

## The Protection of Forest Biodiversity can Conflict with Food Access for Indigenous People

Olivia Sylvester<sup>a,b,#</sup>, Alí García Segura<sup>c</sup>, and Iain J. Davidson-Hunt<sup>a</sup>

<sup>a</sup>Department of Environment, Development, and Peace, Natural Resources Institute, University of Manitoba, Winnipeg, Canada

<sup>b</sup>University for Peace, Ciudad, Colón, San José, Costa Rica

<sup>c</sup>Escuela de Filología, Lingüística y Literatura, Universidad de Costa Rica, San José, Costa Rica

<sup>#</sup>Corresponding author. E-mail: [livsylvester@gmail.com](mailto:livsylvester@gmail.com)

### Abstract

International protected area (PA) management policies recognise the importance of respecting Indigenous rights. However, little research has been conducted to evaluate how these policies are being enforced. We evaluated whether Indigenous rights to access traditional food were being respected in La Amistad Biosphere Reserve, Costa Rica. By examining land management documents, we found that PA regulations have the potential to restrict traditional food access because these regulations ban shifting agriculture and heavily restrict hunting; these regulations do not address the harvest of edible plants. By working with Bribri people, we found multiple negative impacts that PAs had on: health, nutrition, passing on cultural teachings to youth, quality of life, cultural identity, social cohesion and bonding, as well as on the land and non-human beings. We propose three steps to better support food access in PAs in Costa Rica and elsewhere. First, a right to food framework should inform PA management regarding traditional food harvesting. Second, people require opportunities to define what harvesting activities are traditional and sustainable and these activities should be respected in PA management. Third, harvesting regulations need to be clearly communicated by land managers to resource users so people have the necessary information to exercise their rights to access food.

**Keywords:** La Amistad Biosphere Reserve, Bribri, human rights, protected areas, traditional food

### INTRODUCTION

Over 10 years ago, members of the biodiversity conservation community recommended including human rights on the conservation agenda (e.g., outcome 5, Durban Action Plan. IUCN 2004). This was recommended because many protected areas (PAs) have been established without adequate attention to, and respect for, Indigenous peoples' rights to natural

resources (IUCN 2004). Many Indigenous people have been displaced from PAs that have been created on their territories (Neumann 1997; McLean and Straede 2003; IUCN 2004; Brockington et al. 2006; West et al. 2006; Adams and Hutton 2007; Igoe and Brockington 2007; Agrawal and Redford 2009; Jonas et al. 2014). And, even when PAs have not displaced human populations, PAs have restricted Indigenous peoples' ability to access natural resources (Ghimire 1994; Hitchcock et al. 2011; Ibarra et al. 2011; Jonas et al. 2014). In response to the multiple human rights violations associated with PAs, a goal was set to manage all PAs in full compliance of Indigenous peoples' rights by 2014 (main target 8, IUCN 2004).

To support human rights in PAs, people need to retain access to traditional foods (Damman et al. 2008; UNDRIP 2008; Alcorn 2011). Traditional foods have been defined as resources obtained from the local and natural environment (Damman et al. 2008). Some examples of traditional foods

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include: wild plants and meats, species cultivated using Indigenous teachings, and foods prepared using Indigenous recipes (Damman et al. 2008; Power 2008). International human rights conventions support people's right to access traditional foods (Damman et al. 2008; Jonas et al. 2014). For instance, the international human right to food states that every man, woman, and child should have physical access, at all times, to adequate food or means for its procurement, where 'adequate' refers to food and food procurement techniques that are culturally acceptable (CESCR 1999). Other international conventions that support Indigenous rights to harvest traditional food include: 1) the International Covenant on Civil and Political Rights (ICCPR) that supports Indigenous rights to enjoy their own culture (Article 27, ICCPR 1966); 2) the Convention on the Rights of the Child (CRC) that supports Indigenous children's rights to enjoy their culture (Article 30, CRC 1989); and 3) the Indigenous and Tribal Peoples Convention 169 that supports Indigenous rights to enjoy social and cultural practices on their lands (Article 14, ILO 1989).

Access to traditional food is supported by human rights conventions because this food is important for people's health and nutrition (CESCR 1999; Damman et al. 2008, FAO 2008). There are a number of studies that demonstrate how traditional foods can provide people access to nutrients and sources of protein not available in their other dietary items (Grivetti and Ogle 2000; Fa et al. 2003; Golden et al. 2011; Powell et al. 2013). For example, while working in six villages in the East Usambara Mountains in Tanzania, Powell et al. (2013) found that traditional foods were key sources of vitamin A, vitamin C, and iron. The nutritional value of traditional food is especially important to rural people who are increasingly relying on processed foods that are less nutritious and less nutrient dense than traditional food (Kuhnlein and Receveur 1996; Damman et al. 2008).

Access to traditional food is also supported by human rights conventions because people enjoy many social and cultural benefits from these foods (CESCR 1999; Damman et al. 2008; FAO 2008). Harvesting traditional foods can help people develop special relationships with the land—relationships that are a fundamental part of cultural identity (Power 2008; Bolton and Davidson-Hunt 2014; Sylvester and García Segura 2016; Sylvester et al. 2016c). Harvesting traditional food can also contribute to social cohesion among members of a community (Aspelin 1979; Collings et al. 1998; Power 2008). Furthermore, harvesting traditional food can be important for cultural continuity; it is a means to share teachings, including those associated with skills, ethics, values, and spirituality (Power 2008; Ibarra et al. 2011).

Despite the numerous benefits people derive from traditional food harvesting, scholars have demonstrated how these benefits can be negatively impacted when food access is restricted (Peluso 1993; Brockington et al. 2006; Adams and Hutton 2007; Hitchcock et al. 2011; Ibarra et al. 2011; Jonas et al. 2014). For instance, as part of a study on human rights Hitchcock et al. (2011) illustrated how hunting prohibitions in

the Kalahari Game Reserve in Botswana restricted Indigenous people's ability to enjoy their customary rights to hunt in this Reserve; these customary rights included rights to access nutritional food as well as rights to social and cultural practices associated with food procurement. In another study in a state certified PA in Oaxaca Mexico, scholars elaborated on the diversity of social and cultural practices are affected by hunting regulations, including: food sharing, bonding, recreation, and teaching youth (Ibarra et al. 2011).

