Study on the Development of Transboundary Natural Resource Management Areas in Southern Africa

GLOBAL REVIEW: Lessons Learned

Jaidev "Jay" Singh

The Biodiversity Support Program

The Biodiversity Support Program (BSP) is a consortium of World Wildlife Fund, The Nature Conservancy, and World Resources Institute, funded by the United States Agency for International Development (USAID). BSP's mission is to promote conservation of the world's biological diversity. We believe that a healthy and secure living resource base is essential to meet the needs and aspirations of present and future generations.

BSP Communications

Our communications activities are designed to share what we are learning about how best to achieve conservation while doing it. To accomplish this, we try to analyze both our successes and our failures. We hope our work will serve conservation practitioners as a catalyst for further discussion, learning, and action so that more biodiversity is conserved. Our communications programs include print publications, web sites, presentations, and workshops.

Visiting BSP Web Sites

We invite you to visit our general and program-specific web sites at the following addresses:

www.BSPonline.org
Biodiversity Support Program

www.BCNet.org
Biodiversity Conservation Network

http://carpe.gecp.virginia.edu/
CARPE: Central African Regional Program for the Environment

www.bsp-kemala.or.id/
KEMALA: Supporting Indonesian NGOs for Community Based Natural Resource Management

BSP Listserv

Register to receive e-mail updates about BSP through **www.BSPonline.org**. Click on the yellow button marked **stay informed**, send us your e-mail, and we'll keep you posted on what's new from BSP, including project highlights, upcoming events, and our latest publications.

Ordering BSP Publications

Many of our print publications are now also available online at **www.BSPonline.org**. From the home page, click on **publications** to view them online or order copies to be sent to you. You may also contact us by mail, phone or fax to request copies.

Biodiversity Support Program
c/o World Wildlife Fund
1250 24th St. NW
Washington, DC 20037 USA

Phone: 202-861-8347
Fax: 202-861-8324
E-mail: BSP@wwfus.org
Web Site: www.BSPonline.org

Publication Credits

Author: Jaidev "Jay" Singh, College of Forest Resources, Box 352100, 304 Anderson Hall, University of Washington, Seattle, Washington 98195, e-mail: jsingh@u.washington.edu
Cover Design: Chris Henke
Printing: Balmar Solutions in Print
BSP Director of Communications: Sheila Donoghue
Director of BSP's Africa & Madagascar Program and BSP Executive Director: Judy Oglethorpe

Please cite this publication as: Singh, Jaidev. 1999. Study on the Development of Transboundary Natural Resource Management Areas in Southern Africa—Global Review: Lessons Learned. Biodiversity Support Program, Washington, DC, USA.

Study on the Development of Transboundary Natural Resource Management Areas in Southern Africa

GLOBAL REVIEW: Lessons Learned

Contents

BACKGROUND TO THE STUDY ..... **V**

SUMMARY ..... **IV**

1. INTRODUCTION **1**

1.1 BRIEF HISTORY OF TBCAS 3
1.2 GOALS AND STRUCTURE OF THE REPORT 3
1.3 CONSTRAINTS 4

2. HISTORICAL OVERVIEW OF INTERNATIONAL BORDERS **5**

2.1 SOCIAL AND ECOLOGICAL IMPACTS OF POLITICAL BORDERS 5
2.2 SOVEREIGNTY AND NATURAL RESOURCE MANAGEMENT 7
2.3 TRANSBOUNDARY COOPERATION OVER SHARED RESOURCES 10

3. TBCAS AND ECOREGIONAL CONSERVATION **12**

4. OBSERVED AND POTENTIAL BENEFITS OF TBCAS **14**

4.1 BENEFITS FROM TBCAS 14

5. FACTORS THAT CONTRIBUTE TO OR INHIBIT THE ESTABLISHMENT AND SUSTAINABILITY OF TFCAS: LESSONS LEARNED **21**

5.1 CONTRIBUTORY FACTORS 21
5.2 BARRIERS TO THE ESTABLISHMENT AND SUSTAINABILITY OF TBCAS 24

6. PROCESS OF ESTABLISHING A TBCA **26**

6.1 TBCA TYPOLOGY 26
6.2 GUIDELINES FOR ESTABLISHING A TBCA 27

7. CONCLUSION **32**

REFERENCES **33**

APPENDIX: LIST OF CONTACTS **36**

Background to the Study

"Regional cooperation is not an optional extra; it is a matter of survival."

SADC Policy and Strategy for Environment and
Sustainable Development (ELMS, 1993, p.3)

International borders are political, not ecological, boundaries. As such, key ecological systems and components often occur in two or more nations and are subject to a range of often opposing management and land-use practices. In order to ensure that future generations have sufficient access to natural resources, the management of water catchments, ecosystems, and migratory wildlife must become more multinational and participatory across local, national, and international levels.

USAID's Regional Center for Southern Africa (RCSA) funded the Biodiversity Support Program (BSP), a USAID-funded consortium of World Wildlife Fund, The Nature Conservancy, and World Resources Institute, to conduct an assessment and preliminary analysis of issues, approaches, and targets of opportunity related to the development of transboundary natural resource management areas in southern Africa. Geographically, the study covered Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe.

The study was implemented by the following team:

John Griffin	Team Leader and Institutional, Policy, and Legal Analyst
David Cumming	Conservation Biologist/Park Management Specialist (WWF SARPO)
Simon Metcalfe	Sociologist
Mike t' Sas-Rolfes	Economist
Jaidev "Jay" Singh	Global Review Consultant
Ebenizário Chonguiça	Angola Consultant (IUCN Mozambique)
Mary Rowen	USAID Liaison, Technical Advisor, and Editor (AAAS Fellow, USAID)
Judy Oglethorpe	Study Manager and Technical Advisor (Executive Director, BSP)

GIS support was provided by WWF SARPO (Southern Africa Regional Programme Office). Peace Parks Foundation (PPF) undertook a literature collection and established databases on TBCA literature and regional contacts. Zimbabwe Trust provided administrative and logistical support in the region. Dorothy Zbicz provided information on the number and distribution of TBCAs worldwide.

The study process consisted of the following: a review of relevant available literature; individual consultations in the region with stakeholders; development and circulation of draft papers on specific topics; three consultative meetings (with stakeholders, SASUSG members,

and a large final meeting with regional stakeholders); and distribution of a draft final report for comment.

The five reports from the **Study on the Development of Transboundary Natural Resource Management Areas in Southern Africa** are as follows:

1. Main Report,
2. Environmental Context,
3. Community Perspectives,
4. Global Review, and
5. Highlights and Findings.

In addition to assisting USAID/RCSA in its strategic planning, this study, as well as the consultations and meetings associated with it, have encouraged and fostered TBNRM discussions in the region. It is hoped that the study's documents are used by all interested stakeholders to further the TBNRM process.

Summary

Transboundary conservation areas (TBCAs) provide a mechanism to promote sound ecological management of transborder ecosystems, and, at the same, promote opportunities for regional political, economic, and cultural cooperation.

The ecological advantages of TBCAs are generally no different than those that occur with an increase in land area under ecologically sustainable management. The specific advantage of TBCAs is that, where international boundaries have divided ecosystems, river basins, and wildlife migratory routes, formation of TBCAs can re-establish key ecological functions previously disrupted by artificial limitations imposed by political borders. TBCAs can also:

- Improve the protection of internationally shared resources, such as watersheds;
- Increase the area available for wildlife and plant populations, thereby reducing the extinction risk due to stochastic events; and
- Re-establish seasonal migration routes.

