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# Ecuador's Yasuní Biosphere Reserve: a brief modern history and conservation challenges

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**Abstract**
Ecuador's Yasuní Man and the Biosphere Reserve—located at the intersection of the Amazon, the Andes mountains, and the equator—is home to extraordinary biodiversity and a recently contacted Amazonian indigenous group known as the Waorani (or Huaorani). Relatives of the Waorani, the Tagaeri and Taromenane, still live in voluntary isolation deep in the reserve, with no peaceful contact with the outside world. The Yasuní Biosphere Reserve also sits atop large reserves of crude oil, Ecuador's chief export, and contains an abundance of valuable timber species. This volatile combination has led to intense conflicts, and subsequently, increased international interest and concern. To make the issues confronting Yasuní more accessible to a growing audience of interested parties, we synthesized information on the biological, social, and political issues of the region, providing a concise overview of its modern history and conservation challenges. We constructed a chronology of key events in the Yasuní region over the past century and a series of maps designed to guide readers to a better understanding of the area's complicated array of overlapping designations. Main topics of analysis and discussion include: the Waorani and their ancestors living in voluntary isolation, Yasuní National Park, illegal logging, missionary impacts, oil-development-related impacts and conflicts, and the Ecuadorian government's innovative Yasuní-ITT Initiative (ITT: Ishpingo–Tiputini–Tambococha).

**Keywords:** Amazon, Ecuador, Yasuní National Park, Waorani, Huaorani, oil development, roads, illegal logging, indigenous peoples in voluntary isolation

## 1. Introduction

Ecuador's Yasuní Man and the Biosphere Reserve, comprised of Yasuní National Park and the Waorani Ethnic Reserve, lies at an important biogeographic crossroads: at the intersection of the Amazon, the Andes mountains, and the equator (figure 1). This region contains extraordinary biological and cultural richness, along with abundant natural resources (Finer *et al* 2008). It is one of the most biodiverse places on Earth, and the core of a unique area where the continent's plant, amphibian, bird, and mammal species richness centers overlap (Bass *et al* 2009). It is home to the Waorani (or Huaorani), a relatively recently contacted Amazonian indigenous group with a long—and violent—history of protecting their territory

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**Figure 1.** General location of the Yasuní Biosphere Reserve. The reserve, which is composed of Yasuní National Park and the Waorani Ethnic Reserve, is uniquely located at the intersection of the Amazon, Andes mountains, and the equator. White box indicates focal area for figures 2–6.

from unwanted intruders (Cabodevilla 1999, Beckerman *et al* 2009). Relatives of the Waorani, the Tagaeri and Taromenane, continue to live in voluntary isolation deep in the reserve, with no peaceful contact with the outside world (Cabodevilla 2004). The Yasuní Biosphere Reserve also sits atop large reserves of crude oil (Finer *et al* 2008), Ecuador's chief export. In fact, Ecuador's second largest untapped oil fields, known as ITT, lie beneath Yasuní National Park. Finally, the reserve contains an abundance of valuable tree species, drawing illegal loggers deep into its core (Aguirre 2007).

This volatile combination of high biodiversity and rainforest indigenous peoples along with oil and timber interests has led to intense conflicts (Zapata-Ríos *et al* 2006). Some of the conflicts are unfolding on an international stage, such as those dealing with oil development in the national park (Finer *et al* 2008). Other conflicts are shrouded in mystery, such as the bloody confrontations between illegal loggers and uncontacted Waorani (Cabodevilla 2004, Aguirre 2007).

International interest in, and concern about, the Yasuní Biosphere Reserve has greatly increased in recent years. This is a result of several key factors: an emerging recognition that it may be the most biodiverse place on the planet, a growing appreciation for both the Waorani culture and the related uncontacted groups still living in voluntary isolation, the increased conflict sparked by the continued expansion of both the oil frontier and illegal logging deeper into the reserve's core, and the Ecuadorian government's high-profile Yasuní-ITT Initiative. The Yasuní region, however, is now a complicated array of overlapping protected areas, indigenous reserves and extractive concessions, making it exceedingly difficult for new actors to develop a working knowledge of the area.

To make the issues confronting Yasuní more accessible to a growing audience of interested parties, we provide here a concise overview of the Yasuní region's modern history and primary conservation challenges. This synthesis integrates

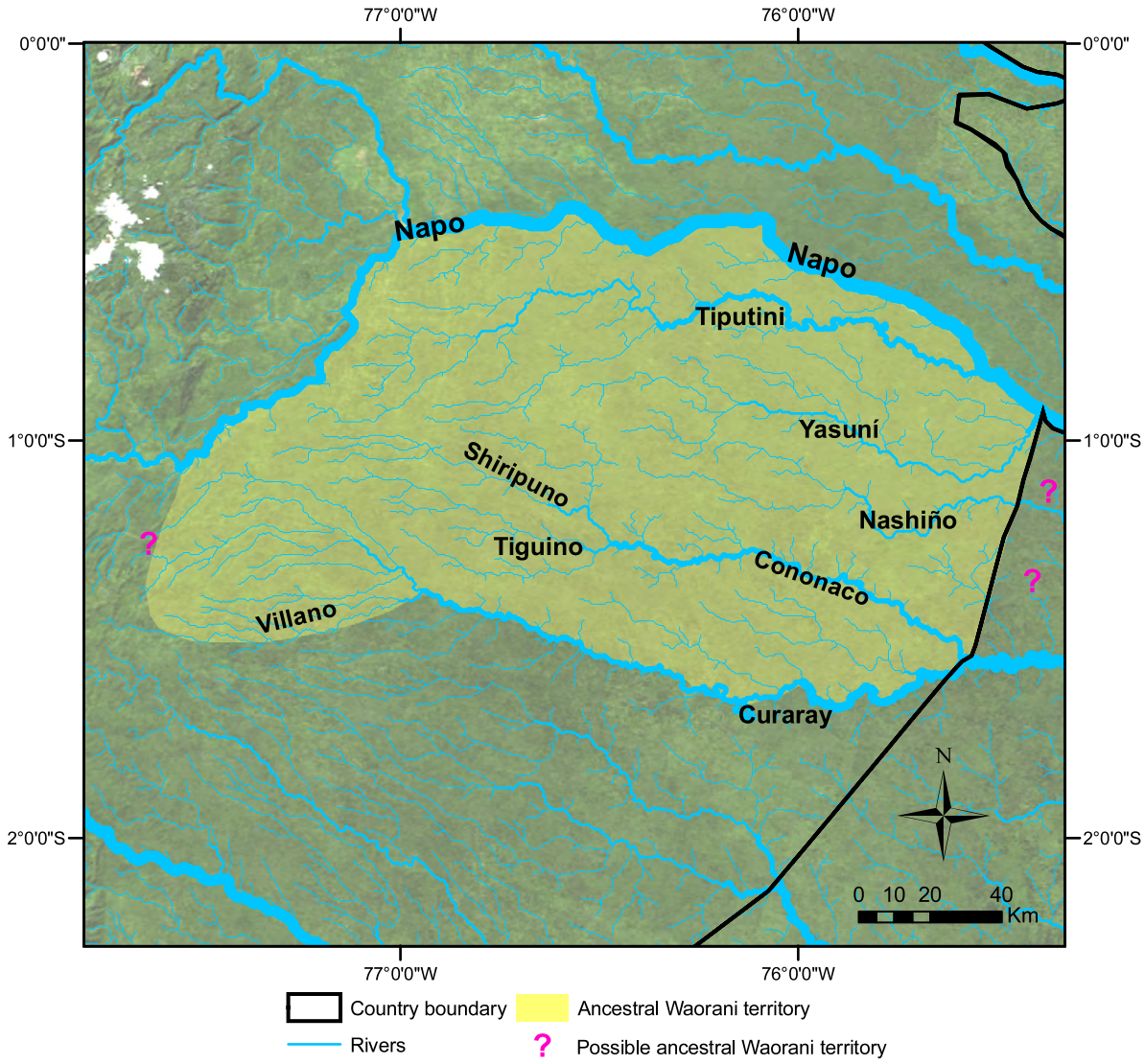


**Figure 2.** Ancestral Waorani territory and the major rivers of the region.

biological, social, and political elements that traditionally have been treated separately.