Despite reports of human rights violations regarding food access in PAs, land being managed as PAs has increased over the last decade (Jenkins and Joppa 2009). In addition, international actors working on the Convention on Biological Diversity have set a goal to expand the global area of protected habitats by 2020 (Aichi Biodiversity Target number 10, CBD 2014). Given that many Indigenous people's lands overlap with protected, and/or resource rich habitats (Neumann 1997; IUCN 2004; Jonas et al. 2014), the creation and expansion of PAs is likely to affect Indigenous people's access to food (Jonas et al. 2014). While access to food in PAs has been deemed important internationally, we lack evaluations to understand if and how this access has been respected in many of the world's existing PAs (Jonas et al. 2014). Such evaluations are important to generate information to guide the creation of new PAs that are respectful of Indigenous people's resource rights.

In this article, we examine Bribri people's access to traditional food harvested from forests of La Amistad Biosphere Reserve, Costa Rica. Costa Rica is an interesting case study to examine people's food access in PAs because 26% of its national area is managed as protected land (SINAC 2010). To date, much of the research done within Costa Rican PAs relates to the conservation of biological species, landscapes, and ecosystems and there is a lack of research on the social impacts PA can have on the human populations living in and around them. This research gap is particularly concerning regarding Indigenous people because many of the 24 Indigenous territories of Costa Rica overlap with or border PAs.

La Amistad Biosphere Reserve was an ideal site to research Indigenous people's access to food for three reasons. First, this PA overlaps with Bribri people's traditional lands—lands that Bribri people have lived on since time immemorial. Second, Bribri people use the forest for all aspects of their food procurement, including harvesting wild food, cultivating food in forest margins, and harvesting timber and water for cooking. Third, Costa Rica has set goals to respect Indigenous rights in PA management and has ratified multiple conventions that support these goals (Cajiao Jiménez 2002; SINAC 2012). For these reasons, our case study is important to examine Indigenous people's access to food in PAs and to evaluate state attempts to respect this access.

We begin with an analysis of Costa Rican PA regulatory documents. Specifically, we examined how PA regulations support and/or hinder Bribri food access in forests. Then, we analysed Bribri perspectives on how these regulations have affected their access to food.

## MATERIAL AND METHODS

### Talamanca Bribri Indigenous Territory and La Amistad Biosphere Reserve

There are 7,772 Bribri people living in the Talamanca Bribri Indigenous Territory (hereafter the Talamanca Bribri Territory) according to the 2011 census (INEC 2013). Bribri people have lived in the Talamanca region since time immemorial. In 1977, the government legally recognised 43,690 ha. of Bribri lands and designated it as the Talamanca Bribri Indigenous Reserve. In 1982, the Talamanca Bribri Territory was included within a large PA: La Amistad Biosphere Reserve (hereafter La Amistad Biosphere; Morales et al. 1984). This Biosphere reserve is Costa Rica's largest PA and it also contains Costa Rica's largest National Park: La Amistad International Park (200,000 ha., hereafter La Amistad Park; SINAC 2012). In total La Amistad Biosphere includes 11 Indigenous territories and nine PAs (SINAC 2012).

The creation of La Amistad Biosphere has affected how land is organised. For instance, land within the Biosphere is sub-divided into different land-management categories; these categories are based on a model of land management developed by the United Nations Educational, Scientific and Cultural Organization's (UNESCO) Man and Biosphere Programme (Batisse 1982; UNESCO 2014a). Specifically, this model stipulates that the areas of high biodiversity should be designated as core areas, areas that are managed as zones of absolute protection; this means that human activity in these core areas is prohibited. Lands around the core areas are designated as either: 1) buffer zones or 2) zones of transition.

### Research partnerships and the Bajo Coen community

The objectives of this research emerged from a collaboration among the authors that started in San José, Costa Rica in 2010. In 2012, author García Segura facilitated author Sylvester's collaboration with the Bajo Coen community to engage in a project on forest food harvesting. Bajo Coen is a community of approximately 45 households located in Alto Talamanca. Bajo Coen residents use forests for all aspects of their food systems, including providing fuel and water for all food preparation. The majority of Bajo Coen residents work in export agriculture (bananas, plantains, cacao), and a handful earn income as teachers and/or labourers.

In Bajo Coen, we collaborated with a women's group called *Grupo de Mujeres Sëbliwak*. To work with this women's group we developed a research partnership based on the Bribri principle related to sharing work, *ulàpeitök*. *Ulàpeitök* meant that we worked together in all aspects of these projects. We proposed objectives that were of interest to the authors and to the women's group, we worked together gathering the information and completing other practical tasks related to this work, and we ensured that the outcomes of this project benefited the authors, the women's group, and the Bajo Coen community (see Sylvester et al. 2016a for more details).

### Information gathering and research colleagues

Qualitative methods were used to understand how PA regulations have influenced forest food harvesting. Document analysis (Bowen 2009) was used to: 1) analyse how forest food harvesting is described in government regulations and 2) understand the Costa Rican legal context around Indigenous people's rights to access forest and other cultural food (Table 1). To interpret how PA regulations were applied in the Talamanca Bribri Territory, we interviewed five people (one woman and four men) working for the multiple land management institutions that operate in Bajo Coen and in the Bribri Indigenous Territory (Table 2); specifically, this included: 1) the president and one other member of the Bajo Coen government; 2) the president and one past member of the Talamanca Bribri government ADITIBRI; and 3) the Administrator of the La Amistad Park, Caribbean Sector.

