

Institutional Arrangements for Adaptive Governance of Biodiversity Conservation: The Experience of the Area de Conservación de Guanacaste, Costa Rica

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Abstract

While studies of the commons have devoted significant attention to understanding how to prevent the overuse of common-pool resources, the study of how common-pool resources or public goods are produced or created has received far less exposure. We draw on the case of the Area de Conservación Guanacaste (ACG) in Costa Rica to identify several attributes influencing their ability to co-produce 'biodiversity conservation.' The identified attributes at the ACG are (1) a clear and inspiring vision internalized by the staff; (2) practice-based learning opportunities; (3) high organizational "contextuality"; (4) long-term financial and administrative autonomy; and (5) a diversity of cross-scale linkages to access resources. We discuss how these attributes interact and create a dynamic system for adaptive governance of biodiversity conservation and why they might be absent at other protected areas in Costa Rica.

Keywords: *common-pool resources, biodiversity conservation, Costa Rica, Area de Conservación Guanacaste*

Resumen

Se ha dedicado mucha atención a entender cómo evitar la sobre-explotación de los recursos de uso común, mientras que el estudio de cómo producirlos en primera instancia ha recibido menos atención en la literatura. En este trabajo utilizamos el caso del Area de Conservación Guanacaste (ACG) en Costa Rica, para identificar varios atributos institucionales involucrados en su habilidad para co-producir 'conservación de la biodiversidad.' Los atributos observados en el ACG son: (1) una visión clara e inspiradora internalizada por el personal opera-

tivo; (2) oportunidades de aprendizaje y práctica; (3) alta contextualización organizacional; (4) autonomía financiera y administrativa de largo plazo; y (5) acceso a una variedad de recursos a través de vínculos a múltiples escalas. Discutimos como estos atributos interactúan para crear un sistema dinámico para la gobernanza adaptativa de biodiversidad y porqué estos factores estaban ausentes en otras áreas protegidas de Costa Rica.

Palabras clave: *Recursos de uso común, conservación de la biodiversidad, Costa Rica, Área de Conservación Guanacaste*

Introduction

For more than thirty years, protected areas have constituted a fundamental pillar of biodiversity conservation and local and national revenue generation through tourism in Latin America. Unfortunately, the history of the governance of protected areas in the region is muddled with cases of poor governance outcomes, unclear biodiversity conservation goals, and public conflict (Ludwig *et al.* 1993; Brandon *et al.* 1998; Terborgh 1999). Such outcomes have fueled a diversity of assessments about the effectiveness of parks for biodiversity conservation (Terborgh 1999; Barrett *et al.* 2001; West *et al.* 2006; Southworth *et al.* 2006; Hayes 2006; Ostrom and Nagendra 2006). Discussions have often centered on whether private or state-based governance approaches might be most appropriate (Terborgh 1999; Anderson and Leal 2001), or why protected areas have failed so often (Barrett *et al.* 2001; West *et al.* 2006; Southworth *et al.* 2006).

Here we use a common-pool resources theory perspective to examine the—often overlooked—question of: what are the internal institutional arrangements at work in protected areas management that have been able to develop a local agenda for the conservation of biodiversity commons? We examine Costa Rican protected areas, and particularly the Área de Conservación Guanacaste (ACG) that has been held up nationally and internationally for its ability to develop such an agenda for biodiversity conservation. We compare our observations in Guanacaste with other parks in Costa Rica to tease out a number of institutional attributes that might account for the ACG's above-mentioned status. Based on long-term observations at the ACG, we discuss how we think these attributes interact with each other in a reinforcing fashion, arguing that they contribute to the persistence of a governance structure that is well-suited for the provision of biodiversity conservation values in the region.

Costa Rica, Protected Areas, and the Commons

Costa Rica stands out among tropical countries for its commitment towards environmental and biodiversity conservation issues and the high place that biodiversity conservation has traditionally occupied in the national political agenda (Gómez and Savage 1983; Heywood 1995; DiCasteri y Younés 1996; Raven 1997; Steinberg 2001). President Oscar Arias (1986-1990) made

sustainable development the conceptual underpinning of his administration. He created the Ministry of the Environment in 1986 (originally named as the Ministry of Natural Resources, Energy and Mines) to give more power and legitimacy to biodiversity conservation and management, raising it to the level of other economic sectors (Umaña and Brandon 1992: 89). Arias' sustainable development policy vowed to grant decision-making power to local inhabitants surrounding the country's protected areas, which account for more than 25 percent of the country's terrestrial territory (SINAC-MINAE¹ 2002). As part of such discourse, the government created the National Conservation Area System (SINAC its Spanish acronym). SINAC is integrated by eleven rurally-based 'conservation areas,' which were defined by a 1990 executive degree as "composed of one or several contiguous (or not) protected areas of varying categories" (loosely following the IUCN system²). The objective of Costa Rica's protected areas was defined as "the conservation of biodiversity and the sustainable production of goods and services derived from the management of natural and cultural resources" (MINEREM 1990).

SINAC is defined according to its website as "a decentralized and participatory governance system that integrates forestry, wildlife, and national park protected area issues so that policy development, planning, and implementation can lead towards the sustainability of Costa Rican natural resources" (SINAC 2009). Not all conservation areas have developed the same way. Some are regarded as more effective than others in their ability to develop a local agenda for biodiversity conservation (Basurto 2007). To contribute to our understanding of what might account for such differences we rely on the commons literature to apply theoretical lessons to the study of local governance of protected areas in Costa Rica.

