Our rivers are not blue: lessons, reflections and challenges from Waorani map making in the Ecuadorian Amazon

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Our rivers are not blue: they are black, coffee coloured, clear or milky. There is probably not a single blue river in the whole of the Amazon” Opi Nenquimo. Opi is a Waorani man from the Southern Ecuadorian Amazon, director of a project to create a map of the Waorani’s million hectare Amazon home as part of a strategy to defend it from oil exploration. His comment encapsulates so much of indigenous peoples’ struggles, across the globe, to represent their worlds on maps. The question is not whether rivers in the Amazon are blue, or indeed if they are really blue anywhere. The question is whether, in order for their maps to be taken seriously by governments, companies and legal systems, the Waorani’s maps need to conform to standards created by a worldview that holds different and in many cases opposing values regarding property, ownership and the environment.

This is just one of the challenges faced by the Waorani and other indigenous map makers. Another is access to appropriate and functional technology. There has been a profusion in the development of GIS software and equipment over the last 10 years, however much of it is dependent upon frequent if not constant engagement with an online environment to upload data for viewing, to stream satellite images or to collaborate with others. There is no reliable internet in the Waorani’s titled lands and the nearest mobile phone signal is often several hours hike away, a situation shared by many indigenous communities living in remote locations. Offline GIS programmes can also be disempowering and disengaging because whilst individual Waorani have learned to use them, sophisticated programmes are not accessible or understandable to the whole community for reasons such as language, user-interface, and lack of collaborative workflows. Creating systems and methods of mapping that not only respect but are tailored to indigenous customs, practices and decision-making processes, and ensure they have control over any data collected, is a key part of decolonising and democratising the mapping process.

This article is based on my experience working with the Waorani over the last two years, and will examine some of these issues in the light of their project, examining why they decided to start to make maps four years ago, how they developed their methodology and technical process, and some of the questions which their experience raises for the map-making and tech communities. We will additionally explore the extent to which map making and cartography can be tools of empowerment for people usually marginalised and excluded from both the process of making maps and the maps themselves1.

The Waorani

There are about 5000 Waorani living in 52 villages in the headwaters of the Ecuadorian Amazon. They used to live a hunter gatherer lifestyle, living in small family groups and moving location often. However, they started to set up villages centred around schools after being contacted by missionaries and oil workers during the 1960s and 70s. The Waorani’s contact experience, like that of so many indigenous people, was traumatic and devastating. It resulted in the deaths of many hundreds of people from introduced illnesses against which they had no immune resistance, such as respiratory diseases and chickenpox. The places where people died are remembered today as ‘nowhere places’ – places that used to be full of life but now lie empty and abandoned (Camilo Huamoni, 2017).

Today the Waorani still depend on their lands for most of the resources they need to live. They hunt and fish...
in the forests and streams, gather fruits and nuts, collect palm leaves to thatch their houses, cut timber for canoes, collect seeds, fibres and clay to make household items, and have in-depth knowledge of the medicinal properties of hundreds of plants. Many people also spend time outside their villages in paid employment, and they now have established gardens growing sweet manioc and plantains, amongst other crops, which supplement the food they hunt, fish, collect and buy.

The Waorani’s current mapping project began about four years ago, when a group of elders visited some other indigenous communities in the north of Ecuador to see the ongoing social, environmental and health impacts of 40 years of oil extraction. There they heard from Kofan, Siekopai and Siona people whose lands and waters have been destroyed by recurring spills and oil companies’ irresponsible disposal of heavy metals and other toxins. With their hunting and fishing resources lost and poisoned there have been dramatic and damaging impacts on the health and livelihoods of these communities.

Although there are currently oil operations in the east of Waorani territory, much of their land remains free from oil platforms and the associated impacts. However in 2015 the Ecuadorian Government opened up large areas to oil exploration, including the remaining oil-free parts of Waorani territory. This is despite the Waorani having legal title to almost one million hectares of their ancestral lands; when granting indigenous land tenure, the Ecuadorian State retains ownership of subsoil resources and often grants mining and oil concessions that overlap recognised indigenous lands and other protected areas.

