

Land use planning and regulation in and around protected areas: a study of legal frameworks, best practices and capacity building needs in Mexico and Central America¹

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ABSTRACT

We gathered national level data in six Mesoamerican countries (Mexico, Guatemala, Honduras, Nicaragua, Costa Rica and Panama) and for 15 individual protected areas in these countries. Using focus groups with participatory activities (mapping, pile sorts etc.), targeted interviews, site visits, expert observation and document review, we gathered data first on the national legal frameworks for governance and land use decision making and later analyzed the land use and decision processes

actually being used around fifteen protected areas in these countries. We used cross-case analysis to describe and compare the best cross-boundary land use decision practices being used within and adjacent to PAs by governments, NGOs, and communities. We then describe the obstacles to expanding the use of best practices and innovative techniques, and suggest capacity building activities that may overcome them. Among the mechanisms being utilized in the study region to foster compatible land use and stewardship around PAs are creation of permanent local planning/environmental committees; a more decentralized development review process involving PA managers; preparation of municipal (city/county) master plans, zoning and subdivision regulations; legislation and performance criteria for buffer zones; improved oversight and decentralization of mandatory environmental assessments; intergovernmental agreements that pool resources for conservation planning; and creation of watchdog and advisory NGOs and government oversight mechanisms to monitor implementation of plans and regulations. Other innovative techniques used to buffer or connect PAs in the countries and PAs studied include conservation easements; environmental services payments to private landowners; use of development fees and project mitigation measures; purchase or transfer of development rights; creation of private and municipal protected areas; technical and financial assistance programs for stabilizing and diversifying land use in buffer zones; land tenure/resettle-

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ment programs, and incentives promoting the establishment of conservation corridors linking parks and preserves.

We found considerable variation in the degree to which local authorities and PA managers are utilizing the expanded powers that new national laws have given them for integrated land conservation and planning.

Keywords: protected areas planning, Mesoamerica protected areas; capacity building; protected areas decision making, buffer zones

INTRODUCTION

In developing countries, the current conservation era is characterized in part by many internal and external land use threats to protected areas (Dudley, Hockings & Stolton, 2003), the decentralization³ of functions traditionally carried out by central governments, (Wycoff-Baird *et al.*, 2000; Agrawal, 2001; Ribot, 1999) as well as changing perceptions regarding the roles of protected areas (PAs) in the landscape (Phillips, 2003, 1998; Hales, 1989). As local governments and civil society become increasingly involved in land use decision making, we propose that this moment in history presents an important and unique opportunity to integrate the goals of protected area management and local land use planning. The elicitation study that follows explores that proposal in six Mesoamerican countries. Though counties in Mexico and Central America are smaller and more densely populated than Brazil and other South American Countries, many issues will be similar and worthy of comparison.

The intensification of land use near PAs in the Americas: Intensifying land use near a protected area's boundary (or corridor) has the effect of sharpening ecological and social gra-

dients, (Reynolds & Schonewald, 1998; Schonewald-Cox, 1988, 1992) thereby reducing the area's effective size and the experience opportunities it offers. As land is cleared, divided and developed, the normal cross-boundary movement of wildlife, plants, natural disturbances, hydrological functions and energy flows are frequently disrupted. In the United States, land values have increased next to PAs. More compatible ranches and farms providing a relatively porous boundaries and shallow ecological gradients (Knight *et al.*, 1995) are being sold and local governments have approved the subdivision and development of hundreds of thousands of properties adjacent to those protected areas. Such changes typically result in many new roads, fences, structures, artificial lighting, noise, disturbed areas, erosion, impacts to air and water quality, altered vegetative communities, and the introduction of exotic and generalist species and domestic animals that displace endemic or native wildlife (Knight *et al.*, 1998; Glick, 1998; Glick & Alexander, 2000). Protected area managers in the US are now forced to expend a frightening amount of their resources controlling fire, insects, disease and wildlife (and other natural phenomenon) that threaten adjacent private properties. The responsibility for most land use decisions in the US was decentralized and given to local (city and county) governments in 1928, (US Dept. of Commerce, 1928) before urban sprawl, or exurban development near protected public lands were issues of concern. As such, land use decision structures and processes evolved with little collaboration between PA managers and local government decision-makers. Some efforts are being made to change this (Wallace, 2002, 2001) but high land values and the "property rights" movement mean that costly economic incentives rather than the inclusion of conservation objectives within planning or land use regulations must now be used to mitigate development pressures near PAs.

Land use next to protected areas is intensifying world-wide where no one thought it would. It often arrives with the agricultural

³ Decentralization here refers to a country's system of governance and not the decentralization of protected area management

frontier (Sherbinin & Freudenberger, 1998) and later intensifies with the advent of tourism and second home development (Stonich, 1998; Theobald and Hobbs, 2002). Likewise, many PAs in Mexico and Central America are superimposed on communities and contain considerable private or communal land from the beginning. Even in countries with buffer zone regulations, adjacent land use decisions are not the exclusive domain of the PA managers⁴ but shared with local governments. As elsewhere, incompatible land uses have the potential to undermine the functioning and value of PAs and to create enormous financial and administrative burdens on them.

