Bridging the great divide: State, civil society, and 'participatory' conservation mapping in a resource extraction zone

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Abstract

It is recognized that participatory mapping techniques in the context of indigenous societies are fraught with dilemmas around the uneven distribution of power, differing understandings of boundaries drawn across the landscape, and incommensurable epistemologies of the human relationship with the environment. At the same time policy makers and practitioners recognize the value of local knowledge in planning and management practices, including for the planning and management of conservation areas. Mindful of this dilemma geographers and researchers in allied fields such as applied anthropology have tested participatory and inclusive mapping techniques across a variety of cultural contexts over the last several decades. This article evaluates the outcomes of a participatory conservation zoning exercise undertaken in a mineral extraction zonedthe Cordillera Huayhuashdin the Andes of Central Peru and contributes a case study to this body of work. The principal method used was the construction of a manual 'GIS' upon which local communities could draw their zoning vision as an overlay on transparent acetate. The evaluation of the work focuses on the governance outcomes from the process rather than the map products that were drawn. The findings confirm that such processes are rife with the dilemmas identified in prior research, yet the zoning project also helped 'bridge' the great divide between the state and civil society by building trust through dialog. The findings also indicate that the chosen approach can be used as a ground truthing tool to identify accuracy and completeness problems in the cadastral database maintained by the government of Peru.

Introduction

Efforts to align broad conservation objectives with the protection of indigenous territories from extractive activities through participatory mapping methods in a development context are not new (Bernard, Barbosa, & Carvalho, 2011; Chapin, Lamb, & Threlkeld, 2005; Herlihy & Knapp, 2003; Nietschmann, 1995; Poole, 1995; Sletto, 2002; Smith, Benavides, Pariona, & Tuesta, 2003; Stocks, 2003; Velazquez et al., 2009). Indeed this combination to defend 'indigenous' territory and, at the same time, slow the encroachment of resource extraction through "counter-mapping" (Peluso, 1995) has a long history. For example, one of the first known counter maps drawn in Peru is Guaman Poma's map of Tahuantinsuyo (the Inca empire) drafted less than one hundred years after the conquest in the early 17th century (Guaman Poma, 1615; Turnball, 1993). The map, combined with lengthy textual accounts, is an elaborately established claim that the Spanish were invaders in Inca territory. The format of the publication attempts to match that of the Spanish chroniclers; in this way Guaman Poma sought to gain legitimacy for his text. The King of Spain likely never saw the work and as history has shown, the effort failed completely. A more recent example lies with the mapping efforts of the Aymara people of Lake Titicaca to retain their autonomous control over the harvest of reed beds (Orlove, 1991, 1993). In this case Orlove observed that the maps made by the Aymara communities and those of the central government were quite distinct and little actual communicative dialog took place; perhaps another failure.[1]

Despite these apparent difficulties maps continue to be drawn by indigenous and/or native people in Peru (and elsewhere) with the intention to make territorial claims or to defend territory from extractive activities such as mining and drilling for oil and gas (for examples see Hinojosa & Hennermann, 2012; IFAD, 2009; Reyes-

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[1] The cultural divide between Lima based government natural resource management agencies and the actual land managers in the Andes of Peru is so large that, to paraphrase Orlove, the epistemologies are simply incommensurable and dialog is impossible at worst and difficult at best (Norris, 2005).

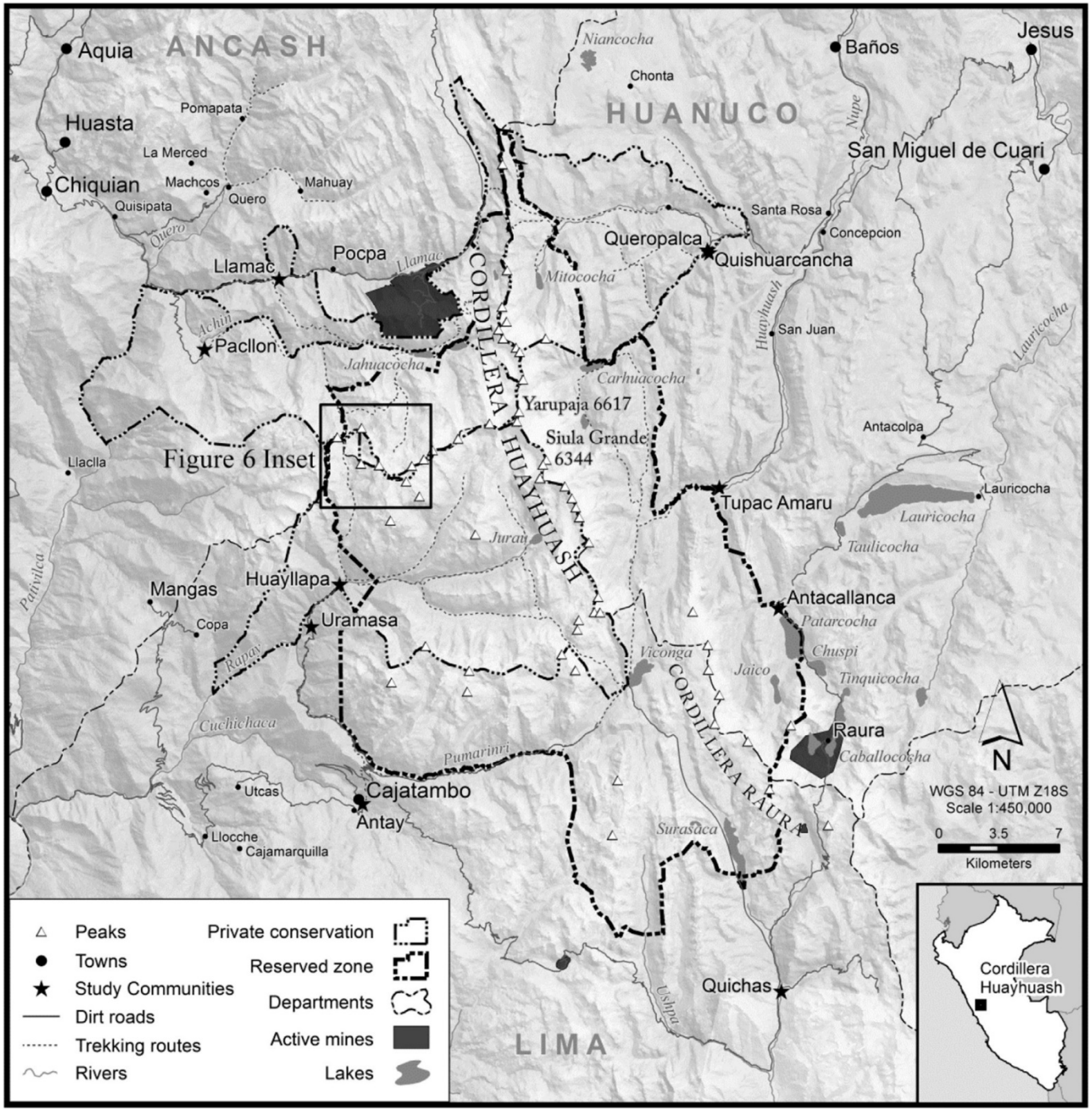


Fig. 1. The Cordillera Huayhuash.