During the Waorani elders’ visit to the North, they decided to take action to protect their land for their children and grandchildren, and looked to maps as one potential tool to help them do this. They wanted maps that showed their way of life and their deep relationship with their territory, a way of visualising the range of potential impacts and putting the proposed oil operations into context.

The problem was that no such maps existed. Or rather, no such maps existed in a format that could effectively communicate these things. As Camilo, an elder from the village of Nemonpare told me “we carry maps of lands in our heads, we elders have always had these maps, we just needed a way of putting them down for others to see”.

And there was another reason the Waorani wanted to make their own maps, which Opi explained: “the State comes and shows us maps of our territory, but we don’t recognise them. Their maps are empty, our territory is full, and alive. That is not our territory”.

Maps and indigenous peoples

That maps wield power to those that make and use them, and that indigenous peoples have been historically excluded from maps, portrayed in ways that discriminate against them or diminish their lands and rights has been well documented, as have some of the struggles to shift the balance of power (Brody 1981, Peluso 1995, Nietschmann 1995, Wood 2005, Louis et al 2012, Hébert and Brock 2016).

In South America, maps, as elsewhere, were used as instruments of statecraft by the colonising forces. For decades after the first exploration of the Amazon by Europeans, the region was effectively a terra nullis, a land of no one, and various papal bulls in the fifteenth century gave colonising powers the mandate to enslave non-Christians, and seize their lands. This concept was perpetrated and exacerbated by maps which portrayed the region as either a vast, empty wilderness free for the taking, or included the region’s people within the exotic fauna of the new continent, dehumanizing them and stripping them of land, resources and freedom.

Maps indicating the location of the fabled city of El Dorado, illustrated with one legged beings and forests filled with cannibals and strange creatures, spread these myths around Europe. They helped feed two opposing but arguably equally damaging conceptions of the continent’s people. On the one hand that of the uncivilised savage of Hobbes, living in a constant state of war and fear. On the other hand the noble savage, which characterised indigenous people as living in an innocent, natural state.

Early maps of South America, of the here be dragons ilk, were replaced as the continent’s mountains, rivers and coasts were chartered and explored by the likes of Humboldt, and valuable natural resources were discovered. These maps claimed accuracy and objectivity thanks to their use of the emerging cartographic method, the legacy of which still informs map making today.

Harley and others’ work in the 1980s and 1990s began to seriously question the degree to which map makers “engage in an unquestionably scientific or objective form of knowledge creation” (Harley, 1989). They sought to break the link between reality and representation on maps.
by highlighting how maps have been used to “subjugate or otherwise impinge on people” (ibid), and by bringing a post-modern critique to cartography, questioning its foundations, assumptions and practices. Harley argued that the implicit and invisible power relations which maps contain are propagated and perpetuated when they are subsequently used, and that the power relations they embody become internalised. In the 30 years since these observations were made, critical cartography has become a core part of the discipline to the extent that Wood (2005) speaks of the death of cartography.

It is power relations such as these that Opi and the Waorani were objecting to when they reject the validity of Ecuadorian government maps, and they are not alone. Indigenous people around the world “criticise official map making with respect to its prerogatives, its form and its content” (Wood and Krygier 2016). Maps produced by the Ecuadorian government show indigenous lands as empty green spaces with a scattering of villages, divided up by the straight lines of oil blocks, mining concessions, or areas for carbon sequestration, and emblazoned with government and company names and logos.

The Waorani’s view of the land is very different and it does not exist in a two dimensional, or even three-dimensional sphere. History, both the recent past and the more distant mythic past has contemporary physical presence in the places where ancestors lived and important events took place. Visiting and telling stories about these places keeps their memory, and thus also the cultural practices and understandings intertwined with place, alive. The spiritual dimension is also real and evident, and no more or less subjective or objective for the Waorani than the location of thatching palms or fishing sites. Territory is living and lived in. The life and relationships embodied in territory is invisible on satellite images, the ultimate objective base-map, and not just because the Waorani’s visual impact on their landscape outside the villages is often small. The Waorani’s daily activities of walking through the forest, visiting hilltop hunting sites, bathing in the rivers and spotting nearly ripe fruit in a distant tree all contain cultural, geographical, ecological and ethical knowledges which contribute to building and maintaining their relationship with territory, and passing it on to the next generation.