## 2. Methods

We collected, analyzed, and synthesized all available information on the biological, social, and political issues of the Yasuní region. Our primary sources were published books and articles, government documents, and local news reports. We also drew upon personal experiences for more recent events not yet documented in published reports.

River data for the figures are from HydroSHEDS (Lehner *et al* 2008). The boundary for Yasuní National Park is from the World Database of Protected Areas. Data on oil blocks are from government sources and are described in detail in Finer *et al* (2008). Oil access roads were digitized from Google Earth. Additional data utilized in the figures provided by IGM (Instituto Geografico Militar), EcoCiencia, and Wildlife Conservation Society.

## 3. Results and discussion

Table 1 provides a chronology of the key events discussed thematically below.

### *3.1. The Waorani*

The entire Yasuní Biosphere Reserve region is ancestral Waorani territory, which extends from the Napo River on the north and west, down to the Curaray River in the south and eastward into Peru (figure 2). This vast territory, which stretches over 20 000 km$^2$, underlies the current limits of Yasuní National Park and the Waorani Ethnic Reserve (figure 3).

Information on Waorani history and distribution prior to the twentieth century is scarce and speculative (Rival 2002, Ziegler-Otero 2004). The Waorani were traditionally a highly mobile, semi-nomadic population of hunter-gatherer-horticulturalists (Mena *et al* 2000, Lu 2001, Rival 2002, Franzen 2006, Beckerman *et al* 2009). They lived in four

**Table 1.** Chronology of key events in the Yasuní region.

| Date | Event |
|---|---|
| Early 1900s | First known accounts of Waorani spearing intruders on their territory |
| 1940s | Shell Oil operates in Waorani territory |
| 1942 | Waorani attack Shell Oil station, killing two oil workers |
| 1949 | Waorani kill several Shell Oil workers in the field |
| 1950 | Shell Oil abandons Waorani territory |
| 1956 | Group of Waorani kill five American evangelical missionaries deep in Waorani territory |
| Oct 1958 | Rachel Saint, with help from Dayuma, enters Waorani territory and establishes first peaceful contact with a Waorani territorial group |
| 1958–1968 | Members of contacted Waorani group live in Tihueno, a new settlement established by Saint |
| 1968 | Ecuador grants 'Protectorate' for relocated Waorani to evangelical missionary group SIL |
| 1968–1972 | Saint leads relocation efforts for the remaining three Waorani groups |
| 1969 | Deadly polio epidemic hits the Protectorate after arrival of third Waorani group |
| Early 1970s | Oil exploration resumes in areas recently vacated by relocated Waorani |
| 1971 | Tagaeri kill oil worker |
| 1977 | Tagaeri kill 3 oil workers |
| 1979 | Ecuador creates Yasuní National Park (YNP) |
| Early 1980s | Texaco constructs Auca road and first oil production sites in ancestral Waorani territory |
| 1980s | Ecuador leases out oil blocks covering the northern section of Yasuní National Park |
| 1983 | Ecuador creates small Waorani reserve; first time land titled directly to the Waorani |
| 1984 | Tagaeri attack oil company canoe |
| 1987 | Tagaeri kill Capuchin missionary Alejandro Labaka attempting a peaceful contact |
| 1989 | UNESCO declares Yasuní National Park as a Man and the Biosphere Reserve |
| 1990 | Ecuador reduces size of Yasuní National Park in order to permit oil extraction |
| 1992 | Ecuador enlarges Yasuní National Park to current size and shape |
| 1992 | Ecuador creates the Waorani Ethnic Reserve |
| 1992 | Petroecuador takes over Texaco oil operations |
| 1992–1995 | Maxus constructs new oil access road into Yasuní National Park and Waorani Reserve |
| 1993 | Group of Waorani kidnap, and later return, Tagaeri woman (Omatuki). Tagaeri attack Waorani on the return trip, killing Carlos Omene |
| 1993 | Class action suit filed in US against Texaco regarding their Ecuador oil operations |
| 1996 | Ecuador leases out Block 31 to Perez Companc |
| 1999 | Ecuador creates the Zona Intangible (ZI), but its borders not defined |
| 2000 | Occidental Petroleum begins construction of access road into buffer zone of YNP |
| 2002 | Petrobras purchases Block 31 from Perez Companc |
| 2003 | Group of Waorani men attack Taromenane house, killing at least 12 |
| 2003 | Petrobras presents EIS for development of Block 31 |
| 2003 | Class action suit against Texaco begins in Ecuador |
| 2004 | Scientists concerned for Yasuní issue unsolicited Technical Advisory Report for Block 31 |
| April 2005 | Ecuadorians force Lucio Gutierrez from office, Alfredo Palacio assumes the Presidency |
| May 2005 | Petrobras begins road construction in buffer zone of Yasuní National Park |
| July 2005 | Palacio administration blocks construction of Petrobras road into Yasuní National Park |
| July 2005 | Waorani march on Quito in protest of Petrobras project in Block 31 |
| Sept 2005 | ONHAE signs controversial usufruct agreement with American company Eco-Genesis |
| 2005–2006 | Over 15 illegal logging camps within Zona Intangible |
| April 2006 | Taromenane spear two loggers, killing one; rumors erupt of revenge killings by loggers |
| May 2006 | Inter-American Commission on Human Rights issue Precautionary Measures |
| Sept 2006 | Petrobras releases new EIS for Block 31; drops plan for access road |
| Sept 2006 | Scientists Concerned for Yasuní respond to new EIS for Block 31 |
| Sept 2006 | Government presents draft Zona Intangible decree to Waorani leaders in Coca |
| Jan 2007 | Out-going President Palacio signs Decree delimiting the Zona Intangible |
| April 2007 | Ecuador announces initiative to craft national policy regarding uncontacted indigenous peoples |
| June 2007 | Ecuador officially launches ITT campaign |
| Sept 2007 | President Correa presents ITT Initiative at the UN |
| Oct 2007 | Ecuador presents plan before IACHR for implementing Precautionary Measures |
| Oct 2007 | Ecuador grants Petrobras environmental license for Block 31 |
| Dec 2007 | ITT Initiative promoted at Bali climate change meetings |

warring and widely dispersed groups (Cabodevilla 1999) located on hilltops away from major rivers (Rival 2000). Rival (2002) postulated that the hilltops surrounding the headwaters of the Tiputini River constituted the core of ancestral Waorani territory. Other indigenous groups, mainly the Zaparos, lived along the Tiputini and Curaray rivers (see figure 2), in essence surrounding the Waorani. When the Zaparos were suddenly decimated by disease and violent displacement during the rubber boom that hit the region in the late 1800s, the Waorani were able to expand their territory northward to the Napo and

**Table 1.** (Continued.)

| Date | Event |
|---|---|
| Feb 2008 | Taromenane attack logging camp within ZI; rumors again erupt of killings by loggers |
| Mar 2008 | Taromenane kill illegal logger outside limits of the Zona Intangible |
| Mar 2008 | Ecuador presents updated plan before IACHR for implementing Precautionary Measures |
| Mar 2008 | Ecuador presents ITT Initiative at OPEC meetings |
| April 2008 | Ecuador establishes illegal logging control point on Shiripuno Bridge |
| Sept 2008 | Petrobras suddenly withdraws from Block 31; block returns to Ecuador |
| Sept 2008 | Ecuadorian voters approve new Constitution |
| Oct 2008 | Ecuadorian court cancels ONHAE-Ecogenesis usufruct contract |
| Oct 2008 | Ecuador announces ITT 'Yasuní Guarantee Certificates' |
| Dec 2008 | Ecuadorian Environment Ministry warns Oil Ministry against proposed new oil exploration project near March 2008 lethal spearing site |
| Feb 2009 | President Correa signs decree that indefinitely extends ITT Initiative deadline |

