Perspectives on Global Protected Areas: People vs. Protection

Case studies from national parks in Tanzania, Costa Rica, and the United States

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May 2, 2011

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Executive Summary

Policies preserving the various functions of landscapes have been implemented across the globe. Such protected areas (PAs) are now in place over more than 12% of the land surface, but the world's resources are under continual threat. PAs are defined as "a clearly defined geographical space…managed…to achieve the long-term conservation of nature with associated ecosystem services and cultural values." For more effective management of these areas, the IUCN defined a series of six PA categories based on varying management objectives: (a) strict nature reserves and wilderness areas, (b) national parks, (c) national monuments, (d) habitat/species management areas, (e) protected landscape/seascapes, and (f) managed resource protected areas. This division allows for an appropriate level of protection in each protected area.

Four perspectives on establishing PAs have been suggested: 1) they are established in sites that area economically "worthless," 2) protection is more important to individuals who have satisfied more basic economic desires, 3) it is a historical and political process, and 4) protection is based on biodiversity significance. Prioritization methods of conservation actions vary between organizations as well. The World Wildlife Fund has designated 200 priority ecoregions across the globe and Conservation International has identified various biodiversity hotspots and high biodiversity wilderness areas. The goal of global prioritization is not to create differing systems of conservation, but to guide the direction of international efforts toward regions of recognized conservation importance.

There are also differences in opinions regarding the appropriate size of protected areas. It is apparent, however, that large areas play a very different role in the function of protection than small areas. Cantú-Salazar and Gaston outline five negative conceptions

surrounding very large protected areas suggesting that many large PAs were created for reasons other than maintaining biodiversity features.

A vital addition to the size and land coverage of protected areas is their connectivity. Connecting individual areas of protected land can be accomplished through corridors and buffer zones. Creating networks of PAs will become increasingly important as efforts to continue their role of conservation on a global scale continue. Each country, however, has its own specific circumstances resulting in unique conservation needs.

Lake Manyara National Park in Tanzania is part of the Tarangire ecosystem and acts as an important game reserve in Africa. The World Conservation Society proposes that "the principle threat to the long-term sustainability of the Tarangire ecosystem is the loss of migration corridors and dispersal areas outside the National Parks." By increasing the connectivity of parks in Tanzania, the effectiveness of individual protected areas will increase and they will become less vulnerable to characteristics of island parks – those that are disconnected from surrounding protected areas. Expanding the borders of restricted areas causes constraints to the surrounding people, however, and conflicts between humans and parks are important issues to address.

Eco-tourism is growing in Costa Rica along with the country's progressive land protection efforts in the last 30 years. During this time, Costa Rica's national development strategy has involved creating several national parks and biological reserves. National parks as a protected area have become an important area of growth, leading to exemplary monitoring programs within the country. These developments have been accompanied by progressive governmental adjustments and conservation laws. The Costa Rican government plays a leading role in creating PAs, becoming active in adapting to

developmental needs and taking direct steps toward a more comprehensive national park system. The country has recognized and begun to take action on the necessity of creating a connected network of protected areas.

The development of protected areas requires the existence of organization and structure. Zion National Park demonstrates the status of the United States National Park Service (NPS) structure. By assessing an established park system, efforts toward future global protected areas can be improved. The NPS Centennial Initiative illustrates the progress being made even in established park systems. A dynamic nature in the midst of changing global circumstances is a quality that conservation efforts in any country must continually strive to attain.

Sánchez-Azofeifa et al. stated the need of "finding a balance between the twin needs for production and conservation." In increasingly human-dominated ecosystems, conservation concerns must be actively addressed by individuals and governments globally. The role of these protected areas varies greatly between countries, societies, and individuals, but natural landscapes are vital to each entity in their own way. Therefore, it is pertinent to understand the state of current protected areas and the prospects of their future in relation to human impact.

Literature Review

Definition and Role of Protected Areas

With advancements of global communities and the fixed nature of the world's resources, it is inevitable that supply and demand surrounding the earth will come into

conflict. If natural landscapes are to be protected, a certain portion of the land's resources must be reserved to prevent loss. Though the ingenuity of the human race may supply the needs of the global population to some extent, the valued and unique resources of the world are in danger of becoming a scarcity (Grefrath, 2010). The state of current protected areas and the prospects of their future in relation to human impact is the starting point for understanding the role of PAs in global lives. Protected areas worldwide vary in size and structure but play an important role in conserving a myriad of landscapes. By examining national parks in three countries, the role of protected areas will be exemplified.

The International Union for Conservation of Nature (IUCN, interchangeably referred to here as the World Conservation Union) has identified a protected area (PA) as "a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values." This definition was negotiated and refined over many years in order to apply to terrestrial, freshwater, marine, and coastal areas (United Nations Environment Programme, 2011).