García et al., 2012; Scurrah, 2008). A contemporary and pressing case in Peru can be drawn from the efforts of native communities in the Amazon basin. For over thirty years native leaders have been drafting maps and gaining legal title for community lands through government agencies, often with the help of several nongovernmental organizations (NGOs) (Benavides, 2010). Now, as exploration for, and extraction of, minerals and hydrocarbon accelerates, these maps and titles will be tested as mechanisms for defense of territory confronted by pressure from multi-national corporations (Smith, 2005; Urteaga-Corvetto, 2012). The community mapping process is used as a ground truth method to correct and/or better inform state cartographic efforts, as a way to offer counter-narratives to the unused territory story often told by state resource management agencies intent on granting extractive concessions to outside interests, and as a means for local communities to "discover" and document extractive activities (Smith, 2011). In cases such as these some might argue that "more indigenous territory can be re-claimed by maps than guns" (Nietschmann, 1995, p 37) while others would argue that the only legitimate map is that of the state backed by the power of guns (Wood, 2010).

In approaching this debate it is recognized that participatory mapping techniques in the context of indigenous societies are

fraught with dilemmas around the uneven distribution of power, differing understandings of boundaries drawn across the landscape, and incommensurable epistemologies of the human relationship with the environment. Broad questions addressing who gains and who loses, who is empowered or dis-empowered, where project ownership lies, and where on the "ladder of participation" (Arnstein, 1969) do participants find themselves remain prominent in all participatory research (Chambers, 2006). Specific to indigenous cartographies, recognized dilemmas include epistemological splits between Cartesian and non-Cartesian world views (Offen, 2003; Rundstrom, 1991), the role that GIS technology plays in obviating non-Cartesian geographies from mapping processes (Cope & Elwood, 2009; Crampton, 2010), the forced use of hard boundaries (Bryan, 2011; Pappalardo, De Marchi, & Ferrarese, 2013; Sletto, 2009; Vandergeest, 1996; Walker & Peters, 2001), exacerbated power differentials both across different classes in society writ large (Pickles, 1991, 1995) and within smaller communities (Agrawal & Gibson, 1999; Brosius, Tsing, & Zerner, 2005; Kosek, 1998), the possibilities of greater conflict (Reyes-García et al., 2012), and empowerment for some and marginalization of others across categories of gender, age, race, and class (Rocheleau, 2005). Perhaps the greatest dilemmas of this work are that results will not come quickly and will be hard to measure (Dunn, 2007; Fox, 1998), mapping is not enough and must be practiced in conjunction with other capacity building strategies, particularly legal (Rocheleau, 2005; Sletto, Barry, Bryan, Hale, & Torrado, 2011; Stocks, 2003), and any outcome will be neither based on traditional or liberal visions of land tenure, but instead on some hybrid system contingent on institutional configurations which cross various scales (Clapp, 2004; Fox, 1998; Hodgson & Schroeder, 2002; Offen, 2003; Peluso, 1995; Rocheleau, 2005; Vandergeest & Peluso, 1995; Wainwright & Bryan, 2009; Walker & Peters, 2001).

As a contribution to the debate on the effectiveness of counter mapping and the ensuing critical body of literature, this article evaluates the outcomes of a participatory conservation zoning exercise undertaken in a mineral extraction zone that is actively being mined—the Cordillera Huayhuash—in the Andes of Central Peru (see Fig. 1). The focus on mineral extraction is particularly relevant as power asymmetries are acute and the non-renewable nature of the mineral resource make this case distinct from the extraction of renewable resources through activities such as forestry and large scale agriculture. The evaluation of the work focuses on the governance outcomes from the process, understood as the unfolding relationship between state, market and civil society, rather than the map products that were drawn. For this paper civil society is broadly understood as legally established communities and NGOs, and the private sector refers to the mining industry. There is a tension within the Peruvian state between its need to render the landscape 'legible' (Scott, 1998) for both mining and conservation, and at the same time 'cross the great divide' (Ostrom, 1996) between the state and civil society in order to construct and legitimize hybrid governance mechanisms that are 'co-managed' by the state, civil society and the private sector (Carlsson & Berkes, 2005). I argue that participatory conservation zoning methods can help build bridges between the state and civil society and thus ease this tension.

The Peruvian context

On April 5th 1992 the president elect in Peru, Alberto Fujimori, ordered tanks to be stationed in front of the chambers of Congress in Lima and then announced that congress would be dissolved. This bold move allowed Fujimori to re-write the constitution of Peru—adopted in 1993—and re-define the relationship between citizens and the state. Fujimori's document dismantled the recognition of indigenous and communally owned lands as inalienable, imprescriptible and not subject to mortgage as institutionalized in the 1973 constitution, and at the same time emphasized that while all sub-surface mineral and hydrocarbon resources would remain owned indefinitely by the state, concessions could be purchased with few limitations. Additional legislative action was taken to protect private investment in Peru, with special attention given to investments made by trans-national corporations. This protection was linked to a reorganized management of state-owned rights to sub-surface mineral deposits in a new digital mining cadaster. Together these neoliberal reforms opened the floodgates of foreign direct investment in the extractive sector (Bury & Bebbington, 2013; de Echave, Hoetmer, & Palacios Panez, 2009). Within a decade concession purchases, royalty payments, and taxes on mineral production became the principal source of revenue for the state coffers. In 1990 slightly over 1% of state territory was conceded as sub-surface mineral rights to mining operations. By 2011 over 14% of state territory fit in this category (INGEMMET, 2011) and in the first decade of the 21st century mining exports accounted for 58% of Peru's total exports (PWC, 2013).

Fujimori also implemented a rural titling program financed by the Inter-American Development Bank. Legislatively initiated in 1992 and funded from 1996 to 2006 the Proyecto Especial de Titulacion de Tierras (special land titling project – PETT) registered nearly 2,000,000 land titles of which 5920 are collective titles granted to rural Andean communities (approximately 98% of known rural Andean communities in Peru) (IADB, 2007). PETT is heralded as one of the most successful titling projects in Latin America, yet in 2008 it was dismantled by the president elect Alan Garcia and subsequently moved to the *Comision de Formalizacion de la Propiedad Informal* (the commission of formalizing [urban] informal property – COFOPRI). Once in COFOPRI the rural titling program began to deteriorate. COFOPRI is an institution designed to handle urban titling and was not prepared logistically or in terms of financial, technical, and human resources to undertake a rural titling program. Within less than a year grave errors had appeared in the rural title database—for one of the communities in this study over 60% of their territory went 'missing' in the COFOPRI database in 2011—and many Andean communities were left wondering if their PETT title was still valid. To complicate matters, later in 2011 Garcia mandated that the rural titling program again be moved, but this time to the regional offices of the Ministry of Agriculture (MINAG). Since this decree rural titling information is almost impossible to verify; COFOPRI denies responsibility and the regional MINAG offices were handed a mess which they have not been able to sort out yet.

