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CONCEPT OF ZONING MANAGEMENT IN PROTECTED AREAS

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Abstract

This paper examined the concept of zoning management in protected areas. In the past 25 years, the area of land under legal protection has increased exponentially, particularly in developing countries where biodiversity is greatest. Concurrently, the mission of parks and reserves expanded significantly. By global mandates, protected areas (PAs) now are supposed to do far more than conserve biological diversity. The protected areas are now charged with improving human wellbeing and providing economic benefits across multiple scales (WPC 2003), mitigate conflict and preserve indigenous cultures. These important goals have been widely embraced in principal, but in practice they are far more difficult to achieve. Due to the promises offered by zoning to mitigate development conservation conflicts, many leading nongovernmental conservation organizations (NGOs) advocate zoning processes in protected areas. These organizations cite similar reasons for advocating zoning. While many of these NGOs promote zoning, there are concerns regarding its success. These concerns have resulted in a variety of recommended methodologies and precautionary tales from NGOs to ensure that future zoning projects learn from past experience. Zoning around large nature conservation areas is especially beneficial for vulnerable or valuable habitats on the edges of these areas.

Keywords: Kenya, Management, Protected Area, Zoning,

1. Introduction

The world's first two national parks were established in the 1870s. Growth the number and size of protected areas was slow at first. It accelerated during the 1920s and 1930s, halted during World War II, and regained momentum by the early 1950s. The number doubled during the 1970s. Before 1970, most protected areas were located in industrial countries. In more recent years, the Developing World has led in both numbers added and rates of establishment. There are 52 protected areas in Kenya covering 8% of the total land for the conservation of terrestrial flora and fauna (Jones et al., 2005). The existing national parks and reserves encompass only parts of the most important ecosystems and habitats that range from wetlands, savannah, forests, mountains to arid and semi -arid zones in the country. The process of establishing national parks and reserves in the past has not been inclusive of communities' views and interests. Furthermore, management of these protected areas is under different management institutions (GOK, 2007). To clarify this situation and to promote the full range of protected area options, the International Union for the Conservation of Nature and Natural Resources (IUCN) provides a series of 10 management categories (IUCN 1978, 1982). Protected areas are categorized according to their management objectives, rather than by the name used in their official designations.

2. Criteria for selection of areas to protect

Protected areas can be located and managed to protect biological diversity at three levels: ecosystem, species and gene levels. The ecosystem level involves protecting unique ecosystems, representative areas for each main type of ecosystem in a nation or region, and species-rich ecosystems and centers of endemic species. The species level is giving priority to the genetically most distinct species (e.g., families with few species or genera with only one

species), and to culturally important species and endemic genera and species while the gene level is giving priority to plant and animal types that have been or are being domesticated, to populations of wild relatives of domesticated species, and to wild resource species (those used for food, fuel, fiber, medicine, construction material, ornament, etc.).

3. Marine protected areas in Kenya

Coral reefs are the predominant marine ecosystem in terms of ecology and economy but sea grass beds and mangrove forests also contribute to the economy of the coastal communities Muthiga (1999). The coastal topography, climate and habitats of the Kenyan coast have been described in McClanahan 1988, McClanahan and Young 1986, Obura et al 2000). In order to conserve and manage these important ecosystems, the government of Kenya has established a system of marine parks and reserves managed by the Kenya Wildlife Service (KWS). Kenya has four marine parks including (from north to south) Malindi, Watamu, Mombasa and Kisite and 6 marine reserves including Kiunga, Malindi-Watamu, Mombasa, Diani-Chale and Mpunguti marine reserves. The importance of protected areas is emphasized by international conventions and programmes such as the CBD, the World Heritage Convention (WHC), the Ramsar Convention on Wetlands, the UN Law of the Sea Convention, UNESCO's Man and the Biosphere (MAB) Programme of the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the global programme of WCPA. Together these agreements and programmes are the backbone of international policy on the establishment and management of protected areas for biodiversity conservation and the sustainable use of natural and cultural resources. Protected areas are the cornerstones of biodiversity conservation, They constitute an important stock of natural, cultural and social capital, yielding flows of economically valuable goods and services that benefit society, secure livelihoods, and contribute to the achievement of Millennium Development Goals. Moreover, protected areas are key to buffering unpredictable impacts of impending climate change.