Indigenous peoples’ special relationship to land and territory is recognised and protected by international law, including the UN Declaration for the Rights of Indigenous peoples and Convention 169 of the ILO. The Waorani’s challenge was how to show this special relationship on a map, which they could then use to try and ensure their rights regarding territory and consultation were respected. How, for example, could a proper base-map be made of Waorani territory which was separate from the territory itself, if their geo-cultural landscape is inclusive of things that can neither be seen nor measured by Western scientific instruments?

Mapping Methods
The group of Waorani elders who originally decided to undertake the mapping had the support of two local partners: Alianza Ceibo, an indigenous organization made up members representing four different indigenous nationalities, the Kofan, Siekopai, Siona and Waorani, which aims to build capacity and leadership, and Amazon Frontlines, an international, multidisciplinary team living and working alongside Alianza Ceibo on a variety of programmes from installation of clean water systems to legal defence. To help with the mapping work they sought the advice of US-based NGO Digital Democracy, whose staff has experience in indigenous mapping and supporting marginalised communities to use technology to defend their rights.

One important parameter that shaped the development of the mapping methodology was that the Waorani wanted to manage and control the project themselves. When the project began the Waorani team had limited experience of project planning, budgeting and timelines, but after three years of working with the Alianza Ceibo territory programme team, they now manage these elements, as well as all the trainings and fieldwork.

A greater challenge was how to ensure that the Waorani also maintained control of the information. It is a common criticism of indigenous mapping projects, that whilst indigenous people may be central to the sketch mapping and GIS data collection stages, when it comes to data entry and data management, they are often dependent upon external experts for support to digitise the data and produce the maps (Wood 2005).

The Waorani have experienced such dependency in other mapping projects, and comment on how it led to alienation from the maps produced. Some communities have participated in conservation mapping to make management plans for REDD+ schemes. Whilst the workshops they did might resemble in many ways the mapping workshops that the Waorani are now undertaking, in the past the Waorani’s involvement was limited to the data collection, which was then taken out of communities to be digitised and turned into a map. Although literate community members might recognise a few more names and sites on the maps returned maps than on the standard government maps, the information was still being held and controlled by others who were also making decisions about what to represent and how to represent it. These decisions once again reflected outside priorities and interests and removed autonomy from the Waorani. As Opi informed me “these maps show the things important to them, not the communities, they don’t even acknowledge the people who worked on them”. Changing this dynamic was a critical part of the Waorani’s mapping plan.

A: Sketch mapping
In many ways the Waorani’s mapping process is modelled on methods that have been in development since the 1970s, including the mapping carried out in the Inuit Land
Waorani women in Damointaro draw their territory map, marking on all the places they go to collect different resources.

Occupancy Project, Hugh Brody’s work with the Beaver people in Northern Canada (1981), Chapin and Threlkeld’s work with the Centre for the Support of Native lands (2001), a three year territory project carried out by the Achuar of the Pastaza in Northern Peru and the Wapichan’s mapping of their ancestral lands in the Rupununi savannah of Guyana.

The Waorani team is currently made up of four members, who each lead the mapping in different villages so that they can map several villages in parallel, and build the map up area by area. First they hold village meetings to discuss the aims of the mapping, how the community might want to use the maps, the process that will be followed and the time frame. Then a drawing workshop is held. In these workshops, the Waorani’s aim is to involve as many members of the community as possible to draw a sketch map of the area that members of that community know and use. The process of coming together almost always sparks interest as people share knowledge of the areas they know best, stories they remember their parents and grandparents telling them and debate with their neighbours about the course of a stream or the history behind a river name.