Politically, the reasons driving TBCA formation vary considerably; they include a desire to improve regional ecological management, increase economic opportunities, decrease cultural isolation, and foster peace in a bilateral and regional framework. TBCAs may provide a mechanism for developing capacity for bilateral cooperation, thereby creating opportunities for further collaboration in other, more politically charged areas.

Culturally, TBCAs assist in the economic livelihood of indigenous groups whose traditional land areas have been divided by international borders. TBCAs assist in developing policies for the resumption (or at least legalisation) of cross-border movement of indigenous groups divided by political international boundaries.

Economic incentives exist along the gradient of players involved in TBCA formation. Increased tourism potential will benefit overall revenues throughout the tourism sector. Care needs to be taken so that economic opportunities are shared among member countries. More formalised TBCA agreements will increase efficiency in monitoring and managing natural resources, including water flow, water quality, wildlife density and abundance, livestock stocking rates, and disease detection and protection. Duplication of monitoring activities can be eliminated, thereby creating an economy of scale that may be shared by the cooperating nations.

One of the greatest benefits from establishing TBCAs is increasing capacity-building opportunities among respective national partner institutions to manage natural resources. Capacity-building in less-developed partner nations is also an area where donor organisations need to focus in order to create a long-term option for sustainable management. This will enable equitable participation in regional meetings among nations. Stronger regional capacity enables better decision-making with regard to common ecological problems, such as climate change, pollution, and desertification.

For all the benefits possible, the formation of TBCAs is neither easy nor rapid. Long-term commitments from both partner nations and donors are necessary to re-evaluate historical perceptions of international boundaries. Some of the factors affecting TBCA formation are outlined below.

Factors That Increase the Likelihood of Successful TBCA Formation

Broad political support. Since establishing TBCAs is inherently a political process, there needs to be a strong political commitment to establish TBCAs.

***Local communities and public participation*.** The success of a TBCA lies in being accepted by local communities. Without the communities' active participation in the decision-making process, the TBCA will not be able to achieve its goals.

***Presence of highly visible "target" species, scenic areas, or key wildlife processes, such as migration routes*.** Whenever possible, individual TBCAs should have highly visible target species' or scenic areas that would benefit from transboundary cooperation. "Target" species focus has proved successful in many conservation and reintroduction projects. Designation as World Heritage Sites also enhances national pride and international interest in area conservation, and may also bring concomitant donor funding.

***Informal relationships between land management officials in adjacent countries*.** Informal relationships have been key in creating opportunities for formally establishing TBCAs.

Involvement of nongovernmental organisations (NGOs). NGOs play pivotal roles in establishing TBCAs. These organisations provide technical expertise and funding, as well as act to place the establishment of the TBCA on the regional agenda.

Regional agreements and organisations. Regional agreements and organisations provide opportunities to achieve regional goals as they are largely driven by local consensus rather than external parties.

Factors That Slow or Impede TBCA Formation

***Lack of funding and political instability*.** Lack of funding, combined with high political transaction costs and political instability, is a major impediment to establishing TBCAs. TBCA development is slow and may be impractical when funding (both external and domestic) and governmental support are lacking. Where three or more countries are involved, TBCA development may occur between a subset of countries at the beginning. Peer pressure may be effective in developing third-party interest as the benefits of the TBCA are realised.

***Time involved in establishing a TBCA*.** Establishing TBCAs is time intensive and requires enormous amount of political capital over a long period.

***Unequal protected status on either side of the international border*.** Unequal status of protected areas may lead to conflicts between resource use and conservation, thereby slowing the TBCA process.

Unequal management capacity among neighbouring states. While this does not prevent TBCA formation, it should be clear to donor agencies and the partner nation(s) that a considerable period of information-sharing and capacity-building may be needed to enable equitable representation among neighbouring states.

***Lack of support from local communities*.** TBCA formation is difficult where the attitudes and perceptions of local communities are not supportive of conservation efforts. TBCAs

must have the support of the local communities as the benefits and costs are usually borne by them first.

Vastly differing languages and cultures. Where language and culture differ, extensive capacity-building and awareness education need to be carried out for both the official and key members of local communities.

In conclusion, TBCA formation is still a new concept in which the potential benefits are yet to be realised. Hence, it is difficult to make any definitive statements as to its long-term success. However, the potential does exist, through TBCAs, to foster political cooperation and sustainable cross-border ecosystem management.

1. Introduction

"Boundaries should be retained, but their functions as lines of division should be reduced to allow them to assume more welcome functions as lines of positive and productive contact."

Asiwaju (1985a)

Concern over the environment is among the top issues facing many developing country governments, together with concerns about national security and economic development. The international community has realised the transboundary nature of most environmental problems and the inadequacy of unilateral efforts to deal with them effectively. In other words, nations realise the importance of adopting a multilateral approach, which may work more efficiently than the sum of unilateral efforts that ignore environmental system dynamics (de Fontaubert and Agardy 1998).

> *These [environmental] problems have reached a threshold at a time when (1) there are increasing global-scale interdependencies in economic, technological, military, cultural and ecological spheres of activity; (2) human beings have increasing capacity to intervene in and alter Earth life-sustaining processes; (3) there are new dynamics in intergenerational relations; and, (4) there are new scientific paradigms concerning the way the Earth functions. (Grundy-Warr and Rajah 1997)*

These realisations have stimulated a number of global conventions to address climate change, air pollution, migratory species, desertification, etc. However, most of these international agreements are binding only on the signatories and are effective only to the extent that they are implemented by each of the signatories (Trolldalen 1992).

Global international conventions have evolved more quickly than regional ones. Although losses of biodiversity have caused concern for quite some time, practical options for conservation at a regional level are still being developed. Progress in resolving the myriad of issues related to protecting large ecosystems that span a number of countries might be more efficient if the solutions were situated in a regional institutional context.

Within regional arenas, transboundary conservation areas (TBCAs) may be a pragmatic approach to multinational conservation. TBCAs are ecological components of larger ecoregions[1] that straddle political borders between two or more countries and encompass one or more protected areas, as well as multiple-resource areas for local communities and landholders. Often both human and wildlife populations traditionally migrate across or straddle the political boundaries concerned. Institutionally, TBCAs may be considered as formal or informal arrangements between bordering states made to achieve multiple objectives of conservation, sustainable development, and peace.

International border areas contain some of the most biologically intact ecosystems in the world, many of which are located in remote and inhospitable areas (Westing 1998; Griffiths 1995). There is a growing need for multilateral collaboration to protect these natural resources as they provide ecological, political, and economic benefits especially in the developing world and among nascent states. Within this context the establishment of TBCAs in the developing world can reduce the threat of regional ecological and political instability and can contribute to

[1] See Section 3 for a discussion on ecoregions and the role of TBCAs in conserving critical functions of ecoregions.

economic development, particularly in politically volatile areas. According to Zbicz and Green (1997), 136 existing and 85 potential TBCAs straddle 112 international border in 98 countries.[2]

TBCAs are similar to transfrontier conservation areas (TFCAs), whose multiple objectives are to protect endangered species; conserve biodiversity and promote sustainable use of natural resources; preserve cultures that were split by the border; increase cross-border cooperation in economic development; and to gain better control over the border area while promoting peace. Another similar category of TBCAs include international peace parks where the primary objectives are politically-driven rather than ecological or socio-economically driven. Several important distinctions between them are summarised in Table 1.