In order to more effectively manage the wide range of protected areas, the IUCN further defined a series of six protected area management categories: (a) strict nature reserves and wilderness areas, (b) national parks, (c) national monuments, (d) habitat and/or species management areas, (e) protected landscape/seascapes, and (f) managed resource protected areas (UNEP, 2011). These categories are determined based on primary management objectives for the area, which vary in degree and purpose:

a. Strict Nature Reserve: managed mainly for science, possessing outstanding or representative ecosystems, geological or physiological features and/or species of interest;

Wilderness Area: managed mainly for wilderness protection, unmodified or minimally modified and retaining its natural character;

b. National Park: managed mainly for ecosystem protection and recreation for present and future generations;

c. National Monument: managed mainly for conservation of specific natural features of outstanding or unique value;

d. Habitat/Species Management Area: managed mainly for conservation of habitats or species through active management and intervention;

e. Protected Landscape/Seascape: managed mainly for conservation and recreation, safeguarding the distinct character created through the interaction of people and nature;

f. Managed Resource Protected Areas: managed mainly for the sustainable use of unmodified natural ecosystems and maintenance of biological diversity (UNEP, 2011).

This division allows for varying levels of protection as is appropriate for specific circumstances and regions. Not only is this differentiation important for the context of this paper, but it also demonstrates the array and distinction between them, offering valuable insight into the approach and mindset behind land protection. Though protected areas can encompass both terrestrial and aquatic sites, the following statistics and discussions tend

to address terrestrial landscapes. In addition, the case studies following this overview will be limited primarily to the category of national parks. *The Protected Planets* website is an excellent source to explore the extent and variety of protected areas worldwide.

<u>*Current Global Protected Area Status*</u>

More than 12% of the world's land surface is currently established as protected areas (McDonald et al., 2008). This totals over sixty million square kilometers, within which there are over 120,000 legally designated PAs (Cantú-Salazar and Gaston, 2010). There are many potential reasons for establishing a protected area, ranging from economic to emotional. McDonald and Boucher delineate four such perspectives in an effort to categorize reasons for PA creation.

One perspective states that PAs are most frequently established in sites that are "worthless" to people economically. These areas would exist primarily in harsh climates with steep slopes and barren soils where protection may be more valuable than agricultural or other uses. A second perspective suggests that the importance of protecting natural areas is greater to people who have satisfied the more basic economic desires. That is, if economic desires are met, there is no need to reserve land for financially productive uses and it can therefore be converted into a protected area with increased vigor. Thirdly, individuals may view land protection as a historical and political process. This implies that the rate and extent of protection will be determined mainly in part by changing social and political contexts of a country. The fourth perspective argues that land protection is a component of biodiversity. Areas, such as rainforests in Costa Rica, might be more

arduously protected if they exist in regions rich with distinguished species. (McDonald and Boucher, 2010)

All four perspectives do not necessarily exist as contributing factors driving the establishment of a single protected area. Rather, one or any combination of these factors may prompt an area to be protected. However, if one were to compile all four perceptions in order to gain an idea of the interplay between them, PAs would occur on the *least valuable* land in areas with the *greatest biodiversity* where people are economically content at a time of political and social support. Of course, these elements are not necessarily compiled in a particular instance and may not be shared by all people - the goal of McDonald and Boucher (2010) in defining these facets of protection was to make projections on the limiting factors and future potential of PA establishment. More detailed research and methods can be found in their work and other work of Robert McDonald, who has published a number of articles on the future of protected areas.

Prioritization of Protection

There are many approaches to prioritizing conservation actions for protected areas based on vulnerability or inability to be replaced. Three major approaches have been established by the World Wildlife Fund (WWF) or Conservation International (CI). The WWF has designated 200 priority ecoregions that are irreplaceable, exhibiting exceptional biodiversity and acting as key representatives of their own particular ecosystem. These ecoregions total 54.9 million km^2. Conservation International identifies biodiversity hotspots with many endemics – species that exist only in a single location result in

vulnerability of the population and high biodiversity wilderness areas. These designations total 23.4 million km^2 and 11.8 million km^2, respectively. (Cantú-Salazar and Gaston, 2010)

According to Cantú-Salazar and Gaston (2010), "one of the goals of the global prioritization templates is to guide international investment, including the designation and establishment of protected areas, toward regions of recognized conservation importance." It is also important to protect the wilderness areas that remain in the midst of widespread human activities, "whether or not these areas necessarily have high levels of biodiversity" (Cantú-Salazar and Gaston, 2010).