The term ‘sketch map’ does not really do justice to the maps that come out of these workshops, which are rich with knowledge and understanding. They often include dozens of rivers and river names, only a handful of which appear currently on national maps, as well as different ecological areas and the complex network of paths they use for hunting and visiting.

The map drawing allows people to clarify what it is they want to communicate with the maps, which sites they want to tell others about and what it is they value. This is something which varies greatly for different indigenous peoples, and is affected both by their motives and intentions in making the maps in the first place, and their particular culture, cosmology and relationship with territory. The Waorani, for example, started off wanting to map every single tree in the forest, such is the depth of their knowledge and the importance of trees to them. Once they evaluated this in the light of their aim of communicating clearly to the government, companies and others, they decided to be more restrained and limit the number of species mapped. Opi reports that the map, when the data from these first trips was imported, “looked like it had a bad case of chickenpox, it was so covered in points and blotches”. However, although the Waorani are still marking a huge variety of flora on their maps, many more than other groups I have worked with, they are aware that their decision has compromised a more fully Waorani portrayal of territory.

B: GPS Training and Ground Truthing

The second step is to collect GPS points. In each village a group of 2–4 people are trained by the core Waorani team to use GPS, and then carry out the necessary walks around their territory to collect the GIS information. The village discusses together the important walks they want to do, starting with the larger paths that run between villages, and then incorporating as many of the smaller hunting trails and tracks as they can. They visit areas of important resources, sites where significant historical events took place, where they hunt, fish and collect medicinal plants.

The GPS trained mappers will always walk with one or more other members of the village who know the path or area well, to make sure they take points at strategic places, and then write down detailed supplementary information in notebooks. This way the mapping process also facilitates the sharing of knowledge between generations,
something ever more important to the Waorani because of the imposition of external educational systems since contact. To attend secondary school, young Waorani often have to live away from their home villages and families for many years, and do not have the same exposure to their territory, or time to travel around it with their parents and grandparents as they used to. Customary methods for youth to incorporate Waorani territorial knowledge are changing, and the mapping exercises, as well as the final maps, create opportunities to explore new ones.

The village teams, with support from one of the core mapping team, usually spend about two months doing walks and collecting the GPS points. There is also a Waorani member of Alianza Ceibo’s communications team who is making short videos of some of the communities’ elders to demonstrate how different resources are used and to showcase some of the special sites within their territory.

**C: Data Entry**

It is at this point that the Waorani’s methods diverge from many other similar mapping projects. Initially a couple of Waorani completed a training in ArcGIS in Quito, and this enabled them to enter the GPS points taken by the communities. However, they found this unsatisfactory because it was still concentrating the knowledge and control over the map data within a few individuals, and the programme was not accessible to other community members.

One solution would have been to use one of the online mapping applications that are available, which have a straightforward interface for adding simple geographic data and annotations, such as OpenStreetMap. If the Waorani had chosen this option, they would still be limiting access and control, internet not yet having reached most of Waorani territory. In addition, by uploading their data to an online, public map, they would be losing control of it in another way. Open data and open mapping is often characterised as giving control and power to the masses in contrast to state and company controlled data. For indigenous peoples whose maps may contain sensitive information about sacred sites, medicinal plants or locations of valuable timber, the reverse can be true. Safeguarding their own intellectual property and maintaining control over what they choose to make public and how, was also key to the Waorani.

To address these needs, after an exploration of many other currently available tools, Digital Democracy (Dd) started building a new mapping application, Mapeo. The requirements that Dd is working towards are that it be:

- Locally owned and managed – so that the data stays with the Waorani and they choose what and how they publish it.
- Simple to use, so that members of the community can see and understand how the maps are being made.
- Offline, so that much of the digitisation and systematisation can be done in the communities.
- Customisable, so that its interface can appear in their own preferred language (including Waorani), with terms and symbols they have chosen.
- Open source and free, these are values important to Dd as an organization to ensure that our tools are as accessible as possible and reduce dependence.