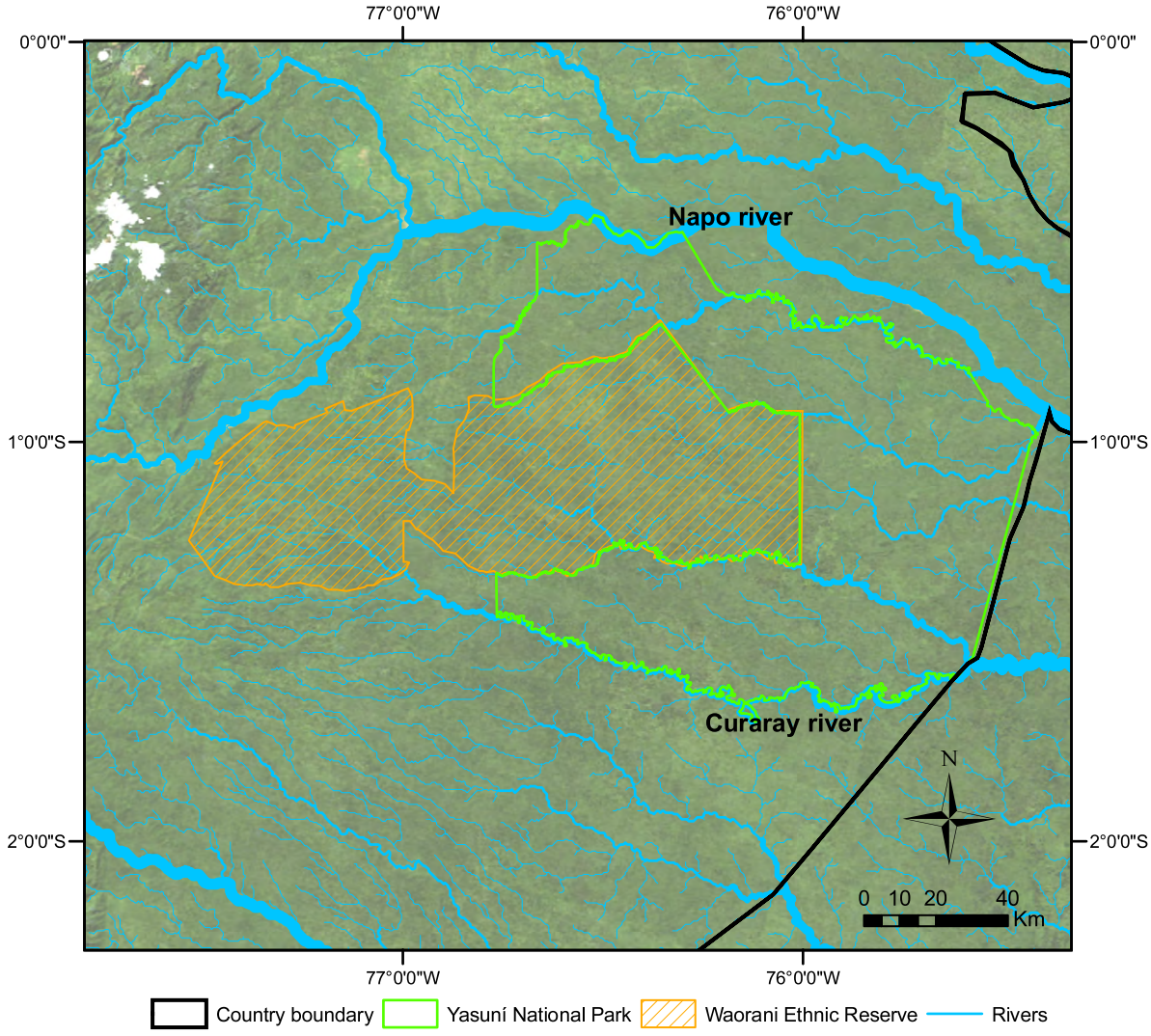


**Figure 3.** Yasuní Man and the Biosphere Reserve, which consists of Yasuní National Park and the Waorani Ethnic Reserve.

southward to the Upper Curaray and Villano rivers. Waorani territory likely reached its greatest extent at the beginning of 20th century (Cabodevilla 1999).

At least two lines of evidence suggest that the Waorani were quite isolated, even from other indigenous groups in the area, for a long time. First, their language, Wao Terero (or Wao Tededo), is an isolated one without known congeners (Lu 2001, Rival 2002) and with only two known cognates at the time of missionary contact in the late 1950s (Peeke 1973). Wao Terero is considered unique in linguistic construction, with no known similarities with Zaparoan phonology or structure (Peeke 1973). Second, the genetic homogeneity of the Waorani

also points to a lengthy isolation of their population (Larrick *et al* 1985).

During modern history, there were four major periods of early contact between the Waorani—which translates to 'the people' or 'true human beings' in Wao Terero—and outsiders encroaching on their territory (Rival 2002, Ziegler-Otero 2004): (1) the rubber boom in the late 1800s/early 1900s, (2) early oil exploration in the 1940s, (3) missionary work starting in the 1950s, and (4) the oil boom starting in the 1970s. Prior to contact with missionaries in the late 1950s, it is estimated that ∼17% of Waorani deaths stemmed from conflicts with outsiders (Yost 1981), whom the Waorani referred to as 'cohouri' (or kowodi) and considered to be non-human predators or cannibals (Rival 2002).

There is evidence dating back to the early 1900s, during the era of the rubber boom, of deadly spearings by the Waorani (Cabodevilla 1999). Such lethal spearings grew more common in the 20s and 30s. Indeed, by this time the Waorani had generated a notorious reputation for their fierce attacks against intruders. The Waorani maintained their dominance of the region until the arrival of the oil company Royal Dutch Shell in the 1940s. Shell established a base camp on the western edge of Waorani lands and built several airstrips in the core of their territory. The Waorani were a constant threat to these operations, killing several Shell workers during the 1940s (Cabodevilla 1999). In 1950, Shell abruptly abandoned operations in Waorani territory.

As shell was leaving, however, the missionaries were arriving. In 1955, a group of American evangelical missionaries started an aggressive effort to make contact with the Waorani, starting with gift distribution via airplane. A group of Waorani made news around the world in 1956 when they speared and killed five of these missionaries, whom had landed their plane deep inside Waorani territory in an effort to make first contact. Two years later, in October 1958, evangelical missionary Rachel Saint—sister of one of the killed missionaries—with the help of Dayuma—a Waorani woman who had run away several years before—made the first peaceful contact with one of the four Waorani groups. Over the next decade, members of this newly contacted group began to live in a new settlement, known as Tihueno (or Tewaeno), established by Saint.

In 1968, the Ecuadorian government authorized Saint's American evangelical organization, the Summer Institute of Linguistics (SIL), to create a relatively small (∼1600 km$^2$) 'Protectorate' in the westernmost part of Waorani lands for the translocation of the three other Waorani territorial groups (Cabodevilla 1999, Rival 1999, 2002, Ziegler-Otero 2004). Over the following five years, Saint—often with the assistance of oil company helicopters—relocated the vast majority of the Waorani to the Protectorate (Cabodevilla 1999, Beckerman *et al* 2009). These events have led numerous authors to speculate about a government-missionary-oil company axis aimed at clearing out the hostile Waorani in order to make way for oil exploration (Kimerling 1991, Kane 1995, Cabodevilla 1999, Perkins 2004, Ziegler-Otero 2004). Oil exploration started up again in Waorani territory during the early 1970s in areas abandoned by relocated Waorani groups.

Total Waorani population size was around 600 when first surveyed in the early 1960s, and more than 500 had been relocated to the Protectorate's mission base by the mid-1970s (Rival 2002). In other words, over 80% of the Waorani population was suddenly living in less than 10% of their traditional lands (Rival 1999). Moreover, instead of several nomadic, self-sufficient, dispersed, and warring groups spread across a vast territory, most Waorani were suddenly confined to a small area, living sedentary, missionary-dependent lives. A deadly polio epidemic hit the missionary compound in 1969 immediately following the arrival of the third Waorani group, killing 16 and permanently handicapping many more (Cabodevilla 1999). Ziegler-Otero (2004) argues that SIL was directly responsible for this outbreak due to inadequate vaccinations and sanitation while at the same time concentrating a large population in such a small area.