Table 1. Three Types of Transborder Areas

Transboundary Conservation Areas	Areas that span well-defined borders. TBCA boundaries in this context are linked to a precise, linear concept of international borders (Krukoski 1998). TBCAs are created to achieve conservation of biodiversity, cultural heritage, and economic benefits.
Transfrontier Conservation Areas	Areas that span regions where the boundaries have not been agreed upon. These are often larger linear regions than borders (Krukoski 1998). In addition to conservation, TFCAs often are created to ameliorate tensions related to disputed borderlands.
International Peace Parks	These areas have definite political objectives and are largely symbolic in nature. Shine (1997) points out that no legal definition of peace parks exists, but they are created with the following three objectives in mind: ♦ The term is generally applied to transboundary cooperation where the primary aim is to confirm, strengthen, or re-establish good relations with a neighbouring state(s); ♦ They may be able to prevent escalation of border disputes, such as Demilitarized Zones (DMZ); ♦ International peace parks may be able to safeguard important areas of biodiversity that are or were in military zones.

For the purpose of this study, the term *TBCA* will be used for all three types of areas. This is because the broad objectives of the TBCA focus are primarily conserving biodiversity and promoting sustainable development across international borders.

[2] Zbicz and Green (1997) described TBCAs as Transfrontier Protected Area complexes comprising adjoining protected areas. Their paper listed 136 of these complexes where at least two protected areas adjoin across international borders. It should be noted that most of these complexes are not formally referred to as TBCAs by the host countries, but the term *TBCA* has been arbitrarily assigned as they may be considered TBCAs. In addition, the authors pointed out 85 additional complexes where one side is protected and the other is either a proposed protected area or does not have an IUCN category.

1.1 Brief History of TBCAs

The first TBCA was established as an international peace park that linked the Glacier National Park in United States to the Waterton Lakes National Park in Canada. This linkage was largely due to the active role of the Rotary Clubs of Montana, U.S., and Alberta, Canada, which urged national and local legislators to create an international peace park as a monument to the enduring friendship between the two countries. In 1931, the Rotarians of Montana and Alberta met at the Prince of Wales Hotel in Waterton, Alberta to discuss the idea of creating a worldwide International Peace Park Movement. According to Lieff and Lusk (1990), the Rotarians drafted a resolution calling for the authorities to establish the Waterton-Glacier International Peace Park. The proposal aimed to "symbolically link the two national parks, whereby each would retain its individuality, its nationality, and its separate rights." Eventually in 1932, the governments of the U.S. and Canada enacted a bill designating their parks as part of the international peace park for the purpose of establishing an "enduring monument of nature to the long-existing relationship of peace and goodwill between the people of Government of Canada and the United States." Though the parks are managed separately, both countries cooperate on joint nature tours and search-and-rescue operations.

Prior to the Glacier-Waterton International Peace Park, Poland and Czechoslovakia signed the Krakow Protocol in 1925 to set the framework for establishing international cooperation to manage border parks (Thorsell 1990). The first of these parks were not established until after the Second World War. The post-Second World War period saw the number of transboundary parks grow; however, the pace picked up during the 1970s and 1980s, when most of the TBCAs were established. The first review of TBCAs during the 1988 Border Parks Workshop identified 70 existing and potential TBCAs. By 1997, this number had grown to 136 (Zbicz and Green 1997).

1.2 Goals and Structure of the Report

This report focuses on the various aspects of establishing TBCAs. It reflects the need to analyse a broad range of information pertinent to understand the role of diverse factors that lead to the successful establishment of a TBCA. This is part of a larger analysis of TBCAs and is primarily a synthesis of the available literature documenting the range of experiences in developing and managing transboundary parks and TBCAs worldwide.

The report has six sections and a conclusion. Section 2 provides a historical overview on the social and ecological impacts of international borders, the concept of sovereignty in natural resource management, and a brief discussion on prior attempts at cooperating over shared natural resources.

Section 3 examines the role of TBCAs in ecoregional conservation and discusses the critical concepts related to the scale of TBCAs with an ecoregion. Section 4 then explores the observed and potential benefits of establishing TBCAs. It attempts to answer the question "What do TBCAs bring that traditional national parks systems do not?".

Section 5 examines critical factors that influence the establishment of TBCAs. A number of informal TBCAs exist as *de facto* creations due to their remoteness or to extreme political conditions, such as war or military standoffs. In contrast, there are only a few formal TBCAs. Section 6 deals with the processes for establishing TBCAs. Since TBCA establishment is

inherently political, this discussion explores under what political conditions can we expect TBCAs to succeed.

The conclusion summarises the key lessons that can be gained from establishing TBCAs and the necessary ingredients that may enhance the probability of success.

1.3 Constraints

TBCAs remain a young concept in conservation. Much of the push to establish TBCAs emerged very recently and, therefore, lessons are still being learned. More importantly, literature analysing TBCAs is sparse. To overcome this, the author interviewed a number of professionals that have been involved in transboundary or multilateral conservation efforts so as to document their experiences (see Appendix). Additionally, since most of the benefits of TBCAs are still being realised, there is a scarcity of materials with respect to actual gains. In light of this, the author discusses mainly potential benefits gleaned from a review of available literature and interviews with management professionals.

2. Historical Overview of International Borders

All international borders are political constructs, the development and recognition of which involve a four-stage process (Krukoski 1998). When one or more of these stages are ignored, problems are likely to develop. The four stages are as follows:

1. *Historical precedent stage*—During the initial phase of boundary development, demarcators examine the cultural characteristics of the people in the region and prior attempts to develop nationhood. Failure to recognise and observe these precedents has resulted in a number of political problems in most post-colonial countries.

2. *Delimitation*—Refers to the establishment and ratification of treaties related to borders. This is essentially a political process, where negotiators decide, in light of current and past documentation, on the delineation of the borders.

3. *Demarcation*—Stage during which demarcators attempt to interpret the terrain, as well as the intention of the negotiators. Demarcations and principal monuments are built defining the lines of the border.

4. *Characterisation*—An ongoing technical process that depends on the prior three stages. During this stage, new "marks" are erected in order to satisfy the necessities of political changes along the borders.

Although they might appear to be fixed, international boundaries are fluid and have gone through many adjustments over the past several hundred years. These adjustments have seriously impacted the interconnectedness of cultural and natural systems. For example, the borders resulting from the colonial legacy in many developing countries, especially in Africa, have split indigenous groups, as well as ecosystems. Moreover, many borders were decided arbitrarily by colonists using geographic features rather than traditional patterns of human and wildlife movements. Rivers, mountains, and, in many cases, longitude and latitudes were used to demarcate national boundaries (Hargreaves 1985).

2.1 Social and Ecological Impacts of Political Borders

Borders established by arbitrary criteria are often not only remote in nature, but are also shrouded in disputes that have led to wars and small-scale border skirmishes. On the other hand, some of these disputed borders have become conduits for human movements, as well as a means to establish zones of peaceful co-existence. In many cases these borders tend to be "self-regulating," mainly due to their remoteness and the costs of maintaining them. Asiwaju explains:

> *In many cases, government authorities within states do not know precisely where their states' boundaries are located. It is common knowledge, for example, that most of Africa's 103 international boundaries, amounting to a total length of about 50,000 miles and ranging from the short Nigeria-Chad border of approximately 50 miles to the Zaire-Angola and the Sudan-Ethiopia borders of 1,485 and 1,460 miles, respectively, are undemarcated and unpatrolled. Not only has this been so since the conventional definition of the boundaries but, in the opinion of at least one*

African expert, this position should be maintained by African states in view of the enormous financial costs that would otherwise be involved and the need to avoid the likely negative reactions not only among the states themselves but also among the partitioned ethnic groups in the border areas, most of whom are nomads and pastoralists well known for their fierce character. The result all over Africa has been an enormous movement of men and material across the boundaries which…in the Nigeria and Niger case has shown, have invariably functioned less as barriers *and more as* conduits *between the states on either side…." Asiwaju (1985b)*