We worked with 16 people who use the forest in Bajo Coen to understand how PA regulations have shaped resource harvesting at the community-level; we used participation, semi-structured interviews, and a focus group discussion (Creswell 2014) for data collection. Specifically, the main data collection method used was participation. Sylvester lived in Bajo Coen for a period of nine months with a Bribri family (March-December 2012) and a total of two weeks in 2013 (May and December). Living with a Bribri family allowed Sylvester to experience forest food harvesting as it took place at the pace of her colleagues' daily life and to experience the tacit, less visible dimensions of harvesting. Specifically, Sylvester participated in harvesting with 16 community members that volunteered to participate in this research (aged from 22 to 75 years, eight women and eight men; Sylvester and García Segura 2016). In addition to working with these 16 people, Sylvester also worked with a wider group of people (e.g., people's family members and friends). These opportunities exposed Sylvester to a diversity of perspectives within the Bajo Coen community.

Sylvester participated in many harvesting activities including hunting, gathering, shifting agriculture, and market agriculture. Harvesting was a daily activity in a diversity of spaces (farms, home gardens, forests, shifting fields, and kitchens). When not harvesting food, she engaged in many other community activities (e.g., cooking, attending community meetings, working in the school, and doing community labour).

Participation in harvesting prior to interviews was important for two main reasons. First, it was important to build relationships so people felt comfortable discussing research themes with Sylvester. Second, participation was important to ensure our interview questions were informed by a deep understanding of Bribri harvesting (Sylvester and García Segura 2016). Our goal was to work with few people to gain an in-depth understanding of harvesting; in this sense our results represent the views of a small group of people from one Bribri community. We encourage future research to expand upon this work to better understand the views of other Bribri people in Bajo Coen and in other communities within the Talamanca Bribri Territory.

**Table 1**

*Documents selected and data analysed regarding regulations over Indigenous land and resource use*

| Document selected  | Data analysed  |
|--|--|
| Costa Rican Indigenous Law N°6172 (1977)   | How forested land can be used on Indigenous lands (Article 7)  |
| Guidelines for forest resource use in Indigenous territories (MINAET 1997 cited in Candela 2007)   | The application of the Costa Rican forestry law in Indigenous territories and its relevance to food harvesting |
| The Wildlife Law 7317 (1992)   | National hunting regulations and relevance for Indigenous people   |
| La Amistad International Park Management Plan (SINAC 2012)   | PA regulations about food harvesting in La Amistad Park and the park buffer zone                               |
| Bribri community management manual   | Regulations for resource use in the Bajo Coen community  |
| A legal guide to respect Indigenous peoples rights to use and manage natural resources in Indigenous Territories in Costa Rica (Cajiao Jiménez 2002) | The Costa Rican legal context regarding Indigenous peoples' rights to resource use                             |
| The Convention on Indigenous and Tribal Peoples 169 (ILO 1989)   | Articles 8, 13, 14, 15 that were applied to La Amistad Park management plan                                    |

**Table 2**

*Organisations that oversee PA management in Bajo Coen and the Talamanca Bribri Indigenous Territory*

| Organisation name   | Description of organisation  | Land and PA management activities  | Geographic headquarters                | Notes   |
|---|--|--|--|---|
| <i>Consejo de Mayores</i> (Elders council)  | A group of Elders from Bajo Coen and neighbouring communities                          | Provides counsel on community and territorial issues   | Bajo Coen and neighbouring communities | This is the original form of Bribri governance, i.e., before states created Indigenous Reserves and PAs |
| <i>Consejo de Vecinos</i> (community council)   | Community governing body created by the state and run by Bribri people                 | Apply the community management regulations created by ADITIBRI, the Bribri regional government | Bajo Coen                              | Decentralized governing body to assist the regional government in land management issues                |
| ADITIBRI - <i>Asociación de Desarrollo Integral del Territorio Indígena Bribri de Talamanca</i> (Integral Development Association of the Bribri Talamanca Indigenous Territory) | Regional governing body created by the Costa Rican government and run by Bribri people | Legally recognised by the state as the government to oversee Bribri land management            | Suretka                                |   |
| MINAE - <i>Ministerio de Ambiente, Energías y Mares</i> (Ministry of the Environment, Energy, and Oceans)   | National governing body for environmental and energy related issues                    | National resource management organisation; works with SINAC in the management of PAs           | Multiple                               |   |
| SINAC - <i>Sistema Nacional de Áreas de Conservación</i> (National System of Conservation Areas)  | A branch of the environment ministry (MINAE) that specializes in PA management         | Participates in the management of La Amistad Biosphere and International Park                  | Multiple                               |   |

Interviews were semi-structured, and were conducted using a conversation method, a method that shows respect for story and for a participant's right to control what they wish to share with respect to the research (Kovach 2009). Twelve semi-structured interviews with eight community members aged from 22 to 75 years were completed (three women and five men). Sylvester carried out interviews in participants' homes or in locations of their choice and followed an interview guide; questions on this interview guide were related to: 1) people's views on PAs and harvesting regulations; 2) how PAs and harvesting regulations shape their harvesting practices and/or access to food (e.g., how have PA regulations affected harvesting frequency, location, time spend on the land and/or access to wild food?); and 3) how PAs and their associated regulations shape people's relationships with the land. Using prompts, people were asked to expand or elaborate on insights they shared during the interviews (Bernard 2006). Interviews ranged from 40 minutes to 1.25 hours in length.

One three-hour focus group discussion was held with two adults and one elder participant (two men, one woman) on August 12, 2012. The goals of this meeting were to: 1) discuss in detail how PA regulations are implemented at the community level; and 2) understand, in-depth and from the perspective of elders, the impacts of these regulations. This discussion was held in a traditional Bribri format that started with food sharing and led to discussion guided by an elder member of the community. Six people were invited to this meeting; only three were able to attend.