One of the most obvious changes attributed to the missionary influence is that the cycle of vengeance killing among the Waorani has largely been broken (Boster *et al* 2004) and internal warfare has ended, or at least reduced to very infrequent incidents. It is estimated that around 42% of Waorani deaths were attributable to internal group violence prior to missionary contact (Yost 1981, Larrick *et al* 1979)—the highest known homicide rate of any indigenous society (Beckerman *et al* 2009). All Waorani deaths, even by illness or accident, were thought to be a direct consequence of another human, triggering a vicious cycle of revenge killings (Rival 2002, Boster *et al* 2004). Interestingly, Beckerman *et al* (2009) found that the most aggressive Waorani warriors did not actually enjoy higher reproductive success. Ziegler-Otero (2004), however, argues that the missionary work was ultimately 'ethnocide', destruction of a traditional way of a life and conversion to a foreign religion and new set of social norms.

### *3.2. Auca road*

The new wave of oil exploration that followed the Waorani relocations led to construction of the first road into Waorani territory. In the early 1980s, US oil company Texaco built the so-called Auca road ∼120 km deep into the heart of Waorani lands (figure 4). Auca is the Kichwa (Quichua) word for 'savage', referring to the Waorani. Constructed without any control points, the road triggered a massive influx of colonists and large-scale deforestation (Zapata-Ríos *et al* 2006). The colonization and deforestation not only followed the principal north–south road, but spread along subsequent secondary and tertiary spur roads. One prominent spur road eventually extended all the way into the northwestern corner of Yasuní National Park in order to access several oil fields. Similar widespread road-induced deforestation was observed to the north during Texaco's initial oil development in Ecuador (Sierra 2000, Bilsborrow *et al* 2004). The Auca road continues to service numerous oil fields to this day.

Texaco, now owned by Chevron, is at the center of a 15 year legal battle regarding these oil operations (Smith and Gullo 2008, Forero 2009). In a class action suit (*Aguinda v. ChevronTexaco*) first filed in US federal court in 1993

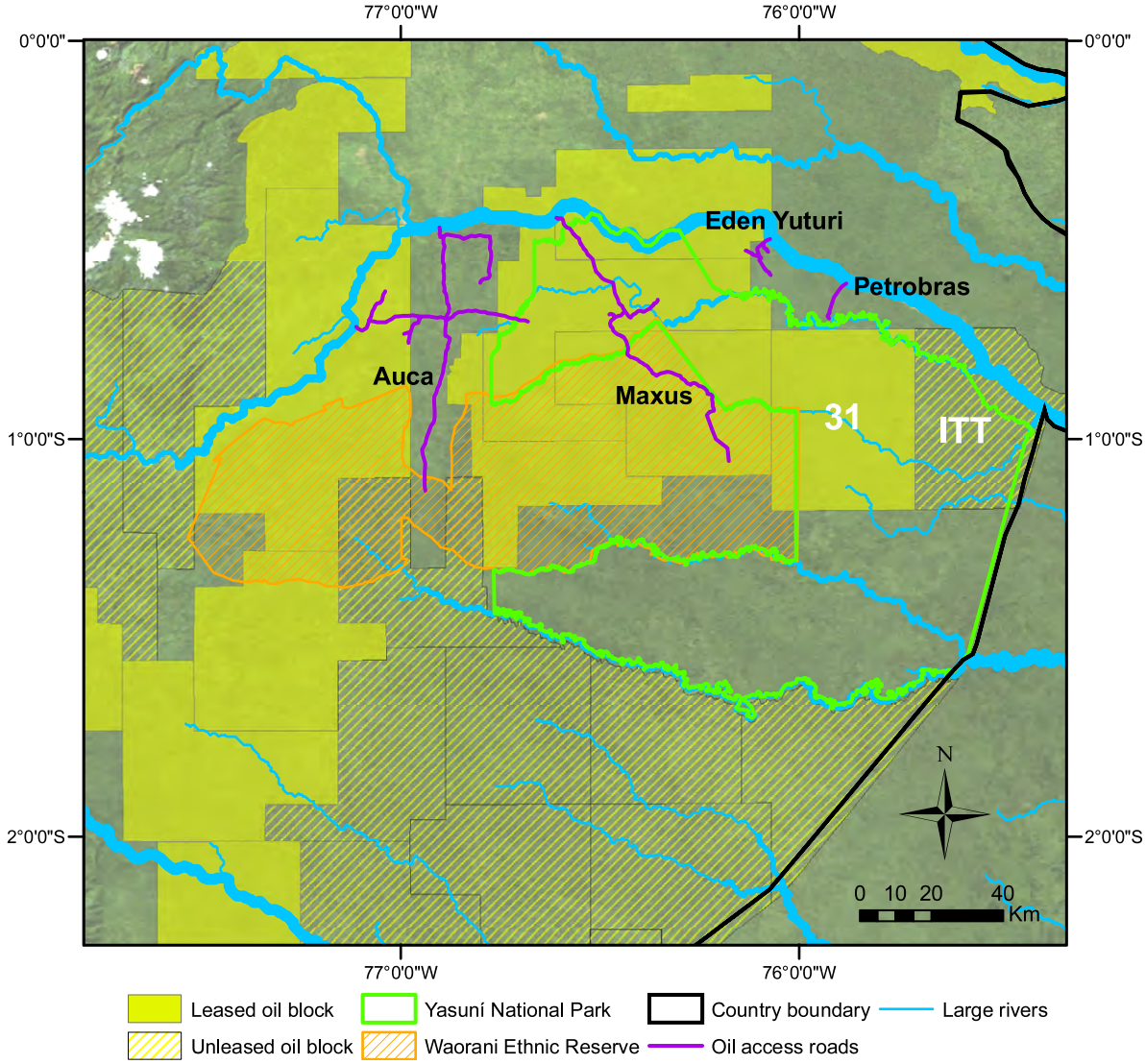


**Figure 4.** Oil blocks and oil access roads of the Yasuní region.

and then relocated to the Ecuadorian court system in 2003, local residents and several indigenous groups—including the Waorani—allege that Texaco dumped over 16 billion gallons of toxic waste directly into the area's waterways during their operations from 1964 until 1990 (Koenig 2007). The company is also accused of leaving over 900 unlined waste pits that continue to leach toxins into the environment. In 2008, a court-appointed expert found that Chevron could be liable for up to $27 billion in damages. Chevron, however, claims that Texaco complied with its cleanup obligations and that PetroEcuador, the Ecuadorian national oil company that took over operations in 1992, now bears all responsibility. A judicial ruling is expected in 2009 (Smith and Gullo 2008).

### *3.3. Yasuní National Park*

Yasuní National Park was created in November 1979 via an Inter-ministerial Decree (Albacete *et al* 2004). The park originally covered 6797 km$^2$ between the Tiputini and Cononaco Rivers in the eastern part of Waorani territory. During the 1980s, however, the Ecuadorian government held multiple bidding rounds to lease out oil concessions covering much of the northern section of the park (figure 4) (Maldonado and Almeida 2006). The size of Yasuní National Park was reduced in 1990 as the limits were modified in order to preempt a legal challenge to drilling in a protected area (Sawyer 2004). In May 1992, the park was enlarged to its current size and dimensions, covering 9820 km$^2$ (figure 3) (Albacete *et al* 2004). Yasuní National Park is not only the largest protected area in Ecuador, but also the country's only Amazonian national park. It is mostly low elevation (200–300 m) *terra firme* moist tropical forest, dissected by numerous tributaries of the Napo River.

Two scientific research stations, the Yasuní Research Station and the Tiputini Biodiversity Station, were established in the Yasuní National Park area in 1994. Research from these two stations has revealed that it is one of the most biodiverse places on the planet. The Yasuní herpetofauna—150 species of amphibians and 121 species of reptiles—is the highest documented in the world (Cisneros-Heredia *et al* 2009, Bass

*et al* 2009). The park's bird (around 600 species) and mammal (around 200 species) richness is extremely high as well (Bass *et al* 2009). For plants, the Yasuní region is one of the few places on Earth with at least 4000 species per 10 000 km$^2$ (Barthlott *et al* 2005).