- Our lives depend on the ecosystem process (productivity and services).
- Humanity is ultra-power animal on the earth, and use around 40% of global natural products.
- The monopoly/overuse of the natural resources might bring catastrophic degradation of the global ecosystem.
- Communal land (forest/agriculture area) system usually bring "Tragedy of Commons"
- Protected areas are necessary to maintain ecosystem as our life support system
- To preserve focused area from "Tragedy of Commons"

4. Zoning

Zoning refers to what can and cannot occur in different areas of the protected areas in terms of natural resources management, cultural resource management, human use and benefit, visitor use and experience, access, facilities and Protected Area development, maintenance and operations. Through management zoning the limits of acceptable use and development in the Protected Area are established. Often, when there is not enough information about the area, zoning is an action that occurs during the implementation of the management plan. It allows areas to be set aside for particular activities such as protection of key habitats or nursery areas and breeding sites, research, education, anchoring, fishing and tourism. Zoning helps to reduce or eliminate conflict between different users of the Protected Areas, to improve the quality of activities such as tourism, and to facilitate compliance. Zoning is a widely accepted method to keep people out of the most sensitive, ecologically valuable, or recovering areas, and to limit the impact of visitor

The zones reflect the intended land use, existing patterns of use, the degree of human use desired, and the level of management and development required. Zoning can ameliorate incompatible land uses in given areas, while allowing for sustainable resource extraction that benefits local communities they consistently attempt to determine where resources will be extracted or preserved and who will claim authority and access to these areas. It is designed to allocate geographical areas for specific levels and intensities of human activities and of conservation. Zoning can also be temporal, that is an area set aside for different uses at different times, within the course of the day, over the week or seasonally (Eagles, et al., 2002).

A zoning scheme generally includes areas under strict protection and areas with increasingly fewer restrictions. There may also be sub-zones, which might be modified on a seasonal or temporal basis, e.g. for boat access or because of breeding cycles of organisms. The scheme should aim to provide a balance between conservation and use, and should be as simple as possible. If it is too complex, it will be difficult to enforce as stakeholders may have difficulty distinguishing the different zones. The zoning plan may be part of the management plan or a separate document, and in some cases the zone types are laid out in the Protected Area legislation. The plan should identify the boundaries of the different zones and explain how each area can be used. Zoning aims to promote broad societal benefits, but this may cause some claimants to lose access to certain rights, while others gain (or regain) access (Jacobs 1998).

4.1 Uses of Zones

Zoning permit selective control of activities at different sites, including both strict protection and various levels of use eg, Marine park in Malindi is zoned for fish breeding. Zoning can establish core conservation areas (sites of high diversity, critical habitats of threatened species, and special research areas) as sanctuaries where disturbing uses are prohibited and can be used to separate incompatible recreational activities (bird watching vs. hunting, or waterskiing vs. snorkeling) to increase the enjoyment and safety of the different pursuits. It also enables damaged areas to be set aside to recover. Zoning should apply to all activities occurring within a protected area: conservation, other land uses, and of course recreation and tourism. The zones, with the policies applied to them, should appear in the protected area management plan and thus guide the way in which the area is managed (Eagles et al., 2002**).**

4.2 Steps in Zoning

a) A *descriptive* step, which identifies important values and recreational opportunities. It requires an inventory of resource characteristics and types of existing recreational opportunities.
b) An *allocation (prescriptive*) step, in which decisions are made about what opportunities and values should be provided where in the protected area. It involves managers working with operators, visitors and other stakeholders to determine what should be protected, what facilities will be provided, what programmes should be set up, and where and when.