Mapeo is currently a desktop app built using ID editor, a tool made by Mapbox for OpenStreetMap, and is very simple to use and to train people in. Jorge, one of the members of the Waorani team told me that showing other people how to use Mapeo was one the highlights of the mapping process for him:

“Memo, an elder from Akaro came over and wanted to learn, it was the first time he had used a computer and a mouse and it took a little time for him to figure it out so it was quite slow at the beginning, but then practiced and got the hang of it.”

Mapeo syncs data using a peer-2-peer system that syncs between devices rather than with a server, this means that each of the Waorani team has a copy of the whole database on their laptop. They can each make edits to it, and then sync with another member of the team who has been working in another area just by using a USB stick. It is currently being built by a core team of developers working for Dd, but is part of a Github project – which means all its coding is available and open source for others to examine, improve upon, or develop from.

Mapeo has been built in constant engagement with the Waorani team about what tools they would like it to include and they have given input into the design of the user interface. It is currently working well for the team, and is available for anyone to download and test. To produce printed maps from Mapeo the data must be exported, currently to Mapbox where the map styling is done. Being able to print maps is a critical step that the Waorani are not yet in control of. They frequently remind the Dd team of this, and map printing and greater styling potential are being built into Mapeo in 2018.
D: Producing the final maps

Once the GPS points are added to Mapeo, draft maps are printed and the team take these back to each village for revision. The symbols used in the map legend came from a design process between the mapping team and a graphic designer who helped turn their drawings into recognisable icons, so that the maps are populated with the plants and animals which fill their forests. All final decisions about style, colouring, fills and text are taken by the Waorani team.

On their return to the villages, a second community workshop is held so that all community members can see the maps in progress, find the areas that they helped work on, correct any errors or misprints and add on anything that is missing. Currently the team are focusing on adding areas to the maps at this stage, such as the higher lands where spider monkeys live, the palm-rich swamps or the areas far from the village where the game resources they depend on reproduce. This is also an opportunity to spot any areas on the map that weren’t visited on the GPS walks, so that further visits and ground truthing missions can be done.

When all edits and additional data have been input to Mapeo, the final maps are prepared and returned to the village. The Waorani team decided to print large maps for village use (e.g. 150cm x 250cm), and a smaller map (e.g. 60cm x 100cm) which is given to each family. The maps

Analyses of satellite data, such as this one showing elevation data, enables the Waorani mapping team to more accurately draw the small rivers and streams that do not appear on satellite images, into Mapeo.

Memo, from the Waorani village of Akaro, marks locations of palms and different monkey species onto the draft version of their territory map during the revision workshop.
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So far the Waorani have finished mapping in twelve communities, and in May 2018 the team will begin the next round of mapping in a further eight communities. To date they have mapped 180,000 hectares of their territory, trained thirty community GPS technicians, put 9300 points on their maps, 235 areas and over 1800 rivers and paths, including animal paths. There is a long way to go, the Waorani are estimating another 3 years at least, and many more challenges ahead. For example, they have yet to map the northern and eastern areas of their territory where oil companies have been working for over thirty years. And another area to be mapped borders the territories of the Tagaeri and Taromenani people, who remain in voluntary isolation and have only infrequent, but often violent interactions with Waorani from neighbouring villages.

E: Impacts

The Waorani started mapping in order to create a tool for defending their land from oil extraction, but they have not yet had to test the legal or persuasive power of their maps to help them achieve these ends.

In the meantime, the project has become about much more than this initial catalyst. Through the mapping the communities have learnt about and visited new places, heard stories of their past, discovered petroglyphs and waterfalls only known of by elders, as well as documenting new threats such as illegal fishing and gold mining. The mapping workshops and forest walks have involved many hundreds of people, bringing generations together and building skills.

The maps have also contributed to building cohesion within and between communities. Often the workshop spaces have created opportunities not found elsewhere for the Waorani to reflect on their current land and resource use, and on the changes that their more sedentary, agriculture-inclusive lifestyle has brought over the last forty years.

Camilo, a man from the village of Nemonpare, said on receiving the maps “now we have our map we are going to make our own rules about where we want to hunt and fish and build gardens. We can identify the beaches where the turtles lay their eggs and take better care of them so that they are still there for the turtles twenty, thirty, forty years in the future”.