The motivation for the study: Over the years the authors have witnessed a variety of integrated conservation and rural development projects (ICDPs) near PAs in Mesoamerica go through different stages. Land titling, agricultural diversification and marketing, environmental education, community based ecotourism, and other similar projects were thought for many years to be the best way to stabilize encroachment into PAs, provide options for residents asked to forego the use of resources, and to win support for conservation goals. While these have been important projects to which PA managers have given considerable effort, participation is usually voluntary, limited to part of the population, and may only temporarily stabilize land use next to protected areas (Christensen, 2004; Wood, Stedman-Edwards, & Mang, 2000; Barborak, 1998; Hough, 1988; Oates, 1995). Such projects often have the unintended effect of making rural areas more attractive for outside investors (Tosun, 2000; Western, Wright & Strum, 1994) intent on changing somewhat compatible extensive agricultural land uses (agroforestry, some grazing systems, etc.) to more intensive and less compatible land uses. This stage of development is not conceived in the cooperatives and community associations formed by

ICDPs or community based ecotourism projects. In fact, those who participated in land titling programs and agreed to manage those lands with conservation objectives may quickly sell out when an attractive offer arrives. The explanation is that without access to a legally binding local government land tenure system and a land use decision process where community members or their representatives with input from PA managers can make land use decisions based on their vision for the future, the intensification of land use next to PAs is likely to become increasingly problematic for managers and local residents (Wallace, 2004, Tosun, 2000; Clark, 2000; Murphee, 1994).

For some time, the authors have wanted to systematically look at adjacent land uses and land use decision structures next to protected areas in Mexico and Central America and document land use changes near PAs. We wanted to see if protected area goals might be integrated with local land use planning as the responsibility for such planning and decision making is passed to local government and new land use decision structures are developed. We propose that it might be possible to avoid some of the obstacles to cross-boundary collaboration that are now present in countries that decentralized before concepts like environmental services, ecotourism, biodiversity protection, and ecosystem management began to re-define the role of protected areas in society (Phillips, 2003). We wanted to see what kinds of cross-boundary collaboration and adjacent land conservation mechanisms were already being used or could potentially be used in Mesoamerica. Finally, we were interested in what capacity building might be needed to address adjacent land use issues.

METHODS

The sampling frame: Team members collected data between March and July of 2002. We chose an area where we had worked and had a network of contacts. Six countries-Mexico,

⁴ "Managers" may be from national, state, NGO, tribal, private or other designated protected areas

Guatemala, Nicaragua, Honduras, Costa Rica and Panama-were included. As suggested by Brocket (1998) and Borrini-Feyerabend, in each country we gathered information about the national legal framework that determines how land use decisions are made, paying particular attention to how this was being affected by decentralization. We then chose three protected areas in each country where we hoped to gather information on adjacent land use and the perceptions of PA managers,

NGOs, and local government officials. In each country we tried to include one well-established area (i.e. consolidated national park or world heritage site) and one newer PA in the early stages of development. Where possible we included a third area having some unique combination of features (i.e. community, indigenous, private management, cultural resources, and corridor functions). A list of these protected areas and their characteristics may be found in **TABLE 1**.

Table 1: Protected areas included in the study and their basic characteristics

	Protected Area	Year Created ¹	Size in hectares	IUCN category ²	Institutional arrangements
México	Sian Kaan BR	1986/1994/ 1998	1.300.000/ 652.192 core	V	Directly managed by the National Protected Areas Commission with strong support from the NGO Amigos de Sian Kaan
	Monarca BR	1980/1986/ 2000	56.259/ 13.551 core	V	Directly managed by the National Protected Areas Commission with strong support through an endowment fund established by WWF Mexico and the Mexican Nature Conservation Fund
	Pinacate/Gran Altar Biosphere Reserve	1993	714.557	V	Directly managed by the National Protected Areas Commission Guatemala
Guatemala	Uaxactun Multiple Use Zone/within Maya Biosphere Reserve	1990	83.558	VI	The community of Uaxactun has a thirty year concession for natural resource management with the National Protected Areas Council
	Tikal NP/within Maya Biosphere Reserve	1955	57.600	II	Directly managed by IDAEH, the Guatemalan Institute for Anthropology and History
Honduras	Copan NM/WHS	1984	64 core	III	Directly managed by IHAH, the Honduran Institute for Anthropology and History
	Lake Yojoa MUA	1971/ 1987	38.000	II/V	One national park partially within the watershed is comanaged by an NGO through an agreement with the Honduran Forest Administration; the entire watershed receives technical support from an NGO created by a commonwealth of municipal governments in the surrounding region

Continues

Continuation Table 1

	Protected Area	Year Created ¹	Size in hectares	IUCN category ²	Institutional arrangements
Nicaragua	La Tigra NP	1952/1971/ 1980	7571 núcleo	II	Co-managed through an act of the Honduran Congress by the NGO Amitigra
	Chocoyero NR		200 aprox.	II	Co-managed through a ten year cooperative agreement with the Ministry of the Environment by the NGO CENADE
	Bosawas BR	1971/1991/ 2001	1.900.000 (includes 6 core zones)	II/V	Managed by a legally constituted national commission with representation of six municipalities, two indigenous tribes, and several ministries and coordinated by the natural resources ministry (MARENA).
Costa Rica	Manuel Antonio NP	1972/1981	700 ha	II	Directly managed by the Ministry of Natural Resources
	Gandoca/Manzanillo WR	1985		V	Directly managed by the Ministry of Natural Resources
	Hacienda Barú WR	1995	330	IV	Privately owned and managed; conservation easement on property
Panamá	Soberania NP	1980	22.104	II	Directly managed by the National Environmental Authority
	Bastimentos Marine NP	1988	13.226	II	Directly managed by the National Environmental Authority

¹ Multiple years indicate creation of area and subsequent hectare increases.

² IUCN categories are approximations, not official designations

Data collection: In each country, local NGOs, environmental law groups, government agencies and Wildlife Conservation Society staff assisted us with data gathering and logistics. To understand the national legal framework, we reviewed existing laws and policies, interviewed key contacts, held focus group meetings with PA, natural resource, and legal professionals, and collected relevant documents. We looked to see if there was enabling legislation for buffer zones near protected areas or legal mandates for creation of protected area management committees or other mechanisms that might promote cross-boundary collaboration. We wanted to understand how land use plans

and decisions were supposed to be made (i.e. who is legally responsible for reviewing and approving land division and development proposals) and to what degree protected area managers currently had the ability to inform or participate in planning or land use decisions affecting their areas. We needed to know which decisions were being decentralized and which still occurred at the state or national level. Finally, we wanted to know which land conservation techniques could be used (easements, environment service payments, private reserves, transfer of development rights, etc.) in each country in order to reduce adjacent land impacts.

