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Deforestation and Waodani Lands in Ecuador: Mapping and Demarcation Amidst Shaky Politics

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1. Introduction

One of the major forces of deforestation around the tropics is the chipping away of forested areas for pastures by agricultural peasants who are difficult to control by remote central governments (Colchester 1998) and by loggers who enjoy the same advantages of working in isolated areas as colonists and who tend to bring roads into the forest. The major danger to many forests is fire, made more likely by the agricultural colonization that follows road construction (Nepstad et al. 2001). In the Ecuadorean Amazon fire is not a major threat, probably because of the year-round rainfall regime that maintains high levels of humidity, and road construction is driven first by oil exploration and exploitation activities that in turn facilitate access and settlement by colonists and loggers (Bromley 1972; Viña et al. 2004). Ecuador's 1964 Law of Agrarian Reform and Colonization classified large portions of Amazon as unoccupied, allowing colonists to claim 50 ha plots along roads, directly promoting deforestation by requiring proof of improvements to establish legal land titles (Bilsborrow et al. 2004; Bremner & Lu 2006; Fuentes 1997; Kimerling 1991).

In many parts of the world, however, the tropical forests have potential allies in the form of indigenous people who have inhabited the forest for millennia and are anguished about seeing it degraded and cut down. In fact it is estimated at present that 85% of the world's areas designated for biodiversity conservation are inhabited by indigenous peoples, whereas outside of the parks and nature preserves, the world's remaining pristine forested habitats are nearly all occupied by indigenous peoples (Alcorn 2000; Colchester 2001; Schmidt & Peterson 2009; Weber et al. 2000). This is true of the Ecuadorean Amazon in particular (GeoPlaDes 2010). In fact, conservation-minded outsiders have only a few choices if they want protection for these habitats. They can try to protect the forests while excluding the indigenous people – treating them essentially as fauna and making enemies of them – or they can assist them as allies (Colchester 2000, 2004; Schwartzman et al. 2000). The latter choice carries its own problems. Not all indigenous people want to save the forest, given their current assessment of costs and benefits of doing so; a certain amount of discrimination is necessary. Those who do usually want to either own the land (Colchester 2000), or, in the case of protected areas, to have signed legal agreements with governments giving them use

and management (or co-management) rights which carries its own problems with coordination, bureaucracy and political will on the part of the state.

Although recognition of ownership and/or control of large tracts of land by private individuals or groups is easy for conservationists in the developed world, it becomes much more problematic in remote forest frontiers where indigenous people may be less visible, forested areas are often not densely populated and conservationists may have closer relationships with governments than with indigenous peoples. Hence, efforts in counter-mapping have become common in the past 20 years in order to identify the areas occupied by and claimed by indigenous peoples (Chapin & Threlkeld 2001; Peluso 1995; Poole 1998; Stocks 2003; Stocks & Taber 2011; Wainwright & Bryan 2009).

Are indigenous people, once they have control and appropriate resources, able to protect forested habitats? Many would say that it is a mistake to equate indigenous occupation with conservation (e.g., Redford & Stearman 1993; Redford & Sanderson 2000). While this may be true as a general statement, the specific local outcome depends on a number of factors that include indigenous levels of organization, the kinds of resources available, their sense of place connected with a history of occupation, their own economy and the political power of competitors— industrial or individual — that also seek to occupy the forest. Evidence from a few sources in the neo-tropics indicates that when indigenous people are protecting a historic homeland with some outside help, they tend to be more successful in maintaining forests than colonist populations faced with essentially the same economic realities (Colchester 2000; Lu et al. 2010; Nepstad et al. 2006; Ricketts et al. 2010; Soares et al. 2010; Stocks et al. 2007). Indeed, in the Brazilian Amazon, the inhibitory effect on deforestation of various kinds of protected areas (strict protection, sustainable use, indigenous lands and military areas) is greatest in the category of indigenous lands (Soares et al. 2010). In the Ecuadorean Amazon this feature of indigenous lands is particularly notable in the A'í (Kofán) case (Borman et al. 2007) and the protection by the A'í of their forests on titled (*resguardo*) lands is also true in Colombia. One recent study with a broad world-wide sample argues that forests owned and/or controlled by local communities, tend to have less deforestation. Livelihood benefits and carbon storage both increase when the historic dwellers own the land or can otherwise control land use (Chhantre & Agrawal 2009).

This chapter is premised on the idea that the Waodani people of Ecuador have the essential prerequisites of ownership, sense of historic occupation, threats from colonists and outside assistance to halt the deforestation of their titled territory; and that physical demarcation of their land is a necessary step in the protection of the forest. However, the particular kind of political organization they currently exhibit, the nature of the colonists that are deployed along their frontiers, industries within their territory, and overlaps with national protected areas make demarcation a somewhat different exercise than one would think. The rest of this paper explores the history of demarcation and the consolidation of land under their control and process of providing technical assistance to them in the face of what we have called “shaky politics.” The dilemma of working with the Waodani is not uncommon in conservation. Conservationists of tropical forests typically encounter groups with essentially egalitarian political philosophies who find the establishment of hierarchical bureaucracies difficult to maintain and impossible to make function in the ways that western bureaucracies operate with top-down control. What makes the Waodani case an outlier relates to the recentness of their permanent contact with western civilization and the powerful forces arrayed against their own control and management of their titled territories. There is something to learn about working with indigenous people in conservation from this case.