Challenges and Limitations

On the one hand the Waorani want to make maps that clearly communicate to people who do not understand the way they live, use and relate to the space around them; on the other hand they want to remain truthful to their own understanding of and relationship with territory. This

Families in the Waorani village of Nemonpare receive their printed territory maps.

Carlos Enqueri, the Waorani film-editor, takes video of Memo’s family in Akaro explaining their customary hunting methods, for short-films to appear on their interactive map.

are printed on high quality paper, with a coating to protect against UV and water damage.

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challenge raises a number of questions about whether maps and cartography, in the form we conventionally consider them, can ever truly reflect indigenous world views, or whether by attempting to conform to Western cartographic standards indigenous peoples are being further co-opted by the very framework they are trying to question, reproducing rather than reversing power relations.

Going back to Opi’s quotation about the blueness, and lack thereof, of rivers in Waorani territory, he understands that colouring the rivers blue is a convention, a rule of grammar in the language of cartography. Together with other elements such as the scale bar, projection and north arrow, it provides familiarity to allow the world held within the Waorani maps to be communicated more easily to the map reader. However, communicability is just one reason the Waorani might choose to paint their rivers blue, another is for them to conform to convention and thus increase their acceptability in the eyes of the State and other bodies. Peluso, in her seminal 1995 article on counter-cartography in Kalimantan, argues that indigenous people using Western cartography and GIS are co-opting these standards with their goal being “to appropriate the state’s techniques and manner of representation to bolster the legitimacy of ‘customary’ claims to resources”.

The Waorani have discussed painting their rivers a uniform grey/brown, or better still, different colours depending upon the actual colour of the river or stream. Their wish to do this is less to challenge the epistemological standard of blue and any power dynamics it contains, and more to remain faithful to the world they live in. And this, like reducing the number of trees they take GPS points for, is something that for now they are willing to compromise on in the hope of making their maps more acceptable. The Waorani are living within a state which, despite recognising their territory in law, has repeatedly violated their rights to consultation over activities which occur there and, against Waorani wishes, permitted widespread oil operations with the ensuing social, cultural, environmental and health impacts (High 2015). Faced today with the threat of yet more oil extraction, the Waorani mapping team do not feel sacrifice to territorial fidelity that the Waorani are making. Producing 2D, paper maps of what, as discussed earlier, is something that for now they are willing to compromise on in the hope of making their maps more acceptable. The Waorani are living within a state which, despite recognising their territory in law, has repeatedly violated their rights to consultation over activities which occur there and, against Waorani wishes, permitted widespread oil operations with the ensuing social, cultural, environmental and health impacts (High 2015). Faced today with the threat of yet more oil extraction, the Waorani mapping team do not feel like they have the luxury to experiment with subverting the cartographic system. They are worried for their children’s health and futures and consider that their maps might have a better chance of being seen, understood and respected by often hostile state departments, if they do not visually embody more challenges than those they consider priorities.

Yet the limitations of this appropriation are many. Producing 2D, paper maps of what, as discussed earlier, is an interconnected multidimensional space is yet another sacrifice to territorial fidelity that the Waorani are making. Wainwright and Brian (2009) argue that, in Nicaragua and Belize, indigenous mapping was “reworking not revising colonial social relations, still conforming to the spatial configuration of modern politics, territory and property rights”. In an attempt to partially overcome this, and to create a more immersive and meaningful experience for the visitor, the Waorani are also developing an online interactive map with stories, videos and information about how and why they use different resources and spaces within their territory.

One more risk of the Waorani’s, and other indigenous mapping projects, as noted by Peluso (1995) and Kosek (1998) is that currently fluid knowledge and use of space becomes bounded and frozen. There is a danger that the map, once made and returned to the villages, becomes the authority with regard to toponyms, histories and the location of resources, leading to other, customary forms of knowledge being relegated or even lost. What was a snapshot in time, the 3 months over which each community map was produced, is likely to gain a longevity with as yet unknown consequences. This is a difficult risk to mitigate against. The Waorani mapping team have control over the database with all the GIS information, and it would be simple for them to update the database in time if errors were found or community members changed their minds about the data. However whether the whole community will really engage in an ongoing reflection on and revision of the content of the map is questionable, not to mention the cost implications of reprinting maps for a whole village.