4.3 Objectives of Zoning

i. To classify conservation and sustainable use zone in the target protected areas based of scientific data
ii. To clear priority of focused area for management action plan
iii. To get consensus of people for management plan
iv. Zoning helps managers, operators, visitors and local communities to understand what park values are located where;
v. Zoning oriented to establishing standards of acceptable human impact helps to control the spread of undesirable impacts; and
vi. Zoning provides a better understanding of the distribution and nature of different recreation and tourism opportunities within and around the protected area.

4.4 Zoning Methodology

Management zones are identified according to the extent of multiple uses to be encouraged. Activities within these zones are planned in accordance with the objectives of the reserve as defined in the strategy document. Certain zones may require intensive management while others may require very little.

4.4.1 Core zones, or Sanctuaries

Habitats that have high conservation values, are vulnerable to disturbances, and can tolerate only a minimum of human use should be identified as “core zones” (or sanctuaries) and managed for a high level of protection. No disturbing uses should be allowed. The first step in designing a protected area would normally be to delineate the core zones. The sizes of these zones can be most important in determining their usefulness as sanctuaries. Small areas of habitat generally have fewer species than larger ones. It is essential to delimit an area large enough to sustain a breeding population of the key species and their support systems including key habitats. This holds for conservation objectives as well as for

replenishing depleted stocks. e.g Ngulia Rhino Sanctuary in Tsavo West and Lake Nakuru Rhino sanctuary are meant to protect the rhino's as they are endangered species

4.4.2 Use zones
Sites that have special conservation value but that can tolerate different types of human uses, and that are suitable for various uses are candidates for dedicated zones in a protected area. Different neighboring habitats are to be mapped and the protected area boundary extended to include as many of these as is practical. The types and locations of required zones must be determined to fit the range of activities planned for the protected area (water sports, recreational fishing, commercial fishing, research, education, and special protection zones). Areas remaining among and around these use zones can be classified as general conservation zones.

4.4.3 Buffer zones
Areas surrounding the core zone where only low impact activities are allowed, such as research, environmental education, and recreation. On a larger scale, buffer zones can also surround the entire Protected Area. There may be need for a buffer zone wherein a more liberal, but still controlled, set of uses may be permitted. The buffer surrounds the protected area and is established to safeguard the area from encroachment and to manage processes or activities that may affect ecosystems within the protected area.

4.5 Zoning Categories
The zoning categories are different among countries and protected area types. Zoning is usually a management tool within a single protected area and would not generally be identified by a separate category, but there are exceptions. In some protected areas, parts of a single management unit are classified *by law* as having different management objectives and being separate protected areas: in effect, these "parts" are individual protected areas that together make up a larger unit, although they are all under a single management authority.

5. Management Zones
Management zones may be the same as the legal zones, but may in many cases be different, particularly where habitat boundaries, landscape features and species ranges do not coincide with legal boundaries, or where complex forms of land use occur, such as seasonal grazing. Details are shown on table 1, 2 & 3.

Table 1: Zones of Influence, Outside the Protected Area

National Administrative Zones	-Maintaining conservation and environmental protection on a regional scale and Promoting regional and national cooperation and coordination on conservation	-Coordinating management efforts with regional and national land use and planning agencies.
International Administrative Zones	-Maintaining conservation and environmental protection on an international scale &Promoting international cooperation and coordination on conservation	-Collaborating with and contributing to international conventions, agreements and organizations (e.g. IUCN, UNESCO, CBD, Ramsar)
Awareness zone	-No defined boundary. -Raising awareness of and support for conservation and the protected area	-Promotion, advertising, park outreach programmes, park web site

Table 2: Types of management zone normally defined within the protected area and wider zones