For each of the individual PA case studies, we again used interviews, focus groups, and document review, but added field trips and expert observation (the 3 team members have more than 70 years of combined experience in the region) as research tools (Yin, 1994). During each exercise, we asked participants to: A) Map land use changes near their protected areas; B) Explain from their perspective how land use decisions were currently made using a flow diagram of the process; and C) Do a pile sort where they rated the likelihood that seven typical components of the land use decision process (local master plan, land use code, planning commission, due process etc.) would be established locally. Interviews and focus group activities were audio recorded and notes were taken, and a code was developed for referencing sources. Questions probed: if there was a map in the PA showing adjacent land configurations and tenure?; was anyone assigned to follow and be involved in local land use decisions?; did the PA currently attempt to influence local land use planning or decisions?; how might decentralization affect land use decisions near their area?; and did PA or NGO staff have a defensive strategy in mind?

Data analysis: Each of the protected areas visited constitutes a case study that could be presented on its own; however, in this study we used cross-case analysis looking for patterns and linkages within and between countries and for obstacles, best practices and lessons learned. We attempted to judge levels of awareness and concern, and listed the perceived obstacles to cross-boundary collaboration on land use decisions. These helped us to understand capacity building needs. Case study analysis can also test for hypothesized variations (Yin, 1994). Prior to beginning the study, we proposed that certain factors might either faci-

litate or limit the implementation of a decentralized land use decision process and the involvement of protected area managers. This checklist was used during data analysis.

FINDINGS

National legal framework affecting land use near protected areas

Centralized and decentralized review of development proposals: Most non-centralized governmental functions in the countries studied are carried out by municipalities⁵, and their role has been strengthened by recent constitutional reform and decentralization legislation. It appears, however, that even with expansion of power given to local government, that national agencies and regional planning will continue to have a stronger hand in land use decisions than is the case in countries that have long been decentralized. We found, however, that national natural resource management and conservation agencies have been given a partial role in the centralized decision process and even have veto power over land use changes within buffer zones in Mexico and Guatemala. Such reviews were reported to be sporadic and frequently circumvented by special interests however. When reviews occur (mostly for larger projects), municipalities that lack the capability or the "real authority" for proposal review have typically forwarded them to national level public works, health, transportation, tourism but also, natural resource agencies (including PA managers) for review. Where environmental assessments (EIAs) are required, PA managers are frequently consulted on proposals near protected areas. Once these reviews and/or assessments are completed, municipalities typically provide administrative approval (often rubber stamp) and issue a building permit.

⁵ Municipio" or municipality in Spanish denotes a sub-region equivalent to a county or township in some countries. Several countries like Mexico also have "Ejidos" and/or "tierras comunales" - lands held collectively by some (ejidos) or by all (tierras comunales) community members. Although these lands are subsumed by municipalities, they each have some long-decentralized land use decision powers of their own that were given at the time of their

Fortunately, most study participants felt that the referral of development proposals to conservation professionals would be transferable to the local government level as decentralization evolves. In Nicaragua, for example, the General Environmental Law directs the National Territorial Institute (INETER) to work with the Natural Resources Ministry (MARENA) to develop land use planning guidelines for municipalities as part of the preparation for the decentralization of the land use decision process. A variety of legal mechanisms (TABLE 2) affect land use and the ability of PA managers to influence those uses near the PAs studied.

Use of Environmental Impact Assessments:

All countries studied have national environmental laws and/or other legislation that requires EIAs for public or private proposals above a certain cost. Because the review process at the municipal level is still weak, EIAs have been a widely utilized method of controlling changes in land use affecting PAs in the countries studied. A common complaint was that during a centralized EIA, local officials have less influence as the assessments are usually carried out by a consultant hired by the developer and reviewed by distant central government officials without site visits or adequate consultation with local government or stakeholders. Manipulation of the decision process was cited as a common occurrence. Only in Honduras had the Environment Ministry passed responsibility for EIA oversight to two larger municipalities, with environmental departments. We found meaningful public input limited, as in Nicaragua where public review only occurs for three days at certain offices and only executive summaries are provided. Legislation in three of the six countries now requires governments to publicly disseminate EIA findings and make sure that mitigation measures are implemented. We found compliance with such laws to be limited.

Legal requirements, definitions and guidelines for buffer zones and corridors: While four of the six countries studied now require

and two encourage the creation of buffer zones for PAs, clear jurisdictional guidelines and regulations regarding land use are often lacking. The omnibus bill for protecting Honduran cloud forests mandates the creation of buffer zones around 37 cloud forest parks and reserves, about half the total system. Eighteen years after the passage of that bill (1987), however, the majority of these PAs still do not have their final core zone and buffer zone limits defined by specific decrees. Although there are agreements among all Mesoamerican nations to promote a regional corridor network, and tens of millions of dollars are being invested in national and regional biological corridor projects in the region, clear guidelines on what constitutes a corridor and how it should be created and managed are still lacking (something that is true in nearly all countries).

Inter-institutional advisory councils and mandates for cross-boundary collaboration for PAs:

Policy documents guiding PA planning in the Mesoamerican region nearly always mandate stakeholder participation, open meetings, and inter-institutional plan review. This was previously a top-down exercise done by central office technicians or consultants. In Mexico national environmental legislation calls for creation of standing local advisory councils for PAs and many now exist. Similar local and regional advisory councils are now being established for many Honduran PAs and have recently become more common in Costa Rica. Such councils provide a way for PAs to take a leadership role on cross-boundary land use issues, even where local governments lack the experience, political will, or resources to establish municipal planning or environmental commissions. In several cases studied, these advisory groups have created consultation mechanisms that could evolve into legally binding land use decision procedures.