The overlap of very large protected areas (vLPAs) with the three prioritization schemes above is generally quite low, as depicted in Figure 1 (Cantú-Salazar and Gaston, 2010). This lack of overlap supports McDonald and Boucher's (2010) perspective that protected areas are biased toward lower quality lands. Protected areas that overlap with prioritized ecoregions, hotspots, or wilderness areas are more likely to have been established for intentional conservation purposes, while those in Figure 1 fail to exist in areas of prioritization.

Size Constraints

There is some contention regarding the appropriate size of protected areas. Cantú-Salazar and Gaston have enumerated five negative conceptions surrounding very large protected areas (with areas greater than 25,000 km^2). One conception is that vLPAs are biased in environmental coverage, protecting lands that have lower productivity, and economic worth. This bias would result in three additional trends proposed as negative conceptions: protected lands that contain substantial areas of wilderness, support low

numbers of species, and make little contribution toward global conservation goals. The final contention listed by Cantú-Salazar and Gaston is that such large areas are somewhat immune to threats under which smaller PAs would suffer. (Cantú-Salazar and Gaston, 2010)

This combination of factors within very large protected areas suggests that many of these tracts of land were not originally created to maintain unique biodiversity features – society is just beginning (relatively speaking) to demand this goal of PAs. Despite the purpose for their creation, the role played by large protected areas is disproportionate. A small number of vLPAs make up a large fraction of protected land while very small PAs are numerous yet comprise a small fraction of the global area. This uneven distribution puts a burden on large areas, which are often more easily protected lands comprised of less diverse substance. More than a quarter of the global coverage of protected areas is constituted by 63 vLPAs (Figure 2). The 63 areas are just 0.05% of the total number of protected areas worldwide. (For a more detailed description of the extent of vLPAs see Cantú-Salazar and Gaston, 2010.)

Large areas play a very different role in the function of protection than small areas and result in differing management because vLPAs are easier and less costly to protect than the smaller reserves (similar to the simplicity and savings of buying in bulk). Though less costly as a whole, one drawback to large area management is the personnel and resource needs for patrolling the area, which are especially inadequate in developing countries. In vLPAs there is an emphasis on importance for supporting large mammals, especially large predators, because these species require a very large habitat on which to live and hunt. Contiguous large protected areas also provide for a farther shift in the distribution range of species due to changes in climatic conditions. Small areas may be able to support some

diversity, but the extent of populations and size of the species supported are more limited. (Cantú-Salazar and Gaston, 2010)

In contrast to the way that vLPAs protect a great deal of land with little threat, small protected areas often constitute areas of great biodiversity that are easily threatened by growing and changing populations (Cantú-Salazar and Gaston, 2010). A study by Cowling and Bond (1991) empirically assessed the differences in species richness between parks located on islands off the coast of Africa and nearby mainland parks. These island parks were used to represent small, isolated reserves such as Lake Manyara National Park (Cowling and Bond, 1991). The isolated reserves are called island reserves and are disconnected from surrounding protected areas due to fragmentation, resulting in a small area that may be insufficient for sustaining species populations (Cowling and Bond, 1991). The study in Africa addressed the size of reserves in conjunction with the effects of fragmentation on plant species richness in reserves that are cut off from surrounding habitat by development, agriculture, and other human uses of the landscape. Cowling and Bond (1991) emphasize that, as with most empirical studies, their example is based on the observations and findings of a single location and can be extrapolated to different situations only with the proper qualifications. Some of the findings, however, can be valuable in regards to observing the affect of small protected areas.

Cowling and Bond investigated whether a large single reserve supports a greater number of species than several smaller ones and whether the magnitude of species loss was proportional to a habitat fragment's size and isolation. Two numerical conclusions indicated that the minimum protected area size necessary to avoid fragmentation effects ranges from 4-15 hectares (for the area of their study), but in order to significantly

conserve species richness, isolated reserves needed to be at least 300-600 hectares. These minimum sizes are significant in their own right, but the disparity between them is cause for a more detailed study. A portion of the study also compared areas of equal size between islands and the mainland. Cowling and Bond concluded that reserve fragments suffer from poor dispersal ability and smaller population sizes proportional to their size and isolation with differences related not only to size, but also to connectivity. (Cowling and Bond, 1991)

Endemic species, which occur in a single geographic location, are a valuable and vulnerable entity of the world's biodiversity. Endemics that once existed on vast landscapes become increasingly confined by the development and transformation of their habitat, confining them to small habitat fragments that themselves are more vulnerable to destruction and degradation. Cowling and Bond's study area in Africa was comprised of only 30% of its former area, and this remaining extent is made up of fragments. In their study they found that mainland reserves supported a number of endemic plants (animals were not included in the data), while islands supported none. This trend is not uncommon around the world, adding purpose behind the investigation of fragmentation and island reserve effects. (Cowling and Bond, 1991)