Commons' scholars initially focused the study of common-pool resources governance around small, place-based, traditional social units in rural areas that have long depended on their traditional knowledge for the collective governance of their commons: forests, fisheries, watersheds, irrigation systems, etc. (*e.g.*, National Research Council 1986; McCay and Acheson 1987; Pinkerton 1989; Ostrom 1990; Lansing 1991; Tang 1992; Berkes 1999). This study differs from those studies and therefore contributes to advancing the study of the commons in several ways. First, we characterize 'community' not as territorially fixed, small, and homogeneous in its interests and norms. Instead we focus on "the multiple actors with multiple interests that make up communities, the processes through which these actors interrelate, and, especially, the institutional arrangements that structure their interactions" (Agrawal and Gibson 2001: 12-13). In our study, the community of interest are not the local farmers or fishermen that live outside the protected area,³ but the governmental employees that work in locally-based conservation areas.

Second, while early studies on the commons focused analysis on local-level interactions, this study incorporates the multi-level interactions—defined as those among actors located at different spheres of influence (*i.e.*, local, national, and international)—involved in managing and conserving biodiversity

as a commons, in order to understand how these resultant interactions affect efforts within protected areas to develop conservation-enabling institutional arrangements.

Finally, we demonstrate how commons theory can be useful for the analysis of different types of goods by treating 'biodiversity conservation' as a public good rather than a common-pool resource. Common-pool resources and public goods share the characteristic of costly exclusion of potential users or beneficiaries but they differ in their degree of subtractability (Ostrom *et al.* 1994). While units of the common-pool resource once "consumed" are not available to anyone else, units of public goods typically cannot be subtracted by competing users. By sharing the characteristic of costly exclusion, common-pool resources and public goods tend to suffer from under-provision problems, defined as those problems that emerge as a consequence of not being feasible to control who benefits from the good, regardless of whether beneficiaries contributed to its provision. As a result, there is little incentive from one particular individual or entity to invest in the production of the good, *i.e.*, biodiversity conservation. Thus, the question of how decentralized State and non-State actors in developing countries like Costa Rica find incentives to devise institutional arrangements to provide 'biodiversity conservation' is of central concern to policy makers and conservationists. Particularly in the context of the mixed record of centralized States when it comes to achieving conservation goals, it is of interest to investigate whether and how decentralized State units, like the ACG in Costa Rica, can yield different results.

The provision of goods such as common-pool resources or public goods, requires successful collective action, and is no different than when the concern is to avoid overconsumption of the same good. Successful collective action is defined as situations or arrangements that allow a group of individuals to find incentives to put the interests of the group ahead of their own. Most works on the commons have focused on how users can devise agreements to engage in successful collective action and avoid overconsumption scenarios: overfishing, deforestation, over-pumping of groundwater basins, etc. This paper however, is concerned with how users or direct beneficiaries of biodiversity conservation can devise agreements to coordinate its production. Ostrom's work provides ample guidance on the types of institutional arrangements that can lead to successful collective action. One such theoretical device is Ostrom's 'design principles.' The 'design principles' constitute a set of general attributes thought to enable successful collective action that can be sustained overtime (Ostrom 2005; Cox *et al.* 2010). Ostrom's design principles were not elucidated for the context of biodiversity conservation. Thus, we use Ostrom's design principles (Table 1 provides definitions for each attribute) as a point of departure to help elucidate what one might look for in this particular context. As will be seen, we identify some attributes that closely match Ostrom's design principles and others that differ. The goal of this study is not to compare our attributes with those of Ostrom but rather focus on how the attributes that we uncover through observations can contribute to successful collective-action for

the provision of biodiversity conservation by the community that governs the ACG.

1. Clearly Defined Boundaries
Individuals or households with rights to withdraw resource units from the common-pool resource, and the boundaries of the common-pool resource itself, are clearly defined.
2. Congruence
A. The distribution of benefits from appropriation rules is roughly proportionate to the costs imposed by provision rules.
B. Appropriation rules restricting time, place, technology, and quantity of resource units are related to local conditions.
3. Collective-Choice Arrangements
Most individuals affected by operational rules can participate in modifying operational rules.
4. Monitoring
Monitors, who actively audit common-pool resource conditions and user behavior, are accountable to the users or are the users themselves.
5. Graduated Sanctions
Users who violate operational rules are likely to receive graduated sanctions (depending on the seriousness and context of the offense) from other users, from officials accountable to these users, or from both.
6. Conflict-Resolution Mechanisms
Users and their officials have rapid access to low-cost, local arenas to resolve conflict among users or between users and officials.
7. Minimal Recognition of Rights to Organize
The rights of users to devise their own institutions are not challenged by external governmental authorities.
For common-pool resources that are parts of larger systems:
8. Nested Enterprises
Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.

Table 1. Design principles illustrated by long-enduring common-pool resource institutions. (Source: Adapted from E. Ostrom 1990: 90).

Searching for Studies of the Commons in Costa Rica

Costa Rica has been the subject of intense interest with regards to the effects of community-based conservation and development around protected areas (*e.g.*, Nygren 1998; Campbell *et al.* 2007; Andam *et al.* 2010). Few studies, however, have taken an explicit common-pool resources approach to examine the governance of biodiversity conservation, and no studies were found that have approached it as a problem related to the provision of a public good.