Requirement for municipal land use planning and regulation:

Except for the Mexican states and two autonomous regions in eastern Nicaragua, regional political subdivisi-

Table 2: National legal frameworks affecting how protected areas address adjacent land use issues.

National legal frameworks	Countries					
	Mexico	Guatemala	Honduras	Nicaragua	Costa Rica	Panama
EIAs required for larger development proposals	Yes	Yes	Yes	Yes	Yes	Yes
Legal requirement for buffer zones	Yes	Yes	Yes	Yes	-	-
Inter-institutional advisory or environmental councils for PAs	-	-	Yes	Yes	-	-
Mandatory cross-boundary consultation mechanisms	Yes	Yes	-	-	-	-
Requirement for municipal land use planning	Sim	Yes	Partial	Yes	Yes	Yes
Support agencies for strengthening municipal governance	-	Yes	Yes	Yes	Yes	Yes
Bio-regional (BRP)/ regional planning (RP) to guide local govts	PBR	PR	-	PBR	PBR	-
Commonwealths or multi-municipal councils	-	-	Sim	-	-	-
Legislation enabling private (P) and municipal reserves (M) or forest concessions(FC)	-	M, CF	-	M,P	M,P	-
Conservation easements (CE) or transfer of development rights (TDR) legally enabled	TDU CE	Contractual CE	Contractual CE	Contractual CE	CE w land trust ¹	-
National environmental service payment programs	-	-	-	-	Yes	-
Active environmental law groups	Yes	Yes	Yes	Yes	Yes	Yes
Location of land registry	State	Municipal	Municipal	Municipal	Municipal	National

ons (i.e. states, departments or provinces) in Central America do not have a prominent governmental role. They denote geographical regions, and may have a governor, house some regional offices for national agencies, or be electoral districts; but they do not deal with land use directly. Land use planning and decision making, like most de-centralizing governmental functions, is carried out by municipalities. We found a slow but increasing emphasis on developing local master plans (often called *planes reguladores*), zoning, and procedures for local development review-though there are still few examples of these in rural towns near most protected areas. This process usually begins with urban development plans in larger towns and is slowly expanded to include entire municipalities as local planning capabilities improve. The updated municipal laws in most nations studied create local planning and development and/or environmental advisory boards that are named by local mayors or municipal councils. Protected area managers and staff can (but are not usually required to) participate. Municipal councils frequently retain the quasi-judicial functions of a planning commission, but such commissions can now legally emerge as local governments and advisory groups mature. Improved land registration systems (below) are strengthening the role and interest of local governments in land use planning and regulation. New general environmental laws and legislation guiding PA management now encourage cross-boundary planning and coordination with other national agencies, local governments, and stakeholders. In Mexico and Guatemala, PA managers have veto power over development proposals in a PA buffer zone, although this power is often not exercised.

Decentralization of cadastre systems and revenue streams: Land and title registry, which has long been managed at the national level, is slowly being transferred to local governments in Costa Rica, Honduras, Nicaragua and Guatemala. In Mexico it remains at the state level, and Panama retains such

records at the national level. Communal, indigenous and “ejido” (Mexico) lands add to the diversity of land tenure in most of Mesoamerica. Concomitantly, control over revenue from land taxes and a limited number of other taxes is being given to local governments, which have previously been dependent on transfer payments from central government treasuries. Local control of revenue streams is still at lower levels than constitutionally mandated. Major investments, often supported by multi and bilateral aid agencies, are being made to create the capacity for local governments to assume these functions. Assistance with geographic information systems, land surveys, titling, replacement of outmoded land registration systems, and staff training has been provided to help cash-starved local governments determine the land values and real estate taxes that will fund local government services including land use planning. Focus group participants noted that inadequate revenue leads local governments to promote or at least permit unsustainable development projects. Land titling and registration was seen by participants as an essential first step for stabilizing land use near some of the PAs studied. Besides reducing encroachment, it provides managers with improved information regarding the ownership of inholdings, and land in buffer zones, and corridors. Unfortunately, we found no titling programs that placed title restrictions or defined compatible uses on lands next to PAs at the time of titling.

Support agencies for municipality strengthening: Most countries have laws creating a central government agency charged with providing technical assistance to municipalities. We found, however, that there was confusion among those interviewed regarding which agencies were responsible for this. In addition, a few municipalities have themselves created national and regional umbrella groups to improve their planning capacity and defend their interests. These groups are helping train local government staff, provide technical assistance, develop guidelines and procedural manuals, and assist in obtaining access to in-

ternational funding for municipal and regional planning and capacity building.

Regional planning and management for multiple municipalities: Legislation in most countries studied now also permits groups of municipalities to form *mancomunidades* (commonwealths or municipal councils similar to councils of government or COGS in the US) where economies of scale or the shared problems make such cooperation appropriate. In Honduras, the municipalities surrounding the Lake Yojoa basin, a multiple use conservation area which includes parts of two national parks, have formed such a group, called AMUPROLAGO. This group has a co-management agreement with the government forestry corporation for management of the watershed. This is funded by a share of land taxes from each member municipality. In Mexico, the new national environmental law (LEEPA) calls for the development of bio-regional land use plans to guide the municipal planning process, including guidelines for compatible land use in PA buffer zones. Managers may legally participate in this landscape level planning. Sixty percent of the plans in Mexico have been completed to date but only 10% are functioning well.