Although borders were intended to define national territory, the arbitrary nature of border demarcation had serious impacts by fragmenting large ecosystems and biotic areas. In addition, cultures that shared a common "heritage territory[3]" were also divided by these demarcations. A fairly well-known example is that of the Masai, whose heritage territory has been divided between Tanzania and Kenya. Many other examples abound in Africa (see Main and Cultural Perspectives reports of this study). These divisions have created divided communities that are ambivalent about their citizenship and national loyalty. This ambiguity, in turn, has made many leaders and governments, especially in Africa, suspicious of these communities, thereby marginalising them from the hinterlands. Asiwaju notes that:

…border regions in Africa have always evolved as special areas of socio-political ambivalence, where the loyalty of the local peoples to either of the states sharing a particular cultural area has not been, and never could have been, very strong.…African border populations have at best evolved attitudes and characteristics suggesting a preference for some measure of binationality or dual citizenship. (Asiwaju 1985)

In many instances, these political divisions of communities across international borders have led to or have been a major factor in promoting anti-national or criminal activities. Phiri observes:

There is also the problem of clandestine cross-border movements and activities, including especially the smuggling of goods and the immigration of unauthorised aliens, including political refugees and, on occasions, criminals seeking refuge and obtaining sanctuary from the laws of neighbouring states. All of these take place under the general cover provided by the identical cultural environment prevailing on either side of the prescribed boundaries. This situation, which can be easily generalised for most frontier zones in Africa, suggests the need for a special kind of arrangement which will allow for international cooperation at the local level. (Phiri 1985)

Short of re-demarcating international borders, there is a need to at least symbolically rejoin these indigenous areas. Among other benefits, protecting the indigenous knowledge of these communities may prove vital in the successful sustainable development of these borderlands. This issue is further explored in a discussion of the benefits of establishing TBCAs in Section 4.

In addition to fragmenting traditional heritage territories, national boundaries also fragmented natural areas. International natural areas that once were single units are managed separately under diverse and, at times, opposing national resource objectives. At the national level, parks continue to be designated within a political framework by boundaries that fail to encompass the habitat required to sustain complete faunal assemblages. Few tracts of land are currently available that encompass entire ecosystems. As a result, most parks are artificial

[3] Heritage territories are areas that have been established through well-established historical use, such as migratory patterns of indigenous peoples.

biotic areas inextricably linked to natural and human activities outside their boundaries (Machlis and Tichnell 1985). Odegaard states that:

> *In 1872, when the world's first National Park (Yellowstone) was established, there were 95 countries in the world. Today there are over 174. That is a lot of changing of borders. In fact, much more recently—between 1972 and 1982—there were 70 boundary changes. (Odegaard 1990)*

International boundaries that divide ecoregions have interfered with the movements and management of nomadic and migratory wildlife (World Bank 1996). Examples include ibex in Europe and elephant in southern Africa. Ibex migrate seasonally between the Gran Paradisio and Vanoise National Parks in Italy and France. The ibex were protected in their winter range in their Italian Alps habitat in the Gran Paradisio, but were not protected in their summer range across the border in France until the Vanoise National Park was established to protect the ibex's transborder range (Thorsell 1990).

Elephant populations along the South African and Mozambique border (Tembe Game Reserve) are prohibited from maintaining their migratory routes between the countries by use of electric fences (World Bank 1996). Similarly, the movements of elephants and wildebeest in search of water have been severely hampered by fences constructed along the borders between Botswana and Namibia. Seasonal movements of Marco Polo sheep and snow leopards have been jeopardised by increased poaching, livestock grazing, and cross-border insurgency in the Central Asian mountains (Jackson and Ahmad 1995).

The remoteness of many borderlands, and the fact that they often split what should be functioning ecological units, make them good candidates for conservation areas. This suitability is evident in the many national parks or game reserves along international borders, especially in Africa. Griffiths notes:

> *Boundaries and national parks come together in a statistically close relationship. Almost 40% (76 out of about 200) of the national parks of Africa lie on international boundaries. Almost one-third of all African boundaries (35 of 109, 32.1%) have a national park on one or both sides. These figures have to be put into the context of only 30 of the 50 African territories (60%) having national parks of any description. National parks are confined to sub-Saharan Africa, and even there 12 territories have no national parks. Excluding boundaries between two countries, neither of which has national parks, the percentage of boundaries on which there are national parks rises to 36.8% (35 of 95). (Griffiths 1995)*

Although it would be extremely difficult to reconstruct new borders to reunite natural areas and heritage territories, there exists a possibility of ameliorating the damaging effects of international political boundaries on natural systems by establishing TBCAs.

2.2 Sovereignty and Natural Resource Management

The Peace of Westphalia in 1648 marked an important chapter in world history; it formally institutionalised the notion of sovereignty over territory. In the modern-day context, sovereignty over natural resources continues to evolve as nations are faced with the need to curb harmful transborder pollutants (e.g., air pollution from coal-fueled utilities and upstream industrial runoffs). Numerous bilateral and multilateral treaties have been signed regarding both

transborder air and water pollution. The 1987 Montreal Protocol for the Protection of the Ozone Layer is a successful example of a multilateral treaty involving transboundary air pollution. In contrast, transborder cooperation regarding terrestrial resources has always been much more complicated, primarily due to issues related to sovereignty.

Schrijver (1993) points out that the notion of permanent sovereignty over natural resources has developed as a new principle of international economic law that has its roots in two main concerns of the United Nations: 1) economic development of underdeveloped countries and 2) self-determination of peoples and human rights. In the 1950s and early 1960s, the United Nations General Assembly (UNGA) asserted that developing nations should be able to dispose freely of their natural resources. A number of resolutions to this effect were passed dealing with sovereignty at the initiative of the Latin American countries.[4]

Based on the treaties and UNGA resolutions passed over the past few decades, a set of rights and obligations has emerged that includes not only a state's right to develop its own resources but also the right and obligation to share equitably in the management and conservation of transboundary resources and shared ecosystems (see Table 2 and Schrijver 1993).

Understanding of the principle of common heritage of natural resources has steadily evolved. Garret Hardin's (1967) "Tragedy of the Commons," which graphically portrayed the overconsumption of a common natural resource and the resulting negative environmental consequences, has contributed to this understanding. For instance, during the discussions regarding the Law of the Sea, it was necessary to set national limits and establish ground rules for the expanse of oceans beyond those limits by recognising the common heritage of these areas. Article 136 of the Law of the Sea simply declares: "The Areas (defined as the sea-bed and ocean floor and subsoil thereof, beyond national jurisdiction) are the common heritage of mankind" (Schrijver 1993).

Despite the above rights and obligations, environmental degradation has occurred in many countries. Burgeoning population growth, especially in Asia and Africa, has been one of the root causes of the degradation and continues to exacerbate it. High population growth, coupled with many instances of political instability, civil unrest, and stochastic acts of nature, has fostered a cycle of biodiversity loss and poverty.

Years of civil war, recurrent droughts, and the wildlife slaughter of the pre-independence tse-tse eradication programme significantly reduced the wildlife in the Gaza area of Mozambique. The current proposal to establish a TBCA encompassing the South African Kruger National Park, the Gonarhezhou in Zimbabwe, and the Gaza West area in Mozambique would re-establish populations of giraffe, Lichtenstein's hartebeest, sable antelope, waterbuck, buffalo, elephant, eland, and the wildebeest over much of their politically fragmented habitat. At the same time, the TBCA would contribute to income-generating possibilities through tourism and game management.

[4] See UNGA Resolution No. 523 (VI) (VII) (Jan.. 12, 1952) – "Integrated economic development and commercial agreement." 100% in favor. See also UNGA Resolution No. 1803 (XVII) (Dec. 14, 1962) – "Permanent sovereignty over natural resources." 79% in favor.