Zone (May be legally defined or not	Management Objectives and Priorities	Management Approach
Core Conservation Zone	-Total priority for conservation of species, habitats, ecosystems, landforms and landscapes -Normally allowing only limited, nondestructive, management oriented monitoring, and research	-Total protection through patrol, enforcement and monitoring. -Absence of any facilities that would assist access or use
Wilderness zone/Non-intervention zone	-Managed for conservation, maintenance of natural landscape values and quiet enjoyment of nature and natural areas. -Normally allows natural processes to occur with minimal management intervention and without infrastructure development. -Normally allowing survey, research and monitoring and regulated low level, low impact recreation with few facilities.	-Protection through patrol and enforcement of strictly defined use regulations -Provision of basic off site Information and interpretation -Facilities to assist access and use, but no permanent and artificial structures
Intensive use Zone	-Accessible and ideally less vulnerable areas enabling large numbers of visitors to use and enjoy the area within acceptable limits -Offering organized recreation with appropriate visitor amenities, interpretation and education facilities and regulated commercial activity -Park management infrastructure is also often located in this zone	-Provision of extensive on-site information and interpretation -Provision of high quality facilities and infrastructure for visitors and other users -Use and enforcement of defined regulations for users, Acceptance of moderate user impact
Intensive use Enclaves or Corridors	-Enabling large numbers of visitors to visit specific locations inside the PA which may be inside restricted zones (normally religious or cultural sites) -Organized and regulated visiting often allowed at specific and significant times of year (religious and cultural festivals)	
Development Enclaves or Corridors	-Enabling continued function of established developments inside more restricted zones. Examples include hydroelectric installation, major roads, -According to agreement with users and their existing use rights	-Close liaison with site managers in enclaves. -Very clearly defined boundaries and limits of use -Regular monitoring

Table 3: Management zones that may be either inside or outside the protected area

Buffer zone	-This is aimed at the integration of research, education, tourism, sustainable use and development and traditional activities -Promoting and assisting non-destructive, sustainable activities that will not harm the protected area. -Allowing limited commercial and settlement development based on defined environmental and design guidelines	-Collaboration with other land management agencies and local resource users -Incentives and development extension assistance and advice for local inhabitants Interpretation, awareness and education for local inhabitants and visitors
Transition/sustainable development zone (Areas adjacent to the managed area)	-Not always fully defined area surrounding the park. -Emphasis on encouraging sustainable and environmentally friendly development activities, which create links between park and its surrounding area.	-Incentives, collaborations, partnerships, planning guidelines. Indirect protection and monitoring & Awareness and education -Incentives and information Collaboration/consultation with land management agencies,
Ecological Zones	-Protecting ranges of species, habitats and ecosystems that spread beyond the park boundary. -Encouraging maintenance of landscape links; avoiding fragmentation; maintaining source populations outside the PA; preventing flows of pollutants into the PA	-Collaboration/consultation with land management agencies, local authorities, local communities and other stakeholders, international agencies and other countries -Contributing to local and regional land use plans
Cultural Zones	-Protecting cultures and sustainable traditional practices of peoples whose territory includes the PA. (for example nomadic or seasonal grazer's) -Encouraging maintenance of traditional practices that support PA objectives	-Consulting with different cultural and community groups and their leaders

5.1 Other zones in the management zone

a. Absolute Protection Zone: Are pristine or nearly pristine areas that are free of known impacts of human origin, especially of alien organisms. Are restricted to research activities based mainly on observation and monitoring.
b. Conservation and Ecosystem Restoration Zone (for general biodiversity values): These are areas with some degree of alteration of the ecosystem. Tourism is permitted with a guide, and research activities for taking samples and conducting experiments that generate minimal impact on the environment.
c. Low impact Zone: Its essential function is to isolate or shield, basically, the Area of Conservation and Restoration of Ecosystems of severe human impact.
d. Multiple use Zone: Allows many activities like fishing, tourism, science, conservation, navigation and maneuvers.
e. Limited use Zone; Uses subject to additional restrictions, in order to protect environment, resources or activities that are important and remarkably sensitive to alterations.
f. Semi-Intensive Zone: This area has a moderate tourism activity since it is not included in the main tourists routes in the protected area.
g. Special Purpose Zones: They are placed in areas that require specific zoning controls and management; for example, port facilities. The activities permitted in these zones are dependent upon the specific nature of the activities and management needs.

h. Extractive zones; Areas zoned for a particular use, specifically, extraction of certain natural resources. Limitations may be placed on the type and quantity of resources extracted from these zones, as well as those with the right to do the extracting. Often, industrial extraction is prohibited in these areas.