Legislation regarding private and municipal reserves and forest concessions: Recent reforms in municipal laws in most of the countries studied either directly or indirectly provide municipalities with the power to create municipal protected areas and to work actively to conserve and improve the environment within their jurisdictions. While many of the wealthier and more populated municipalities have created municipal planning and environmental departments, few have yet to create municipal parks and reserves systems. Through the initiative of a number of individuals, corporations, and NGOs, the number and total size of private protected areas in the countries studied has expanded rapidly in recent years. Costa Rica and Guatemala specifically authorize creation of private reserves, some of which can qualify for inclusion in the national PA

systems. Other nations provide tax exemptions, environmental service and trail payments, or law enforcement assistance in dealing with squatters to landowners that voluntarily conserve their properties. National associations of private reserves have been established in several nations. Many of these private PAs are located adjacent to or in buffer zones and conservation corridors around and between designated PAs, and help to reduce their fragmentation and isolation. Few private reserves have initiated a plan for perpetual protection however. Guatemala passed legislation enabling the creation of forest concessions (25 years and renewable if performance criteria are met) which are granted to local community groups that agree to do land use planning and steward forest resources. Such plans call for community site planning, but have thus far focused on resource utilization and not the impacts caused by the settlements themselves.

Conservation easements and transferable development rights: In all the countries studied except Panama, we found that modified conservation easements are allowed, but usually through recent court interpretations of existing (contractual) civil code provisions. These interpretations are not as flexible for conservation purposes as the enabling legislation for easements in the US for example. In Guatemala, contractual easements are not permanent, which reduces their usefulness as a conservation tool. In Honduras, the first conservation easements were recently developed in the Lake Yojoa watershed to protect an important micro-watershed. Only in Costa Rica are easements being used together with environmental service payments to support private reserves. In Mexico we found innovative legislation being developed that would make the purchase and transfer of development rights from areas needing protection to areas designated for more intensive development possible.

National environmental service payment programs: There is considerable interest in how to internalize the costs of conservation,

using mechanisms for compensating both private landowners and PAs for the environmental services like carbon sequestration or watershed protection. Costa Rica has become a leader in such efforts. Using a combination of debt for carbon swaps, a fuel tax, and international donations, the government has established an environmental service payment system to compensate private landowners (including conservation NGOs) for maintenance or restoration of forest cover and sound land stewardship practices. Since demand for the program exceeds available funds, the regional conservation areas in Costa Rica each prioritize payments based in large part on the buffering and corridor functions of eligible private parcels.

Environmental law groups: In all the countries studied, national environmental law NGOs have recently been established. Rather than emphasizing litigation, these groups tend to assist with the creation or improvement of legislative frameworks and capacity building for conservation. They have formed regional and extra-regional alliances to train judges, law enforcement and PA personnel, law students, government agencies, and citizen groups regarding best practices and minimum standards for environmental legislation (Gundling et al, 1995). They have

also published and disseminated easy-to-read documents on environmental laws, conservation easements, and coastal zone legislation (Paniagua, Alfaro & Villalobos, 1996; Ferroukhi, Wo Ching & Aguilar, 2001), and have provided assistance to NGOs, private landowners, and municipalities on conservation planning.

Case studies: Threats from adjacent land use and attempts to address them in 15 protected areas

Once national legal frameworks were better understood, we wanted to know what was actually happening on the ground, or how PA managers were dealing with adjacent land use decisions. Numerous national level participants forewarned us that we would find the body of law to be ahead of actual practice. Although this article will only provide an abbreviated account of the case studies, **TABLE 3** summarizes the adjacent land use impacts described and mapped by case study participants in each case study area. Importantly, **TABLE 4** summarizes many of the salient findings from the managers in the 15 protected area case studies regarding the variety of “mechanisms” they were using to address incompatible land uses near protected areas and merits careful scrutiny.

Table 3: Type and frequency of impacts from inappropriate land uses within or adjacent to 15 Mesoamerican PA's or designated corridors—as described by case study participants (MX–Mexico, GU–Guatemala, PM–Panama, HO–Honduras, NI–Nicaragua and CR–Costa Rica)

Impacts	Protected areas affected	Frequency
Unplanned tourism development	Tikal (GU); Copan (HO); Chocoyero (NI), Manuel Antonio (CR); Bastimentos (PM); Gandoca-Manzanillo (CR); Sian Kaan (MX); Pinacate (MX)	8
Proliferation of vacation homes	Yojoa (HO); Bastimentos (PM); Chocoyero (NI); Manuel Antonio (CR); Gandoca-Manzanillo (CR); Sian Kaan (MX); Pinacate (MX)	7
Intensifying agriculture encroachment by squatters or intensification on private property	Uaxactun (GU), Bosawas (NI); Bastimentos (PM); Manuel Antonio (CR); Soberania (PM)	6