Prior to 2008 the national mining cadaster and the PETT database, while technically public information, were inaccessible to the common citizen as bureaucratic fees to access the data ranged between hundreds (for an individual title search) to tens of thousands (for access to regional data) of US$. In 2008 INGEMMET published the mining cadaster database through the online portal GEOCATMIN in which detailed geographic records of sub-surface concessions, contact information for the rights holders, amounts paid in transactions with the Peruvian government, and so on, can be found (INGEMMET, 2014). This move is part of a broader transparency initiative within several Peruvian ministries to publish public records as geographic information online. Indeed, amongst others the Ministry of Housing and Construction (where the PETT data resides) and the Ministry of the Environment (where the protected areas database resides) also opened online geospatial portals in the same year (COFOPRI, 2014; MINAM, 2014; SERNANP, 2014). While the portals theoretically offer access to anyone with a computer, data for community titles are not yet available

at the time of writing and system navigation requires some knowledge of GIS and geographic databases to extract relevant information.

Prior to this release of online geospatial data, legislation that promoted decentralization of, and democratic participation in, natural resource use decisions was crafted and signed into law. One aspect of this was a complete overhaul of the *Servicio Nacional de Areas Naturales Protegidas* (the National Natural Protected Area Service – SERNANP) which included a new legal code of protected area operations signed into law in 2001. The new code included novel instruments for private conservation as well as mechanisms to privatize state roles in the creation and maintenance of protected areas in Peru (Capella, Cerdan, & Solano, 2005). Since this overhaul there has been a veritable mini-boom of private conservation in Peru: in 2001 there were no private conservation areas (PCAs); in 2013 there are over 60 areas recognized as PCAs representing over 250,000 ha (SERNANP, 2013). The new conservation legislation also creates mechanisms for significant foreign investment to flow through private-public hybrid organizations to protect of Peru's remarkable biodiversity, particularly in the Amazon basin (SERNANP, 2009).[2]

A second aspect of decentralization and democratization reforms is the *ordenamiento territorial* initiative (territorial ordering) coupled to fiscal and political decentralization laws; both legislated in 2002. The decentralization law—*Ley No 27783: Ley de Bases de la Descentralización*—places a limited set of fiscal and development decisions with locally elected officials in provincial and district municipal governments. Prior to 2002 these positions were appointed and decisions were made centrally in Lima. The territorial ordering initiative mandates land use zoning at a regional and provincial level in terms of *zonificación ecológica y económica* (ecological and economic zoning, ZEE). According to the law it is a "political and technical process" that seeks to "define environmental criteria and indicators for the allocation and use of territory" and the process itself should be "participatory and concerted, dynamic, [and] flexible" (GOP, 2005; GOP, 2006 respectively; GOP, 2010 translation mine). Observers have interpreted the ZEE coupled to the territorial ordering as a hopeful participatory process for improved planning and environmental governance, yet practitioners have found it difficult to implement due to ambiguous amendments to the original legislation, lack of local capacities to do the work, and institutional isolation from previous legislation for both conservation and extraction. Indeed some suggest that it may be a smokescreen for the deepening of and continued centralization of control over strategically important natural resources (Azpur, 2012). In any case it is a cartographic process intended to bring together environmental and economic concerns at local scales for decision making purposes.

The release of the geographic data, the inclusive zoning methods, and the scale of the territorial ordering all lend well to the goals of 'good governance' or even 'private environmental governance' touted by international financial institutions keen on maintaining capital flows in the developing world. Although these new policy instruments appear to be important steps towards transparency in the governance of natural resources, several caveats undermine the process. First, participatory zoning is an extension of participatory mapping and other participatory research methods that have well known benefits as well as a laundry list of potential problems and dilemmas. Second, the decentralization of the territorial ordering along with the decentralization of other fiscal and political decisions remain subsumed by the governance of sub-surface resources (minerals and hydrocarbons) which remains under centralized control. When evaluating the participatory mapping methodology—inherently a decentralized and local process—this centralized control of subsurface resources is a powerful determinant in the governance outcomes. And third, the online publication of these digital databases raises important questions about the general integrity of the data. I interrogate each of these points below by asking the following questions. What problems and dilemmas emerged in the mapping process? How did centralized control over sub-surface resources confound the process and outcomes? How can participatory mapping serve to identify errors in the national cadaster database?

Methods

On the 16th of May 2011, in the auditorium of the national water authority in the city of Lima, under the authority of the SERNANP and the Ministry of the Environment, a commission was formed to categorize the Cordillera Huayhuash Reserved Zone (CHRZ). Since the ratification of ILO 169 by Peru in 1994, categorization requires a consensus approval for the proposed protected area, its master plan and administrative structure, from all people who occupy land within the proposed reserved zone. Two previous categorization attempts had failed largely due to top-down approaches. Residents had perceived the national conservation effort as a threat to local livelihoods and autonomous development and in response four communities developed private conservation areas (PCAs) (Bury & Norris, 2013). A determining factor in this perception is that the previous commissions for categorization were presided over by SERNANP and were made up largely of outside actors with only a minority of seats held by community members. The 2011 commission was still presided over by SERNANP, but nine out of nineteen seats were filled by community authorities. At the meeting it was proposed that a participatory zoning approach could be used for this third categorization effort to remedy the real and perceived top down conservation planning. Several months (and meetings) later a work plan for the categorization that included a participatory zoning exercise was approved by the commission. Over 50 people participated in this planning process who represented ten communities (as elected authorities),[3] six municipalities (as civil servants), SERNANP (as civil servants), two mines (as environmental and community relations officers), several NGOs (as designated officers), and a smattering of tourist guide agencies (as business owners).

This article draws from the above participatory conservation zoning exercise conducted across three months in 2011. The mountain range lies across the Andean continental divide approximately 200 km north of Lima and spans three political departments (similar to US states) (see Fig. 1). The work was part of a larger multi-actor effort to strengthen local private conservation efforts and explore the possibilities of creating a national protected area in the Cordillera Huayhuash. Indeed, the zoning exercise builds upon previous work which includes the creation of a grass roots NGO in 2003, several subsequent capacity building projects, and a long-term engagement to build relationships based on

[2] A national level history of this institutional evolution can be found in Solano's (2005) and Young and Rodríguez's (2006) work. Details on how these reforms have touched down in the Cordillera Huayhuash are in Bury and Norris' (2013) work.

[3] Rural communities in Peru are legally established organizations with a set of elected officers including a president, a secretary, a treasurer, and a controller who both represent the community legally and manage the community's collective internal and external affairs.

Fig. 2. Examples of the three 1:25,000 base maps used for each community. On the left are examples of the two prepared maps (satellite and topographic with mining concessions) and on the right is an example of the PETT quadrangles. Photos: Matthew Hall.

collaboration and trust in the across the region.[4] Ten communities were identified to participate directly in the study based on their communal ownership of lands that lie beneath the peaks of the Cordillera Huayhuash and the Cordillera Raura (see Fig.1). The total area of their combined territory encompasses 135,150 ha. The communities do not self-identify as indigenous, yet many community members speak local dialects of Quecha, the indigenous language of the region.[5] The work was conducted as a combination of activist academic research, state led conservation outreach, municipal governance, and community based conservation. Funding was drawn from several international donors including the National Geographic Society and the National Science Foundation, from the Ministry of the Environment and its sub-unit SERNANP, from regional and municipal governments with jurisdictions in the region, from the communities in the form of labor, food, and lodging, and from several individual private donors.