2. The Waodani people and their territory

The Waodani (also known as Huaorani or Auca) were the last indigenous people in Ecuador to be “integrated” into the western world, with two clans – the Tagaeri and Taromenane – remaining in “voluntary isolation” to this day. Their language has no known relatives and at the time of contact only included two words borrowed from other languages (Trujillo León 1996); their DNA confirms their extended isolation from neighboring peoples (Cardoso et al. 2008; González-Andrade et al. 2009). A tiny population of no more than 500 people defended with their spears through random and dispersed raids a vast territory of over 20,000 km² between the Napo and Curaray rivers from all outsiders – Kichwas, colonists, oil companies, the Ecuadorean military, and missionaries (Cabodevilla 1999; Holt et al. 2004; Kane 1993). They did not participate in historical trade networks and emphasized extreme closure from all outsiders whom they call “cowode” or cannibals (Rival 1999). Their political structure was egalitarian – centered on the “nanicabo” or family longhouse – with no classes, no chiefs or leaders. Gender roles were also flexible (Holt et al. 2004). A man could become a leader for a specific event, and when the event passed so did his leadership. The intensely independent and individualistic social system led to frequent divisions of nanicabos and/or moves to distance themselves from conflicts and to escape retaliation. The primary mechanism for social control was peer pressure, with the ultimate threat of death by spearing (Rival 1999; Yost 1991).

Under increasing pressure from oil companies exploring their territory for oil reserves and from colonists in the early 1950s, the Waodani responded with spearing raids, at the same time intensifying an internal cycle of violence that produced the highest rate of death by homicide for any indigenous group anywhere (Beckerman et al. 2009), and induced several young women to escape to neighboring Kichwa farms where they became slaves (Yost 1981). An attempt by Summer Institute of Linguistics (SIL) missionaries to make peaceful contact resulted in five missionaries being speared in 1956 – an event that brought worldwide attention to the plight of the Waodani (Eliot 1958). Two SIL women, one sister and one wife of the murdered missionaries, subsequently worked with one of the escaped Waodani women to learn the language, and together the three made peaceful contact with a first Waodani clan in 1958 (Yost 1981). SIL intensified their efforts and brought several clans together in an area known as the “*Protectorado*”, in the west of the historically occupied Waodani territory, and made the first formal territorial claim to the Ecuadorean government in 1964 (Yost 1979). CONFENIAE (Confederación de las Nacionalidades Indígenas de la Amazonía Ecuatoriana) provided further backing for this territorial demand, resulting in the first Waodani land title in 1983 for 66,000 ha of the Protectorado which effectively cleared the way for oil activities and the opening of the vía Auca further east (Kane 1993, Kimerling 1991). The second and most important land title was awarded to the Waodani in 1990 and also represented a favor to oil companies, converting a large portion of the Yasuní National Park (declared in 1979) to Waodani territory, but under the condition that the Waodani did not oppose oil activities on their new lands (Kimerling 1991; Rival 1992), and recognizing the Auca road and collateral colonization as a massive cut into Waodani territory.

The legally recognized lands of what number today approximately 3500 Waodani indigenous people in Ecuador therefore amount to around 700,000 hectares in three separate land titles given at three points in history with formal ownership vested in somewhat different ways (Figure 1 and Table 1). Additionally, a number of Waodani communities are located in the Yasuni National Park, while two Waodani clans remain formally

“uncontacted” and range widely within the titled territory and the park. All in all, the Waodani inhabit over 1.5 million hectares of land in the rainy upper Amazon and Andean foothills, arguably the world’s most biodiverse forest (Bass et al. 2010).