Future Prospective

The size and land coverage of protected areas are important considerations in a global perspective. A vital addition to these facets is the connectivity of PAs (Sánchez-Azofeifa et al., 2003). Connecting individual parks and reserves can be accomplished through corridors – protected areas that span the landscape between two isolated protected areas, and buffer zones – an area enclosing a protected zone that discourages the

infringement of human use directly adjacent to the PA. Creating networks of PAs will become increasingly important in efforts to continue their role of conservation on a global scale (Sánchez-Azofeifa et al., 2003). Sánchez-Azofeifa et al. suggest that "the increasing isolation of protected areas may prevent them from functioning as an effective network" (2003). For this reason, the following case studies will address the importance of protecting a system of natural areas in particular countries in order to build toward global coverage.

Case Studies

In his evaluation of wildlife corridors and buffer zones in a Tanzanian park, Mwalyosi (1991) stated that:

> The conservation of wildlife is internationally supported for scientific, aesthetic and educational reasons. However, there is no common agreement on the most effective means of achieving long-term conservation. This is because each nation has its own specific problems and political ideology, and the path to conservation as a consequence tends to be specific to each country.

This concept provides vital context for the case studies that follow. Comparisons are intended to expand the perspective of parks as a protected area while acknowledging the differences between PAs in different areas of the world.

Lake Manyara is a small park of 110 km^2, but despite its size, it maintains a crucial role to Tanzania in terms of visitors, revenue, and biological diversity. Manyara's size, however, has limited its long-term viability as an island park in the midst of the agricultural settlements surrounding it (Mwalyosi, 1991). In a 1991 study on Lake Manyara National Park (NP) and the surrounding area, Mwalyosi addressed the concern regarding Manyara's viability, conflicts between the park and local people, and potential solutions for these dilemmas.

The role of national parks in developing countries is distinct from those in more developed countries because, as Mwalyosi stated, "each nation has its own specific problems and political ideology." The reason existing reserves in developing countries have survived, he suggests, is because of the type of land on which they are commonly created – marginal lands where there are fewer people and harsher conditions that inhibit resource development (Mwalyosi, 1991). These reasons from his 1991 study are in agreement with three of the four potential motivations for establishing parks as delineated by McDonald and Boucher in 2010: they are common on less valuable land, are affected by political processes, and are restrained by the economic advancement of local people.

Within Tanzania, Lake Manyara NP ranks as the third largest protected area in the number of visitors and second largest in terms of revenue. Ngornongoro Conservation area and Serengeti NP precede it in visitors and Kilimanjaro NP in revenue. Manyara boasts the highest animal biomass in Africa, consisting of a complex array of species inhabiting a number of diverse habitats within the park. These qualities, among others, qualified Lake Manyara NP for Biosphere Reserve status. Protected areas like Manyara are valuable for

both flora and fauna, but vertebrate animals tend to act as useful demonstrations for quandaries regarding species movement over an area. Because of this, animals often become the topic of issue assessments rather than flora. (Mwalyosi, 1991)

Connectivity

Manyara acts as an important game reserve in Africa and is part of the Tarangire-Simanjiro ecosystem that stretches from the Kenyan border in the north to the Massai steppe in the south and is bordered on the west by the rift escarpment seen in Figure 3 (Mwalyosi, 1991; Wildlife Conservation Society, 2011). For an excellent description of the Tarangire ecosystem and to learn details of actions being taken to protect this area, visit the *Wildlife Conservation Society* (WCS) website.

The WCS proposes that "the principle threat to the long-term sustainability of the Tarangire ecosystem is the loss of migration corridors and dispersal areas outside the National Parks," (WCS, 2011). The lack of corridors connecting national parks is also a threat to the parks themselves, as in the case of Lake Manyara (Mwalyosi, 1991). This idea is further supported by the findings of Sánchez-Azofeifa et al. (2003) in their study of the

Fig 3. ty of Costa Rican national parks and biological reserves, which also determined that buffer zones increased park viability because negative human use of the landscape

 Figure 3. Location of Lake Manyara NP and the immediate environment. (Mwalyosi, 1991)   f

parks in Tanzania, such as Manyara and Tarangire NPs (shown in Figure 3), the effectiveness of individual protected areas will increase and the vulnerability of island parks will decrease (Mwalyosi, 1991). An island park, again, is one that is disconnected

from any surrounding protected areas, resulting in a small area that may be insufficient for sustaining wildlife populations.