5.2 Challenges to zoning

At many sites in Kenya, management of Kenya wildlife services and donor agencies have initiated zoning projects to balance conservation and development around Protected Areas. Majority of the parks and reserves currently allow local people to use at least some resources within their boundaries. However enforcement has remained the greatest challenge. Zoning efforts face serious political and institutional challenges.

5.2.1 Increased Conflict over Land and Resource Use

Issues in and around protected areas have brought about conflict about land and resources access and distribution. While zoning has increasingly been applied as a conflict resolution tool, it is not always successful. In some protected area's zoning or re-zoning has heightened conflict, provoked public outcry and even violent protests. For example when villagers in India set fire to large areas of the Kanha National Park of Madhya Pradesh. In some situations, zoning helps solve land use conflicts.

5.2.2 Continued Ecosystem Degradation after Zoning

Natural parks and conservation areas are often very successful in protecting ecosystems and species. However, if zoning is not implemented carefully and with support from local communities, it may have the opposite effect. For example, in the Sagarmartha (Mount Everest) National Park, resentment from Sherpas regarding the park's creation and subsequent destabilization of their traditional commons management practices led to an acceleration of forest loss in the park.

5.2.3 Enforcement

Zoning is unlikely to achieve either ecological sustainability nor the insurance of local claims to resources unless there are established and reliable governance institutions and enforcement mechanism. The lack of inclusion and buy-in of local stakeholders can inhibit effective enforcement of zoned areas. A lack of adequate resources also makes enforcement of zones difficult.

5.2.4 Inadequate Administrative Resources

Unfortunately, zoning is often needed most where it is least likely to succeed. The national agencies or organizations charged with administering these areas are often small, politically marginalized, and have limited monetary resources.

5.2.5 Identifying Customary Property Rights is Difficult and Political

Distinguishing customary property rights involves the power to narrate history, define tradition, and in the process, make claims to land and resources. Thus, defining and identifying property rights can be a contentious process that should include multiple stakeholders in a bottom-up approach.

5.2.6 Devolution of Power

The devolution of power to local actors is often a difficult process. On one hand, conservationist and governments may be reluctant to lose control of natural resources and protected areas. On the other hand, if control is not devolved to local actors, there may not be community buy-in for projects or inadequate enforcement of zones.

5.2.7 Equity of Access

Zoning does not always include equitable access for different resource users. Local people may see conservation areas as an imposition on their land and rights. Furthermore, it is important to be aware of inter-community conflicts over resources and land access when creating areas of varying extraction rates and buffer zones.

5.2.8 Zoning May Not Reflect "Moving" Elements of Ecosystems

Zoning does not always reflect transitory and moving aspects of biodiversity and conservation, such as migratory wildlife. Many groups are now advocating the use of wildlife corridors in park and zone planning.

5.2.9 Need for Good Governance
A stable government context and enforcement of zones is ultimately needed for successful protection of biodiversity. This may be difficult to obtain with limited resources.

6. Zoning Approaches
There are several techniques that may be used in the zoning process. Some approaches highlight local participation, while others feature high-tech methods. Some do both. They include;

6.1 Participatory 3-Dimensional Modeling & Community Integrated Geographic Information Technology
These methods emphasize community participation in the mapping and zoning process to capture the cultural importance of land as well as geographic characteristics. Three-Dimensional mapping refers to physically building 3-D maps with communities; while community integrated GIT uses technologies such as Geographic Information Systems (GIS) to capture community knowledge and perceptions of place (Harris and Hazen 2006).

6.2 Geographic Information System (GIS)
A system of hardware, software, and procedures designed to support the capture, management, manipulation, analysis, modeling, and display of spatially referenced data for solving complex planning and management problems (Harris and Hazen 2006).