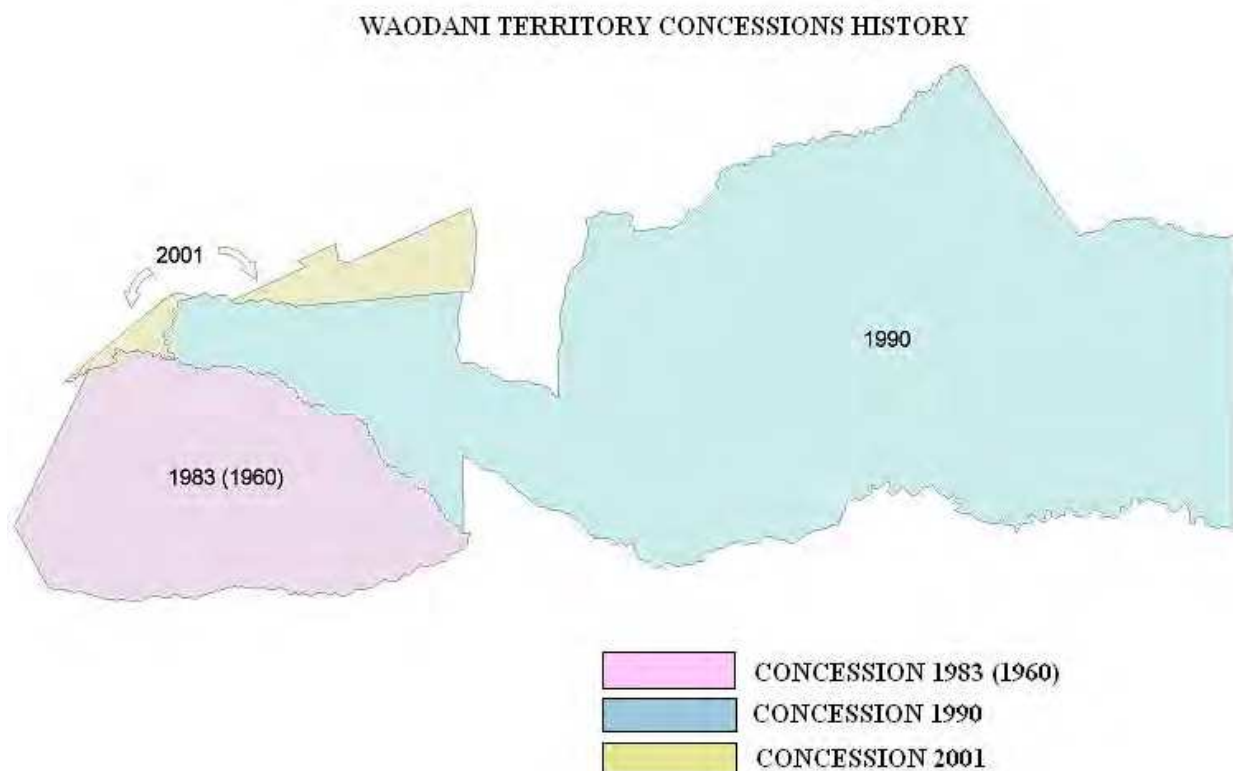


Fig. 1. Waodani territory titles (Lara et al. 2002b)¹

Year	By whom and to whom	Extension (ha)
1960 (1983)	IERAC (Instituto Ecuatoriano de Reforma Agraria y Colonización) to Waodani Ethnic Group, specifying the “community organizations” Tiweno, Tzapino, Wamono, Kiwaro, Dayuno, Toñampade	66,570
1990 / 1998	IERAC to the “Waorani Ethnicity”, specifying the community organizations identified as: Kewediono, Damointado, Nuevo Tiweno, Kenaweno, Nuevo Golondrina, Cononaco, Owanamo, Tagaeri, Tiwino and Yasuní	612,560 / 613,750
2001	INDA (Instituto Nacional de Desarrollo Agrario) to the Organización de Nacionalidades Waodani de la Amazonía Ecuatoriana (ONHAE)	29,019

Table 1. Waodani territory titles (Lara et al. 2002b)

¹The size of the first title is inaccurately represented in this map. The first territory has never been accurately georeferenced.

The process of land titling has accompanied an equally ambiguous process of organizational development for the Waodani. The Protectorado experience, while it brought an end to the more overt internal violence, was traumatic as it combined the initial contact with the west (sedentary communities, change in diets and technologies, dependence on outsiders for subsistence and new material goods, change in health conditions) with intense social change because of the concentration of the population in a small area, a new generalized leadership by a woman who acted as cultural broker, controlling the flow goods and services from missionaries and other outsiders (replacing the traditional situational leadership by men), and new relationships with Kichwas through marriage that facilitated access by Waodani to external resources while at the same time permitting access by Kichwas to Waodani natural resources and land (Holt et al. 2004; Yost 1981; 1991). As early as 1972, however, the Waodani in the Protectorado began returning to areas they had previously occupied to the west, in some cases settling near oil operations in order to benefit from work and gifts provided by the companies.