Through collaboration between the author, SERNANP, and several NGOs, digital geo-referenced data were collected and consolidated. For each of the ten identified communities within the CHRZ two base maps were prepared with the same scale and projection as the corresponding 1:25,000 PETT quadrangles and then printed on a tough vinyl banner material (20 printed maps in total).

One prepared map represented each community's territory and environs as a topographic map which included towns, place names (government compiled), roads, trails, rivers, lakes, mountains, and contours (25 m intervals). Current mining concession data (polygons) were included on this topographic base map as a final overlay. The second created map represented the landscape using 2008 false color TerraLook satellite images from the ASTER sensor (15 m per pixel) on which different land cover types were clearly visible (i.e. pasture, forest, rock, and glacier). The same toponym data from the topographic maps was included as an overlay on the satellite images. If the community had previously gained recognition as a PCA, the conservation zoning from their already existing master plan was included as an overlay on the satellite map. In this manner there were three maps with identical scale and projection parameters for each community involved in the zoning process (two prepared maps and one government map from PETT e see Fig. 2).

Following this map preparation a two day workshop was held in the town of Chiquian in the province of Bolognesi, department of Ancash. With only a few exceptions, the same people who were present in the May planning meeting were present for this workshop in September (over 50 attendees). The set of map materials and zoning scheme were distributed and explained. The elected representatives from the nine participating communities[6] spread their materials across the auditorium and groups from each

[4] While generally this engagement has been well received, the research relationships vary across and within communities. At the positive end of the spectrum a sheep was gifted by a community to the author as an expression of gratitude, and on the negative side one individual attempted to sue the author for biopiracy (yet this same individual was later sued by one of the communities).

[5] Andean communities have been labeled as indigenous, rural, or peasant depending on historical periods in Peru.

[6] One community was absent due to a communication problem.

Table 1
The conservation zoning categories with a brief description.

Zoning categories	Description
Indirect use	
Strict protection	Off limits to human activity with exceptions for environmental monitoring and scientific study.
Wilderness	Off limits to human activity with the exceptions above and tourism (no motor vehicles).
Direct Use	
Historical/cultural	Archeological or historical sites; infrastructure development permitted (tourism, research, education)
Tourism	Tourism infrastructure development permitted (buildings, roads, and motor vehicle use)
Special use 1	Economic activity permitted (agriculture and other activities including mining)
Special use 2	Economic activity permitted (agriculture and other activities including mining)
Transitory	
Restoration	Degraded areas designated for restoration projects

community drew the first lines on an acetate overlay. Often the first lines drawn were the community boundary, prominent rivers and lakes, and roads by which people could orient and locate themselves in the map. Preliminary zoning followed. The set of zoning categories used was based on zoning for national protected areas in Peru (see Table 1). This set of classifications was also used by the already existing PCAs in the Huayhuash; the only change is that each individual PCA placed its own definitions on the two special use zones; these two zones had no specific agreed upon definitions across the entire area. By the end of the meeting two of the communities already recognized as PCAs (Llamac and Queropalca) had completed their zoning maps. The community of Quishuarcancha also completed their zoning map based on a previous mapping exercise completed in 2007. The meeting ended with a logistical exercise to coordinate the follow-up visits to each community that would take place in the next several weeks (see Table 2).

The purpose of the follow-up visits was to inform the community assembly—the voting body of the legally constituted community—of the categorization process and the participatory zoning activities and to invite participation. This was part of a broader goal to continue a dialog between the communities, SERNANP, NGOs, and local governments about conservation, tourism, local livelihoods, and mining in the region. A core work team of the commission had been identified and tasked with the community visits. The team consisted of the author as the leader, two agronomists who are well known in the region, a representative from SERNANP, and a representative of the provincial government in Lauricocha, Huanuco. As the visits were conducted by this group the SERNANP representative varied between three people based on their availability (a GIS technician, a park guard, and the park chief; all from the nearby Huascaran National Park). The product of each visit was a preliminary hand-drawn zoning map (on transparent acetate) for each community (for an example see Fig. 3). All government place names from the PETT maps were double checked and for the most part were found to be correct. The final map product was entrusted to the commissioned team by the community under an agreement that the map would be returned to the community authorities once it had been copied and incorporated into a GIS.

The maps were imported into the ArcMap 9.x desktop GIS platform and then digitized, using head-up manual digitization, into a shapefile with polygon geometry. Three regional zoning maps were created (both as posters at 1:50,000 and for reports at 1:300,000) that showed the complete zoning exercise as an overlay on a mosaic of the 2008 TerraLook satellite imagery, the complete zoning exercise as an overlay on sub-surface mining rights, and a final map showing the zoning internal to the Cordillera Huayhuash Reserved Zone. The final map included the necessary reclassifications from indirect use to direct use where conflicts between a particular community's vision of conservation zoning and sub-surface mineral rights existed. Two poster maps at 1:25,000 scale were prepared for each community (20 maps in total) that showed on one poster their respective conservation zoning as an overlay on satellite imagery and on the second poster the final zoning on topographic base maps.

On November 21, 2011 an additional meeting was held at the SERNANP offices in Lima to present the results and return the map materials to representatives from the respective communities. All present agreed that the work was a good but insufficient start, and that further work was necessary to bring the results to each community and continue the process of capacity building at a community level. The will to continue the conservation work exists

Table 2 – Participating Communities, dates visited, and activities completed.

Community	District/Province/Department	Date (2011)	Activities completed
Pacllon[b]	Pacllon/Bolognesi/Ancash	Sept 18–19	Small leadership meeting, zoning built on 2005 PCA and 2007 exercise
Llamac[b]	Pacllon/Bolognesi/Ancash	Sept 21–22	Some conversations among leaders, zoning built on 2010 PCA and 2007 exercise – completed in Chiquian
Quichas	Oyon/Oyon/Lima	Oct 2–3	Community workshop (good attendance), preliminary zoning completed with several leaders
Antay	Cajatambo/Cajatambo/Lima	Oct 4–5	Community workshop (good attendance), preliminary zoning completed in workshop
Huayllapa[b]	Copa/Cajatambo/Lima	Oct 6–7	Community workshop (good attendance), zoning built on 2005 PCA
Uramaza	Cajatambo/Cajatambo/Lima	Oct 8–9	Community workshop (medium attendance), preliminary zoning completed as a continuation of 2007 exercise
Mangas[a]	Mangas/Bolognesi/Ancash	Oct 10	Community meeting, no map
Jesus[a]	Jesus/Lauricocha/Huanuco	Oct 24	Meeting of authorities from Jesus, Tupac Amaru and Quishuarcancha, border between Tupac and Quishuarcancha delimited, no zoning map (see Quishuarcancha and Tupac Amaru)
Antaccallanca	San Miguel de Cauri/ Lauricocha/Huanuco	Oct 25	Community workshop (medium attendance), preliminary zoning completed
Raura Nuevo[a]	San Miguel de Cauri/ Lauricocha/Huanuco	Oct 26	Conversations with authorities, no map
Túpac Amaru	Jesus/Lauricocha/Huanuco	Oct 27, Dec 4	Meeting with authorities, preliminary zoning completed as a continuation of 2007 exercise
Queropalca[b]	Queropalca/Lauricocha/Huanuco	Oct 29, Dec 3	Meeting with authorities, zoning built on 2007 PCA and 2007 exercise – completed in Chiquian
Quishuarcancha	Jesus/Lauricocha/Huanuco	Oct 30, Dec 3	Community meeting (medium participation), preliminary zoning completed as a continuation of 2007 exercise – completed in Chiquian

[a] These outlying communities are not technically occupants of the CHRZ and did not draw a zoning map, but their representatives participated in regional meetings and discussions.
[b] These communities are recognized as private conservation areas (PCAs).