The most impressive aspect of Yasuní National Park's biodiversity is the number of species packed into small areas. The Tiputini Biodiversity Station, located adjacent to the northern border of the park, holds world records for local amphibian, reptile, and bat species richness (Rex *et al* 2008, Cisneros-Heredia *et al* 2009, Bass *et al* 2009). The Yasuní Research Station, located within the park itself, holds the world record for number of tree species in just one hectare, with 655 (Bass *et al* 2009). At least 571 bird species have been documented at the Napo Wildlife Center, an ecolodge within the park (Rivadeneira and English 2007). It is uncertain exactly why Yasuní is so diverse, but one likely factor is the region's high rainfall and relatively aseasonal climate—i.e., ever-wet and ever-warm conditions—due to its unique proximity to both the Andes mountains and the equator (Pitman *et al* 2002, Kreft *et al* 2004, Bass *et al* 2009).

Yasuní National Park is also an important refuge for a considerable number of threatened species and regional endemics. The park is home to 28 threatened or near threatened vertebrate species—including two globally endangered mammals (white-bellied spider monkey and giant otter)—and over 95 threatened or near threatened plant species, including eight which are globally Endangered or Critically Endangered (Bass *et al* 2009). In addition, the park contains at least 43 regionally endemic amphibians, birds, and mammals (i.e., species largely restricted to the Napo Moist Forests ecoregion) (Bass *et al* 2009).

### *3.4. The Waorani Ethnic Reserve*

Starting in 1975, for reasons including the depleted forests around the mission center and the weakening of the SIL, many Waorani began to leave the Protectorate and return to their previous homelands (Cabodevilla 1999) or to more remote forest in and around the Protectorate (Rival 2002). In 1983, the government created a 665.7 km$^2$ reserve for the Waorani in the area of the now-defunct Protectorate (Albacete *et al* 2004), formally granting the Waorani legal title to a portion of their ancestral lands for the first time. In April 1990, on the day following the size reduction of Yasuní National Park, Ecuador created the much larger Waorani Ethnic Reserve (6126 km$^2$). It included the area just excised from the park and extended to the west to include the areas in and around the former Protectorate (figure 3). Although this land was officially granted to the Waorani, the government maintained subsurface rights and it was expressly stated that the Waorani could not reject government-sponsored oil activities (Rivas *et al* 2001, Albacete *et al* 2004, Cabodevilla and Berraondo 2005). The Waorani Ethnic Reserve, which incorporates three separate land grants from the Ecuadorian government in 1983, 1990, and 2001 (Albacete *et al* 2004), now covers around 7000 km$^2$, roughly a third of their ancestral territory.

There are now at least 38 Waorani communities, up from around 20 a decade ago (Rival 2002, Beckerman *et al* 2009). Virtually all communities are located along a river or road, a shift from traditionally living on remote hilltops. Many communities are clustered in the former Protectorate area, but some are to the east along the Shiripuno, Cononaco, and Yasuní Rivers, and the Auca and Maxus oil roads. In addition to the communities, an increasing number of Waorani now live in nearby cities like Puyo or Coca (Lu 2001). Current Waorani population size is between 1400 and 2000 (Lu 2001, Beckerman *et al* 2009), and increasing at an annual rate of 2.2–2.5% (Yost 1981, Holt 2005). Over half the current population is under the age of 24 (Rival 2000, 2002).

The Waorani continue to experience rapid cultural change, which although begun by missionary contact, has more recently been catalyzed by petroleum development and an increasing integration into the market economy (Lu 2001). There have been health-related changes as well. Waorani living in permanent settlements show greater incidence of malaria than those maintaining a traditional lifestyle (Kaplan *et al* 1980). In 1998, an outbreak of hepatitis D caused an epidemic in some Waorani communities. The spread of the epidemic may have been accelerated by increased mobility between communities which facilitated the spread of the disease between members of extended families (Manock *et al* 2000). On the other hand, the Waorani language (Wao Terero) appears to be thriving in a majority of the communities, even among the younger generation.

A group of young male Waorani leaders were the driving force behind the creation of a Waorani representative organization, known as ONHAE (Organization of the Nationality Huaorani of the Ecuadorian Amazon) in 1990 (Ziegler-Otero 2004). In 2005, the Waorani women formed their own organization, known as AMWAE (Association of Waorani Women of the Ecuadorian Amazon). In 2007, ONHAE was renamed as NAWE (Nationality Waorani of Ecuador). Both newer names, NAWE and AMWAE, reflect the preferred use of the word 'Waorani' instead of 'Huaorani' (El Comercio 2007). It is for this reason we use Waorani throughout this paper, but it is important to note that much of the previous literature uses Huaorani.

In 2005, ONHAE signed a controversial usufruct agreement with an American company, Eco-Genesis Development. The contract granted the company, which was established to commercialize assets in the Ecuadorian Amazon, exclusive rights for 30 years to develop the resources on the Waorani Ethnic Reserve. In October 2008, an Ecuadorian court struck down the contract, claiming it violated Waorani collective rights to their territory (El Comercio 2008).

### *3.5. The Yasuní Biosphere Reserve*

In 1989, the area in and around the original limits of Yasuní National Park was designated as a Man and the Biosphere Reserve by UNESCO (United Nations Educational, Scientific and Cultural Organization). The Yasuní Biosphere Reserve now covers 16 820 km$^2$, including a 5000 km$^2$ core area. According to UNESCO documents, this core area is centered around the Yasuní and Nashiño Rivers in the northeast section of the park. The rest of the reserve (a 7000 km$^2$ buffer zone and

a 4820 km$^2$ transition zone) includes much of the remaining park area and the adjacent Waorani Ethnic Reserve.

The Yasuní Biosphere Reserve is the core of a small, unique area where South America's plant, amphibian, bird, and mammal species richness centers overlap (Bass *et al* 2009). Furthermore, the reserve is located within the 'Core Amazon', an especially wet region (Killeen and Solórzano 2008) predicted to maintain wet, rainforest conditions as climate change-induced drought intensifies in the eastern Amazon (Malhi *et al* 2008). Haffer (1969, 1997) postulated that the area in and around the Yasuní Biosphere Reserve was one of several Amazonian forest refugia during dry climatic periods over the past 65 million years, but this hypothesis has now largely been rejected (Mayle *et al* 2004, Maslin *et al* 2005).

### *3.6. The Maxus road*

In the early 1990s, a second major road was constructed into the Yasuní region. Known as the Maxus road, in reference to the oil company that built it, this oil access road extends over 140 km into Yasuní National Park and Waorani Ethnic Reserve (figure 4). The saga around the road's construction, including the turmoil within the freshly formed ONHAE and the prominent role of some American environmental NGOs, is well documented in Joe Kane's popular book *Savages* (Kane 1995). In contrast to the Auca road, the Maxus road was built with a control post at the entrance, which has successfully prevented non-indigenous colonists from entering the area. Indigenous peoples, including Kichwa that have come to inhabit parts of ancestral Waorani territory along the Napo River, are allowed free passage (Greenberg *et al* 2005).