A literature search in a general database (Academic Search Complete) and a specialized one (the Digital Library of the Commons) yielded very few results using “common-pool resources” AND “Costa Rica” with any of the following keywords: *parks, biodiversity, conservation, protected areas, co-management.*

Studies that use an explicit common-pool resource approach to look at the governance of biodiversity commons in Costa Rica include an analysis of the performance of community-based organizations for water provision (Madrigal *et al.* 2011); community-based fisheries organizations (Solis and Madrigal 2008); groundwater basins (Fernandez-Gonzalez 2004); and forests and reforestation (Montoya 1991; Guess 1979; Kull *et al.* 2006). Studies explicitly looking at protected areas have focused on the relationship with local communities (*e.g.*, Girot *et al.* 1998; Hoffman 2011) or whether protected areas constitute common-property or not and their policy implications (Kitamura and Clapp 2004). Unfortunately, only a few of these studies have been published in peer-reviewed journals.

Research strategy

Data collection took place in Costa Rica between 2002 and 2006 for a total of 462 data-collection-days. The first stage of research allowed for identifying key informants and gaining access to a wide variety of archival records (*i.e.*, unpublished reports and private records). The second involved conducting participatory observations, informal interviews, and 34 in-depth interviews of key informants using appropriate ethnographic techniques (Bernard 2006).

Interviews, participant observation, and archival research were conducted at SINAC's central offices and at protected areas within four conservation areas: the Osa Conservation Area (ACOSA its Spanish acronym), the Tortugero Conservation Area (ACTo its Spanish acronym), the Arenal-Tempisque Conservation Area (ACAT its Spanish acronym) and the previously mentioned ACG (Figure 1). In this study we consider the ACG as one large protected area given that the ACG staff manages all of its land as one megapark. In other conservation areas, protected areas are not interconnected and often each is managed independently from the others, with each park typically having its own staff and programs. For the purposes of comparison with the ACG, we describe the most prominent parks in ACOSA, ACTo and ACAT. In all conservation and protected areas studied we only focused on programs that had a clear mandate to support biodiversity conservation goals, had more than two members of staff, and could make operational decisions regarding management and implementation of biodiversity conservation-related activities and resources. Examples of programs include a 'Biological Education Program' that conducts biological or environmental education activities with the local population, or a 'Protection Program' that focuses on the prevention of hunting and poaching.

The time period described in this study spans from the early 1970s to about 2005, unless otherwise stated. The National Park Service was created in the 1970s and while the ACG became the first conservation area to be formally established in the early 1990s, the formation of SINAC was not formally enacted into law until 1996. Interviewees and key informants included conservation area park-guards, program coordinators, and directors, previous and current directors of the national park system, senior advisors to the Minister of the Environment, and the Minister of the Environment himself, as well as directors or knowledgeable individuals that worked for non-governmental organizations that formally interacted with the conservation areas.

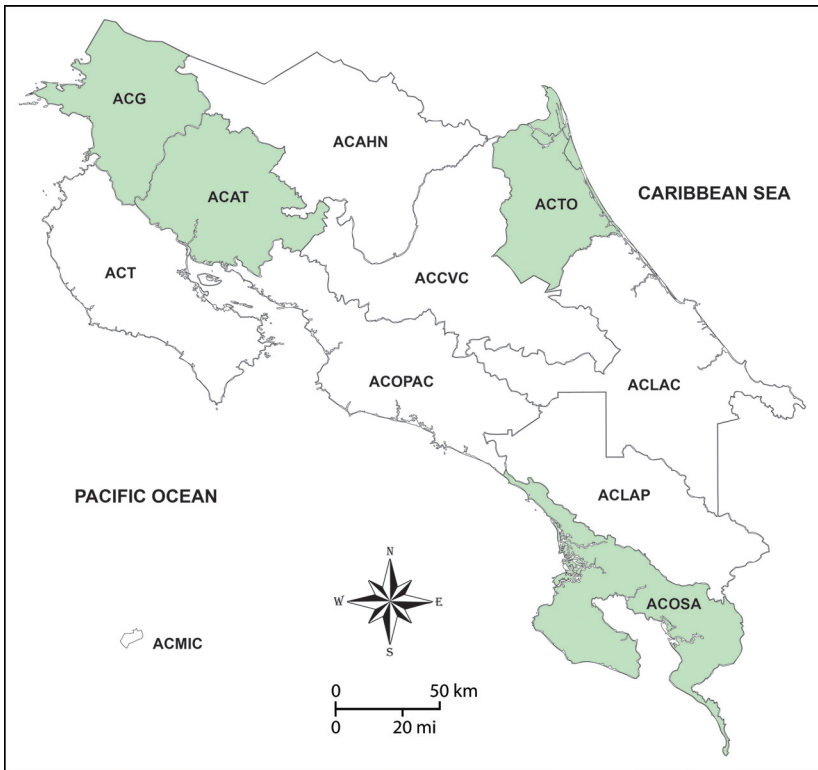


Figure 1. Acronyms of the Eleven Regionally-based Administrative Units known as Conservation Areas of Costa Rica (Source: SINAC).

Study Area

As shown in Figure 1, the ACG borders Nicaragua to the north, the Pacific coast to the west, the Guanacaste mountain range to the east, and ACAT to the south. The ACG is nationally and internationally known for more than two decades commitment towards conserving biodiversity. The ACG has expanded from 1,000 ha in 1966 (Miller 1980; Miller and Borstel 1968) to encompass a continuously protected transect of 153,000 ha, which span dry tropical forests, marine, coastal, rainforest and cloud forests (Janzen 2000a). The ACG is recognized as a UNESCO World-Heritage Site.