To expand on this idea, Mwalyosi (1991) states, "the concept of game reserves presupposes that 'island' reserves contain all essential life-sustaining ingredients for the animals, and should therefore thrive." Where this ideal is not attained, as in Manyara NP, migration must occur in order for animals to meet the requirements of habitat and meals. In some instances, animals in an 'island' park utilize adjoining land for their additional needs, but this is unlikely to remain a plausible option in the midst of growing populations (Mwalyosi, 1991). In such circumstances, creating a network of protected areas with corridors and buffer zones can allow for the movement required for wildlife to meet their needs. In his 1991 study, Mwalyosi proposed a series of buffer zones and corridors connecting Lake Manyara National Park with Tarangire National Park, as shown in Figure 4.

Conflict

Expanding the borders of restricted areas, however, causes constraints to the surrounding people who would oppose being overshadowed by a concentration on wild animal species or habitats. Mwalyosi (1991) discusses buffer zones between parks and people to allay these concerns. This is a vital consideration in establishing a system of protected areas throughout the world that support biological resources and are supported by the local people. Mwalyosi (1991) summarizes the dilemma of human-animal conflict and the mindset that may provide its solution when he says:

Unfortunately important migration routes surrounding the Park are under

increasing threat. A rapid increase in agricultural activity around the Park

has led to the loss of five of the nine main migration routes in Tarangire, and

a further two corridors are severely degraded... The continued tolerance and

stewardship of the local communities towards wildlife on their land is

therefore essential for the long-term conservation of the ecosystem.

Manyara is surrounded by expanding agricultural settlements – the life

support of many local people. Because of the small size and location of Lake

Manyara, it follows that in order for the park to be supported by the rural

communities of Tanzania, management actions must benefit both the reserve and

the people. Mwalyosi sums it up succinctly by stating that "since conflicts between

conservation and rural communities appear to be disadvantageous to both,

integration of conservation with rural development seems a better compromise."

This conflict and its potential improvement is an excellent area for future study.

(Mwalyosi, 1991)

Costa Rica

Eco-tourism is a growing component of Costa Rican life (Sánchez-Azofeifa et al.,

2003). The "rich coast" of Costa Rica contains a huge proportion of the world's biodiversity

on only 0.1% of the world's landmass (Blue Water, 2011). A significantly greater amount of

information on Costa Rica's protected areas is available due to the progressive nature of

land protection within the country in the last 30 years (Sánchez-Azofeifa et al., 2003).

Sánchez-Azofeifa et al. (2003) state that Costa Rica has "one of the most comprehensive national park systems in the world." This is significant since the country aspires to create a continuous band of protected land spanning from the Nicaraguan border to Panama in the south.

Contentions exist between protected areas and human settlements. Some evidence of this was seen in the Tanzanian case study, but it can be further exemplified by looking at Costa Rica's national parks and biological reserves. Land cover change is occurring here, as it is in many areas of the world, but Costa Rica contains a large amount of tropical forests which have a disproportionally larger affect on global biodiversity than other types of land cover (Sánchez-Azofeifa et al., 2003).

Development

The establishment of a national park system is one of many opportunities available on the road to protecting landscapes on a global scale. Specific techniques toward protection differ between various circumstances, and the most appropriate technique must be identified for each country or region. For Costa Rica, however, national parks have become an area of significant advancement and remain an area of great potential (Sánchez-Azofeifa et al., 2003).

Since the 1970s, Costa Rica's national development strategy has involved creating several national parks and biological reserves (Sánchez-Azofeifa et al., 2003). Logically following these advancements, monitoring the integrity and interactions between newly established protected areas has begun (Sánchez-Azofeifa et al., 2003). These monitoring programs serve as a prime example for other developing nations to follow, and the issues

raised can be applied to existing PAs in any country. Boundaries, buffer zones, and connectivity are the subject of major observation in Costa Rica. Their effectiveness in terms of public respect and reaction will be the focus of evaluation here. Future research should strive to link these observations explicitly to the related economics of creating, managing, and supporting protected areas. This link will ensure a comprehensive view of the land protection process.

Changes in development strategies have been accompanied by direct governmental adjustments and the addition of conservation laws. Three Forestry Laws (1979, 1986, and 1996) and a Biodiversity Law (1998) were enacted and implemented in fewer than twenty years. In 1995, the three agencies in charge of the protection and conservation systems were consolidated into a single entity – the National System of Conservation Areas (SINAC). A single governmental agency provides the ability to ensure a unified approach to conservation. (Sánchez-Azofeifa et al., 2003)

This Latin American country has a rich history of environmental conservation accompanied by the seemingly inevitable tension with economic development (Sánchez-Azofeifa et al., 2003). The tropical deforestation rate here is among the highest in the world, driven by the benefits derived from changes in land use by local populations (Sánchez-Azofeifa et al., 2003). In this way Costa Rica exemplifies the earlier suggestion by McDonald and Boucher (2010) that potential land use drives land protection. For example, some land in Costa Rica is productive for coffee while other land is not. The land that is more productive is more likely to be deforested, while unproductive land may not suffer these pressures and consequently become a more likely candidate for protection (Sánchez-Azofeifa et al., 2003).