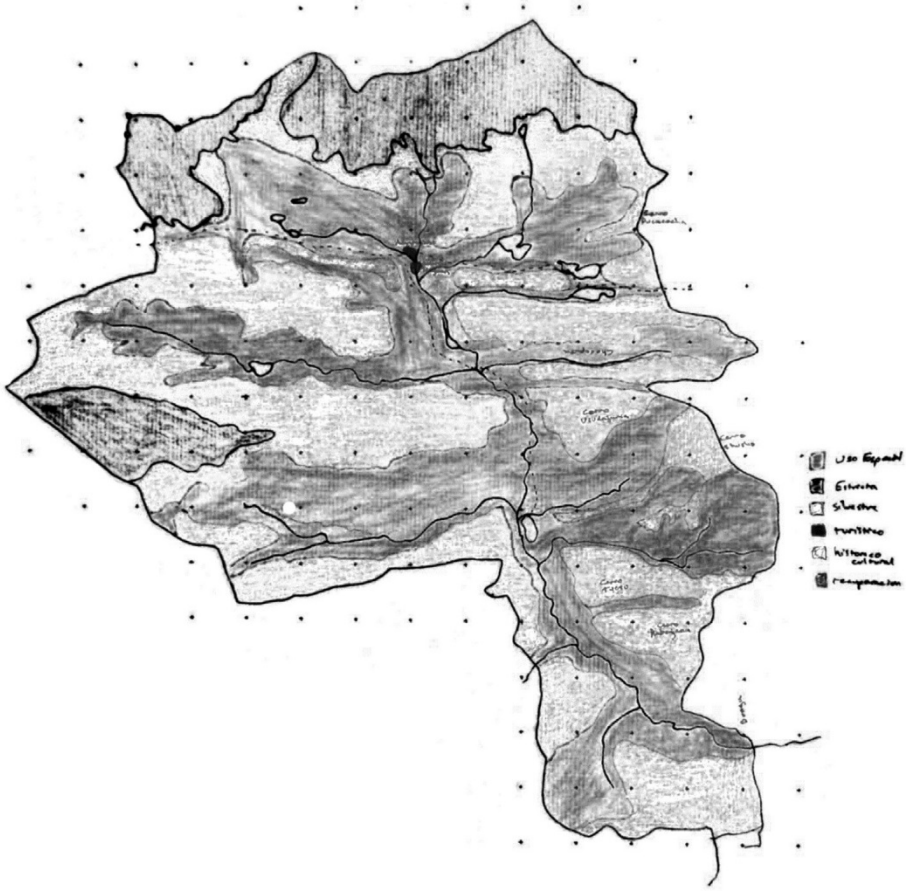


Fig. 3. Example of community based conservation zoning as drawn by one community. Note that North is to the right, yet this orientation reflects how the community understands its territory.

at the national, regional, and community levels, yet at the date of writing SERNANP has not allocated sufficient financial or human resources to continue the work (although several sympathetic officials are actively seeking these resources). This observed lack of government allocated financial resources for the development of this protected area likely stems from a broader government strategy to maintain a favorable stance towards foreign direct investment in the extractive sector.

Results and discussion

The process invoked for this work was largely top down. The local communities did not 'ask' for a participatory conservation zoning exercise, but their representative leaders approved it. The planning process for the conservation zoning work was located in the middle of the participation ladder. It was initiated by interests both from above and below; ownership was shared between the communities, the state, and the author. Everyone's work was compensated according to experience and contributions, and the project design was a collaborative between SERNANP, community leadership, local municipal governments, and the author. Contrary to this moderate level of participation in the project design, the principal part of the work, the zoning process, was almost entirely top-down. The categories for zoning were dictated by planning guidelines for national protected areas in Peru. While this makes sense for SERNANP from a perspective of legibility (Scott, 1998), it was very difficult to implement in each individual community as tenure regimes are not homogenous across communities. This classification scheme also puts all pasture in one of two categories while local residents distinguish four basic pasture typesdindeed biologists also make the same four distinctions (Florez, 2005)dand make over ten further distinctions based on pasture quality, productivity, and use. On a theoretical level this problem emerges from the stark difference between the cartographic imperative to classify pasture types as polygons in Cartesian space and the local more nuanced interpretation of reality that is not based on distinct polygons nor an x/y coordinate system. This tension between what the government wants to see and what local land managers actually see is perhaps one of the primary factors in the repeated failure to reach a consensus approval of a national protected area (cf. Orlove, 1991).

On a superficial level the zoning results can be visualized as a map (see Fig. 4) and described quantitatively as summary tables of the areas designated as the different zoning categories organized by community, zone type, and the impacts of pre-existing mining concessions on the preliminary zoning (see Tables 3 and 4 respectively). While the focus of the analysis is not based on these zoning results, the problems encountered between conservation zoning and the pre-existing mining concessions are significant. Across the ten participating communities a total area of 135,150 ha was considered and designated as one of the described conservation zones; 67,700 ha of the area considered falls within the CHRZ. Of the 135,150 ha of total area considered preliminary zoning designated 75,794 ha (56%) as direct use areas, 58,292 ha (43%) as indirect use areas, and 1064 ha (<1%) as restoration areas. Within the 67,700 ha of the CHRZ preliminary zoning designated 28,729 (42%) as direct use areas, 38,515 ha (57%) as indirect use and 456 ha (<1%) as restoration areas (see Table 3). Once the preexisting sub-surface mineral rights are superimposed on