ACOSA is located in the southwest of the country in the Province of Puntarenas. Within ACOSA, Corcovado National Park contains the only protected region of tropical wet forest on the Pacific slopes of Mesoamerica, including a significant number of species that are endemic, threatened, or new to science (Sánchez-Azofeifa *et al.* 2002). Many consider Corcovado National Park the ‘crown jewel’ of Costa Rican protected areas.

ACAT is located in the province of Guanacaste and encompasses to the north portions of the Guanacaste mountain range and the south portions of the

Tilaran mountain range where the famous Monteverde cloudforest is located. It also encompasses important tracts of dry tropical forests in Palo Verde National Park, but concentrates in protecting floodplains and marshes associated to the Tempisque River. This wetland system provides protected habitats to important migratory bird species and has gained international recognition as one of several Ramsar Convention sites (wetlands of international importance).

ACTo is located in the northeast of the country in the province of Limón. It is also considered an important Ramsar site and it is internationally recognized because Tortugero National Park constitutes the largest beach-nesting aggregation in the Atlantic for the green turtle (*Chelonia mydas*) (Bjorndal *et al.* 2005).

Altogether, these areas represent more than a third of the eleven conservation areas in the country, and the selection criteria of ACOSA, ACAT, and ACTo was based on their relevance to biodiversity conservation purposes following the opinion of two senior expert informants: Alvaro Ugalde, founder of the National Park Service and Daniel Janzen, senior tropical biologist in Costa Rica; as well as the published literature (Janzen 1983; Sánchez-Azofeifa *et al.* 2002; Bjorndal *et al.* 2005).

Developing Effective Local Agendas for Biodiversity Conservation through Successful Collective-Action

We identified five attributes contributing to the ACG's ability to engage in successful collective action to develop an effective local agenda for biodiversity conservation between 1990 and 2005. Three attributes were closely related to Ostrom's design principles: 1) "congruence," the distribution of benefits from appropriation rules is roughly proportionate to the costs imposed by provision rules. That is, in the context of biodiversity conservation governance, congruence between long-term goals, locally-designed operational rules, and social-ecological conditions. We labeled this attribute "contextuality." 2) "Minimal recognition of rights to organize," the rights of users to devise their own institutions is not challenged by external governmental authorities. We call this attribute "long-term financial and administrative autonomy." Finally, 3) "nested enterprises," the organization of appropriation, provision and other governance activities in multiple layers, was relabeled as "linkages across-scales to access varied types of resources" (*i.e.*, political, social and economic).

The two remaining attributes are related to entrepreneurship or leadership, and while not directly related to Ostrom's design principles, they are often mentioned in the literature on common-pool resources as influential for the emergence of successful collective action (Ostrom 2001; 2007). These attributes are: presence of a senior local leader able to create an inspirational vision successfully articulated by the staff and wide availability of practice-based learning opportunities facilitating the emergence of shared leadership.

Next we briefly describe each of the five attributes we identified at the ACG. Then we contrast them with the other selected protected areas, and discuss how we think they interact in a dynamic-reinforcing fashion to enable successful collective action for adaptive governance for local biodiversity conservation.

1. Clear and shared vision inspired by on-site senior leadership

Leadership is often cited as a key factor in effective biodiversity conservation (Manolis *et al.* 2008). At the ACG, Daniel Janzen and Winnie Hallwachs have played strong senior local leadership roles that have inspired the rest of the staff with a clearly-defined vision and a goal focused on the common-good. The vision is clearly articulated as “the non-destructive use of biodiversity through bio-development” of a rural landscape where national parks are like any other rural farm producing a wide variety of ecosystem services (Allen 2001, Janzen 2001, 2000a, 2000b). Janzen is a biologist at the University of Pennsylvania, a member of the U.S. National Academy of Sciences, a McArthur Fellow, and recipient of the inaugural Swedish Crawford price in Ecology, among other distinctions. Together, Janzen and Hallwachs bring their own history, personal resources, and influence to create and manage an inspiring and distinctive vision to the ACG and its staff. Janzen and Hallwachs are also excellent communicators and understand the importance of keeping a high morale and motivation among the ACG staff. Janzen organizes a yearly presentation that illustrates “why the ACG is a very special place” and how the staff can become part of “this very special project.” He uses phrases such as “you will not become rich by doing this job, but you will have the satisfaction of being part of something important.”

Janzen and Hallwachs were born and professionally trained in the U.S., are fluent in the local language, highly knowledgeable of local politics and customs, and spend most of the year living inside the ACG. This is an unusual practice for senior advisors or leaders of a conservation area or other members of the same socioeconomic class in general. This image is well-received by the surrounding rural low-income populace because they can identify with it more readily. Janzen and Hallwachs clearly fulfill the three criteria for leadership proposed by Bennis (2003) through their *competence* in science and management; virtue through living inside the protected area and in the same housing conditions as the rest of the staff; and their ability to create and communicate an inspiring and shared vision. Finally, they also fit the term “bilateral activists” (Steinberg 2001), which refers to those individuals able of successfully navigate local and international arenas, bringing the best of both worlds to their projects.

As a result of the work and lifestyle of these leaders, most of the staff shares a clear and inspiring vision that explains the *raison d'être* of the ACG. ACG staff consistently stated that they work to “establish the only reserve in Costa Rica protecting a continuous tract of natural ecosystems from the Pacific to the Atlantic slope.”