Although originally billed as a 'low impact' road (Holmes 1996) due to its colonist control system, the Maxus road has, in reality, caused major direct impacts and even greater indirect impacts (Zapata-Ríos *et al* 2006, Scientists Concerned for Yasuní, unpublished report). Direct impacts include habitat fragmentation, soil erosion, altered hydrology, vehicle–wildlife collisions, noise (Canaday and Rivadeneyra 2001), and forest edge effects. Indirect impacts include deforestation and overhunting stemming from the colonization of the road by Kichwa and Waorani Indians (Greenberg *et al* 2005, Franzen 2006, Zapata-Ríos *et al* 2006, Suárez *et al* 2009). Greenberg *et al* (2005) documented unsustainable deforestation rates along the Maxus road due to land conversion by the Waorani and Kichwa, predicting that half of the forest within 2 km of the road will be eliminated by 2063. Franzen (2006) found that the Maxus road is extensively used by indigenous hunters, resulting in unsustainable hunting rates of vulnerable species such as the spider monkey (*Ateles belzebuth*). Waorani and Kichwa hunters that have come to inhabit the Maxus road sell meat to dealers at a local Saturday market near the entrance of the road (Suárez *et al* 2009). At least 47 species of wildlife—mostly mammals and fish, but also birds and reptiles—have been sold by Waorani and Kichwa hunters at the market (Suárez *et al* 2009). The Waorani, traditionally subsistence hunters only, now mostly use guns instead of traditional blowguns and spears (Franzen 2006) and take advantage of free transportation along the Maxus road provided by the oil company to not only increase hunting territory, but also to bring their prey to market (Suárez *et al* 2009). This wildlife trade is illegal, and according to Suárez *et al* (2009), authorities know about the Maxus road market but have yet to act.

### *3.7. Illegal logging and the Zona Intangible*

Most of the Waorani had been relocated to the Protectorate in the early 1970s, but several groups, known collectively as the Tagaeri, rejected contact and remained isolated in remote parts of their territory. Although the missionary influenced-Waorani largely abandoned their practice of killing unwanted intruders on their territory, those remaining in voluntary isolation did not. The Tagaeri killed oil workers in several incidents during the 1970s and attacked an oil company canoe in 1984. With plans for oil exploration intensifying in the 1980s, Capuchin missionary Alejandro Labaka feared the government and oil companies would forcibly remove or kill the Tagaeri (Cabodevilla 1999). In 1987, Labaka attempted to make contact with the Tagaeri, but was speared to death after being air dropped by an oil company helicopter near a Tagaeri house.

A second uncontacted group, known as the Taromenane (or Taromenani), also inhabits the Yasuní region. Whereas the Tagaeri are known to be the Waorani that avoided contact in the 70s, the origins of the Taromenane are much less understood. The Waorani/Tagaeri and the Taromenane appear to be part of the same isolated linguistic family, but the Taromenane are more distantly related and may have migrated into the Yasuní region in recent decades from across the Peruvian border (Cabodevilla 2004, Cabodevilla and Berraondo 2005). Proaño and Colleoni (2008) present evidence for an alternative hypothesis that the Taromenane have been living in core Waorani territory for at least the last century. The Waorani identify the Tagaeri as part of their own family, whereas the Taromenane are considered a distinct, but related, group (Proaño and Colleoni 2008). Therefore, the Waorani do not consider the Taromenane as immediate family, but do not consider them as outsiders either.

Very little is known about the current situation of the Tagaeri and Taromenane. Cabodevilla and Berraondo (2005) report that the Tagaeri are now likely extinct, having lost an inter-clan battle with the Taromenane. Under this scenario, some Tagaeri women and children may have been taken in by the Taromenane. Another hypothesis is that the Tagaeri continue living as a separate group in an area north of the core Taromenane territory. Either way, their total numbers are likely low, perhaps a few hundred individuals. According to Rival (2002), the Tagaeri live in hiding, with no cultivated crops and make fire only at night. There is also speculation of another uncontacted group near the Peruvian border and evidence of several other uncontacted groups on the other side of the border in Peru (AIDESEP 2005).

In January 1999, the 'Zona Intangible'—an area off limits to extractive activities such as logging and oil—was created by presidential decree in order to protect the Tagaeri and Taromenane. Although the decree indicated that the Zona Intangible was to be in the southern part of Yasuní, it did not set

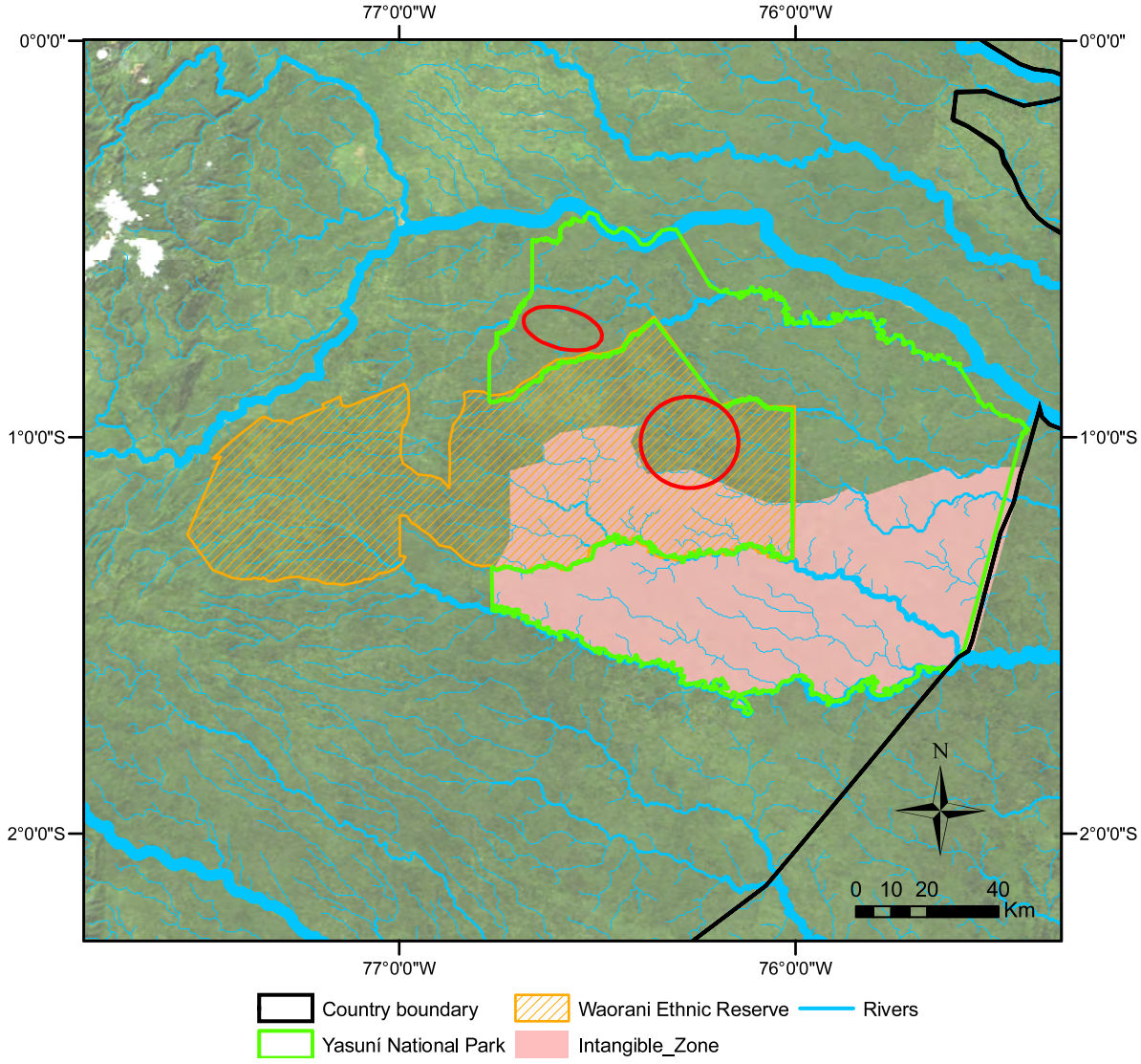


**Figure 5.** The Zona Intangible. Red circles indicate areas where Proaño and Colleoni (2008) found evidence, based on testimonies of nearby Waorani communities, of uncontacted Taromenane and/or Tagaeri occurring outside of the Zona Intangible boundaries.

fixed boundaries of the zone. Over the next few years, the Zona Intangible decree went largely unenforced and illegal logging in the area actually escalated dramatically. The loggers utilized the Auca road to access interior river routes (Aguirre 2007), highlighting one of the many indirect impacts caused by oil access roads. The loggers were mostly targeting valuable cedar (*Cedrela spp.*) trees.