Table 2. Rights and Obligations of States from the Principle of Sovereignty over Natural Resources

Rights of states emanating from the principle of sovereignty over natural resources	***Obligations of states emanating from the principle of sovereignty over natural resources***	
	National Level	**International Level**
a) To possess, use, and dispose of its natural resources within the limits of its exclusive economic jurisdiction; b) To regulate the admission of foreign capital and to tax and exercise authority over activities of foreign investors; c) To control the outflow of capital; d) To nationalise or expropriate property, both of nationals and of foreigners; e) To conserve and manage its natural resources pursuant to its own developmental and environmental policies; and f) To share equitably in the management and benefits of transboundary resources.	a) To exercise its permanent sovereignty over natural resources in the interest of national development; b) To exercise its permanent sovereignty over natural resources in the interest of the well-being of the people, including the realisation of socioeconomic human rights; c) To respect the rights and interests of indigenous peoples; d) To provide and secure fair treatment for foreign investors; e) To respect acquired rights and the freedom of investors to determine their own investment and production policies; and f) To prevent the waste of natural resources and to provide for reservations for future generations.	a) To respect international law and the rights of other states; b) To fulfil international obligations in good faith; c) To provide fair treatment to foreign investors and to observe limitations relating to, for example, the exercise of the right to take foreign property; d) To cooperate in world economic development; e) To cooperate in the development of developing countries; f) To cooperate and assist developing countries in the exercise of their permanent sovereignty over natural resources; g) To prevent significant harm to the environment of other countries and to the global environment as a whole; and h) To cooperate for collective ecological and environmental security, including reservations for future generations.

Source: Schrijver (1993).

2.3 Transboundary Cooperation over Shared Resources

Transboundary cooperation has always existed in many forms at national, regional, and local levels (Blake 1997). International boundaries are, at best, permeable membranes that allow the flow of both natural and manmade processes, such as trade, postal services, and transportation. Many states have been, and are, trying very hard to manage most transboundary movement, usually at a very high cost, in order to control and secure their borders. Krasner observes:

> *The nature and level of control exercised over flows across territorial boundaries—the movement of people, goods, finance, ideas, and information—has varied across states and over time. Some states have very effectively regulated some kinds of activities, such as the movement of goods, but not others, such as the movement of people. Even the most powerful states have found it extremely difficult to block the penetration of their national boundaries by radio waves. Ideas, from the Reformation to rock-and-roll, have been transmitted across borders, despite the efforts of sovereign political authorities to control them. (Krasner 1993)*

Transboundary cooperation over shared ecosystems has been problematic at times. Efforts at cooperation over two primary terrestrial resources—water and land (wildlife, forests, etc.) are summarised below.

Shared water resources

The first instance of international cooperation involving shared water resources was the 1856 Danube Commission that established a regional arrangement to manage the Danube River watercourse. Until quite recently, most agreements over shared water resources, including the 1856 Danube Commission, have been concerned with navigation. There are only a few watershed-wide agreements on non-navigational uses of rivers, compared to navigational-use related treaties. Treaties and understandings regarding non-navigational uses of water resources involving fisheries, water quality, water extraction, and agriculture and industrial runoffs have grown over the past three decades with increasing sophistication. Schrijver notes:

> *The 'Helsinki rules on the uses of the waters of international rivers'[5] adopted by the International Law Association in 1966 have served as a relevant model for the development of international norms in this field in recent decades. Criteria such as prior use, historic rights, proportionality, and relative needs have been invoked and applied in order to achieve equitable results with respect to the use and apportionment of shared water resources. (Schrijver 1993)*

An example of a watershed-wide, water-allocation related agreement concerns the Ganges river between India and Bangladesh, where both sides have realised the importance of focusing on sustainably maintaining the entire watershed (Blake 1993).

The complexities of dealing with shared water resources result from the fact that watersheds cover large areas that span multiple climates and landforms. As Blake (1993) points out, watersheds are the most readily-defined ecological units. Definitions of watersheds typically

[5] See *Helsinki rules on the uses of the waters of international rivers*. London: International Law Association (ILA), 1967.

include only surface-water drainages; unfortunately, the associated groundwater movement does not always parallel surface-water movements (Bailey 1996). The failure to treat surface and groundwater as a single unit often generates serious problems. For example, industrial runoffs from upstream may have deleterious effects downstream in another state, while adversely affecting the groundwater quality of an altogether different state. In fact, most of the top 15 rivers in the world, in terms of watershed area, are affected by international boundaries (Table 3); by no means have all of them been the subject of agreements among the affected states. Together, these 15 watershed areas cover 26% of the global land surface (Blake 1993).

Table 3. The 15 Largest Watersheds in the World

Watershed	*Watershed Area (million hectares)*	*Length (kilometres)*	*Number of Watershed Nations*
Amazon	587	6400	7
Congo (Zaire)	372	4700	9
Mississippi	325	6020	2
La Plata	320	4880	5
Nile	303	6650	9
Ob	301	5410	2
Yenisey	253	5540	2
Lena	249	4400	1
Niger	220	4200	10
Yangtze	196	6300	1
Amur	190	2820	3
Ganges-Brahmaputra	160	2900	5
Zambezi	142	3500	8
Mackenzi	184	4240	1
Saint Lawrence	128	4000	2

Source: Blake (1993).

Shared land resources

Land resources include renewable resources, such as forests and grasslands, as well as non-renewable resources, such as gas, coal and oil. While non-renewable resources are beyond the scope of this paper, it is pertinent to discuss what few precedents there are as a framework for analysis of transboundary-related extraction of renewable resources. Two examples are: 1) The 1985 joint oil exploration agreement between North and South Yemen (before they merged) in a region where the international border was in dispute and 2) German and Dutch agreement on an underground boundary that did not coincide with the surface border, in order to peacefully facilitate coal mining along the Worm River (Blake 1993).

In both cases, the states involved collaborated to find ways to share the resources along their borders. Both cases illustrate that countries are able to work cooperatively toward joint extraction of shared natural resources with significant economic potential, especially along a disputed border—as in the case of North and South Yemen. This has valuable lessons for TBCAs that encompass significant renewable resources, such as forest lands. Both renewable and non-renewable resources have tremendous economic value and create incentives to work toward joint management for sustainable development. However, much of the time these borderland resources are left undeveloped, often due to the remoteness of border regions, as well as lack of transborder collaboration caused by ongoing disputes.

3. TBCAs and Ecoregional Conservation

An important question is the position of TBCAs relative to other ecological management systems. Table 4 lists the levels of ecological units and the management or organisational structures for managing the corresponding units.

Transboundary conservation areas are generally considered a sublevel of bioregions or ecoregions. A bioregion or ecoregion is a relatively large parcel of land or water that harbours a characteristic set of species, communities, dynamics, and environmental conditions. Defining ecoregions in biological terms focuses attention on the biodiversity at stake that often extends across political boundaries. An ecoregional approach attempts to look at the whole system—ecological and social—from a holistic standpoint to ensure sustainable development (WWF 1998). McNeely states:

> *In order for a bioregion to be managed sustainably, it must include sufficient habitat for viable populations of all native species in the region; areas large enough to accommodate natural disturbance regimes; a period of centuries within which species and ecosystem structures and processes can evolve; and human occupancy and use at levels that do not result in ecological degradation. (McNeely 1993)*

Table 4. Levels of Ecological Units and Management Regimes

Ecological Level	***Management Regimes or Organisations***	***Indicative Activities and Capacities***
Global	Global/Inter-governmental programmes, conventions and treaties: Convention on Biological Diversity, CITES, etc.	Inter-governmental negotiation; diplomacy; supported by science, information, and management.
Regional/biogeograhic • Ecoregional conservation • TBCA • Landscape level	Ecoregional programmes: • Multi-country level/TBCA/ International Peace Parks • Country level/National Park and Reserve programmes	Inter-governmental negotiation; diplomacy; science and information-gathering; regional planning, cooperation and management; protected area planning; and policy development.
Local habitats: structure, species composition, genetic variation, local migration, and patch dynamics	Community-level programmes	Traditional and local knowledge, research, sustainable harvest, protection, and restoration.