2. Fostering practice-based learning and shared leadership

At the ACG we observed the active fostering of learning opportunities at all organizational levels among their staff. Most of these learning opportunities did not come in the form of traditional seminars, workshops, or “meetings with experts” as we observed in other conservation areas. There was an explicit emphasis on learning-by-doing and on-the-job training (Janzen 2004). Fostering learning opportunities in any organization is likely easier to implement in a private setting and much more challenging in a governmental bureaucratic system. To be successful in a State-controlled system, the local bureaucratic structure needs to be able to protect its low-level staff from the

central bureaucracy that will attempt to fire staff without civil-service protection when mistakes are made. However, mistakes can foster learning, and learning also helps build respect, self-confidence, and adaptive capacity, key ingredients in the formation of new local leaders from a pool of initially low-level local staff (Basurto 2013a). Although part of a State system, the ACG was able to find mechanisms with which to protect lower-level staff from the higher bureaucracy (*i.e.*, lobbying by local senior leaders, and other mechanisms) and at the same time design learning-by-doing processes (*i.e.*, incorporate the costs of learning and making mistakes into their operating budgets) (Basurto 2013a). As a result, staff with entrepreneurial skills eventually developed enough self-confidence to accept the risk of taking on more responsibilities (to a point), and this allowed leadership at different levels within the organization to emerge. It is important to note that this is not the norm but the exception in rurally-based bureaucracies within Latin-American class-based societies, where rural labor is abundant and employees are very risk averse due the likelihood of being fired in the event of any mishap or mistake. Breaking with this pattern in these settings is very challenging. The parataxonomist program⁴ at the ACG has been able to incorporate personnel without formal academic studies into positions of knowledge and power, with great motivation and public recognition. Unfortunately, in other conservation areas within Costa Rica, parataxonomist personnel have been relegated to marginal decision-making positions (Basurto 2007).

The emergence of leadership at various levels within a conservation area's organizational structure could also be facilitated by the prevalence of a more horizontal organizational structure at these sites. ACG staff often referred to the organizational structure as "very horizontal" or "very messy" and often struggled to describe the structure in a neat and hierarchical fashion. The ACG shows a combination of "power" and "task" cultures *sensu* Handy (1999), which allows them to react quickly to crises as they emerge and effectively experiment and learn.

3. High contextuality: Congruence between long-term goals and vision, operational rules and social-ecological conditions

Developing long-term goals and vision at the ACG was strongly based on the senior leaders' broadly accurate but ultimately limited understanding of the local social and cultural context. Obtaining high contextuality at the ACG was achieved when hired local personnel were incorporated into decision-making processes. In general, local personnel—not the senior leaders—played key roles in developing high congruence between the operational rules of each of their programs, adequately addressing constraints and opportunities provided by their particular social-ecological setting. In general, the ACG modified the typical administrative structure found in other conservation areas and oriented their activities to locally-developed processes that could better respond to the particular needs of their social-ecological setting. For example, the biological education program personnel were allowed to decide what environmental education materials were likely the most effective in reaching local rural children from nearby towns. Being locals themselves, the personnel did not find any of the available materials satisfactory and decided to invest in the development of their own environmental education materials and activities, so that they could

be especially tailored for the social-ecological context of the local population of rural children they serve. Similarly, the fire-fighting personnel had significant autonomy to make operational and administrative decisions that allow them to act quickly and decisively when a wildfire appears (Basurto 2013a). In other conservation areas in Costa Rica, operational units seem to be severely constrained in their local autonomy to design operational rules and adequately respond to their particular social-ecological context.

4. Long-term administrative and financial autonomy

The ACG initially had significant amounts of local autonomy, defined as a conservation area's ability to participate in decision-making and implementation without being constantly overruled by a higher-level authority (*i.e.*, the central government) (Ostrom 1990). In the ACG, autonomy determined their capability to make decisions on (a) budgetary matters over a given time period and readily have access to information on the status of its budget; (b) regarding the possibility of pursuing alternative sources of income (fundraising); (c) how to internally organize its administrative tasks and hire and fire its personnel; and (d) regarding the implementation of their day-to-day activities (Basurto 2013b).

The ACG was able to successfully negotiate financial, administrative and operational autonomy with the central government and has legal status as one of several autonomous agencies whose budgets are not part of the central state budget (Basurto 2013a). Thus, significant political power rests within the ACG rather than at some central office far away from the protected area. Clearly, what made ACG's autonomy most robust was their ability to build a financial endowment with the goal to secure the long-term economic viability of their activities and programs (Allen 2001). The endowment provided them with bargaining power and relatively less dependence on the fluctuations of external funding priorities from international cooperation agencies, NGOs, grants, and the general budget of the national protected area system, which is typically controlled by the central government, in the case of Costa Rica.⁵

5. Linkages across-scales

Linkages with key local, national, and international actors and organizations like the surrounding rural communities, national protected area policy-makers, governmental agencies, scientists, and international research, funding and development organizations, are essential for accessing different types of political, social, and economic resources (Basurto 2013b). The ACG's biodiversity conservation programs have been funded by international foundations such as McArthur, international development agencies like UNESCO, SIDA, or JAICA, and a variety of private domestic and international donors. At the national level the ACG has gained access to policy-makers and constantly engages with them to help design policy issues related to biodiversity conservation (Allen 2001). Locally, the ACG created a constituency that demands some of the educational and employment-related resources that the ACG generates and is willing to provide political support when needed (Janzen 2004; Basurto 2013a).