**Conclusion: What makes a map indigenous?**

In the past the Waorani did not make physical maps of their territory. Their maps, as discussed earlier, existed in the space created between mind, memory and the daily occupation of and movement through territory. However other indigenous peoples have created items of material culture to represent space, such as the Ammassalik, carved wooden coastline maps which the Inuit used for navigation, the stick-charts of the Micronesian Marshall islands and some Australian Aboriginal paintings. Other indigenous people have performances, dances and ritual discourses which embody territory, place and toponyms. These maps are embedded within the cultures that made them and carry within them these worldviews, in addition to geographical or spatial knowledge. However, does this make them more genuinely indigenous than the maps the Waorani and others peoples are making today?

Wood (2005) relays a story of how the people of Fitzroy Crossing in Australia submitted a painting, Ngurrara II, as evidence of their relationship to territory during a land claim. The painting was described by the court as “the most eloquent and overwhelming evidence that had ever been presented to them”. Wood goes on to mention that although more conventional maps were also included as evidence, the court “came close to expressing regret about the necessity”.

In cases where they exist and where states are open to receiving them, items such as Ngurrara II, can convey something of the intangible and unmeasurable relationship and value of territory to its people in a way no paper map could. However, I wonder about the danger of limiting our understanding of indigenous maps and map making to items of so called traditional culture, and
assuming that anything that involves elements borrowed from or conforming to so called scientific cartography is compromised and subsumed within its power dynamic. Would such a stance not be guilty of reifying indigenous culture into something incompatible and other, and result in the continued dictation to indigenous people of what is and is not acceptable, and yet again exerting power to define, exclude and marginalise them?

Renee Pauluni Louis, a Hawai’ian indigenous cartographer, has encountered and articulated many of these challenges and the disempowered space they leave her in: “I am silenced by the limitation the tools that Western cartography provide for me as an Indigenous cartographer… I find myself using the language of my colonizer to express myself” (Louis 2004). Despite this Louis, like the Waorani, is trying to find a way through the maze, to be informed of the limitations and dangers and yet continue try to find “common ground between epistemologically diverse cultures” (ibid).

Indigenous mappers I have met, although aware of many of these problems, do not feel crippled by them. Many, as mentioned, do not have the time to be: for the Waorani and others mapping is an urgent activity of physical and cultural survival. Neither are they simply blindly following form and convention. Many indigenous mappers are part of networks of mappers, sharing news and experiences with other mappers on a frequent basis, which allows them to keep trying and experimenting, learning from each other, from art, from counter cartography and from the very latest in technology to find means and manners to tell their stories in the most effective ways. Different modes of expression are becoming possible and more mainstream; the almost weekly articles in the press about marginalised communities using a combination of maps and technology to defend their rights and lands is testament to this.

The profusion of counter-mapping initiatives, both indigenous and non-indigenous, as well as protest maps and art-maps all provide more hope. Portrayals of the world which force us to stop, take a fresh look at what is illustrated and see our own assumptions glaring back abound in galleries, blogs and across social media. There is also evidence they are causing lasting change within cartography (Wood 2005), perhaps even the kind of change which could result in maps with “black, coffee coloured, clear or milky” coloured rivers no longer being seen as an obstacle to legitimacy, even by less than friendly state departments.
Postscript: Keñe Ahua
There are clearly many challenges and issues that arise from indigenous mapping and cartography, and important as they are to keep in mind, and to keep questioning and looking for better methods and ways to subvert entrenched power relations, the debate should not let us lose sight of what is actually happening on the ground, the people involved, their lives and stories.