6.3 Quantitative Zoning
(Sabatini et. al. 2007) have formulated a quantitative method to "expeditiously zone" protected areas by assigning potential land uses based on land aptitude, priority of use, biodiversity conservation, and the influence of the surrounding areas. For example, a metric may be used to assess how effectively a land use pattern contributes to the maintenance of species and gene flow between landscapes.

6.4 Zoning with Satellite Images
Satellite images allow practitioners to see and compare large areas of land and to differentiate land types. In this technique, zones are delineated according to the analysis and weighting of land attributes such as type of soil, topography, hydrology, and prevalent agricultural use. Salm et al (2000)

6.5 Adaptive co-management
An approach that recognizes the evolving, place specific nature of governance over social ecological systems. The emphasis is on collaborative planning and decision-making among multiple stakeholders that cross community, regional and national levels. Recognizing that socio-ecological urgencies and stakeholder needs may change over time, adaptive co-management promotes trust building as the basis for governance, which involves dialogue and feedback from stakeholders, periodic monitoring, and a willingness to modify process, goals and outcomes.

6.6 Collaborative spatial planning
Involves a variety of decision-makers with divergent backgrounds and interests and seeks to bring these voices and interests into the planning process as a way of reconciling individual approaches and leading to satisfactory solutions for all participants (Healy 1997).

7. Advocates for Zoning
Participatory land use zoning is a slow and uncertain endeavor yet remains one of the few options for integrating conservation with development at the landscape level. United Nations Development Programme (UNDP) envisions protected areas (and the zoning that occurs therein) as tools for achieving simultaneous conservation and development gains. They advocate that more attention needs to be given to the people who live in and around protected areas. They also argue, however, that the importance of protecting humanity's long-term survival on the planet must not be

compromised. World Conservation Society (IUCN) believes that biodiversity protection is the most important goal of protected areas. They advocate zoning to protect biodiversity, as "the best way to reconcile an array of different use." According to IUCN, zoning is a tool that ensures strict protection of a core zone as part of larger multiple-use protected areas. IUCN emphasizes that zoning processes should work with relevant sectors, involve local communities, and be innovative and flexible. IUCN also mentions that zoning may provide a safe haven for indigenous people.

8. Zoning of protected areas for conservation and use

There is now an increasing recognition that PAs can serve multiple uses including recreation, tourism, and livelihood products for local communities through sustainable management. In Kenya, for example, the four Marine National parks are adjacent to or surrounded by Marine National Reserves. Tourism activities are permitted in the Parks, but all extractive activities are prohibited. The Reserves are open to fishing by traditional fishers using approved methods. The Parks function as no-take zones for replenishment of fishing grounds in the adjacent Reserves and beyond. By way of additional compensation for their loss of access to fishing grounds now in the Parks, local fishers have *exclusive* rights to fish in the Reserves (recreational, tourist and non-resident fishing is prohibited in the Reserves and enforced by the management authority).There is need to enlist the active involvement of local populations in the process of multiple use protected area zoning and management. A sense of local ownership and cooperation needs to be instilled.

Though Zoning has greater advantages than disadvantages few critics think that highly imperiled habitats may require more agile strategies (e.g., conservation concessions). Within parks, areas of fertile soil or high tourism potential often attract multiple and conflicting claims. Institutions strongly shape zoning outcomes. New national policies promoting participatory planning open opportunities for negotiation but may also create confusion. Amid shifting and/or ambiguous policies, local stakeholders will be reluctant to compromise in land use planning exercises.

Amid decentralization, municipal governments have more power and this need to be considered carefully in zoning negotiations. Their role deserves critical attention. Support for implementation is often grossly neglected. Zoning is most likely effective if scaled to managerial capacity and viewed as legitimate by local citizens. Field research and monitoring is essential for lasting conservation. Science needs to be presented in a transparent fashion. Opportunities to adapt and rezone for biodiversity purposes need to be built into plans, just as such opportunities are offered for future economic development. Innovative mapping promises to link customary and scientific knowledge and facilitate negotiation. Despite considerable investment and years of deliberation, zoning has not resolved land use conflicts. Participatory land use zoning is a slow and uncertain endeavor yet remains one of the few options for integrating conservation with development at the landscape level.