Continues

Continuation Table 3

Impacts	Protected areas affected	Frequency
Unplanned or inappropriate subdivision of land, often purchased by outsiders and foreigners	Tikal (GU); Gandoca-Manzanillo (CR); Sian Kaan (MX); Pinacate (MX)	4
Approaching urbanization	Copan (HO); Pinacate (MX); Manuel Antonio (CR); Sian Kaan (MX)	4
Illegal, unplanned or poorly designed or located roads	Copan (HO); Yojoa (HO); Baru (MX)	3
Clearing of forest for logging, grazing	Uaxactun (GU); Yojoa (NI); Bosawas (NI); Manuel Antonio (CR)	3
Unlicensed vendors with makeshift stands	Yojoa (HO); Tikal (GU); Pinacate (MX)	3
Airports and overflights, illegal landings	Uaxactun (GU); Copan (HO); Pinacate (MX)	3
Runoff from agrochemicals and concentrated animal wastes affecting rivers, groundwater or costal zone	Manuel Antonio (CR); Soberania (PM); Gandoca-Manzanillo (CR)	3
Solid waste from nearby populations accumulating on beaches, shores	Baru (MX); Bastimentos (PM); Gandoca-Manzanillo (CR)	3
Mangrove, or coastal dune destruction	Manuel Antonio (CR); Bastimentos (PM); Sian Kaan (MX)	3
Road kill of wildlife from adjacent roads	Baru (MX); Pinacate (MX); Sian Kaan (MX)	3
Billboards and advertising	Tikal (GU); Pinacate (MX); Sian Kaan (MX)	3
Trespassing, drug cultivation and smuggling emanating from adjacent private lands, resorts	Pinacate (MX); Bastimentos (PM); Bosawas (NI)	3
Plans for an international highway through the Peten	Uaxactun (GU); Tikal (GU)	2
Highly visible communication towers	Copan (HO); Pinacate (MX)	2
Mining	Bosawas (NI); Pinacate (MX)	2
Urban or industrial sewage contamination of rivers, groundwater and costal zone	Manuel Antonio (CR); Bastimentos (PM)	2
Solid waste dumping at reserve boundary	Tika (GU); Pinacate (MX)	2
Sand and gravel extraction from beaches, marine reserves and rivers	Manuel Antonio (CR); Gandoca-Manzanillo (CR)	2
Use of area by military	Uaxactun (GU)	1
Tanks, ponds, cages built for raising of exotic fish	Yojoa (HO)	1
US border causes PA to be used as crossing point - fatalities	Pinacate (MX)	1

Findings from the pile sort exercises reveal the expectations of participants regarding the likelihood that the typical components of a decentralized land use decision process would be implemented or realized in their municipalities and PAs “within the next few years”. **TABLE 5** summarizes the results of this activity. The total number of people participating in this exercise only approached 100 so the means cannot be statistically generalized. Nonetheless, two major findings and challenges emerge from those involved in the study-most of who are experts in their own right. First, although there is confidence regionally that the planning and development review and decision process will in fact be transferred to local government and

that it is very likely that PA managers will be able to participate in that process. Unfortunately, there is still limited confidence that the decentralized land use decision process will be honored by special interests or all elected officials. Secondly, there is lack of confidence that beyond master plans, a land use code with specific zoning, permitted uses and performance criteria will be developed. Since land use codes are the basis for decision making in most countries, and if followed, tend to quell abuses by decision makers, these two findings show a basic lack of confidence that the “rule of law” can prevail and point to the need to undertake considerable strengthening of civil society in all the countries studied.

Table 4: Mechanisms used in fifteen Mesoamerican protected areas to reduce the threats from adjacent land uses*

Mechanisms used	MEXICO			GUATEMALA		HONDURAS			COSTA RICA			PANAMA		NICARAGUA	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Maps/database explaining adjacent land uses and ownership near the protected area	-	X	X	X	-	X	x	X	-	x	X	x	x	-	X
Management plan (MP) directs or staff is assigned (SA) to track land use proposals on adjacent lands	-	X	PM / FD	X	-	x	X	-	x	x	X	X	x	-	-
Designated buffer zone (BZ) or coastal protection zone (CP)	ZCP/ZA	ZA	ZA	ZA	ZA	ZA	-	ZA		ZCP	ZCP	-	ZA	ZA	ZA
Established criteria for land uses in the buffer zone	x	X	X	X	x	X	-	x	-	x	-	-	X	-	X
Municipal master plan/land use code with prescribed zoning and permitted uses next to or within the PA	-	pd	x	-	-	pd	-	-	-	-	-	-	-	-	-
Local development (DC) committees, environmental committees (EC), or watershed committees (WC) that advise elected officials	cd	-	-	x	cd	X	CBH	-	-	-	-	-	-	-	-
Protected area has citizen advisory committee	-	-	X	X	-	X	X	-	x	x	X	-	x	x	X

Continues

Continuation Table 4

Mechanisms used	MEXICO			GUATEMALA		HONDURAS			COSTA RICA			PANAMA		NICARAGUA	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Bioregional (BP), regional master plan (RP), regional tourism plan (TP), or corridor plan (CP) to guide municipal plans	pb	-	PB	PB	-	PR	-	-	PR	PC	PC	-	pt	-	pr/ pt
PA staff are participating in the local planning (P) and development review (DR) process	-	-	P	P	-	x	P/ MU	-	x	-	-	-	-	-	X
Municipal PAs exist	-	-	-	-	-	-	x	-	-	-	-	-	x	-	-
Agricultural extension diversification/stabilization programs used to reduce encroachment into PA	-	X	X	X	-	-	X	X	-	X	-	X	-	X	X
Resettlement of populations living within or next to PAs	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-
Increased patrolling and enforcement of regulations prohibiting squatters in PAs	x	x	-	X	-	-	x	-	-	-	X	X	x	X	-
Land titling, registration (LT) or land concession (LC) programs that target populations within/near protected areas	-	-	TT	CT	-	-	TT	-	-	TT	-	ct	x	-	-
Perpetual (PE), contractual s (CE) or temporary (TE) conservation easement	-	-	-	-	-	ct	-	-	-	-	CP	-	-	-	-
The purchase (P) or transfer (T) of development or use rights are used to reduce the impacts of adjacent development	-	C	T	-	-	-	-	-	-	-	-	-	-	-	-
Commonwealths (C), or intergovernmental agreements (IG) are used to enhance land use decision making or buffer PAs	ai	-	AI	-	-	-	CI/AI	-	-	-	-	-	-	-	-
Financial mechanisms like endowments (E), reforestation or environmental service payments (ES), or taxes (T) are used to improve neighboring land uses or purchase inholdings	-	D	-	-	-	-	sa	-	D	SA	SA	sa	-	-	-