Lastly, Sylvester participated in a full-day regional meeting regarding La Amistad protected forest management on October 5, 2012 in Shiroles. During this meeting Bribri and Cabécar Indigenous resource guards met with the administrator of the La Amistad Park (Caribbean Sector) and discussed some of the existing issues and challenges regarding La Amistad Park. These resources guards expressed both, their own perspectives

as well as perspectives they brought forward from their respective communities. During this meeting Sylvester took notes on the issues and topics raised. These notes informed the creation of interview guides for interviews with one resource guard and the administrator of the La Amistad Park.

Interviews and the focus group discussion were conducted in Spanish. Bribri language was used during interviews and discussions to describe concepts that were not easily translated to Spanish. When Bribri concepts were used, these concepts were explained to Sylvester in Spanish. Some of these concepts were further unpacked with Ms Sebastiana Segura (our Bribri interpreter in Bajo Coen) and with Mr Alí García Segura (co-author of this article and Bribri member of the Bajo Coen community).

Elders in the Bajo Coen community, members of the Bajo Coen government (*Consejo de Vecinos*), and the University of Manitoba Joint-Faculty Research Ethics Board approved of this study. Mr Elias Escalante, the president of the Talamanca Bribri government (ADITIBRI), and Mr Olman Morales, the administrator for La Amistad Park (Caribbean sector), were informed of, and respected the Bajo Coen community representatives' decisions to participate in this research. All research colleagues provided their ongoing, informed consent and chose to have their names beside the insights they shared.

### Information analysis

Qualitative coding was used to analyse information (Creswell 2014). Information was compiled (i.e., notes from participation, interview and focus group transcripts, and data generated from document review) and analysed by hand. Thematic coding was carried out using the following codes identified prior to reviewing data: 1) protected areas; 2) conservation; 3) harvesting regulations; 4) forest food access; 5) hunting; and 6) gathering. A more in-depth coding process revealed themes that were not identified during the first stage of thematic coding. Specifically, information was examined looking for repetitions (i.e., recurring topics), similarities and differences among and within topics, and for in vivo codes (i.e., codes that emerged from the data that are specific to local language or local practices; Ryan and Bernard 2003). This latter process allowed for the fleshing out of the original a priori codes into new codes that reflected the nuances of our information; these new codes were used to organise the results section of this article.

## RESULTS

### Protected forest management regulations and access to food

Forest and wildlife protection regulations are found in two main documents that affect Indigenous peoples' food harvesting in La Amistad Biosphere. The first document is the La Amistad Park management plan (SINAC 2012). The La Amistad Park management plan is administered by two state environmental

organisations, i.e., *Ministerio de Ambiente, Energías y Mares* (=Ministry of the Environment, Energy, and Oceans; MINAE) and *Sistema Nacional de Áreas de Conservación* (=National System of Conservation Areas; SINAC) (Table 2). The regulations outlined in this management plan apply to all of La Amistad Park as well as to the communities that live in the park's buffer zone; this includes all of the communities in the Talamanca Bribri Indigenous Territory. The second document that contains food harvesting regulations is a community management manual (*Manuel de Funciones de la ADITIBRI y los Consejos de Vecinos*). This manual was created by the Talamanca Bribri government and given to every Bribri community to be used in land management (Table 2). We reviewed both of these documents with land managers to uncover guidelines relevant to Bribri food harvesting in forests.

La Amistad Park management plan indicates that traditional Indigenous forest use and management will be permitted in the areas that Bribri and Cabécar people have used traditionally (*Normativa General* 4.8A, SINAC 2012, pg. 61). This forest management regulation is informed by human rights articles that outline Costa Rica's obligation to recognise Indigenous people's right to retain their customs and institutions, their spiritual values, their relationships with land, their use and management of resources on their lands, and their ownership over the lands they have traditionally occupied (SINAC 2012: 61 citing ILO 1989 articles 8, 13, 14, 15). Despite the fact that forest management guidelines support Bribri access to cultural resources in forests, these guidelines are qualified by many restrictions. For instance, traditional management is only permitted in a small area between the La Amistad Biosphere core area (i.e., La Amistad Park) and Indigenous Territories. This small area where traditional management is permitted only includes four regions within the park buffer zone areas, and this small area does not include Bajo Coen.

One traditional food harvesting practice that is prohibited in the La Amistad Park management plan is shifting agriculture (SINAC 2012: 61). Bajo Coen forest management representatives explained that this regulation applies to all forested land (e.g., communal forests in communities and state managed forests, both within La Amistad Park and its buffer zone) but not to forests on farmer's private lands (interview with Mr Juradir Villanueva, resource guard, Bajo Coen, May 3, 2012). Despite this clarification, it is important to note that the La Amistad forest management plan does not state anywhere that shifting agriculture is permitted, even on private land.

There were no specific regulations regarding harvesting wild plant foods in either community or La Amistad Park management documents. Bajo Coen community members and the president of the Bajo Coen government explained that there were no PA regulations regarding wild plant food and that Bribri people have their own unique ways of managing wild plant food (e.g., interview with Ms Teonila Hernández, Bajo Coen government president, August 28, 2012). When Sylvester spoke to regional Bribri and state forest management officials about wild food harvesting, they explained how these activities are permitted for traditional but not commercial use

(interviews with Mr Elias Escalante, ADITIBRI president, Bajo Coen, October 30, 2012 and Mr Olman Morales, administrator of La Amistad Park, Caribbean Sector, Bribri, November 19, 2012).

Hunting regulations are found in both the community management document and La Amistad Park management plan. However, these regulations are articulated differently in the different forest management documents. Specifically, the community management regulations state that hunting is banned. On page one of this document, the regulations for hunting and fishing state, “because there are no longer domestic animals in the territory, it has been decided that no permits will be issued for this activity [hunting and fishing]” (manual consulted on November 16, 2012). In the above quote, domestic is a term translated from *doméstico* in Spanish. In the context of this document, the term *doméstico* refers to all wild species that are consumed for hunting and fishing. This term does not, as the literal English translation suggests, refer only to those animals reared by humans.