To improve participatory zoning outcomes, it is critical to analyze global experiences. Case studies from various parts of the globe have shown participatory zoning succeed in attempts to link conservation with development, resolve conflict, and promote sustainability. Majority of the cases engage the UNESCO Biosphere Reserve model by attempting to demarcate a core protection area surrounded by zones allowing greater intensity of use. These cases reveal that governance, funding commitments, ecological context, and the use of science and innovative mapping techniques can stall or advance zoning outcomes.

The assumptions are the external factors that must be established so that planning for the management of the Zones in protected area is realistic. As part of the viability analysis it is necessary to analyze: the description of the initial situation and its change trends, the motivations of the actors regarding the programmed activities, the necessary resources for the execution of the programmed activities, the availability of resources for the actors and the viable activities in the current scenario.

Zoning is a key prescriptive tool for administration and management of protected areas. However, the lack of zoning is common for most protected areas in developing countries and, as a consequence, many protected areas are not effective in achieving the goals for which they were created (Bos, J., 1993). Zoning can destabilize communities' traditional management practices in common areas and lead to an acceleration of ecosystem degradation if communities do not

understand the rationale of zoning or were not involved in its design and implementation. Zoning efforts are most likely to be effective if they are scaled to managerial capacity and are viewed as legitimate by local citizens and key stakeholder groups. Zoning promises to link customary and scientific knowledge and build alliances among competing groups Yet zoning often is not truly participatory. Deeply political and often contentious governance decisions can be masked by bland planning terms such as "consensus" and "stakeholder." Despite inclusive rhetoric, zoning may be a coercive exercise designed to contain local dissent, or it may be a political maneuver to postpone or prevent enforcing unpopular rules or confronting powerful commercial interests. In such cases, zoning may actually reduce the size of Protected Areas and set a precedent for carving up the area. Ideally, parameters of authority and decision-making are defined early in the zoning process (Healey, 1999).

9. Conclusion

It is often difficult to accommodate all the interests and needs of local residents, tourism development, and the conservation values and needs within a Protected Area. Tourism in Protected Area may be compatible with conservation in all but the most ecologically sensitive areas if properly managed. Nevertheless, damage may be caused by the construction of tourist facilities around wetlands and beaches that border the Protected Area. Protected Areas are typically designed to permit several controlled and sustainable uses within their boundaries. But often particular uses need to be confined to particular zones within the Protected Area where they are appropriate or where their uses do not conflict with other uses. Zoning is a widely accepted method to keep people out of the most sensitive, ecologically valuable, or recovering areas, and to limit the impact of visitors. The Government Bills should include separate provisions for zoning and Protected Area provisions should provide an "umbrella" for regulating all activities within the Protected Area.

In the large and valuable areas that typify most Protected Areas, many groups claim authority and access, managing Protected Areas effectively means bringing these often competing groups together to negotiate rules transparently and democratically for managing use and avoiding conflicts. In any one locale, tradeoffs between biodiversity conservation and economic development are likely, but at larger scales side by side integration may be possible (Robinson and Redford 2004). Buffer or multiple use zones can be established to soften the line between preserving biodiversity and extracting resources. Boundary demarcation also ought to reflect dynamic ecological processes, including wildlife migrations and disturbance regimes. Therefore, effective zoning for Protected Areas requires sound science and innovative use of technology.

Not all stakeholders will be winners, yet building alliances and collaboration among multiple stakeholders can lead to more equitable and less costly management and monitoring for Protected areas zoning. In Machalilla National Park, Ecuador, zoning initiatives raised public expectations that land use restrictions would be entirely lifted; in essence some citizens hoped the park would be "de-gazetted" (Alvarez, 2006). All areas that may be linked to the park or protected area should be examined carefully and monitored regularly—activities in remote areas can sometimes affect coastal or marine systems (e.g., deforestation leading to increased sedimentation, or pollution by inland industries along major rivers).(Clark, 1998).

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