* Upper case letters denote that mechanism is being used; lower case letter denote sporadic use or that of the mechanism is just beginning. 1.Pinacate; 2.Monarca; 3. Sian Kaan; 4.Uaxact; 5.Tikal; 6.Copan; 7.Yojoa; 8.La Tigra; 9.Manuel Antonio; 10.Gandoca/ Manzanillo; 11.Baru; 12.Soberania; 13.Bastimentos; 14.Chocoyero; 15.Bosawas

Table 5: Feasibility of selected land use decision process components as determined by focus group participants in six countries of Mesoamerica¹

Country	Protected area/capital city	Municipal Master Plan	Municipal land use code	Municipal Planning Commission	Decentralized development Review	PA Mgr. will be able to participate	Due process will be used	Process will not be abused	Mean
México	Sian Kaan	4	4	4	4	5	4	3	4,0
	Monarca	4	4	4	4	2	4	2	3,4
	Pinacate	3	3	3	4	4	4	4	3,6
Guatemala	Uaxactun	5	2	3	3	4	3	2	3,1
	Tikal	2	2	3	2	2	1	1	1,8
	Cidade de Guatemala	4	4	4	4,5	5	5	3	4,2
Honduras	Copan	4	3	4	4	5	4	3	3,9
	Yojoa	4	4	3	5	5	4	3	4,0
	La Tigra	4	2	4	4	4	5	5	4,0
	Tegucigalpa	4	3	5	5	5	5	2	3,9
Nicarágua	Chocoyero	3	2	5	5	5	5	2	3,9
	Bosawas	3	3	5	3	2	5	1	3,1
Costa Rica	Manuel Antonio	4	3	5	5	3	5	3	4,0
	Manzanilla/Gandoca	4	3	4	4	4	4	3,5	3,8
Panamá	Soberania	4	2	3	5	4	3	2	3,3
	Bastimentos	4	3	3	5	4	3	2	3,4
	Bocas del Toro	4	4	4	5	4	3	4	4,0
Mean		3,8	3,0	3,9	4,2	4,1	3,9	2,8	-

¹ Responses were given on a five-point scale with 1 = impossible; 2 = not very likely; 3 = somewhat likely; 4 = very likely; 5 = already exists

DISCUSSION AND RECOMMENDATIONS

The potential for widely integrating best practices into land use decision structures

We encountered a diverse array of practices and projects being used to improve land use planning, regulation and stewardship in and around protected areas in all six Mesoamerican countries (TABLE 4). No single country or protected area could be said to have an integrated approach for anticipating and mitigating incompatible adjacent land uses or drawing on a full range of the techniques found either by this study or in the literature. Even in those countries with more advanced legislation, programs, and greater levels of invest-

ment in improved land use planning and management around PAs, there is at best sporadic knowledge about, confidence in and implementation of best practices—at least for the 15 case study PAs. For protected area managers to be able to influence significant adjacent land use decisions on a continuing basis requires a stable, enforceable local planning and development review process in which they can legitimately participate. During the impending and historically unique period of decentralization, managers must participate in both their own capacity building and that of civil society if cross-boundary collaboration is to become institutionalized within a trustworthy, inclusive, proximate and democratic land use decision process that incorporates local knowledge and institutions. Only

then can we expect that a more complete set of the best practices encountered will be integrated and applied consistently (Few, 2000; Borrini-Feyerabend & Buchan, 1997; Murphee, 1994; Mumme & Korzetz, 1997). It is our observation and that of others (Sundberg, 2002; Brocket, 1998) that this will be more difficult and more important for PAs that were originally designated without consultation with local communities, or in regions that have been subject to warfare, or government and/or corporate repression-as we witnessed in Guatemala's Peten and parts of Nicaragua and Panama during the study. It will also be a more complex task for land use decisions on communal or indigenous lands.

What to do as land use decision structures decentralize

There are things that managers can do while the local land use planning process matures: A) The stage can be set for cross boundary reciprocity with the creation of protected area advisory groups that allow local input on land uses and management actions within the protected area while participants simultaneously become more familiar with the PA's mission, management objectives and the myriad of issues that are present at the PA boundary or within the buffer zone. B) Managers can designate staff who will begin tracking, mapping and analyzing adjacent land uses, especially in sensitive areas where changes in the ecological gradient would be most detrimental (Wallace, 2001).

C) If not already in place, managers should be ready to participate in the development of local or regional master plans and land use codes, paying special attention to the zoning, permitted uses and development criteria that are proposed for lands in the buffer zone or adjacent with the boundary. D) Of special importance are contributions to the refinement of a more decentralized review and decision process that will institutionalize input from PA managers when changes in land use (land subdivisions or development) are proposed near protected areas and allow reviews to be

tracked. E) Managers can become familiar with the new legal frameworks, land conservation tools, best practices, and obstacles that were found during the study.

The good news for protected areas

The challenges of creating communities that regulate and control development activities via a civil society that has confidence in its own empowerment, and in a participatory, transparent and enforceable democratic decision process are considerable (Blair, 2000; Nepal, 1997) but essential for any landscape or ecosystem approach to conservation. Conservation professionals should not be expected to take the lead in improving the skills and decision structures needed by a civil society but they must help. Our findings suggest that many Mesoamerican PA managers are in a better position to participate in and influence local land use decisions than their counterparts in decentralized countries. In the United States and Canada for example, local governments became developed and very autonomous prior to the era of conservation planning (Platt, 1996). Property rights groups and high land values there make changes in zoning or land use regulations that favor protected areas difficult (Glick, 1998). In the study area, the combination of buffer zone legislation, the tradition of including PA managers in the referrals for EIAs, and the prevalence of integrated conservation and rural development programs (ICDPs) near protected areas may have the cumulative effect of giving PA managers a legitimate seat at the land use decision table. To institutionalize this potential at the local level means bolstering investments which improve local land use planning, regulation and cross-boundary stewardship capacity. This capacity building is needed nearly everywhere and must be proactive rather than reactive since it is more easily implemented before PAs and their surrounds are "discovered" and experience increases in tourism, land values, outside investors, enclaves and rapid in-migration (Tosun, 2000; Trousdale, 1999; Wallace & Pierce, 1997).