I met Keñe Ahua, an elder from the village of Damointaro, in October 2016 when I accompanied the Waorani team on one of their trips. She was the village matriarch, with countless grandchildren and great grandchildren, and she presided over the mapping exercises with a visible pride, as well as a light touch and contagious laugh.

She continued to be deeply involved in the mapping over the following months. Opi told me how she encouraged her grandchildren to participate in the trainings and ground truthing walks, and was looking forward to the next workshop to revise the draft map.

Keñe died on February 7th 2017, the day we arrived back in Damiontar to carry out that workshop; she had been bitten by a poisonous snake the night before. The Ecuadorian Health Service delayed so long to get the required paperwork for an emergency evacuation that by the time the helicopter arrived in late morning it was to bring her coffin rather than the anti-venom.

Opi said: “Keñe was so excited by the map making. She has seen what has happened since contact, and felt there was finally the chance to really mark the Waorani’s place on the map, to tell the world where we are.”

Keñe believed that mapping was an opportunity to raise her people’s profile and to share the meaning of their beautiful, diverse, history-laden territory with others. I trust in her wisdom, experience and vision, and that her grandchildren were so engaged with ideas of mapping, politics and indigenous representation, that they did.

Notes
All photographs were taken by members of Digital Democracy. The images including extracts of the Waorani Territory map contain the intellectual property of the Waorani Nation.

1. The irony of these words about empowerment and Waorani autonomy in mapping written by a British anthropologist who has only known the Waorani mapping team for a couple of years, is neither lost nor taken lightly. The stories and experiences relayed here are eloquently articulated by the Waorani themselves, and the majority of my analysis and reflection comes from speaking of these issues with Opi, the Waorani team and villagers, as well as from meetings with other indigenous map makers. The intention here, with the mapping team’s full consent, is to share elements of their method and contribute to broadening and deepening the debate on these issues. I would like to thank the Waorani Mapping Team, Opi Nenquimo, Camilo Huamoni, Jorge Gaba, David Coba and Carlos Enqueri for sharing their insights with me, the Alianza Ceibo and Amazon Frontlines teams and all the members of the villages where I have been received with Waorani warmth.

2. Both concepts continue to abound in contemporary portrayals of indigenous people, and are still used to justify missionary activity, state policies of integration or colonisation of border regions, and large-scale development projects.

3. The all-seeing satellite and drone maps being two of the most recent forms it has taken.

4. See Posey (1983) for a discussion of ways in which indigenous people have modified the ‘natural’ environment, debunking the myth of virgin forest, despite not being visible or easily detectable in satellite image.

5. To discuss in depth the nature of the Waorani’s, and other indigenous peoples’ relationship with territory is beyond the scope of this article, and has been well discussed elsewhere, including each peoples’ unique relationship, as well as common threads between them (Posey 1996, Rival 2002, Surrallés and García Hierro (eds) 2005).

6. “Governments shall respect the special importance for the cultures and spiritual values of the peoples concerned of their relationship with lands or territories” ILO 169, Article 13

“Indigenous peoples have the right to the lands, territories and resources which they have traditionally owned, occupied or otherwise used or acquired” United Nations Declaration on the Rights of Indigenous Peoples, Article 25

Keñe Ahua during the village mapping workshop in Damointaro.
7. Schemes under the international funding structure: Reduced Emissions from Deforestation and Degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD+)
8. These latter two projects were supported by the author and by Gregor MacLennan respectively, both now on the Digital Democracy team.
9. Mapeo is being built with financial support from the Leonardo DiCaprio Foundation, the Knight Foundation, All Eyes on the Amazon, and other supporters of Digital Democracy.
10. Mapeo is not the only mapping programme that aims to hand more power over to marginalised or indigenous communities. Sapelli, for example, developed by the Extreme Citizen Science (EXCITES) programme at UCL is being developed with a focus on non-literal and illiterate users: www.sapelli.org
11. www.mapeo.world A mobile tool, Mapeo Mobile, is also currently in development by Digital Democracy and will be ready for testing in mid 2018. This tool will replace the GPS in the data collection process, facilitating the workflow and increasing accessibility of the mapping.

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