The prestige and recognition of senior on-site leaders has been key to link the ACG with the international community and some types of national level resources. However, without actors at mid and low levels within the organization helping to create linkages at the national and local levels, the linkages of the ACG would not be as diversified and effective as they are.

Barriers for Successful Collective-Action at Other Protected Areas in Costa Rica

While a full in-depth comparison of the ACG with other protected areas is beyond the scope of this paper, this section exemplifies some of the barriers present at other protected areas to engage in successful collective action for the provision of 'biodiversity conservation' as a public good.

Tortugero National Park a protected area of ACTo

Since the inception of Tortugero National Park in 1970, park-guards were the only personnel actively managing the protected area. Their main activity was sea turtle protection against poaching during the breeding season. Eventually sea turtle-related tourism increased, and increasing park visitation and local business' demands for tourism regulations overwhelmed the park-guards. Individual park-guards took leadership roles at different moments in time, splitting their time between patrolling and attending tourists' needs throughout the park. An informal ecotourism program emerged but often lacked support from higher levels within ACTo and local efforts were hard to sustain. Eventually, the conservation area officially recognized the ecotourism program (locally known as the public services program) and non-park-guard personnel were hired to manage it. This program often works alongside external organizations like the Caribbean Conservation Corporation to certify and organize local tourism guides. While Tortugero lists other conservation-related programs in their organizational structure, such as research, environmental education or community involvement programs (Solano 2006), most of these programs either only existed on paper or were active for a brief period of time and then disappeared when funding from the European Union or other international organizations ended.

Unlike the situation in the ACG, most directors or leaders of ACTo have often been based away from the protected areas in which they work. This is often argued as a necessity, given that most of their budget still comes from the central government/SINAC and close contact with decision-makers is key in bringing resources to ACTo's protected areas like Tortugero.

Corcovado National Park a protected area of ACOSA

Corcovado National Park is part of ACOSA, and was formally established in 1975 due to the uniqueness and biological richness of the lowland coastal rainforests. The complex history of the creation of Corcovado National Park involved a constant struggle to gain political attention, raise funds, and solve land tenure issues (Christen 1994). Although the park's founders envisioned a focus on scientific research activities, all of the resources at their disposal went to protection and patrolling. By 1977, the administrative headquarters had been built at Sirena, a remote location inside the park but were later moved

out to Puerto Jimenez. Sirena became the park's center for ecological research. By living on-site, administrators of the Sirena research station have learned to understand the needs of researchers and visitors, and have developed informal policies to better accommodate their needs. Some of these decisions often ran counter to the policies set by the formal coordinator of research based in the town of Puerto Jimenez, who has a different vision of the role of visitors in the park, and how they should be managed. As a result, there are constant conflicts around visions and management goals among Corcovado National Park staff. The administrators live-on site but having lower administrative-ranking than their superiors stationed outside of the park, they are usually overruled or sanctioned for developing local informal policies to address operational issues on site.

Despite Corcovado National Park being considered the Crown Jewel of all protected areas in Costa Rica, long-term funding and administrative autonomy has not been achieved. Informal figures compiled by an unpublished Nature Conservancy project estimated that tens of millions of dollars on funding short-term projects have come through ACOSA during the last twenty years. This is more funding than the amount the ACG brought in to build their endowment during the same period. Unfortunately, ACOSA has not been able to find enough incentives within its staff and their international donors to build an endowment. In short, despite its biological importance for the Costa Rican national park system, ACOSA did not enjoy the kind of long-term financial and administrative autonomy that ACG benefited from between 1990-2005.

Palo Verde National Park a protected area of ACAT

Palo Verde National Park is part of the Area de Conservación Arenal-Tempisque (ACAT), which also protects the important Arenal reservoir and the watershed of the Tempisque river that flows into the Gulf of Nicoya. ACAT has three active programs related to biodiversity conservation. Besides the protection program there is a land-tenure program that has developed a geographic information system database providing mapping services to help identify the location of private properties and park boundaries. ACAT is not actively raising funds and buying land as the ACG has done and has not received as much funding as ACOSA over the years. However, ACAT uses the information generated by the land-tenure program to negotiate funding with the State to pay for expropriated land-owners to whom the State still owed funds, or seek new expropriations to increase the size of its existing protected areas. ACAT's limited implementation capability forces them to partner with other external organizations to develop their local agenda for biodiversity conservation. Its activities are usually co-coordinated with other (usually private) educational organizations like the Monteverde Conservationist League or Las Pumas, a wildlife rescue center, or with the Organization of Tropical Studies (OTS), which has a research station next to Palo Verde National Park. OTS's research station has significant expertise on all aspects related to providing research services and resources and in reality ACAT has delegated all aspects of research to OTS. Thus, ACAT only has one person in the research program in charge of oversight activities. As a result, there is often a struggle to define the purpose and goals of these activities, and whether they should be conducted inside or outside the protected areas. ACAT's high dependency on outside organizations

to conduct activities related to biodiversity conservation, results in boom-and-bust periods of activity depending on their partners' schedules and resource availability. While these partnerships foster learning-by-doing opportunities, the limited participation of ACAT personnel that will stay long-term at the conservation area, results in little accumulation of experience in the area over time, and thus, limited contextuality and congruence between long-term goals and locally-designed operational rules and social-ecological conditions.