3. The development of Waodani political representation

The first formal Waodani political organization, ONHAE (Organización de la Nacionalidad Huaorani del Ecuador), was not constituted until 1990, by the first young Waodani men who had received formal education in Spanish, and supported by the oil company Maxus which required a formal counterpart to secure its operations in Waodani territory. In 1993 Maxus signed a ground-breaking 20-year agreement with ONHAE (although numerous oil companies work in Waodani territory this remains the only agreement signed with the Waodani organization and benefitting the Waodani people as a whole; subsequent agreements have only benefitted the communities within the oil company's area of operations), providing resources for the organization itself and its leaders, as well as health, education and community development resources (Rival 2000). This agreement has been maintained by the Spanish company, Repsol, which took over Maxus operations in 1996. At the same time, however, in line with indigenous rights agendas and indigenous political organizations including CONFENIAE and CONAIE (Confederación de Nacionalidades Indígenas del Ecuador), ONHAE founders also expressed the new organization's mission as preventing oil exploitation and road construction in Waodani territory, emitting a series of declarations to that effect since 1991 (Lara et al. 2002a; Rival 1992). It appears, therefore, that the Waorani might have chosen the card that had been dealt. Even Ziegler-Otero (2004: 6) agrees that 'to preserve any semblance of cultural self-determination, indigenous people must be capable of negotiating.' Negotiating and making a deal with Maxus offered the Waorani at least some tangible - though temporary - benefits in the context where rejecting those benefits would have left the Waorani empty-handed. Indeed, there are facts indicating that the Waorani were aware of the dilemma and they chose the pact with Maxus as 'a lesser evil'. As Aviles (2008:42-43) states, ONHAE representatives first attracted the attention of the public by marching in Quito and denouncing both Maxus and Petroecuador (Ecuadorian oil company). The fact that the same people ended up signing the deal with Maxus shortly afterwards demonstrates the ultimate powerlessness of the Ecuadorian indigenous people in their dealings with the state and the external sources of revenues. This turn of events

also shows the reason why dealings with the Waorani have been so frustrating for many international environmentalists. They resent ONHAE's perceived lack of principles and feel that the leadership has 'signed agreements with the Ecuadorian state and the oil companies, in apparent contradiction of their organizational positions and public statements' (Ziegler-Otero:1).

ONHAE and its successor organization, NAWE (Nacionalidad Waodani del Ecuador), since 2007 therefore represent a radically new form of political organization for the Waodani, structured as required by external "western" agencies including the government and the oil companies as well as NGOs. A president and other leaders ("dirigentes" for education, health, territory, tourism, etc.) are elected by representatives of the various communities at assemblies held irregularly every 3-18 months. The communities themselves, now numbering over 40, are new social and political structures, though in practice they have not greatly altered the traditional nanicabo social system, despite boasting presidents and other leaders. Thus new communities continue to form, often with only one or two families who have moved away from another community because of disagreements or to gain access to new resources including external assistance. Often the community presidents are not the de facto authority in the community, and a number of "big men" act as local leaders negotiating with ONHAE/NAWE, with other influential Waodani individuals and communities, and with external actors. To the degree that external actors (government representatives, oil companies, NGOs) make agreements with these "big men", obviously the strength of ONHAE/NAWE is undermined, and the generation of a Waodani conscience and unity falters.

External actors assume that ONHAE/NAWE intermediate on behalf of the Waodani people, as a form of representative democracy whereby the leaders make decisions that express the will of the people, and sign agreements including land titles with ONHAE/NAWE on behalf of the Waodani people as a whole (Ziegler-Otero 2004). In contrast, the Waodani people themselves consider ONHAE/NAWE's primary role to be the negotiation with oil companies (primarily Maxus/Repsol because individuals and communities negotiate directly with the other oil companies whose concessions overlap with the particular community's land) and the administration of the oil company-financed projects (distribution of benefits including health services, school lunches and other education services, and other goods and services). A traditional mark of Waorani leadership is the ability to get goods from outsiders and the Maxus/Repsol negotiation reaffirms the traditional orientation of their leadership (Ziegler-Otero 2004:129). The people in the communities do not expect ONHAE/NAWE to make other kinds of decisions on their behalf (High 2006). Thus, one primary challenge for today's NAWE is to provide - in addition to the social services - technical services that add value to the organization and involve them in overall conservation and development planning for Waodani holdings.

Whereas fire is not the danger in eastern Ecuador that it poses in Brazil, nonetheless colonization and road-building fuel deforestation. For the Waodani, the colonization has historically been Kichwa migrants settling along the Napo River on the north who gradually have deforested land towards the interior, and Kichwa and other migrants settling along the Curaray River on the south with the same effect (Trujillo León 1996). Oil production has driven colonization (Kichwa, Shuar, and mestizo colonists) by penetrating the very heart of

the Waodani titled territory with two roads from north to south: one, the Via Auca since 1980 which has sparked uncontrolled settlement and the other, the Via Maxus since 1993 with relatively tight control over settlement by the Maxus and Repsol oil companies in turn (Finer et al. 2009; Kane 1993; Rival 1992; Villaverde et al. 2005). On the west, the major impacts have come from the expansion of the national agricultural frontier toward the Amazon with numerous roads connecting the rivers that flow from the Andes to join eventually with the Amazon River. Urban settlement near Waodani borders is common. On the east the titled territory is bordered by the Yasuní National Park which, at present, remains relatively un-colonized and is, as indicated above, the location of numerous Waodani communities. The two clans out of contact range both in the park and in the eastern part of the titled territory (Figures 2 & 3).