In the most recent forest management plan for La Amistad Park, hunting is permitted in certain forest zones; this permission is also has qualifications. For instance, hunting is only permitted if it is: 1) for subsistence; 2) done using traditional (and antiquated) methods (i.e., bow and arrow); and 3) done in the day and without the use of dogs or rifles (SINAC 2012: 61). These hunting guidelines are subject to change at anytime based on any scientific research about what is considered sustainable and/or based on reports of species vulnerability (SINAC 2012: 61).

The La Amistad Park and community land management documents are not the only sources of information on state hunting regulations. The local radio, *Radio Cultural La Voz de Talamanca*, for instance, broadcasts information about hunting. In 2012, these broadcasts explained that hunting was banned in La Amistad Biosphere and in the Talamanca Bribri Territory. These broadcasts are not consistent with La Amistad Park guidelines that support (albeit in a restrictive sense) Bribri people’s right to hunt. Radio broadcasts are an important way to disseminate information in Talamanca. Some colleagues, both young and elderly, explained their interpretations of hunting regulations are based on these broadcasts (e.g., interview with Mr Eleuterio Mayorga, farmer, Bajo Coen, October 03, 2012 and Ms Sebastiana Segura, farmer, Bajo Coen, August 29, 2012).

### **How bribri people experience forest management regulations**

#### ***Access to health and traditional food***

Our Bribri colleagues mentioned that forest management regulations have negatively impacted their access to healthy and nutritious food. Colleagues talked about this in reference to both, shifting agriculture and hunting. In reference to shifting agriculture, two colleagues described how they are in disagreement with regulations that restrict this important traditional form of agriculture:

I do not agree with the law because now the law stops us from growing corn in the forest. Also, there is nowhere to grow corn because our ancestors, the Elders, they had their places in the forest on flat lands where they cultivated the land and they took care of the forest but now the forest became small to us, too small (interview with Ms Sebastiana Segura, Bajo Coen, April 29, 2012).

ADITIBRI [the Talamanca Bribri government] said: they accept the concept of conservation because it [conservation] is part of the nature of being Indigenous. But, when the law jeopardizes Indigenous practices such as when it says I can no longer cultivate rice, beans, or corn in the forest, then I do not support it [conservation]... We have always taken a piece of land for shifting agriculture, but after we leave that land we look for another piece [of land]. When we return to the original patch of land, it has tall trees again (interview with Mr Porfirio Paez, farmer, Bajo Coen, November 14, 2012)

Mr Juradir Villanueva similarly mentioned in an interview conducted on May 3, 2012 how he disagrees with laws that challenge people’s access to shifting agriculture, an activity he explained is particularly important for elderly to access nutritious food:

I do not agree when people say to a grandfather that they cannot burn the land to grow corn, rice, or beans because those are our ancestral practices that we have done for years and years; and, without those practices, how are our elders going to support themselves?

All of the people Sylvester interviewed mentioned hunting bans in relation to forest food access. In an interview on August 29, 2012, Ms Sebastiana Segura shared why hunting bans have affected her access to healthy and nutritious food. She described how the law is concerning to her because it challenges her access to wild meat, meat that is nutritious and important for her family’s health:

The law has done us a lot of harm because here no one sells [wild] meat but we do eat it; the law has made it so we can only eat chickens and pigs and it is boring to keep eating the same thing and it is unhealthy because the chicken that arrives here [to the community] has hormones and... antibiotics, things that are not good for us.

When Ms Sebastiana Segura talked about wild meat she compared it to the factory farmed meat that is brought into her community from outside sources. She expressed a specific concern that imported meat was becoming far too common in her community (in schools and in corner stores), and how her children are being served this meat frequently. Because of these additional factors, Ms Sebastiana Segura explained how having access to forest meat was “*mas importante que nunca*” (=more important than ever). Two other colleagues, like Ms Sebastiana

Segura, expressed similar concerns (interviews with Ms Nimfa Hernández, farmer, Bajo coen, November 3, 2012, and Ms Karen Hernández, farmer, Bajo Coen, June 19, 2012).

Hunting restrictions can also limit people's access to wild greens and medicines. When people hunt they travel to sites where other food and medicines can be accessed; forest greens are examples of species directly associated with hunting in the Bribri territory and elsewhere (Ibarra et al. 2011, Sylvester et al. 2016b, 2016c). Thus, although La Amistad forest management regulations do not restrict harvesting forest foods or medicines, the simple act of restricting hunting can affect how often hunters travel on the land and the opportunities they have to harvest other species important for health.

### **Sharing food**

Colleagues described how hunting bans can affect people's opportunities to share foods and the traditional recipes prepared from these foods. Colleagues Ms Nimfa Hernández (interview on November 3, 2012), Ms Sebastiana Segura (interview on April 29, 2012), and Ms Karen Hernández (interview on June 19, 2012) all discussed this; they explained how hunting bans have discouraged many people from hunting, and thus, wild meat is rarely available to prepare and share with their families. While Sylvester was preparing a recipe of wild meat with Ms Sebastiana Segura, she told Sylvester how state laws affect her opportunities to share food with her family and especially with elders:

Sometimes my partner goes and brings me *skula'* [armored rat] or a piece of peccary and it makes me feel good because I can share it here with my family or with my mother. Mostly it is the Elders that like eating wild meat; sometimes my mother says she is bored of eating pork and when someone brings me a piece of *kásir* [peccary] or *káno'* [paca] she gets happy. If the law prohibits this, how will Elders eat wild meat, who is going to bring it to them? (interview April 29, 2012).

This illustrates how banning hunting can affect not only those that hunt, but also the people that benefit from food sharing. Ms Segura's insights further illustrate how hunting prohibitions can affect a person's ability to feel a sense of cultural pride associated with sharing traditional food with family members and elders.

### **Teaching youth**

In addition to being a means to access food, forest harvesting is also a way for people to learn about the land. For instance, when people harvest, prepare, and cook food, they acquire important Bribri teachings. These lessons may be about edible plants and animals or they may be more general and related to Bribri diet, nutrition, and history.

