natural resources.

Future management needs to be informed about and incorporate behavioural motivation such as the socio-political motivations identified through the two political ecology theses discussed. For example, management regimes should focus on educating local communities about the importance of sustainably using their resources and maintaining the long-term integrity of their marine ecosystems. A co-management framework for future management strategies would be a useful tool that promotes local compliance with conservation efforts as it empowers local communities and integrates their perspectives, values, and traditions into management regimes, while still respecting government authority. Diversifying the fisheries will help alleviate pressures on already overexploited species by providing more economic opportunities. These strategies could be employed separately, but together, they will ensure the empowerment of local communities, the sustainable use of marine resources, the compliance of conservation efforts, and the long-term goal of ecosystem biodiversity and integrity.

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