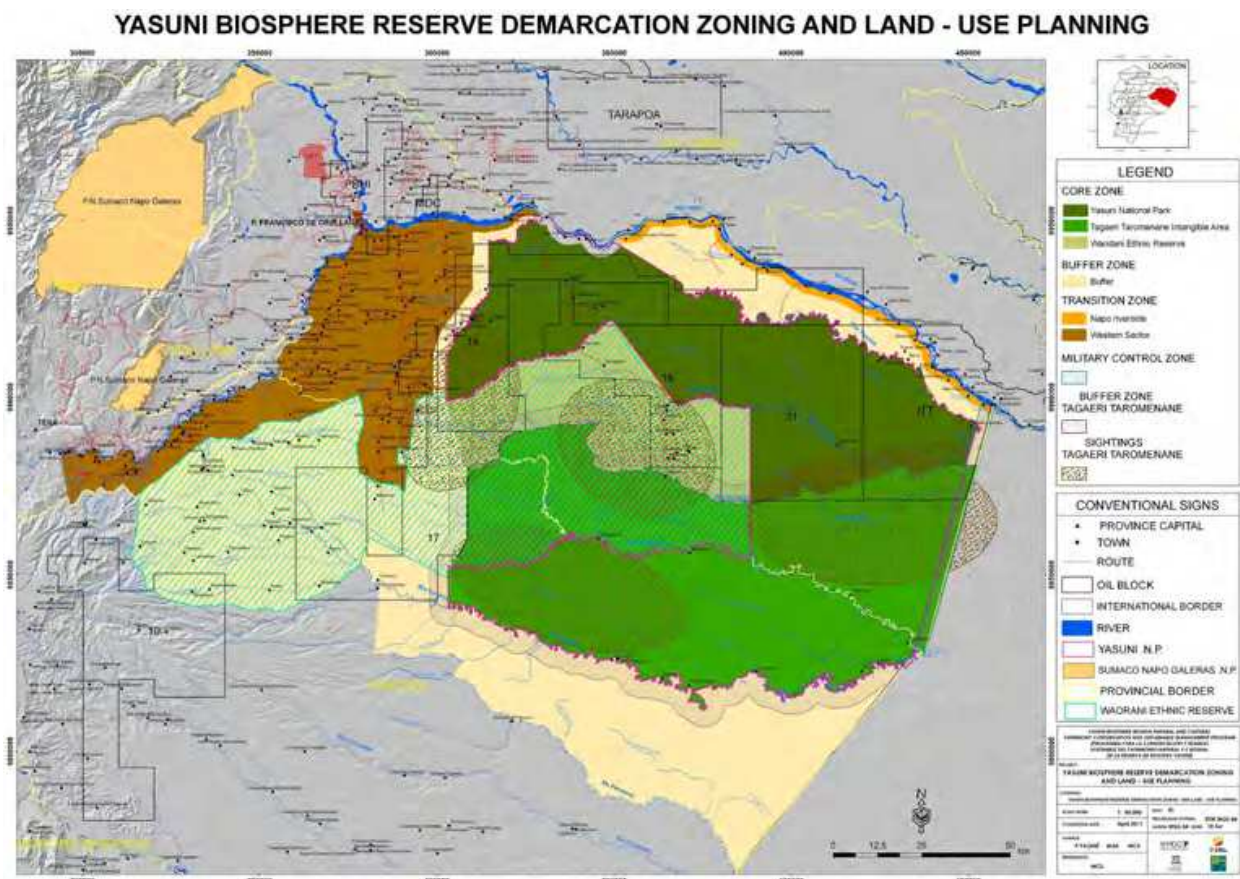


Fig. 2. The Waodani territory within the Yasuní Biosphere Reserve (MAE, MGDF, UNESCO, WCS 2011).