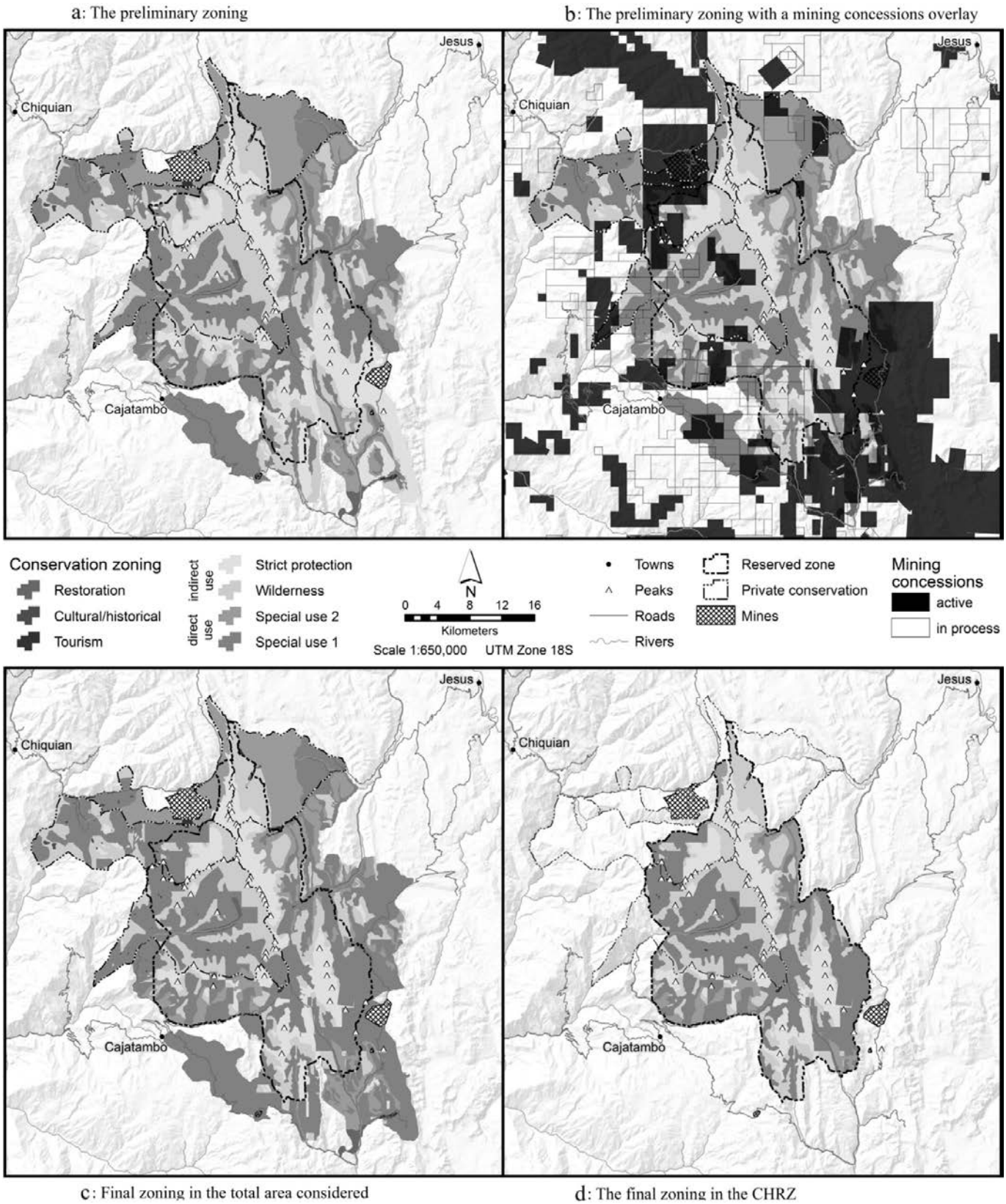


Fig. 4. Four stages of results from the zoning exercise.

Table 3 – Zoning results by area (ha) within the CHRZ summarized by community and by zone type (these measurements consider the pre-existing rights in the mining cadaster).

Owner	Area (ha) by type of zone							Total area (ha) by owner	Total area (%) by owner
	Indirect use		Direct use						
	SP	W	T	HC	SU1	SU2	R		
CP Antacallanca	799	260			3002	54		4114	6%
CC Antay	759	1324			1199			3283	5%
CC Huayllapa	116	6889	24	7	10032	161	456	17685	26%
CC Llamac	1116					488		1604	2%
CC Pacllon	1557	1107	12		2128			4804	7%
CC Queropalca	890	2566	46			4		3506	5%
CC Quichas		717			1474	307		2498	4%
CP Quishuarcancha	541	847	18		448	1331		3186	5%
CP Tupac Amaru	1597	2151	4	3	2856	712		7323	11%
CC Uramasa e communal[a]	3035	1764	36	4	6409	578		11826	17%
CC Uramasa e private[a]	168	208			707	1321		2404	4%
Estado	1846	152	3		317	410		2729	4%
Contested	1090	7			1424	109		2629	4%
Total Area (ha) by Zone	13514	17993	143	14	29996	5474	456	67590	100%
Total Area (%) by Zone	20%	27%	0%	0%	44%	8%	1%	100%	

[a] Uramasa is the only participating community to have partially privatized its communal title.

the preliminary zoning drawn by the communities these numbers change; the indirect use areas are diminished and the direct use areas increase (see the contrast between Fig. 4a and c). Of the total area considered in the exercise the change from indirect use to direct use imposed by the mining concessions is 17,117 ha (13%) and within the Cordillera Huayhuash Reserve Zone the change is 7008 ha (10%) (Table 4).

During the community visits there were many opportunities for dialog and the sharing of information; particularly around legal issues regarding rights of access and exclusion related to both conservation zoning and the mining cadaster. The team had the unfortunate job to dispel the local myth that private conservation efforts can limit both present and future mining activities. As the then current mining concessions were overlaid onto the zoning maps and parts of communities' territory were fractured by decisions made in Lima without their consultation, one community mayor made the comment that the work was all a "*saludo a la bandera no mas*" ("nothing but a salute to the flag").[7] His sarcastic comment reflects his frustration with mining company's ability to gain access to territory within the community even with SERNANP's presence. This outcome reflects a growing consensus that while most of Peru's political decisions are being decentralized and democratic participation is generally increasing, the decisions over sub-surface resources are actually going through a process of deeper centralization and tightening of control (cf. Gil, 2009; Kohl, 2002).

As a part of the zoning process, two additional significant findings surfaced. First, a titling error between the communities of Pacllon and Huayllapa was clarified. In January of 2011 the respective presidents of both communities approached the author and solicited help in rectifying a cartographic border problem. A records search was performed for the titles for both of these communities and an "error" was discovered in the cartographic transcription of the written boundary documents registered with the title of Pacllon. This discovery was reported to all actors involved (the communities of Pacllon and Huayllapa, SERNANP, and the Raura Mining Company) and an ensuing *mesa de dialogo* (table for dialog) was opened. Upon deeper investigation it was found that the written boundary agreement between Pacllon (department of Ancash) and Huayllapa (department of Lima), which is used to inscribe the community boundary on an official topographic map and then registered as the correct property line in the department where the community is located, had been altered. Specifically an altitude of a mountain was changed from 5222 to 4929 (see Fig. 5). This alteration made the mountain called Ushpa to be used twice consecutively as a boundary marker, and a small triangle of stateowned "public" land opened between two contiguous communities. The title search showed that Raura bought the concessions in 1996 and the communities registered their titles in 1999. The Raura mine located its drilling platform within this "state" territory, most conveniently (see Fig. 6). It was not possible to find information about when, how, where, or by whom the document was modified and the registry office of the department of Ancash denies that any mistake was made.