Bribri colleagues expressed concerns that exclusionary PA management practices have interfered with young people's opportunities to acquire food procurement skills and teachings. Specifically, colleagues described how hunting regulations

have the potential to interfere with young people's skill building process. Mr Sabino Díaz, an experienced hunter, explained how hunting regulations affect his ability to teach youth. He explained how state hunting regulations have not stopped him from hunting but have forced him to travel deep into the forest so his gun or hunting dog will not be confiscated. Such changes in his hunting routes have made it difficult for him to teach because these new routes are far from dwellings and the trails are not well suited for youth to travel (interview April 21, 2012). Ms Nimfa Hernández similarly explained how hunting regulations can interfere with youth's opportunities to practice hunting skills and with youth's overall motivation to get out on the land:

My son knows how to hunt but he does not go [hunting] any more; the [hunting] law scares us because it is strict... at this point in time, he [her son] has gotten out of the habit of hunting. It is a shame because that law has gotten youth out of the habit of hunting (interview November 3, 2012).

Hunting prohibitions can also affect the knowledge sharing that take place in a household. This concern was articulated by Ms Sebastiana Segura; if people stop hunting, she explained, young people will lose their opportunities to be exposed to traditional food processing and preparation and the teachings and stories that accompany these practices. While cooking a recent harvest of armored rat and wild ferns, Ms Segura explained why having wild food around the house is important to keep her children exposed to Bribri teachings and traditions:

If no one goes out to hunt, I do not make food here, Bribri food, so where are my kids going to learn to eat like this, to eat like our ancestors? [My kids] are only going to learn *síkua* [outsider] traditions and that is not beneficial for us (interview April 29, 2012).

In addition to hunting regulations, other exclusionary management practices in La Amistad Biosphere have interfered with young people's ability to acquire Bribri skills and teachings. Mr Juradir Villanueva, an experienced hunter, resource guard, and someone who has travelled many Bribri food harvesting routes, explained how young people train by walking in forests. In his case, he trained with his father who took him to learn to hunt on many harvesting routes, including long-distance, multi-day routes that traverse La Amistad Park from the Caribbean to the Pacific side of Costa Rica. Because much of La Amistad Park is managed for absolute protection, Mr Villanueva explained, Bribri people are discouraged from using and even from walking within those zones. He explained how this was of great concern because these forest patches and routes were instrumental in his training as a hunter. He further explained how walking traditional harvesting routes in the past was important for him to learn Bribri stories and history, as well as to learn about a suite of edible and medicinal plants that are found in forests (interview May 3, 2012).

### ***Relationships with beings in the other Bribri worlds***

Our colleagues brought our attention to an impact of PA regulations on food procurement that is not easily visible to non-Bribri people. Specifically, colleagues explained how PA regulations can disrupt the natural dynamics of the land and the abundance of plants and animals that exist. Elder Hernan García discussed this topic in depth. When PA regulations were created, Mr García explained, forest dynamics were disrupted in such a way that animals started to become scarce. Mr García attributed these disruptions to the fact that PA regulations were not a natural way to care for and to use the forest. More specifically, he explained, PA regulations try to structure nature in a way that separates humans from all the other life on the land. This structure is contradictory to Bribri understandings of the land because, for Bribri people, nothing on the land exists just to exist, everything has a purpose; and the purpose of many plants and animals is to be used for food and medicine. Thus, when laws that prohibit the use of different species are imposed, it is unnatural and inconsistent with Bribri ways of using and caring for the land. Mr García elaborates on this point here:

The law has imposed an order on nature, an order on the forest, an order on the beings that live there, it is something that is not natural. Before these [conservation] laws, everyone would go to the forest and take something, it could be medicine or food, but today it is different, nature is defending itself. For example, a hunter goes out and they do not see much. This is because of the law; it is like the law scares them [the animals]...the animals are hiding themselves, their owners are telling them to hide somewhere. Thus, these are things that concern us and we need to manage them in the way that our ancestors did (focus group discussion 12 August 2012).

Co-author of this article Alí García Segura expands upon this insight; he explains how when nature and the beings that protect the natural world learn that species are no longer being used for their purpose, nature itself will react. In other words, if plants and animals are not being used, nature will not continue to produce them. This is why, García Segura explains, Western PA systems that prohibit people's use of forest resources can have unintended consequences, i.e., in this case the disappearance of species. García Segura describes how this is a unique Bribri perspective, a perspective that has not been considered in the state management of protected forests in Talamanca and to his knowledge elsewhere in Costa Rica.

## **DISCUSSION**

The goal of this article was to evaluate how Bribri people's food access has been affected by PA regulations within La Amistad Biosphere. To do so, we examined PA food harvesting regulations and worked with Bribri people to understand how they experience those regulations in their daily lives. In our

discussion, we cover three topics. First, we expand upon how our findings contribute to better understanding of food access in PAs. Second, we outline a series of steps that are important to support better access to food in PAs. Third, we suggest areas for future research on food access, relevant to La Amistad Biosphere and in PAs elsewhere.

### **Food access in La Amistad Biosphere**

Our work is consistent with the work of others who have demonstrated how PA regulations can affect access to food harvested from the wild and food cultivated using shifting agriculture (Hitchcock et al. 2011; Ibarra et al. 2011). Specifically, our research illustrates how hunting regulations can decrease people's access to wild meat; and, when people hunt less, people have fewer opportunities to harvest wild greens. These findings are concerning for Indigenous people's health because both wild meat and wild greens can be important sources of protein and micronutrients not readily available in other dietary items (Grivetti and Ogle 2000; Fa et al. 2003; Golden et al. 2011; Powell et al. 2013, Sylvester et al. 2016c).