Results

In all the protected areas (PAs) briefly described above, staff interviewed often struggled to respond clearly or coherently when asked the question "what was the main purpose of their PA, and whether they had an explicit organizational mission or vision." This suggested that they did not have a clear collective sense of purpose and a shared organizational vision. When pressed, interviewees (*e.g.* program officer, park-guards or researchers) tended to reply that the purpose of their PA was that of the activity or job they were hired to do, *i.e.*, a park-guard would say "poaching control", an educator "environmental education" and a researcher "producing scientific information". When the PA was part of a larger organization (*i.e.*, national park service) it was common that interviewees would refer to the general purpose of the agency, however vague and distant this might be for the particular social-ecological reality in which the protected area was embedded.

In none of the conservation areas, except the ACG, did we find a well-established senior on-site leader. Most park directors did not fill this role. This is probably due to the fact that in many instances they tend to spend only a few years in the position before moving towards a more senior position elsewhere, usually at an NGO or a central government position in an urban area. Thus, it is not surprising they find few incentives to develop either a long-term commitment or an inspiring vision for the area. In fact it usually seemed that a central leadership role was filled by an ambitious bureaucrat sent from afar, who had a hard time understanding the idiosyncrasies of the local culture or saw the area as a natural appendix of the larger bureaucratic structure of SINAC, and thus replicated the same social-class dynamics, instead of attempting to create a different organizational culture more congruent with the needs of the local social-ecological context (Basurto 2013a).

None of the conservation areas surveyed, except the ACG, claimed to enjoy administrative and financial autonomy (Basurto 2013b). Their budget was usually controlled by a central office, most likely located in the capital San José, distant from actual implementation needs and realities in the field. We also observed international development aid agencies that often tried to supplement protected areas' budgets through cooperation projects. International projects often brought significant financial and technical resources to protected areas but only for a two to five year period, and were highly dependent on foreign or national professional consultants. Sadly, more often than not, it seemed that international assistance weakened protected areas' long-term capability to develop self-governance mechanisms, as documented elsewhere (Gibson *et al.* 2005).

The protected areas described above are likely no different from the reality prevalent in most of Costa Rica, and arguable in other Latin American countries. Protected areas generally showed staff lacking a guiding vision, poorly empowered to participate in decision-making, heavily dependent on financial aid and technical expertise from the outside, and feeling neglected from their central office or by unfulfilled expectations brought by outsiders, *i.e.*, foreign donors. We believe that this organizational climate can often lead to a defensive or even resentful attitude towards other colleagues inside or outside the protected area. It appears that when (a) staff lacked a clear record of successes, (b) professional prestige was absent, and (c) foreign ideas or outside criticism were regarded with suspicion, parochial views prospered, making it very difficult for the protected area to establish linkages across scales (local, national, and international) that would bring much needed resources (*i.e.*, funding, knowledge, prestige, and political power) for the benefit of their biodiversity conservation programs (Table 2).

Attributes	ACG	Other Conservation Areas in Costa Rica: ACTo, ACOSA, ACAT
Clear and shared vision inspired by on-site senior leadership	Present	Mostly absent
Fostering learning opportunities and horizontal leadership	Mostly available	Mostly absent
Cross-scale linkages	Present	Mostly absent
Long-term administrative and financial autonomy	Present	Mostly absent
Congruence between long-term goals, operational rules and social-ecological conditions	High	Usually low
Externally and self-regarded as “having successfully developed a local agenda for biodiversity conservation”	Yes	No

Table 2. List of Attributes Conducive to Successful Collective-Action for Biodiversity Conservation in Costa Rica

The ACG’s dynamic system for adaptive governance

All the attributes described at work in the ACG influence and often enhance the ability of the community of actors locally governing the ACG to engage in collective action to co-produce a local agenda for biodiversity conservation. These attributes interact in a dynamic and self-reinforcing manner, a sort of “virtuous cycle.” From this perspective, each attribute acts both as a cause and effect at different moments in time (Olssen *et al.* 2004). Having said this, a review of the history of the emergence of the ACG would suggest that on-site senior leaders jump-started the processes depicted in Figure 2 (Allen 2001; Basurto 2007, 2013). For instance, senior leaders initially played key roles at shaping the “horizontal” organizational structure of the ACG and created rules and norms for learning opportunities among the staff, which

eventually facilitated the emergence of middle and lower level leadership. Janzen used his national and international scientific prestige, connections overseas, and experience to navigate international and national level bureaucracies to attract funding, and political support (*i.e.*, autonomy) (Allen 2001). Janzen and Hallwachs did not build the “virtuous cycle” alone, rather they acted as catalysts and facilitators so that key players *e.g.*, the ACG’s talented/empowered local staff, members of national bureaucracies, experienced national professionals and the international community, would find it feasible and desirable to be part of this project. No less important, these leaders invested time to share their in-depth knowledge and leadership skills with the staff, so that the local staff could in turn shape their operations to be better matched to the particular social-ecological setting in which they are embedded.