Capacity building recommendations

We encountered little investment in individual, institutional, or society-wide capacity building for sanctioned land use decision structures or decentralized governance in general. The adoption of many of the best practices encountered during the study will require moving beyond the voluntary ICD projects we did see and investing in the development of local institutions that can make and enforce legally binding decisions. (Murphee, 1994; Nepal, 1997). Target audiences for capacity building aimed at integrating PA objectives and local land use decisions should include PA professionals, municipal planning staff citizens groups, and those national and multinational entities providing technical, financial and legal support to local governments; as well as environmental law groups, extension agents, NGOs that have focused on voluntary ICDPs, and university faculty among others. The following topic areas should be considered for inclusion in capacity building activities (i.e. short courses, study tours, manuals, web sites and distance learning, workshops and conferences).

1) Improving governance and the participation of civil society: Topics of importance include stakeholder participation, creation and training of citizen boards and commissions, meeting and public hearing skills, the use of due process, balancing administrative procedures with citizen advisory groups, "due process", transparency, trust in the rule of law, accountability, public records, use of ombudsmen, appeals courts, and inter-jurisdictional agreements (Blair, 2000; Trousdale, 1999; Murphee, 1994). Efforts should be made to blend new decentralized governance mechanisms with traditional or indigenous governance mechanisms within decentralized decision structures (Borrini-Feyerabend & Buchan, 1997). Discussion of what forms of governance should remain centralized and how to phase decentralized governance will be critical.

- 2) Planning and land conservation tools: Capacity building should help a wider array of people learn about what goes into legally binding mechanisms like master plans or land use codes, how they interact, and what land use tools and best practices are available for implementing them. This should include both regulatory (zoning, performance criteria, phased infrastructure, fees, etc.) and market or incentive-based land conservation techniques (easements, purchase or transfer of development rights, tax incentives, certification, municipal and private reserves, environmental service payments, etc.)
- 3) Incorporate cross-boundary activities into protected area management plans: Define buffer zones, conduct PA boundary analysis (USDA Forest Service, 2001), locate corridors, and develop specific outreach programs that include staff participation in local planning and review of development proposals. Open this PA planning process to local governments and adjacent landowners.
- 4) Creation of inter-institutional mechanisms for land use decisions: Improve local government's ability to oversee the review of development proposals using an inter-institutional and when warranted, a cross-boundary referral process that includes conservation professionals and citizen boards as part of that review. Likewise, foster newly formed PA advisory councils and seek their input on management actions near the PA boundary to set the stage for a reciprocal review of adjacent land uses by PA staff.
- 5) Strengthen and diversify revenue streams for local government: Even though more are being enabled, many communities are not used to paying or managing sales taxes, special district taxes or even fees for services. New taxes must be created, used wisely and seen favorably by those who pay if local governments are to function

and provide decentralized services. Citizens must understand the strategies used for environmental service payments.

- 6) Pilot and prototype projects: PAs and municipalities should create multi-year efforts to produce compatible municipal land use plans and park management plans, and employ a full range of best practices during a trial period.
- 7) Refinement of national enabling legislation: In some countries, enabling legislation for buffer zones, corridors, easements, and private and municipal reserves are still lacking or unclear. Where it is lacking, clarify that the devolution of authority to local government must include a mandate to prepare and implement municipal land use plans and codes, and a development review process with more local responsibility for EIAs. Enable the use of appointed boards or commissions that are quasi-judicial or that advise elected officials, thus providing checks and balances and trust in democratic decision making. Where none exists, legally enable a local government cadaster and land registration system accessible to all. Titling programs should be enabled to limit type of use and density for lands titled adjacent to PAs or within biological corridors. National environmental legislation should be in place to both guide and restrain local decision making with minimum standards for shared resources like air quality, water quality and biodiversity. As study participants have emphasized, local governments must be allowed to create new revenue streams if decentralization is to succeed. Most municipalities are only empowered to levy property taxes and a few fees for services.

The current debate about protection vs. integrated conservation and development projects (ICDPs)

There is currently a debate in international conservation circles over the extent to which

protection measures, usually by central governments, can stem external threats to protected areas in developing regions (Wilshusen et al., 2002; Rabinowitz, 1999). Some authors like Christensen (2004), Van Schaik & Kramer (1997), Terborgh (1999, 2000) and Oates (1999, 1995) cite the failures of voluntary ICDPs to protect biodiversity and argue for a strengthened emphasis on law enforcement. Others believe this approach is doomed because it will increase conflict and alienate allies, and that the political will for such a solution is usually lacking (Wilshusen et al., 2002; Phillips, 1998). Both overlook the importance of participating in the development of local government land use decision structures as the most logical middle ground. All but the largest protected areas exist in a wider landscape dominated by human-altered ecosystems, and even where stronger protection measures are put in place, the ecological viability of most protected areas will depend on bio-regional and local land use planning, code enforcement, efforts to instill a land (and sea) ethic, and the promotion of land and resource stewardship beyond protected area boundaries. Where cross boundary collaboration that benefits PAs is achieved, it will be in large part through strengthening the capacity of local government to integrate voluntary conservation and development projects, best practices for land use planning, and land use regulations that buffer PAs into their governance structures emerging during this historically unprecedented decentralization period. Many have forewarned that that the landscape around PAs are likely become more and more fragmented and intensely developed leaving them as islands in a sea of incompatible land uses. National level officials and PA managers in our study area have begun to address these issues in a variety of ways which collectively, given us some direction for the work ahead.



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