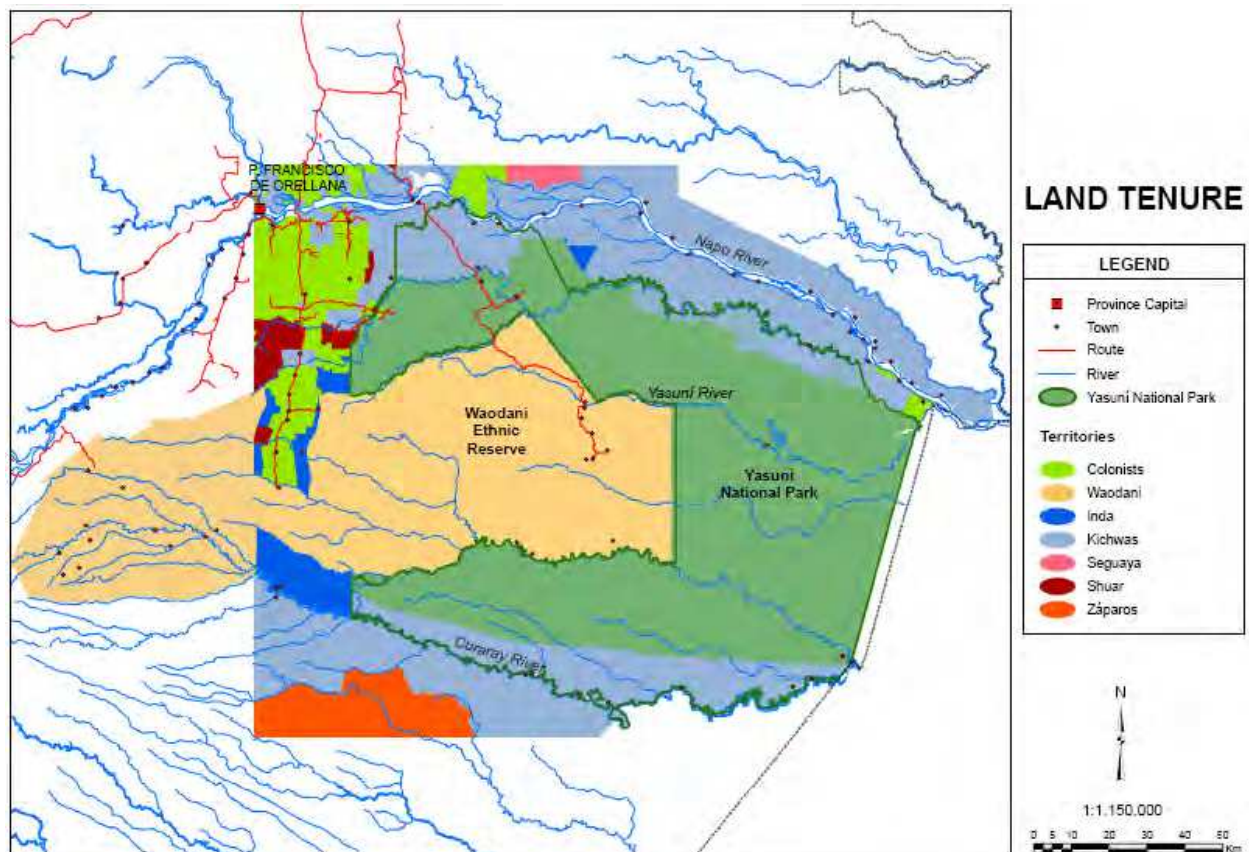


Fig. 3. The Waodani territory, Yasuni National Park, and neighbors (WCS elaboration).

4. WCS and the IMIL project: Strategies for shoring up the political structure and supporting conservation

The Wildlife Conservation Society (WCS) has been working with the Waodani organization NAWÉ since 2007, under the USAID-financed “Integrated Management of Indigenous Lands” (IMIL) Project. The project provides continuation to a previous phase of USAID funding through the Chemonics-administered CAIMAN (Conservación de Áreas Indígenas Manejadas) project (2002-2007). WCS and NAWÉ signed a formal memorandum of understanding, and subsequently a sub-grant agreement, in order to promote territorial consolidation, institution-strengthening, capacity-building, and alliances with other organizations to support the Waodani people, culture and territory. The principal territorial concern expressed by NAWÉ to WCS and in a strategic planning exercise (Vallejo & Burbano 2008) was to complete the physical demarcation of the territory begun years before with CONFENIAE assistance (Kimerling 1991) and also advanced under the CAIMAN project (Chemonics International 2007). The principal institutional priority expressed by NAWÉ was the incorporation of Waodani technical staff to the organization, and the training of this staff. WCS therefore discussed with NAWÉ ways to address both issues through the consolidation of a technical team of Waodani mapping technicians who are capable of collecting field information with a GPS (Global Positioning System) unit and generating basic maps in ArcView. Additionally the IMIL project has approached the organizational strengthening of NAWÉ through providing USAID funds that NAWÉ can

use to carry out its own contract negotiation with outside technical actors. The outcome so far indicates a marked improvement in NAWE planning and responsibility for projects, a small but significant step in consolidating the territory and gaining community confidence. For example, NAWE technicians trained under the IMIL project have assumed responsibility for developing and implementing agreements with the Ministry of Environment's Socio Bosque program (described further below) as well as community management plans; one has been elected community president, and others were hired by the Ministry of Justice in its program to protect the Tagaeri Taromenane Intangible Zone (described further below).

The demarcation process successfully completed the remaining 89 km of territorial boundary between Waodani and neighboring Kichwa communities. These boundaries followed more or less those established in the legal titles, with local adjustments made by consensus with the Kichwa neighbors according to history of use and prior verbal agreements. The Waodani did not consider it necessary to demarcate the boundary with the Yasuní National Park as their elders, at least, consider the park to be part of their territory.