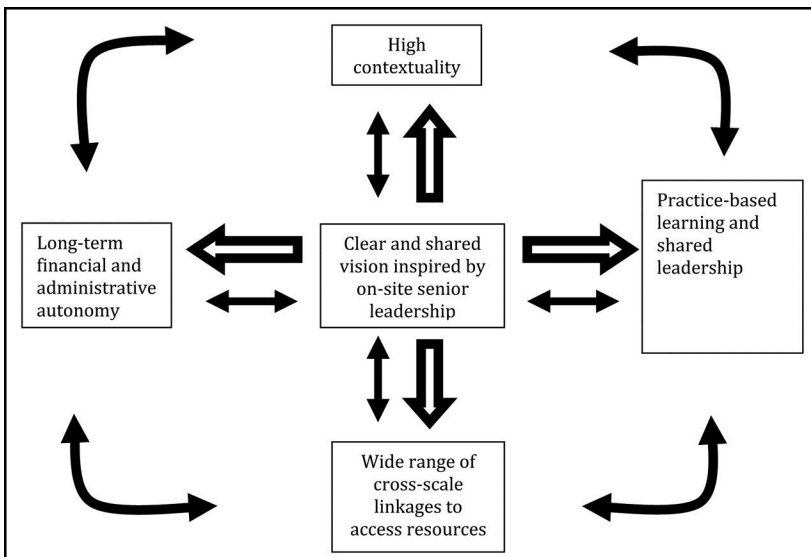


Figure 2. The “Virtuous Cycle” in place at the ACG. Hollow arrows indicate that senior leadership jump-start the formation of the attributes located in the peripheries. Once these attributes are in place they all interact with all others in a synergistic, self-reinforcing, and on-going manner. Solid arrows indicate direction of the relationship.

As a dynamic, self-reinforcing and synergistic system (Figure 2), with attributes acting both as cause and effect in interrelations with other attributes, adaptive governance capacity for biodiversity conservation can “appear” as an emergent property of the system (Folke *et al.* 2005). For example, key informants at all three sites agreed that developing institutional arrangements that are well-matched to the social-ecological setting (*i.e.*, high contextuality) were key to be able to develop and adapt mechanisms for learning-by-doing, giving them the

flexibility they needed for staff's ability to adapt their management needs as they changed over time. At the same time, having in place learning-by-doing mechanisms and high financial and administrative autonomy allowed them to increase or maintain an adaptive capacity to continuously develop institutional arrangements well matched to the social-ecological setting.

Developing clear goals and purpose through locally-based senior leadership facilitated their ability to negotiate and attain financial and administrative autonomy from the central offices. At the same time, once high financial and administrative autonomy was achieved it facilitated the maintenance of clear goals and a sense of purpose, because the ACG was better able to implement their own agenda when in control of their own budgets and administrative structure.

Finally, we detected the existence of an "anti-consultant" attitude or culture among the ACG staff, which disfavored the hiring of external consultants to develop strategic planning or develop written management plans, as other conservation areas customarily do (Basurto 2007). When asked, staff did not suggest envy, jealousy, or philosophical objections to consultants. Instead, one perceived that the existence of a staff with entrepreneurs at various levels within the organization sharing a common vision, which enabled them to perform strategic planning as a regular activity without having to go through a highly ritualized planning instance led by external technical assistants or consultants foreign to the local context and long-term vision.

A direct consequence of the dynamism and self-reinforcing nature of this organizational structure is that while senior on-site leaders continue to be key players at the ACG, over time we have noticed that their relative influence and authority to modify and shape each of the different attributes of the system has diminished. Having said that, it remains unclear whether without senior local leaders these processes could be maintained, partly because they continue to play a hard-to-replace key role as the public faces seen by the international community.

Conclusions

Developing local agendas for effective biodiversity conservation continues to be an enduring challenge, despite the dramatic increase in the number of protected areas enacted around the world in the last decade. Part of the challenge is associated with the difficulty that local bureaucracies have in creating the incentives to engage in successful collective action for the provision of public goods, such as biodiversity conservation. Using commons theory, this paper outlines the institutional arrangements that enabled the ACG to develop a local agenda for biodiversity conservation between 1990 and 2005. While many studies of the commons have focused on how communities might be able to create local arrangements to avoid the overexploitation of the commons, this study calls attention to the importance of also understanding the institutional arrangements needed for the provision of commons or public goods such as

biodiversity and biodiversity conservation. Provision and consumption are two sides of the same coin and both need collective action to succeed.

When paying attention to collective action processes, it should not surprise us that certain individuals like Janzen-Hallwachs, at the ACG, played such prominent roles in the collective effort. As users or direct beneficiaries of biodiversity conservation at the ACG, these biologists noticed more than most, and thus had the greatest incentives, to organize the production or provision of biodiversity conservation and enlist others into a collective effort. What is remarkable is that they succeeded in energizing other individuals to make the pursuit of biodiversity conservation their life project, despite not being able to read the landscape and appreciate its biological diversity in the same way. It was their ability to provide new meaning to the pursuit of biodiversity conservation, and embody it into a system of values shared by the ACG staff, that made the co-production of biodiversity conservation as a local public good in rural Guanacaste, Costa Rica a reality.

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Notes

¹ MINAE is the acronym in Spanish for the Ministry of the Environment and Energy. In 2008 it changed its name to the Ministry of the Environment, Energy and Telecommunications (MINAET for its acronym in Spanish).

² The International Union for the Conservation of Nature's (IUCN) six category system consists of: Category Ia: Strict nature reserve; Category Ib: Wilderness area; Category II: National park; Category III: Natural monument or feature; Category IV: Habitat/species management area; Category V: Protected landscape/seascape; Category VI: Protected area with sustainable use of natural resources (Dudley 2008).

³ The relationship between protected area and local inhabitants has been explored in Basurto (2013a) and is beyond the scope of this paper.

⁴ The parataxonomist program trains and employs individuals from rural areas surrounding the ACG to work in biological inventory-related activities. In this sense a parataxonomist is to taxonomy what a paramedic is to medicine (Janzen 2004).

⁵ After this study was conducted the central government found ways to tap into the ACG's endowment according to key informants interviewed in 2008.

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