The illegal loggers had a major presence within many parts of the un-delimited Zona Intangible by 2003. That year, a group of nine Waorani men traveled deep into the zone and killed at least 12 Taromenane, mostly women and children (Cabodevilla 2004). Although there is evidence that the massacre was a traditional Waorani revenge killing (Cabodevilla 2004), there is also speculation that the illegal loggers seeking safe access to these lands were a motivating factor (Smith 2004).

By 2006, the illegal loggers had established well over a dozen camps within the Zona Intangible (Gilbert 2006). In April of that year, the Taromenane speared two loggers working deep in their territory, one of whom died within days. News of the spearings was quickly followed by media reports, never confirmed, of revenge killings by the loggers. On 1 May, 2006, a group of Ecuadorian activists petitioned the Inter-American Commission on Human Rights (IACHR) to intervene and pressure the Ecuadorian government to take measures to protect the Tagaeri and Taromenane from outside threats. Just ten days later, the IACHR called on the Ecuadorian government to adopt specific 'Precautionary Measures' in order to protect the lives and personal integrity of the Tagaeri and Taromenane, particularly by implementing measures to prevent the entry of outsiders, such as loggers, into their territory.

In January 2007, eight years after the zone's creation, out-going President Alfredo Palacio signed a decree that finally set the Zona Intangible boundaries. The final zone encompass 7580 km$^2$, covering the entire southern half of Yasuní National Park and parts of the adjacent Waorani Ethnic Reserve (figure 5). The Zona Intangible also covers parts

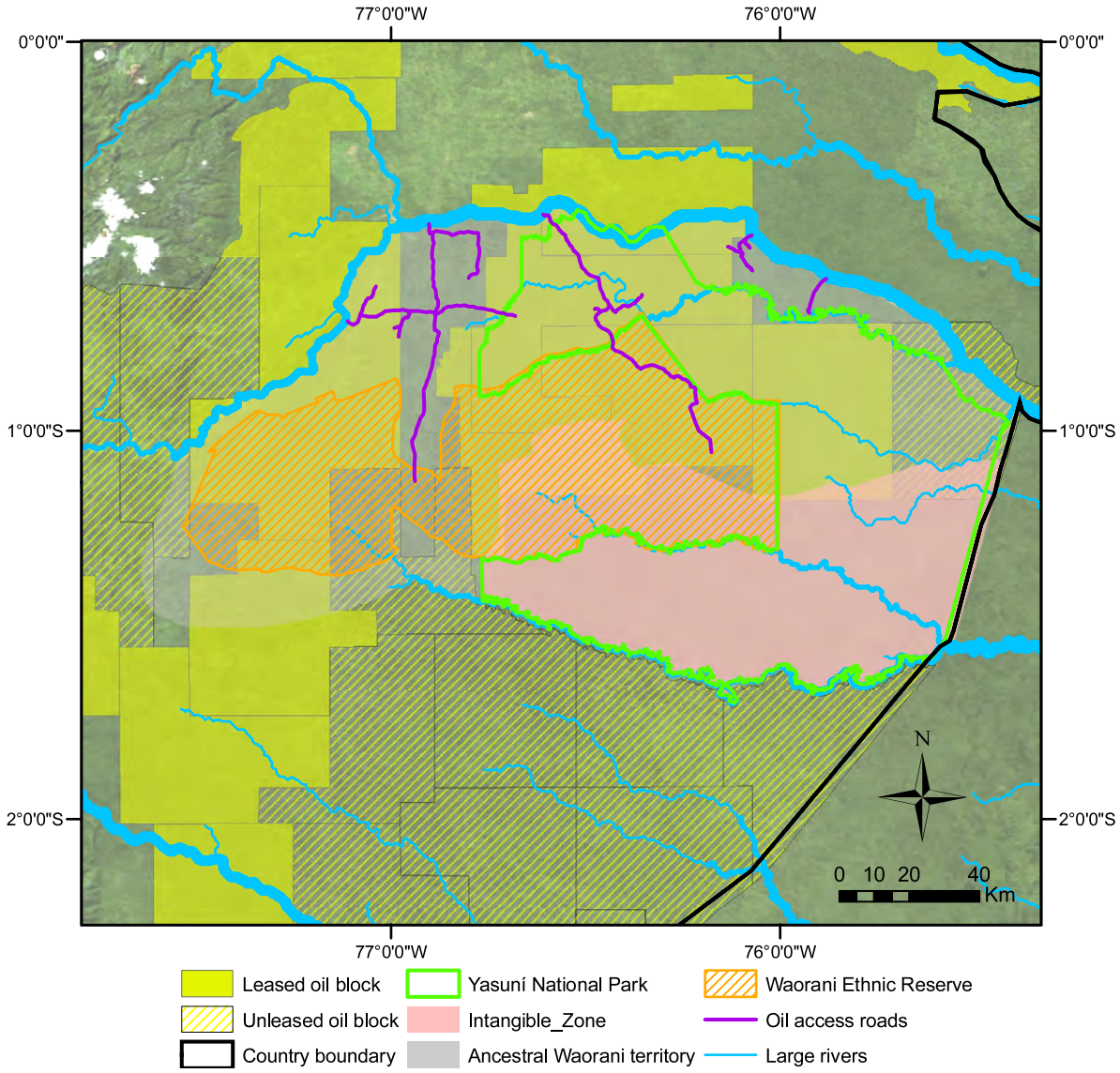


**Figure 6.** Overlapping designations of the Yasuní region.

of five oil blocks, including major oil reserves in two of the blocks (Block 17 and ITT) (figure 6). In April 2007, the Ecuadorian government began an initiative to design an official uncontacted peoples policy. The draft policy stressed that their territories must be off limits to extractive activities.

Despite all this apparent progress, illegal loggers continued to operate within the Zona Intangible. In February 2008, the Taromenane attacked an illegal logging camp. As in 2006, the media erupted with unconfirmed stories of revenge killings by the loggers. The following month, the Taromenane attacked another logging camp, killing a logger with multiple spears. This attack occurred outside the northern limit of the Zona Intangible.

In late 2008 came reports that the Ecuadorian Oil and Mines Ministry was planning new oil exploration in a site (known as Armadillo) very close to the lethal spearing incident earlier that year. Proaño and Colleoni (2008) present further evidence, based on interviews at several Waorani communities surrounding the Zona Intangible, that the Taromenane and/or Tagaeri inhabit at least two areas well beyond the northern limit of the Zona Intangible (figure 5). Thus, it is now clear that the Zona Intangible does not cover the full territory of Ecuador's uncontacted groups and would need to be extended north to the Tiputini River to adequately do so.

In October 2007, and again in March 2008, the Ecuadorian government presented their plan for the implementation of the Precautionary Measures at IACHR working group meetings in Washington DC. As part of this plan, in April 2008 the government established the first military and police control point at a key entry and exit point utilized by the loggers (where the Auca road crosses the Shiripuno River). Initial reports indicate that this control has effectively shut down the illegal logging in the Zona Intangible.

The new Ecuadorian Constitution, approved by voters in September 2008, forbids any extractive activity within the territories of indigenous peoples living in voluntary isolation,

and any violation of the rights of these peoples is considered ethnocide.

### *3.8. Battle in Block 31*

In 1996, seventeen years after the creation of Yasuní National Park, the Ecuadorian government leased out the exploration and production rights of Block 31 to the Argentinean company Perez Companc. This block is located in the relatively intact northeastern section of the park (figure 4). In 2003, the Brazilian national oil company Petrobras, which took over the block in 2002, presented an Environmental Impact Study (EIS) for the development of two oil reserves (Nenke and Apaika) within Block 31. Most controversially, the EIS called for construction of a new access road into the park in order to develop these two oil fields.

A group of over 50 scientists with research experience in the Yasuní region, dubbed the Scientists Concerned for Yasuní, submitted an unsolicited Technical Advisory Report regarding the proposed project in Block 31 to the Ecuadorian government in November 2004. The report concluded that the greatest threat facing Yasuní National Park comes from the direct and indirect impacts associated with new oil access roads, and therefore no new road construction should be permitted within the park. The Association for Tropical Biology and Conservation and a group of leading tropical scientists from the Smithsonian Institution issued similar science-based letters opposing this new oil access road.