Bans on shifting agriculture can also have nutritional impacts. Shifting agriculture is often based on the use of saved heirloom seeds. The continued use of heirloom seeds is important to support genetic diversity on people's farms, a diversity that can serve as a safety net when certain crop varieties are hit by disease (Brush 1995). The continued use of heirloom seeds and local cultivation is also healthier than the alternative. In Bajo Coen, seed crops grown locally are done so without the application of pesticides. When corn is not grown locally in Bajo Coen people have to buy corn; this corn is often imported, animal-feed corn that is likely grown with heavy doses of pesticides.

Access to wild and locally cultivated food is especially important where rural people are undergoing nutritional transitions and/or westernisation of their diets (Damman et al. 2008). The westernisation of Indigenous diets means people rely more on processed foods and less on foods accessed through fishing, hunting, gathering, and local cultivation (Damman et al. 2008). In Bajo Coen, our colleagues were especially concerned that a decrease in access to wild meat may cause significant rise in the reliance on imported meat, meat that is already prevalent in community diets (e.g., served in schools and sold in the community). Consuming imported processed meat raises health concerns in Bajo Coen; this is because imported meat is raised on hormones and antibiotics and comes from animals raised on poor diets (i.e., using poor quality animal feed).

We found multiple negative impacts PA had on aspects of food harvesting beyond nutrition; these impacts related to teaching youth, quality of life, cultural identity, social cohesion and bonding, as well as on the land and non-human beings. Some of these impacts have been reported elsewhere, i.e., changes in the transmission of knowledge and skills, and decreased opportunities for social bonding (Ibarra et al. 2011). In addition to confirming the findings of other scholars, our

research reported new impacts PAs can have on harvesting. For instance, our findings demonstrate that harvesting regulations do not only affect the bonding that takes place on a hunting journey or the bonding that happens when sharing food (e.g., Ibarra et al. 2011), but harvesting regulations can also affect people's opportunities to experience a sense of cultural pride when sharing wild food.

Our research expands on our understanding of how PA regulations can affect youth's opportunities to learn skills, teachings, and values associated with traditional food harvesting. Scholars have reported that hunting regulations interfere with youth's opportunities to learn some skills associated with hunting (e.g., tracking animals), a phenomena referred to as de-skilling (Ibarra et al. 2011). In Bajo Coen, our colleagues reported concerns regarding de-skilling in relation to hunting. For instance, there were concerns that PA regulations interfere with youth's opportunities to learn to process, prepare, and eat traditional foods. The consequences of losing these opportunities extend far beyond those associated with health. When children are not exposed to Bribri food preparation and to the tastes of Bribri foods, our colleagues explained that their children are susceptible to adopting western diets and creating palates only for western foods. A few of our colleagues were concerned that this process of dietary change is underway in Bajo Coen. Furthermore, when traditional food is not prepared in households, youth have fewer opportunities to benefit from the cultural teachings that are shared during food preparation. When youth learn to process, prepare, and eat traditional foods they are learning more than practical skills, they are learning about Bribri language, health, history, and ethics.

Our research highlights how PAs can negatively affect the dynamics of the natural world, an impact that has not been fully explored in the literature. For our Bribri colleagues, the abundance of plants and animals in forests can be affected by a PA when that PA advocates for a decrease in use of forest species; this is because all plants and animals have a purpose and for many species their purpose is to be used. When this purpose is not fulfilled, these species may decrease in abundance because nature will not continue to produce these species. Our findings also illustrate how it is not only PA regulations that are culpable for the loss of access to food species. As our colleagues described, restrictive land use principles that are part and parcel of some conservation programmes can impact the abundance of plant and animals in a given area into the future; this is because conservation programmes, such as those associated with Biospheres, are based on principles of restriction, i.e., supporting resource-use only in buffer zones and not in core PAs. For our colleagues, these restrictive principles meant that the land and wild species can stop fulfilling their purpose and as a consequence species can cease to exist. This point clearly illustrates that we need to understand both, how PA regulations shape resource access as well as how wider Western ideologies of conservation and restriction shape resource access for different people (Peluso 1993; Ribot and Peluso 2003). In other words, even

if Bribri people's rights to hunt and harvest are supported in protected forest buffer zones, people's access to benefit from these resources can still be compromised when people's rights to use and visit the land within core protected forests are restricted. As an outsider it was hard for Sylvester to understand this perspective. Sylvester's lack of understanding of the Bribri world reinforces why Bribri people need to have the autonomy to manage their lands because only they have a clear understanding of the impacts of different forms of land management.

Describing how Bribri people experience PA regulations through their own concepts and words is one of the most important contributions of this article. Bajo Coen community members told Sylvester how creating space to have these conversations is lacking. PA regulations have been created and enforced without giving Bajo Coen residents the opportunity to discuss how these regulations can affect their food harvesting. State PA managers explained how there are logistical barriers to hosting such discussions at the community level, especially in communities that are located far from PA management headquarters. Our findings illustrate the need to create space for these discussions because there is a suite of health, social, and, cultural impacts on people that are not currently addressed in La Amistad Biosphere management.

### **Next steps to support food access in La Amistad Biosphere**

We propose three steps, important to better support food access in La Amistad Biosphere, steps relevant to other Biospheres. First, to better support Bribri food access in La Amistad Biosphere, PA managers need to fully incorporate human rights into forest management plans. Although Costa Rica has started the process of incorporating human rights into forest management, the process is incomplete. Currently La Amistad Park management plan has only used a limited number of articles from one human rights convention (i.e., ILO 1989) to inform PA management; other human rights conventions are not incorporated. Scholars have explained how Indigenous rights to access traditional food needs to be understood within the full suite of Indigenous rights; this is because all human rights are universal, indivisible, interdependent, and interrelated (UN 1993, Damman et al. 2008, Jonas et al. 2014). Thus, access to traditional food needs to be conceptualised through the full suite of Indigenous rights. Some of the human rights PA managers should use to inform PA regulations include rights to: 1) access culturally acceptable food (CESCR 1999); 2) enjoy a way of life that is closely associated with a territory and its resources (general comment 23, HRC 1994); 3) access all traditional forest lands (Article 14, ILO 1989); 4) enjoy one's culture (ICCPR Article 27, 1966); and 5) ensure youth have the opportunity to enjoy their culture (Article 30, CRC 1989).