The Raura mine "retired" from its exploration process in January of 2012 approximately four months after the mesa de dialogo had been convened with both communities, the mine, SERNANP, and the author participating (in a process facilitated by a well-known Peruvian conservation NGO). The official reason given for the withdrawal was the lack of permit for the use of water in the Achin River watershed; SERNANP had initiated an inquiry into this missing permit in May of 2011 and had found that indeed the mine did not have the correct permit. While it is impossible to attribute the mine's withdrawal to the discovery of the titling "error," it is highly likely that this finding played a role (cf de Echave, 2008; Scurrah, 2008). Before the discovery of the "error," the mine used the escalating tensions between the communities of Pacllon and Llamac to better negotiate access to their exploration site; apparently a classic divide and conquer strategy. After the discovery of the "error" the tension between the communities diminished and the mine's strategy was observed to be less effective. The *mesa de dialogo* was also an important moment for both communities to build trust in their relationship with sympathetic government officials within SERNANP and vice-versa.

Second, the communities of Tupac Amaru and Quishuarcancha, both considered "annexes" of the principal community of Jesus, used the zoning exercise to initiate a process to become independent communities with their own property title instead of sharing an unregistered and unofficial title with the community of Jesus. In a manner somewhat similar to the discovery of the title error between Pacllon and Huayllapa, these two communities used the project as an attempt to rectify a completeness error in the cadastral database. This

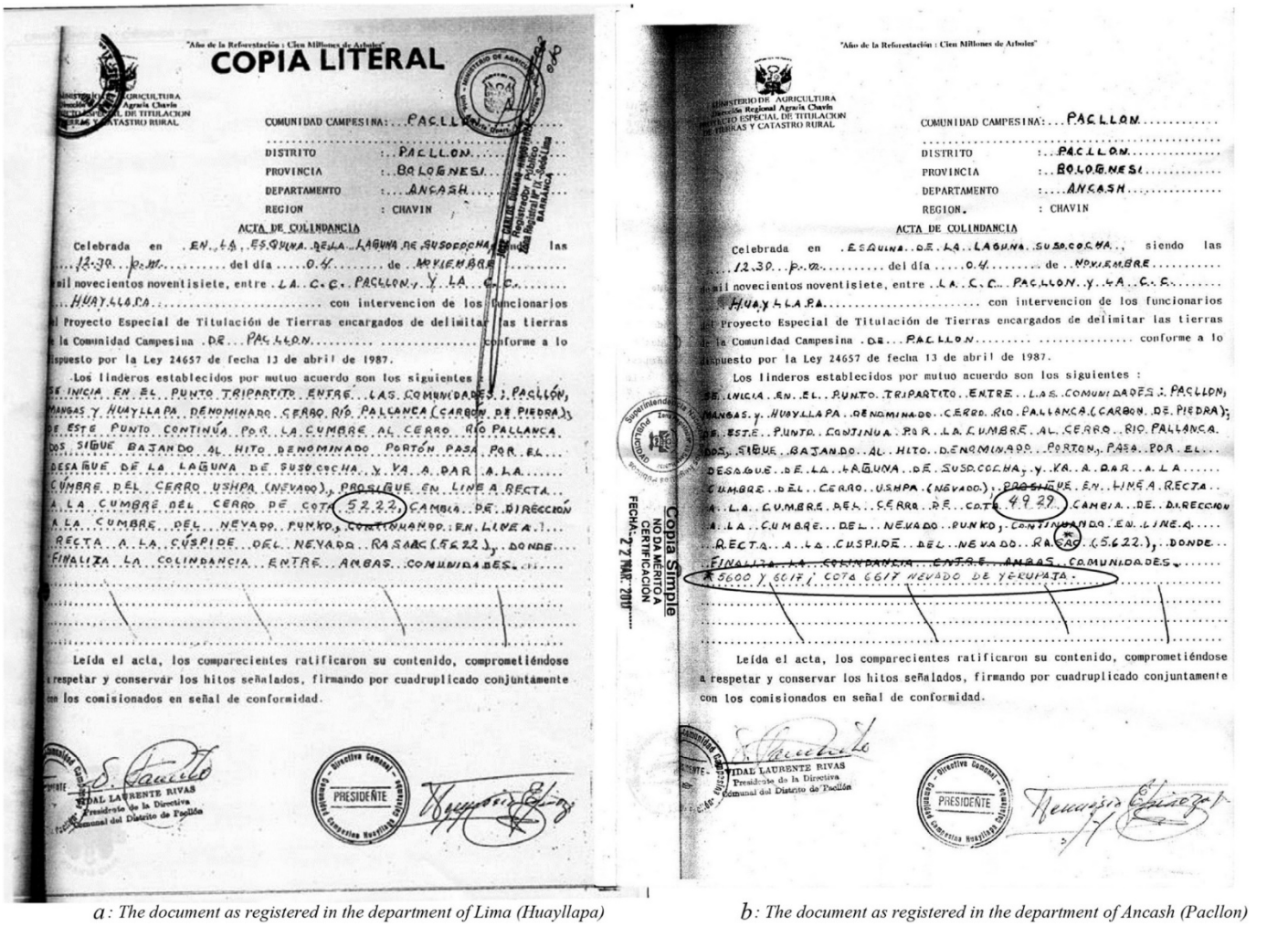
[7] Anonymous interview from the fall of 2011.

Table 4
Zoning results by area (ha) and percentage summarized by zone type and how mining concessions impacted the zoning results.

Zone Category	Total w/o concessions ha (%)	Total with concessions ha (%)	CHRZ w/o concessions ha (%)	CHRZ with concessions ha (%)
Indirect use	58293 (43%)	41175 (30%)	38515 (57%)	31506 (47%)
Strict protection	23510 (17%)	14847 (11%)	16516 (24%)	13514 (20%)
Wilderness	34783(26%)	26328 (19%)	21999 (32%)	17993 (27%)
Direct use	75794 (56%)	92911 (69%)	28729 (42%)	35737 (53%)
Tourism	452 (<1%)	452 (<1%)	143 (<1%)	143 (<1%)
Cultural/historical	188 (<1%)	188 (<1%)	14 (<1%)	14 (<1%)
Special Use 1	54336 (40%)	71453 (53%)	22987 (34%)	29996 (44%)
Special Use 2	20818 (15%)	20819 (15%)	5584 (8%)	5584 (8%)
Transitory	1064 (<1%)	1064 (<1%)	456 (<1%)	456 (<1%)
Restoration	1064 (<1%)	1064 (<1%)	456 (<1%)	456 (<1%)
TOTAL	135150 (100%)	135150 (100%)	67700 (100%)	67700 (100%)

process is known as a *saneamiento* (cleansing) of the title and is one of the identified preconditions for the *ordenamiento territorial* and zonificacion ecol ogica econ omica initiatives. What remains to be seen is whether the identification of the errors will lead to actual rectification of the errors in the registered cadastral database. The ZEE process is not housed in the same government agency as the title cleansing process and the discovery and initial rectification from this zoning exercise must now go to the local offices of the Ministry of Agriculture to correct the title. How and when this will take place is not yet clear due to the reorganization of the rural titling process in 2008 and 2011 (see above).

The purpose of this article is to evaluate the outcomes of a participatory conservation zoning project undertaken in a



a: The document as registered in the department of Lima (Huayllapa) *b: The document as registered in the department of Ancash (Pacllon)*

Fig. 5. The two registered copies of the transcribed oral description of the property line between Pacllon and Huayllapa.