Source: Adapted from Miller (1996).

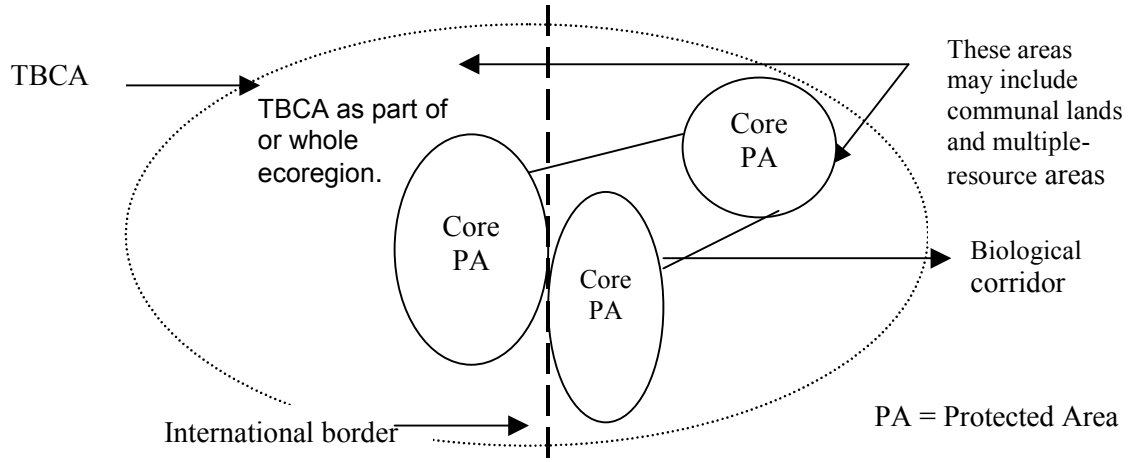
Developing coherent biodiversity conservation plans for ecoregions creates the potential for strategic goals that are aimed at particular sites, populations, and ecological processes, as well as threats to the ecoregion as a whole. Each TBCA must be planned in accordance with a larger ecological unit. TBCAs assist in the management of larger ecological units by focussing on critical areas that extend across international political borders.

When a TBCA is established, the parameters for its design must be agreed upon at the conceptual stage (Mishra , H. R., pers. comm. 1998). Core areas within the TBCA may need to be identified in order to establish buffer and transitional multiple-resource areas around them. Within the institutional framework (both formal and informal) of the TBCA countries, it is necessary to recognise critical areas that need greater protection and are necessary for ecosystem functioning. In this way, the participating countries can identify and focus costs on the core areas within their respective borders. This approach forms the basis for establishing international marine protected areas (MPAs) under the Specially Protected Areas and Wildlife (SPAW) Protocol.[6] de Fontaubert and Agardy state:

> *Regional cooperation under the SPAW takes place first and foremost in the designation of the species in the various annexes, but also through the establishment of buffer zones and reciprocity provisions when the buffer zones and protected areas are contiguous to international borders (Articles 8 and 9). By promoting regional cooperation, the Protocol allows for the consideration of large marine ecosystems (LMEs) and the harnessing of the ecosystem science that is now available. With better knowledge of the ecosystems, and of the areas where most vulnerable components of these are found, MPAs can be set up optimally and the individual MPAs can be smaller and thus easier to manage. When it comes to site selection, "bigger" is not necessarily "better," and the MPA designators are better off carefully targeting the area they want to protect, with a clear objective in mind and the appropriate enforcement mechanisms. The designation of MPAs is one area where most of the costs can be divided among the State parties, by allowing each to concentrate on a particular aspect of the ecosystem that is being protected. (de Fontaubert and Agardy 1998)*

This can also be represented graphically (see Figure 1).

Figure 1. Designing a TBCA



In short, TBCAs should be at a large enough scale to implement planning and management of key ecoregion and watershed resources, yet small enough to be mapped in detail and managed effectively (McNeely 1993). Moreover, TBCAs need to integrate scientific understanding and indigenous knowledge in order to permit sustainable management of these areas (Lusigi , W. pers. comm. 1998).

[6] The SPAW Protocol refers to the Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, UNEP, 1990.

4. Observed and Potential Benefits of TBCAs

Emphasis on TBCAs marks a conceptual shift among social and political institutions away from creating large, strictly protected national parks toward establishing regional, multiple-use resource areas for local communities along national borders (Hanks 1997). Possible reasons for this are addressed in the following sections on the benefits of TBCAs. It is noteworthy that this shift may have been brought about by international institutions rather than by domestic/national political institutions.

International institutions, such as the World Bank, IUCN (World Conservation Union), World Wide Fund for Nature (WWF), World Resources Institute (WRI), and The Nature Conservancy (TNC) have realised the immense potential of large-scale protected areas and/or multiple-resource areas for preserving biodiversity within internationally shared ecosystems, as well as promoting cooperation among neighbouring states (Westing 1998; McNeill 1990; Weed 1994; Hanks 1997; Singh 1997). Moreover, recent research in international relations by such political scientists as Keohane (1984, 1989), Keohane and Goldstein (1993), Krasner (1986), Young (1989), Litfin (1998), and Finnemore (1996) has shown the value of international institutions and their role in persuading states about the normative and/or positive ideas embodied in TBCAs. These normative or positive ideas may take on a life of their own in state policies and structures.

The TBCA concept can incorporate such innovative approaches as biosphere reserves and a wide range of community-based natural resource management (CBNRM) programmes (World Bank 1996). These innovations may be considered "as old ideas with new opportunities." TBCAs allow for the scaling up of traditionally protected areas with benefits spread over larger areas and more communities with potentially significant political and economic gains.

This shift in thinking is reflected in a number of regional and transboundary projects proposed and funded by large donors, including the World Bank, Global Environmental Facility (GEF), and United States Agency for International Development (USAID). For example, USAID's Regional Center for Southern Africa (RCSA) has funded the study (of which this document is part) examining the development of transboundary natural resource management areas in region. The World Bank has proposed a number of TBCAs between South Africa, Zimbabwe, and Mozambique in order to generate foreign exchange through expanded tourism and to aid in Mozambique's economic recovery. This project will assist local communities in defining means of sustainable economic development through transboundary efforts to conserve biodiversity.

Much of the justification for investing in regional and transboundary projects stems from the value of protecting global commons and the value of preserving environmental security of the region or globe.

4.1 Benefits from TBCAs

The many benefits of establishing TBCAs can be grouped into the following categories: ecological, cultural, socioeconomic, economic, political, and institutional.