Governmental action also plays a leading role in creating PAs. In recent years, Costa Rica's government has become active in this role, changing development strategies and taking direct steps toward a more comprehensive national park system (Sánchez-Azofeifa et al., 2003).

In the four years between 1974 and 1978, the percent of Costa Rica covered by national parks and biological reserves (level-1conservation areas) expanded from 3% to almost 12%. By the end of the 20th century, 25.1% of the nation was dedicated to conservation – a larger percentage than any other country on earth. This progress is remarkable and reflects the dynamic nature of Costa Rica's conservation system. (Sánchez-Azofeifa et al., 2003)

Developmental steps that are being taken by the Costa Rican government include 1) establishing and consolidating a national park system, 2) beginning programs that promote sustainable management for tropical forests, and 3) financially compensating private landowners for environmental services that are derived from their land. Costa Rica is a unique example in Latin America of continually evolving developmental policies and the adaptation of conservation systems that are appropriate in a very dynamic global society. Areas for growth still remain, however. Many of the PAs in the country have not been legally purchased by the government. Purchasing these lands has become an international effort and has been successful in some areas of Costa Rica. Sánchez-Azofeifa did not address the affects of government-seized lands on private owners. (Sánchez-Azofeifa et al., 2003)
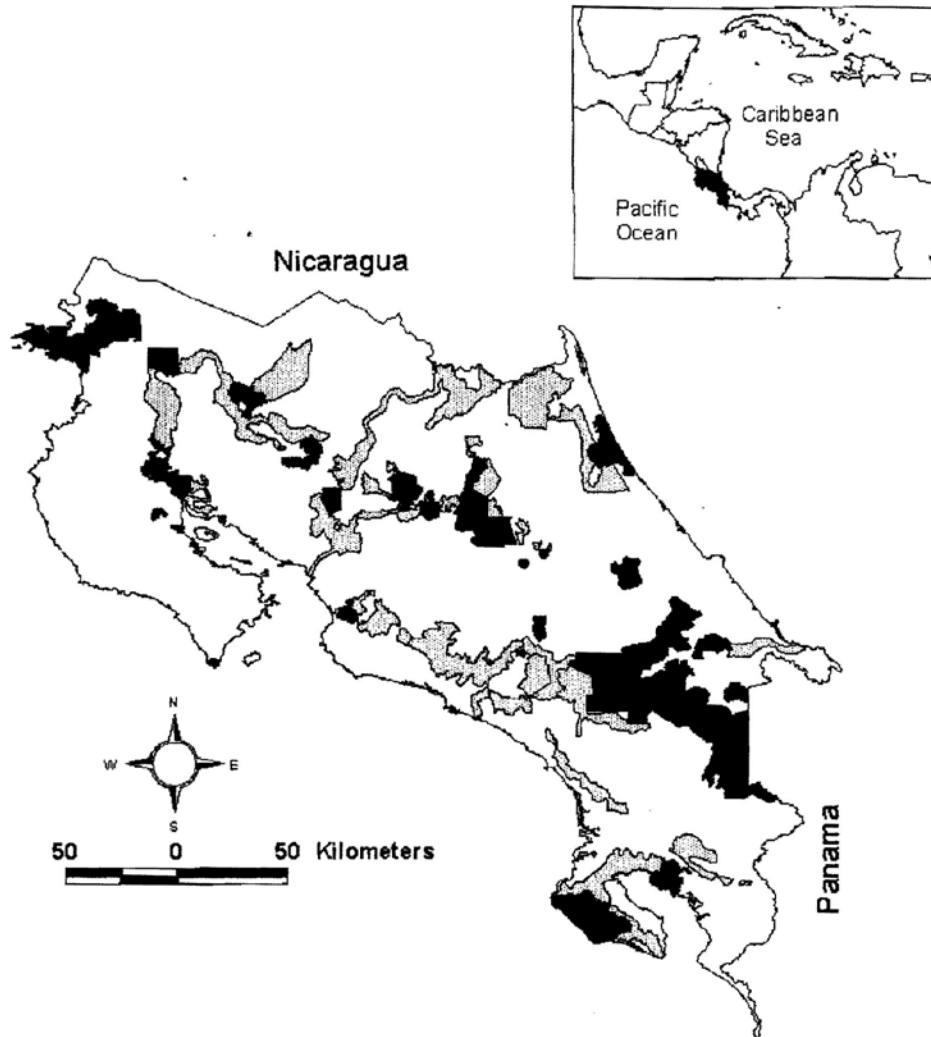
Figure 5. Spatial distribution of Level-1 conservation areas (Black) and proposed level-1 and biological corridors (Gray).