In addition, during the boundary demarcation process WCS discussed with NAWE and the technicians the role of community mapping as a tool for territorial management, finding that ONHAE/NAWE had already recognized its importance in their territorial management plan (Lara et al. 2002a) and in their strategic plan (Marchán 2006) developed previously but not implemented. An enormous challenge facing the Waodani is the imposition of external management systems and boundaries on their territory—with at least eight active oil exploration and exploitation concessions overlapping Waodani territory. One assessment describes the titled Waodani territory as under the administration of oil companies with the approval of the government (Lara et al. 2002a).

Also overlapping Waodani territory are a series of protected areas which each restrict Waodani actions: the Yasuní National Park was created in 1979, with significant boundary adjustments in 1989 and again in 1992; the Yasuní Biosphere Reserve was declared in 1989 (including the entire Waodani territory); and the Tagaeri-Taromenane intangible zone was declared in 1999 and formally demarcated in 2007 (Finer et al. 2009; Lara et al. 2002a; Villaverde et al. 2005). The Waodani communities currently located within the Yasuní National Park are not permitted under Ecuadorean law to obtain land titles (Ecolex 2003).

While the Waodani at times express their ignorance of these boundaries including the Yasuní National Park, the Tagaeri-Taromenane Intangible Zone, and even the border with Peru (Randi Randi 2003), the borders in practice mean that other actors are managing significant portions of Waodani territory. In addition, the 2008 Ecuador Constitution ratifies the government's rights to sub-surface resources including oil and minerals, but also forest resources and environmental services (Bremner & Lu 2006; Reed 2011). Thus the Waodani are legal owners but not actual administrators of their territory (CARE 2002).

Community mapping therefore represents a tool whereby the Waodani can visualize and negotiate with others their own land and resource use plans, zoning, and vision for their territory (Alcorn 2000; Eghenter 2000; Peluso 1995).

The first community that requested assistance from NAWE and WCS technicians in undertaking a community mapping effort was Kewediono (= Keweriono / Que'hueriono) motivated by the association which unites five neighboring communities and which has developed a world-class and internationally acclaimed eco-tourism project—the Huaorani Ecolodge - supported by Tropic Tours in Nature. These communities had previously

defined a strict conservation area surrounding the lodge itself, and wanted maps to illustrate and reinforce these management decisions. The subsistence hunting area is the bulk of the territory, and is not subject to logging or deforestation for cultivation, while less than 1% of the territory has been deforested for farms and settlements (Custodio et al. 2008). The second set of communities requesting support is led by Gadeno (Gareno) which also boasts a tourism project, though one operated privately under concession to the Gadeno big man. The distribution of zones is similar to that for Kewediono (Table 2), with the detail that Gadeno also identified a small sacred area where the first Waodani had settled in this region (Custodio et al. 2009) and the mapping effort revealed an unsuspected zone where no hunting was permitted according to the tradition of the community of Meñempade, located on the same map as Gadeno.

Communities	Total area (ha)	Conservation %	Hunting %	Deforested %
Kewediono, Kakatado, Wentado, Apaika, Nenkipade	59,900	7	92	<1
Gadeno, Konipade, Meñempade, Dayuno	26,702	8+6	85	<1
Kiwado	26,703	74	24	<2
Toñampade	39,346	57	41	<2
Teweno	17,514	62	37	1
Guiyedo, Ganketa, Timpoka	59,494	67	32	1
Daimontado	20,957	75	19	6

Sources: Custodio et al. 2008; 2009; Arce et al. 2009; 2011; Landivar et al. 2010; Espín et al. 2010; Stocks & Espín 2010.

Table 2. Community mapping exercises with Waodani communities.

Subsequent mapping efforts took place after the launching of the government of Ecuador's innovative Socio Bosque program, whereby the government signs 20-year agreements with private (individual as well as collective) land-owners, paying an annual incentive per hectare of native forest protected (de Koning et al. 2011, Reed 2011). Although the program's only requirement is that forest not be cleared, allowing subsistence hunting or community tourism uses (commercial hunting is illegal nationwide), the communities' interest in using the maps to join the Socio Bosque program may have increased the proportion of conservation area formally identified in the mapping process. The communities may also combine the strict conservation area with the subsistence area in their proposals to Socio Bosque. Kiwado became the first Waodani community to join Socio Bosque in May 2011, assigning 24,000 ha of its territory that includes most of the conservation and subsistence hunting areas identified in the earlier mapping exercise (Arce et al. 2009).

In addition to the mapping itself, which emphasizes Waodani language place names and sites of cultural importance, each community established its own regulations for the use areas it had defined—for example strict conservation / tourism, conservation / subsistence hunting, sacred, settlement and cultivation. The Guiyedo case is the first mapping effort with communities located inside the Yasuní National Park rather than the Waodani titled

territory (Stocks & Espín 2010), and is intended by the communities to serve as a tool for negotiating a co-management agreement with the National Park for the areas utilized by the communities, as well as for joining the Socio Bosque program. Lacking a title, the co-management agreement is a pre-requisite for Socio Bosque. The northern boundary recognized by the communities is the Tiputini river, a boundary agreed with neighboring Kichwa communities, though both Waodani and Kichwa venture across the boundary. The recognition of the Yasuní park boundaries is also conditional on whether or not individuals perceive that the park and Ministry of Environment are providing benefits. Guiyedo is also the first community mapping exercise to include locations where signs of the Tagaeri-Taromenane uncontacted groups have been found by the Waodani.