There were legal challenges as well. A lawsuit brought by several Ecuadorian NGOs challenged the fact that the new processing facility required for the project had been relocated to be within the park without proper studies. A second suit brought by several Ecuadorian human rights groups focused on Constitutional violations of the project.

Despite these scientific and legal challenges, Petrobras began road construction, including the associated cutting of primary forest, in May 2005. By the end of June, the new road had been built from its starting point on the Napo River southward to the northern limit of Yasuní National Park (see figure 4), and Petrobras was seeking the final permit needed to extend the road into the park. But by this time, the political climate in Ecuador had changed dramatically. At the end of April, Lucio Gutierrez was forced out of the Presidency due to public outrage regarding his manipulation of the Supreme Court. The administration of his successor, Alfredo Palacio, reconsidered the Block 31 issue. On 7 July, 2005, the new head of the Environment Ministry issued a letter to Petrobras informing them that they were not authorized to build the processing facility or road into the park and instead had to develop a roadless entry design with the processing facility located outside of the park. Less than a week later, over 150 Waorani marched through the streets of Quito to protest the Petrobras project and delivered a letter to the government calling for a 10 year moratorium on new oil projects in their territory.

In September 2006, over a year after being denied access into the park, Petrobras submitted a new EIS for the same project. The new design called for the processing facility to remain outside the park and for helicopter access to the drilling platforms inside the park instead of an access road. In October 2007, the Environment Ministry issued the environmental license necessary for the project to begin. The issuing of the license triggered another round of legal and administrative challenges from civil society organizations. Then in September 2008, President Correa made a surprise announcement that Petrobras had decided to terminate its contract and return the block to the state. Press reports indicate that Petrobras had invested over $200 million, but no oil was ever exported from the site. Block 31 is now operated by Ecuadorian state-owned oil company Petroamazonas SA. The company is reportedly seeking financing to develop the block.

It is important to note that the new Ecuadorian Constitution, approved by voters in September 2008, initiated a prohibition on oil extraction in protected areas such as Yasuní National Park. An exception was built-in, however, that would allow such drilling to proceed if petitioned for by the President and declared in the national interest by Congress, which may call for a national referendum if deemed necessary.

### *3.9. The Yasuní-ITT Initiative*

To the east of Block 31 are three oil fields known as ITT (Ishpingo–Tiputini–Tambococha; see figure 4). Collectively, they are the second largest untapped oil fields in Ecuador—containing around 850 million barrels of oil—and account for roughly one-fifth of the country's known reserves. A considerable portion of the oil, perhaps 20–30%, lies in the extreme southern end of the ITT Block, within the Zona Intangible. The development of the ITT fields would likely cause major impacts to the still largely intact northeast corner of Yasuní National Park. A preliminary study indicated that an ITT development project would require six separate drilling platforms stretched across the length of the block, connected via an access train system.

Although previous administrations had begun to elaborate plans to extract the ITT oil, President Rafael Correa advanced an innovative alternative in his first year of office (Koenig 2007). In April 2007, President Correa stated that his administration's preferred option for ITT was to leave the oil permanently underground in exchange for compensation from the international community. Ecuador officially launched the Yasuní-ITT Initiative in June 2007. The primary goals of the initiative are to: (1) respect indigenous peoples' territory, particularly those in voluntary isolation, (2) protect the park and its biodiversity, and (3) combat climate change by keeping ~410 M metric tons of $CO_2$ out of the atmosphere. Government officials subsequently promoted the Yasuní-ITT Initiative at numerous international gatherings, such as the UN Climate Summit in New York (September 2007), the UN Climate Conference in Bali (December 2007), and at OPEC meetings (March 2008).

Ecuador initially proposed to the world a compensation package of around $350 million per year for 10 years, which equals approximately half of the income it would obtain by extracting ITT's crude oil (based on the price of oil in mid-2007). In late 2008, the strategy shifted in favor of greater reliance on carbon markets. Ecuador announced that it would

issue 'Yasuní Guarantee Certificates' for the $CO_2$ locked in the ITT oil fields, with the objective of making them fungible in the European Trading System, the European Union's market for carbon credits (Moncel 2009). Income from the sale of the certificates would go to a Trust Fund, and its interest would be used to fund sustainable development projects (Moncel 2009).

Germany has thus far been the key supporter of the Yasuni-ITT Initiative. In June 2008, the German parliament gave the initiative a much needed spark by formally calling on the German federal government to back the initiative. Spain has also contributed to the effort, and other countries such as Italy, France, and Hungary have voiced support. Several Correa-set deadlines have come and gone without major financial offers, however, and the initiative is clearly a limited-time offer from the Ecuadorian perspective. President Correa has repeatedly stated that he will move forward with ITT oil extraction if the international community is not able support the proposal. Ecuador has already signed a memorandum of understanding with four foreign state oil companies for the potential development of ITT. As noted above, however, oil extraction in Yasuní National Park is now constitutionally banned unless approved by Congress and the President.

## 4. Conclusion

The Yasuní region, once entirely ancestral Waorani territory, is now a complex mix of overlapping designations (figure 6). Roughly a third of the region is legally recognized by the government as the Waorani Ethnic Reserve, while the world renowned Yasuní National Park covers much of the remaining area. A UNESCO Biosphere Reserve encompasses Yasuní National Park and the Waorani Ethnic Reserve. Following the creation of Yasuní National Park, the Ecuadorian government leased out a number of oil concessions covering the park's northern half. Most recently, the government decreed and delimited a Zona Intangible—an area off limits to extractive activities such as logging and oil—in order to protect the Tagaeri and Taromenane, relatives of the Waorani that are still living in voluntary isolation deep in the reserve. The Zona Intangible overlaps the southern half of the park, the southeastern part of the Waorani Reserve, and portions of five oil blocks.

The dual primary threats confronting the Yasuní Biosphere Reserve are oil development and illegal logging. Eight oil blocks cover Yasuní National Park and the Waorani Reserve. Two major oil access roads (Auca and Maxus roads) have been built into the Yasuní region since the 1980s, triggering deforestation and unsustainable hunting. Large, untapped oil fields are located in the remote northeast section of the park (Blocks 31 and ITT). Rampant illegal logging deep within the reserve over the past decade has resulted in periodic deadly encounters between the loggers and the uncontacted Taromenane and Tagaeri.

Recent developments, however, provide optimism for the future of Yasuní. Although the northwest section of the Yasuní Biosphere Reserve has been heavily impacted by indirect effects sparked by oil access roads, much of the remaining area remains intact (Zapata-Ríos *et al* 2006). The government's unprecedented proposal to keep the ITT oil fields permanently underground in order to protect the park and fight global warming has received praise from around the world. The newly delimited Zona Intangible puts a huge area off limits to oil development, including two large oil fields in the core of Taromenane/Tagaeri territory. The government's decision to prohibit oil road construction into Block 31 has potentially set a 'no-new-road' precedent throughout the entire region. Moreover, the new Ecuadorian Constitution prohibits oil extraction in protected areas such as Yasuní National Park, although a major loophole may undermine this advance. As for the illegal logging, the government made major strides towards cracking down on the problem in 2008. Motivated by the Precautionary Measures issued by the Inter-American Commission on Human Rights and recent reports of deadly encounters between loggers and the Taromenane, the government launched an action plan in March 2008 that included, for the first time, police and military presence at the key entry and exit point utilized by the loggers.

The Waorani continue to find their place in the modern world. Divisions run deep between leaders strongly opposed to new oil development on their territory and those more inclined to negotiate with oil companies. The Waorani representative organization—originally ONHAE, now NAWE—has experienced a tumultuous run of short-lived administrations. Nonetheless, both NAWE and the Waorani women's organization AMWAE are important actors in an ongoing struggle for cultural survival, territorial integrity, and the protection of their uncontacted relatives, along with new efforts to promote sustainable development projects such as ecotourism and handicrafts.

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