(Sánchez-Azofeifa et al., 2003)

Connectivity

Interaction between parks is a necessary component in achieving the intended

functions of national parks and biological reserves (Sánchez-Azofeifa et al., 2003). An

isolated PA cannot successfully sustain the existence and growth of biological diversity, as

illustrated in Lake Manyara National Park (Mwalyosi, 1991). Since the mid 1990's, the

Costa Rican government has recognized the necessity of creating a connected network of

protected areas in order to maintain the integrity of individual parks (Sánchez-Azofeifa et al., 2003). The government has participated in multi-disciplinary discussions with private groups in Costa Rica recommending the implementation of a series of biological corridors connecting level-1 conservation areas (Figure 5) (Sánchez-Azofeifa et al., 2003). Sánchez-Azofeifa et al. (2003) acknowledge in their study that "whether these proposed corridors *can be*, and in fact *will be*, effective in integration" is a key question (emphasis added). In addition, they found that land around these conservation areas was highly fragmented, supporting the need for wide buffer zones surrounding parks and their corridors.

The United States

The structure of Zion National Park and the United States National Park Service (US NPS) is not necessarily uniform for park systems across the globe, but its structure and potential for progress can be roughly extrapolated to national parks in various countries and, to a degree, to protected areas in general. The existence and importance of structure, as demonstrated by Zion NP, can be considered a commonality in national parks and protected areas worldwide. By assessing these qualities in an established park system, such as in the United States, efforts toward creating, monitoring, and maintaining global protected areas can be improved. This case study will 1) provide an example of the structure of a National Park Service, using Zion NP as an illustration, and 2) implicitly show the extent of information available from a single national park website, as this will be the sole source of information for this study.
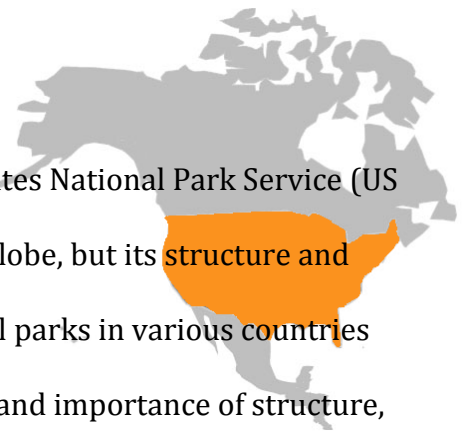
Organization

In 1872, Yellowstone became the world's first national park. The US NPS was officially established 44 years later on August 25, 1916, when President Woodrow Wilson signed the Organic Act into law. This act states that the fundamental purpose of the NPS,

> *"...to promote and regulate the use of the...national parks...which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."* (US NPS, 2011)

In the 95 years since that day, a good deal of progress has been made in the extent of the National Park Service. As of April 2011, the US NPS consisted of:

84,000,000 acres of land;

4,502,644 acres of oceans, lakes, reservoirs;

400 endangered species;

393 national parks; and

1 mission: The National Park Service cares for special places saved by the American people so that all may experience our heritage. (US NPS, 2011)

The NPS was established as a bureau within the Department of the Interior (DOI), whose mission is to "protect America's natural resources and heritage, honor

our cultures and tribal communities, and supply the energy to power our future."

The DOI is directed by an individual who is nominated by the President of the

United States and confirmed by a vote from the US Senate. A group of senior

executives support this director, managing national programs, policy, and budget

from Washington DC and from seven regional headquarters throughout the country.

(US NPS, 2011)

The National Park Service remains a system driven by public support and

involvement. The NPS expresses that "with the help of volunteers and park partners, we

are proud to safeguard these nearly 400 places and to share their stories with more than

275 million visitors every year" (US NPS 2011). This visitor count has grown steadily over

the years, beginning with one million recreational visitors in 1920 and climaxing at 286

million visitors in 2000 (US NPS, 2011). The following years give a representation of the

increasing number of visitors to national parks in the US:

1920 – 1 million visitors

1940 – 17 million visitors

1960 – 79 million visitors

1980 – 198 million visitors

2000 – 286 million visitors

2010 – 281 million visitors

The drop in visitor numbers in the most recent count is cause for further analysis. However,

this trend of interest in protected areas is encouraging and can lead to a dynamic future.