Withal, the mapping work with communities has identified the hunting turfs probably associated with the first Nanicabo settlements in each of the areas. These turfs (loosely called 'community territories') are well-known by community elders and each contains areas identified with at least some hunting restrictions. In a situation of "shaky politics" at the level of the ethnic group, the turfs or territories reassure communities that their own management will be respected. Additionally demarcation at the level of the titled territory assures local communities that their land claims are taken seriously by the central authorities and that they share a common border with other Nanicabo communities. The ambiguity with regard to their neighbors of other ethnicities is somewhat resolved by the series of inter-community border agreements. In terms of strategy, the training of a technical team fielded by the central organization, NAWÉ, has proved to be successful, both in terms of getting the work done competently in association with professionals contracted by NAWÉ and in terms of community perceptions of added value to NAWÉ itself. The community conservation areas, now firmly geo-referenced, are the basis for agreements with the Pre-REDD+ program, Sociobosque, and will undoubtedly play a significant role in later REDD+ programs. Certainly it cannot be argued that these lands are not under pressure from deforestation by Kichwas and colonists entering Waodani territory. The efforts of NAWÉ and the communities to develop and implement local boundary and territory monitoring programs will continue to be critical in protecting them.

5. Conclusions

The central issue in this chapter has been an attempt to avoid deforestation in one of the world's most productive and critically threatened habitats through consolidating the hold of indigenous people on the land and by working with an indigenous organization with a tenuous hold on legitimacy and a limited mandate from communities in order to improve resource management and conservation. This is a challenge that most serious conservationists encounter at some time in their career if they work around forest frontiers. There is no easy recipe for success or guarantee that the forest will not disappear in a determined number of years, but our experience is that the probability of encountering a relatively intact forest in, say, 50 years is greatest if indigenous people are in control of the outcome in areas they have historically inhabited, and greater still if they still maintain language and customs connected to their historic past. The work IMIL has done with the Waodani so far has, arguably, increased both the definition of the land controlled by them in general and specifically by community - land that includes large areas of no-commercial-hunting zones - and their ability to relate to a central ethnic organization that can be trusted to provide valuable assistance in the defense of land.

Because of the economy of the Waodani, the land they control is 99% or more in forest, so from a carbon perspective any investment in stability has benefits beyond the forest patches actually counted as conservation land. Such situations should be obvious targets for financing through global carbon markets as REDD+ proposes to do.

From the point of view of a conservationist, the key to working with the Waodani is the recognition of their sovereignty over land and resources. This recognition should not carry with it the assumption that the Waodani people are "cultural" ecologists. Actually, they are and their ecological knowledge runs deep, but the social expression of their own ecological adaptation involved levels of violence no longer tolerated in the Ecuadorian state. The modern adaptation to multiple cash sources and the heritage of decentralized political control has left them more vulnerable than most groups, so the importance of a central organization with some input into resource management is emphasized by the situation. The rub will come if the state tries to exercise its own constitutionally-granted rights to the forests in imposed ways that do not recognize Waodani sovereignty. One hopes that wise heads prevail in the government ministries that deal with the Waodani. If the Waodani are assisted to manage the forests in ways that strike them as culturally appropriate, everyone wins.

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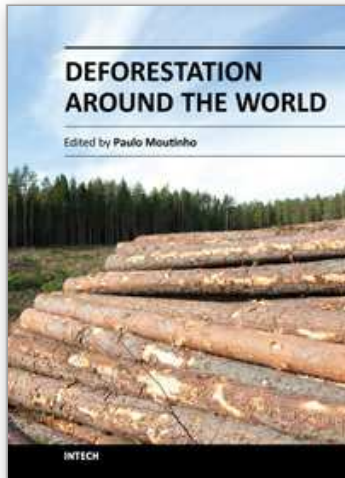
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Deforestation and forest degradation represent a significant fraction of the annual worldwide human-induced emission of greenhouse gases to the atmosphere, the main source of biodiversity losses and the destruction of millions of people's homes. Despite local/regional causes, its consequences are global. This book provides a general view about deforestation dynamics around the world, incorporating analyses of its causes, impacts and actions to prevent it. Its 17 Chapters, organized in three sections, refer to deforestation impacts on climate, soil, biodiversity and human population, but also describe several initiatives to prevent it. A special emphasis is given to different remote-sensing and mapping techniques that could be used as a source for decision-makers and society to promote forest conservation and control deforestation.

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