4.1.1 Ecological benefits of TBCAs

Ecological benefits of TBCAs are mainly associated with protecting larger areas. They are especially important where an important ecological function is disrupted by political borders or dispute. Specifically, TBCAs:

- Improve the protection of internationally shared resources, such as watersheds, that provide important ecological and economic services. TBCAs may encompass critical portions of watersheds for multiple purposes, such as pollution control, clean water supply, wetland management, and carbon sinks.
- Increase the size of areas available to maintain large populations of species, thereby reducing the chance of extinction due to stochastic disturbances. Moreover, increasing habitat size may significantly reduce conflicts between wildlife and the people who live near or within TBCAs, thereby reducing predation and competition between wild ungulate and livestock. Reduced contact would reduce disease transmissions from wildlife to livestock (and vice versa) and reduce crop damage and threat to human lives. Note that levels of ecological benefit depends on the amount of livestock grazing and agricultural farming that is contiguous to the protected areas.
- Re-establish seasonal migration routes, as well as protect sufficient land for species with long-range habitat requirements, such as elephants, large ungulates, and carnivores. This is especially important in areas where animals migrate long distances in response to seasonal changes in rainfall.
- Increase range of habitat types within conservation areas to better meet the requirements of a sustainable ecosystem.
- Increase available habitat, which could reduce the threat of inbreeding depression by permitting larger population sizes of both rare species and those that require large home ranges.
- Create better opportunities for endemic flora to be conserved and provide better chances for reproduction of the vegetative base in traditional ranges.
- Protect at least part of an ecosystem or wildlife population during civil unrest on one side of an international border. Facilitate the re-establishment or reintroduction of the species once peace has been restored.
- Create biological corridors between isolated protected areas to facilitate movement of organisms.
- Aid in efforts to understand climate change at both regional and global levels by protecting key areas within an ecoregion that straddles an international border. For example, in the Miombo Project in southern Africa, the effects of land use and the resulting effects on climate change are being analysed.

  Miombo landscapes are the main source of the cloud of tropospheric ozone, which drifts off Africa every September, and are the source of about 10% of the global carbon monoxide and biomass-burning aerosol particle budgets. The Miombo woodlands are also significant sources of nitric oxide from biogenic processes in the soil; methane from the dambo wetlands, ruminants and termites; and non-methane hydrocarbons from the vegetation (Densankar et al. 1997).

4.1.2 Cultural benefits from TBCAs

TBCAs can help rejoin traditional heritage territories and assist in the preservation of indigenous knowledge. These activities have great potential, not only in re-establishing ethnic customs and building confidence among border communities, but also in building confidence and trust between national governments.

Two good examples of potential cultural benefits from TBCAs are the Masai people along the border of Kenya and Tanzania and the La Ruta Maya project in Central America. The Masai traditionally migrated between Kenya and Tanzania. The three border parks (Serengeti National Park and Maswa Game Reserve in Tanzania and Masai Mara in Kenya) are key components of the Greater Serengeti Ecosystem. "The whole of the eastern half of the park (in Tanzania) was part of the Masai pastoralist system, whose rangeland resources were used by both wildlife and livestock. The Masai are the largest pastoral ethnic group in East Africa…" (WCMC 1997; Leader-Williams et al. 1996). Unfortunately, political differences between the two countries have hampered joint monitoring and other natural resource programmes between these protected areas. Sustained cooperation between the two countries would allow the Masai to return to their heritage territories, leading to a better understanding of their traditional patterns, preservation of their traditional knowledge, and more effective designs of culturally-related TBCAs. Meanwhile this would also afford scientists and visitors an exciting opportunity to experience one of the "greatest wildlife spectacles on Earth," as well as encounter one of the oldest cultures in its traditional settings while contributing to the local economy through ecotourism (Thorsell and Harrison 1990).

The La Ruta Maya transboundary programme will establish an unprecedented four-nation cooperative to manage a multinational ecocultural tourism circuit in the Maya region of Central America. This programme, first conceived in the 1960s by the Organisation of American States and the International Development Bank, would preserve the cultural and biological heritage of the once powerful Mayan empire that spanned southern Mexico, Belize, Guatemala, and El Salvador. The potential of this transboundary cultural project is immense, not only in terms of preserving Mayan culture and architecture, but also in generating revenues for local communities in this poor region. Moreover, the importance of this project goes beyond generating revenue and cultural preservation; it is also an important vehicle with which to foster peace in the region. El Salvador and Guatemala have both suffered serious civil unrest. Cooperative work on this project would generate significant political interest in maintaining regional peace to sustain the benefits of the project.

The success of a cultural TBCA is enhanced when the respective national governments do not perceive a threat to national security in the restoration of the rights of indigenous groups to travel freely across international borders. As Lusigi (pers. comm. 1998), Somé (pers. comm, 1998), Metcalfe (pers. comm., 1998), and Mokombo (pers. comm., 1998) point out, most African governments have inherited an administrative structure from colonial times that inhibits effective governance of indigenous groups split across borders. Certain African governments may be wary of cross-border collaboration due to incursions by rebel insurgents that may be aided by transboundary communities with a sense of dual nationalism. To overcome this fear, it is imperative to build the trust of border groups. One way is to include border indigenous groups in the planning and management of TBCAs.

4.1.3 Economic and socioeconomic benefits from TBCAs

There are important economic and socioeconomic incentives to establish a TBCA. Following are examples of the types of benefits that may ensue.

Non-consumptive economic benefits

- **Tourism**: According to World Bank figures, tourism is second only to oil in generating the world's largest income. In 1994, global tourism generated an estimated U.S. $3,400 billion of gross output, or 10% of global GDP (World Bank 1996). TBCAs can improve opportunities for expanded ecotourism and help diffuse tourist concentrations to achieve high-quality "experiences." This will allow a greater number of tourists to go through multinational destinations and circuits. In addition, TBCA ecotourism would offer tour operators an economy of scale. Hamilton observes:

  It is more cost-effective and satisfying for the tourist to be able to visit more than one park from his or her base, and even pay one admission fee (e.g., boat trips across the border on Waterton Lake for Waterton-Glacier International Peace Park; river rafting between Kluane/Tatshenshini-Alsek/Glacier Bay crossing three jurisdictions and two countries; boat tours down the river border in the bilateral Bohemian-Saxonian Switzerland in Germany and the Czech Republic). (Hamilton 1997)

- **Watershed and catchment maintenance**: TBCAs may protect critical parts of a watershed for maintaining water supply and quality (e.g., watersheds and wetlands act as natural filtration systems and reduce the need for expensive water filtration systems).

Consumptive economic benefits

- **Consumptive use of flora**: Transborder communities often rely on the native wild flora and fauna for subsistence. Allowing these communities larger areas for collecting and harvesting could improve quality of life, as well as reduce reliance on food imports. Moreover, there is a possibility of creating and promoting markets to sell locally harvested food and herbal medicinal plants, thereby creating a source of income and promoting sustainable use of these resources (Reid 1994). These products may aid in preserving indigenous knowledge of native plants and their medicinal and food qualities. This knowledge has important implications for the biotechnology industry and agro-based industries in the host countries, as well as global markets.

- **Agriculture**: Most of the major crops grown in the U.S. originated in other countries, and they depend on infusion of new genes from those countries. According to WRI, the genetic diversity used in plant breeding accounted for about half of the gains in agricultural yields in the U.S. from 1930 to 1980, amounting to some $1 billion in annual additions to the value of U.S. agricultural output. Conversely, loss of genetic diversity places agricultural productivity at risk. For example U.S. farmers lost $1 billion to a disease that swept through uniformly susceptible corn varieties. Similarly, the citrus outbreak in Florida in 1984 can also be blamed on lack of genetic diversity (Reid 1994). Establishing TBCAs would facilitate protection of gene-pool diversity.

- **Forestry and fisheries**: Healthy and biologically diverse ecosystems are the foundation of strong forest and fisheries industries (Reid 1994). For instance, sustainable management of salmon in the Pacific Northwest of North America relies on transboundary cooperation between the U.S. and Canada to maintain rivers important to

the successful propagation of the various salmon species, as well as healthy ecosystems along the northern Pacific coastline.