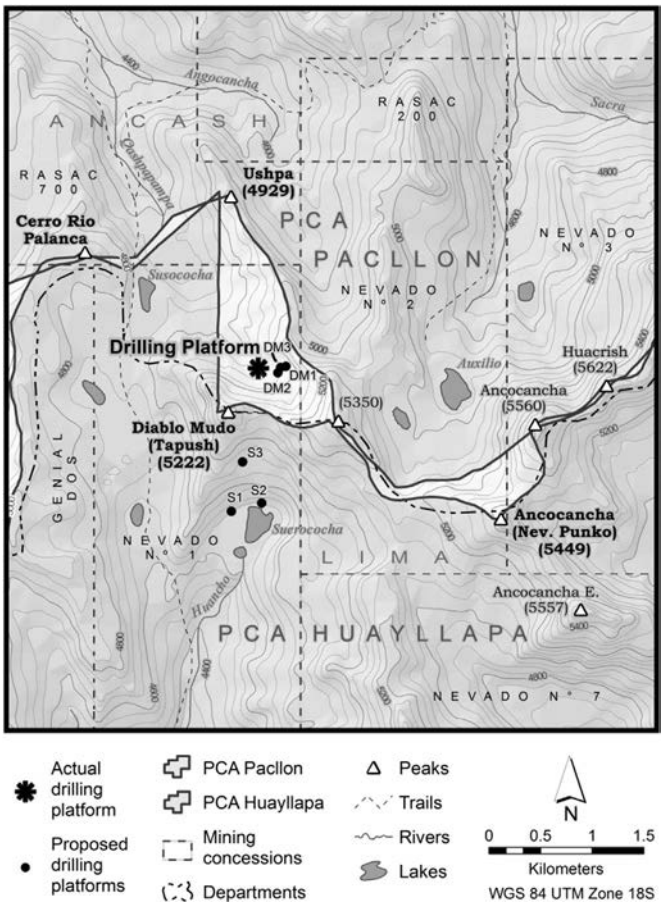


Fig. 6. The titling error discovered between Pacllon and Huayllapa; the drilling platform for the Diablo Mudo exploration project lies in the center of the untitled land in an uncanny coincidence. Sources: IGN 1:100,000 sheets 21i,21j (1999), Conservation Areas e SERNANP (2008), Mining Concessions e INGEMETT (2011), Drilling Platforms e Ficha Resumen de Proyecto Diablo Mudo (no date), gps ground truth in May 2011, Details e PETT sheet 21j III NO (1975).

mineral resource rich zone in the Andes of central Peru. While this work was perhaps not counter mapping (cf Harris & Hazen, 2006; Hodgson & Schroeder, 2002), it involved many elements of participatory research and community-based mapping with a broad goal to empower community-based conservation and planning. This goal was shared by the communities themselves, SERNANP, and other actors in the project planning stage, yet it is likely that this hopeful goal was not envisioned equally by all involved. Indeed, many dilemmas exist when a process such as that described is undertaken, and as the work progressed the team encountered almost every classic problem identified in prior participatory research. Certain community members were empowered while others did not receive this benefit. In some cases conflicts external to the communities were diminished or clarified yet at the same time several conflicts within the communities either emerged or were exasperated (cf. Bury & Norris, 2013). Sharp lines were visible between gender and age throughout the process. Boundaries proved difficult to explain in the context of multiple-use landscapes that are locally understood as "overlapping patchworks" (Zimmerer, 1999) of uses and usufruct rights. Dissimilarities between the state's preferred conservation management vision and local versions of natural resource governance were mostly incommensurable. And finally, measuring and evaluating change in community land-use management and resource governance based on factors other than the maps produced is difficult and may only show results after several years of continued work.

At the same time two communities are working towards the tangible benefit of registering their land titles, two communities have avoided a potential boundary conflict, one mine has retired (for the time being), and all of the participating communities are now aware of sub-surface mineral concessions beneath their territory. Perhaps most important, but also quite intangible, there is an increase in dialog between the communities of the Cordillera Huayhaush and SERNANP. Indeed, the entire process was successful in building and strengthening two specific conversations; all of the communities recognized as private conservation areas want SERNANP's technical help and advice with their PCAs and all of the communities who cannot be recognized as PCAs due to lack of property titles want SERNANP's presence as a means to slow the increasing mining activity in the area. These observations emphasize the importance of process over product in any 'participatory' mapping exercise (Flavelle, 1994).

Conclusion

There is a long standing lack of trust between Andean communities and the Peruvian state. This situation has many historical and contingent factors. The uncertain validity of land titles that were issued by PETT, the apparent certainty of the sub-surface concession database and encroaching mineral development, and a constellation of government agencies emitting mixed messages only make the lack of trust worse. For local residents the errors found in the official cadaster map for community held titles in the region are alarming as is the encroachment of sub-surface concessions. The zoning effort partially addressed this lack of trust through a direct collaboration between sympathetic government officials in SERNANP and the communities of the Cordillera Huayhuash and has thus constructed an initial bridge between these actors. The process of mutual discovery and sharing of knowledge about the extractive industry and the recent institutional reforms was powerful (cf.Smith, 2011). The maps made visible the communities presence in spaces that were previously "empty" and therefor "unused." In some cases the maps showed conflict with recent concessions for sub-surface mineral resources. In this context dialog has opened between novel private conservation institutions and current land-use management within the communities. Directions for future collaborations include the creation of partnerships to improve pasture and water management, the creation of mechanisms to make legal advice and consultation accessible for the resolution of territorial conflicts, and the transformation of the zoning work into a truly participatory exercise in which land-use categories are defined using local criteria (cf. Velazquez et al., 2009; Zimmerer, 2000). These possibilities will depend ultimately on leadership and the role of the "spatial intellectual"—somewhat like Gramsci's role of the intellectual (2005 [1971])—in the relations between state and civil society. This role can make possible bridges that span distinct knowledge systems, differing epistemic communities, and divisions such as rural and urban.

Yet several underlying questions remain. Will the communities gain greater territorial control through this zoning effort? How will their internal institutions of land management and governance change due to this process, if at all? Has the mapping project changed the way the communities represent themselves to the state? Future research should be encouraged to answer these questions. This call constitutes a larger project to leverage participatory research to assist marginalized people in the technical details of defending their territory. It is clear that

"[p]articipatory methods cannot guarantee socially just sustainable development," yet "[t]hey can facilitate democratic or self-determined programs to protect, create, and maintain sustainable livelihoods and living landscapes for a multiplicity of unfolding futures." (Rocheleau, 1994, p. 18). It is these ideals of decentralized participatory democracy for a sustainable future, *much like those of neoliberal reform*, that make participatory and action-oriented mapping methodologies powerfully attractive. Indeed, all critics of participatory mapping methodologies temper their observations with the acknowledgment of the value of, and need to continue with, participatory and action-oriented research programs. It would seem that in certain contexts, under certain conditions, and with mindful awareness of all the potential problems, participatory research that uses mapping as one of its tools can help build legitimate institutions that recognize the rights of people previously ignored or not included in the state's vision.

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