Progress

To prepare for the next century of the National Park Service, the DOI has begun establishing a Centennial Initiative. Following a series of more than 40 nationwide listening sessions and over 6,000 comments from citizens, park partners, experts, and other stakeholders, five centennial goals have been established. These centennial goals and its vision were presented to President Bush and to Americans in a report called <u>The Future of America's National Parks</u>. The Initiative was launched on August 25, 2006 – the 90th anniversary of the National Park Service – "to prepare national parks for another century of conservation, preservation and enjoyment," and to "invite the world to discover the meaning of national parks to their lives and inspire people to both experience and become devoted to these special places." The National Park Service director said that "when history is written, the Centennial Initiative will be second only to the creation of the national park system itself." (US NPS, 2011)

Zion National Park established its own First Annual Centennial Strategy in 2007 in conjunction with the NPS Initiative. This Strategy delineates a broad range of objectives for Zion, including categories of sustainability, environment, recreation, education, and professionalism (US NPS, 2011). Each objective strives to improve the park's resources and the experience of park visitors while emphasizing the importance of considering the future of both. Every one of these aspirations is worth recognizing, and a number will be recorded here. Zion National Park's First Annual Centennial Strategy aims to:

- Improve the condition of park resources and assets.
- Encourage children to be future conservationists.

- Reduce environmental impacts of park operations.

- Inspire an environmental conscience in Americans.

- Engage partners, communities, and visitors in shared environmental stewardship.

- Focus national, regional, and local tourism efforts to reach diverse audiences and young people and to attract visitors to lesser-known parks.

- Impart to every American a sense of their citizen ownership of their national parks.

- Be one of the top 10 places to work in America. (US NPS, 2011)

Sustainability is an important aspect of the National Park Service mission. This is a recurring theme in Zion's Centennial Strategy and in the NPS Centennial Initiative. To the NPS, sustainability "means living today without compromising future generations' ability to meet their needs," (US NPS, 2011). This is reflected in the 1916 mission stated above, which concludes by striving to "leave [the national parks] unimpaired for the enjoyment of future generations," (US NPS, 2011). The farsighted perspective of its mission provides opportunities for the National Park System of the United States to develop and change with national and global dynamics. The ability to recognize and adapt to changing circumstances is a quality that conservation efforts in any country can continually strive to attain.

Critique

Protected areas such as national parks and biological reserves are an important aspect to preserving natural landscapes. However, as Gaston et al. (2006) points out, "it is not that the labels matter, but what the labels achieve." Some studies appear to focus exclusively on the importance of protecting natural areas, to the exclusion of human considerations. A balance must be reached between humans and the environment. This

balance may fluctuate, but life itself is not a static process. The dynamics of life must be reflected in our ability to adjust accordingly.

As an example, Lisette Cantú-Salazar and Kevin Gaston (2010) state that "poaching in many African protected areas within zones of armed conflict has inflicted devastating effects on wildlife because extreme poverty has led many people to become dependent on bushmeat." This may be true, and is an important consideration in terms of environmental protection; however, Africa suffers dilemmas unique to developing regions, and people's livelihoods often depend upon the natural landscape. It is vital to protect exceptional landscapes in Africa, but perhaps of greater importance is taking action toward improving the circumstances of people who depend on the landscape. This may contribute to eliminating the necessity of poaching that threatens natural areas. By providing opportunities to those individuals seeking them, threats to PAs will consequently be decreased.

In their study of the integrity of Costa Rica's protected areas, Arturo Sánchez-Azofeifa et al. (2003) stated this essential component most insightfully when he emphasized the need of "finding a balance between the twin needs for production and conservation [which] will require comprehensive and fair policies." In light of increasingly human-dominated ecosystems that result from a growing population, conservation concerns must be actively addressed by individuals and governments globally. It is fortunate that advancements in science and changes in lifestyle have extended human life spans, but these advancements should not come at the expense of the natural world, which supports that existence and provides so many unacknowledged benefits in life.

The role of these protected areas varies greatly between countries, societies, and individuals, but natural landscapes are vital to each entity in their own way. In the United States, these areas may add enjoyment to life, while in Costa Rica and Tanzania they make life possible through opportunities in eco-tourism or with the resources protected.

The United States is blessed with certain advantages in conserving natural areas, one of which has existed for a nearly one hundred years. The techniques of this country have provided leading examples in the conservation of protected areas. However, developing countries such as Costa Rica are now some of the most active participants in land protection and face unique dilemmas. It is vital, therefore, to monitor and understand the processes involved in protecting land – not only in order to continue conservation efforts, but to improve them.

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