Second, resource managers should create more opportunities for Bribri people to participate in defining what harvesting activities are traditional and sustainable; although this process

has started with a small number of Bribri people who are associated with La Amistad Park (e.g., resource guards), there are still many Bribri people who have not had any opportunity to provide their input on harvesting regulations.

If PA managers create space for a diversity of resource users to provide input on harvesting regulations, it should be done in a way that supports the participation of marginalised groups. In Bajo Coen, for instance, the women we worked with explained how they would appreciate an opportunity to provide their input on PA management; but, even if such an opportunity existed it would be challenging for them to travel to the park headquarters in Bribri or elsewhere because of their high work responsibilities around their dwellings. Elders also discussed constraints on travel and expressed the need for meetings of this nature to happen in their community.

Third, to support people's rights to access food in La Amistad PA, people need more information about harvesting regulations and about their rights to access food. The La Amistad Park management plan articulates the need to support Indigenous rights to continue traditional harvesting practices. At the same time, community management guidelines as well as the messages broadcast to Bribri communities contradict the La Amistad Park management plan because they highlight multiple prohibitions to traditional harvesting. Broadcasting messages about harvesting prohibitions detracts from a forest management plan that is has started to consid human rights. Thus, steps should be taken to provide people with accurate information about PA regulations so they can both understand and exercise their rights to access traditional food.

The three steps we propose here are important to a wider process of decolonisation of PAs. As one reviewer of this paper pointed out, PAs are often managed based on Western models of biodiversity conservation; these Western models do not necessarily accommodate Indigenous teachings regarding life in relation to forests and the land, teachings that are not based on restricting people's access to resources but rather are based on promoting resource use to keep the land alive (Sylvester and García Segura 2016). Incorporating human rights into PA management can create frameworks that will support Bribri people to define what harvesting activities are sustainable and what land use models are culturally appropriate. Such a process is important to move away from conservation approaches that merely make small spaces for Indigenous involvement within predominately Western models of biodiversity conservation (Langton et al. 2005).

### **Future research on food access in Biosphere reserves**

Despite its high priority in international conservation policy (e.g., IUCN 2013), access to food in PAs remains a poorly researched topic. Because our findings illustrate multiple negative impacts of PA regulations on food harvesting systems, it will be important to analyse whether the patterns revealed here are consistent with other regions. La Amistad Biosphere is a large area with zones managed differently and with different Indigenous groups living within it (e.g., Bribri and Cabécar

peoples); thus, the impacts of PA regulations could vary among communities and Indigenous groups in La Amistad Biosphere. Furthermore, the impacts of PA regulations on food access could vary among Biospheres in other regions. Our results are consistent with those reported on for one other PA in Latin America (e.g., Ibarra et al. 2011) and one in Africa (Hitchcock et al. 2011); however, there has been a lack of case study research to understand these issues in the 631 Biospheres found within 119 countries. More research on Biospheres is needed because one goal of Biosphere management is to promote and conserve cultural diversity. Traditional food is an important part of people's cultural diversity that UNESCO Biospheres' have set a goal to conserve (UNESCO 2014b).

### **CONCLUSION**

In this article, we have examined how PA regulations in La Amistad Biosphere have shaped Bribri people's access to food. Our analysis reveals how PA regulations have affected people's access to nutrition. PA regulations have the potential to restrict people's ability to enjoy wild meat and plants, and shifting agriculture prohibitions have the potential to discourage a traditional form of agriculture that is intrinsically linked to Bribri identity, and important for health. Our analysis further illustrates how PA regulations have negatively affected multiple dimensions of food procurement including: food sharing, teaching youth (both skills for food procurement as well as teachings associated with language, history, nutrition, and ethics), people's ability to feel a sense of pride associated with sharing food, people's right to their cultural identity, and the availability of wild species. Our findings are important because data is lacking on how PA regulations can affect Indigenous people's access to traditional food. For instance, our study is one of only three studies that have examined food access within PAs. This is the first study, to our knowledge, that has explored food access in-depth within a biosphere reserve.

Costa Rica is a global leader on human rights and has demonstrated this by using Indigenous rights to inform PA management within La Amistad Biosphere (SINAC 2012). Our findings illustrate however, that there is still more work to do. We propose three steps to better support Bribri people's access to food in La Amistad Biosphere. First, resource managers should revise PA management regulations to include a broader human rights framework (e.g., Damman et al. 2008, Jonas et al. 2014). Second, resource managers should create more opportunities for Bribri people to participate in defining what harvesting activities are traditional and sustainable. Third, resource managers should provide Bribri people more clarity regarding harvesting regulations; this clarity is fundamental for people to be accurately informed in order to exercise their rights to access food.

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### SUPPLEMENTARY PHOTO CAPTIONS AND CREDITS

Photo 1: Wild foods harvested from forest lands in the Talamanca Bribri Territory, Costa Rica (photo credit Olivia Sylvester)

Photo 2: The Talamanca Mountains in the Talamanca Bribri Territory and La Amistad Biosphere Reserve, Costa Rica (photo credit Olivia Sylvester)

Photo 3: Edible palm heart and flowers of the Diko' plant *Bactris gasipaes* harvested from forest lands in the Talamanca Bribri Territory, Costa Rica (photo credit Olivia Sylvester)

Photo 4: Edible fiddlehead ferns called Rpò *Cyathea sp.* harvested from forest lands in the Talamanca Bribri Territory, Costa Rica (photo credit Olivia Sylvester)

Photo 5: Edible wild fruit called Mo'wö *Renealmia alpinia* harvested from forest lands in the Talamanca Bribri Territory, Costa Rica (photo credit Olivia Sylvester)

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