- **Pharmaceuticals and biotechnology**: Nearly 25% of all U.S. drugs are derived from plants. More than 3,000 antibiotics are derived from microorganisms. Most of these life-saving drugs were discovered while bio-prospecting in the wild. Advances in biotechnology have enhanced pharmaceutical companies' interest in natural products. Biotechnology, a growing sector in the U.S. (and the rest of the world), relies on a stable gene pool and biological diversity from all over the world. Moreover, growth in biotechnology leads to growth in other fields such as pharmaceuticals and agriculture. Today, growth in the biotechnology sector remains substantial. Total product sales for this sector in U.S. totalled $4 billion in 1991 and were projected to top $50 billion by the year 2000 (Reid 1994). Thus, establishing TBCAs along biologically rich borders has significant revenue- sharing potential between border communities and countries.
- **Hunting**: According to World Bank (1996) figures, the market for hunting in southern Africa is "large, price inelastic, and far from being saturated." This market may be further enhanced with the creation of TBCAs, which will foster cooperation between adjoining hunting blocks. Cooperation will depend upon the concessions on each side of the border. Hunting has the potential of generating revenues in areas where farming or any other economic venture may not be feasible.
- **Game ranching**: Several communities in east and southern Africa have benefited from game ranching activities. Transboundary communities may benefit on both sides of the border through similar game-ranching programmes by increasing the amount of land available for wildlife.

Socioeconomic benefits

Aside from the direct economic benefits mentioned above, TBCAs would reunite indigenous groups divided by international borders and possibly assist in preserving indigenous knowledge and cultures. (See above discussion on cultural benefits). TBCAs can also act as a conduit for transborder movement of trade both within and between indigenous groups.

4.1.4 Institutional opportunities and benefits from TBCAs

Establishing TBCAs creates a number of important management opportunities, as follows:

- Cross-border institutional capacity can be increased, especially where one country's institutions are stronger than its neighbours. An example is the TBCA between the Tibet Autonomous Region of China (Quomolongma National Park) and Nepal (Langtang National Park, Makulu-Barun National Park and Kanchenjunga Conservation Area, and Sagarmatha National Park) that creates one of the world's largest networks of protected areas across international borders. With the help of The Mountain Institute, informal information exchange began between the two countries; Tibetan officials gained from the expertise of the Nepalese wildlife and park officials to a point where there is sustained communication between the two nations related to natural resource management, tourism, and cultural exchanges (Sherpa , L., pers. comm. 1997).
- Highly visible, joint activities, such as research and monitoring, technical meetings, and training workshops promote staff morale, transfer of technology and expertise, and information-sharing between neighbouring countries. These activities may lead to

compatible management plans, as well as offer positive and non-threatening activities upon which to base other collaborative efforts (Hamilton 1997).

- Better opportunities for controlled experimentation are created. More importantly, TBCAs would facilitate research on wildlife that regularly cross international borders. This research would have extensive management implications for conservation, sustainable game ranching, and tourism.
- TBCAs could provide a forum for cooperative efforts to limit or eliminate alien species and control disease.

4.1.5 Political benefits of TBCAs

According to McNeil (1990), TBCAs may be established to build confidence and goodwill between border nations, as well as to stimulate transboundary cooperation in resource management. For instance, peace parks along the German, Luxembourg, Belgian, and Dutch borders were established as signs of peace after the Second World War. The La Amistad (Panama and Costa Rica) and Si-A-Paz (Costa Rica and Nicaragua) International Parks in Central America are being established largely to develop a continued dialogue using natural resource management and conservation as gateways to achieve political and economic cooperation (Zbicz and Green 1997; McNeil 1990; Hanks 1997; Katerere 1997).

Other important political benefits include a regional approach to foreign aid to developing countries that may increase economic, socioeconomic, and cultural impacts of the aid along with peace dividends. The major implications for multilateral lending institutions; such as the World Bank and such national agencies as USAID, CIDA, GTZ and NORAD; are clear. These agencies may be able to appropriate foreign aid regionally rather than bilaterally, thus contributing to shared regional economic growth and cooperative natural resource management. This preference among donor agencies for regional over bilateral funding has not been realised due to technical difficulties in multilateral funding. A good example of a donor agency funding a regional TBCA project is the World Bank's Central Asian Transboundary Biodiversity Project proposal between the states of Krygyz Republic, Kazakstan, and Uzbekistan (World Bank 1990a). Although the project is regional, it is being initiated on a country-by-country basis and will slowly build toward regional coordination.

TBCAs and the concept of environmental security

TBCAs are increasingly being considered in the academic community as case studies in which to test alternative hypotheses about how to manage natural resources and boundary disputes. L. Brock of the Peace Research Institute in Frankfurt, Germany examined the importance of the environment's role in peace research:

> *…environmental change—just like the nuclear stalemate between the superpowers—can give rise to new hope. Precisely because it tends to affect us all (at least in the long run), environmental change may force societies to seek cooperation and such cooperation may establish ties that could outlive acute crisis and conflicts. (Brock 1991)*

In matters of environmental security, TBCAs may play an important role by reducing or eliminating the impacts of violence on and over natural resources. As a fledgling academic field, environmental security relates to re-conceptualising national security interests by incorporating the significance of natural resources in the economic, cultural, and social

development of a nation. Mathews (1989) and Kaplan (1994) show how the effects of environmental degradation on human and wildlife populations can lead to conflict over resources and political chaos. Hanks (1997) also points out the effect of military violence on natural resources and its related effects on regional economies. Establishing TBCAs may be considered a first-line of defence to protect regional commons and to cooperatively promote sustainable economic development and peace. Good examples of these exist in Central America where the regional ecological, economic, and sociopolitical realities have made regional cooperation on resource allocation inevitable and necessary. Though it is difficult to develop precise causal linkages between the poverty, armed conflict, debt, and overpopulation in Central America to its ecological problems, it is safe to say that these problems are related (Weed 1994).

Weed (1994) evaluated five peace parks in Central America in order to determine whether they served as important tools in biodiversity conservation and as "concrete manifestations" of a new spirit of regional cooperation and conflict resolution in Central America. The parks examined included La Amistad International Biosphere Reserve (Costa Rica and Panama); Si-A-Paz or the Planned System Areas for Peace (Nicaragua and Costa Rica); Trifinio Trinational Conservation and Development Zone (Guatemala, El Salvador, and Honduras); Maya Biosphere Reserve and related protected areas (Mexico, Guatemala and Belize); and Darien Conservation Zone (Panama and Colombia). Weed concluded that the process of establishing these peace parks had brought these countries closer than before. As these nations attempt to meet the challenges of regional coordination, they are talking and exchanging information on various levels with positive impacts. A significant achievement of the Maya Biosphere Zone is the warming of relations between Guatemala and Belize to an extent that Guatemala has formally recognised Belize's borders. Weed notes:

> *As a result of this and other examples of cooperation and organisation, the flow of international funds for conservation to the area has increased dramatically. Moreover, the relations among the three governments are better now than at any time in the recent past: Mexico is hosting Guatemala's peace talks, and in 1991, Guatemala restored diplomatic relations with Belize, which were severed in 1981 because of ongoing border disputes. (Weed 1994)*

Efforts to create a sustainable transboundary link along the borders of Cambodia, Laos, and Vietnam have similar environmental security implications. Although the efforts are primarily to preserve Indochina's remaining natural forests, which occur mostly on the borders of these countries, the endeavour may also create trust between the three states. In this context, the "Forum for Transboundary Conservation in Cambodia, Laos, and Vietnam," sponsored by WWF and UNDP hopes to establish dialogue and transboundary conservation areas along the national boundaries straddled by the Ho Chi Minh Trail, a powerful regional and worldwide symbol of conflict (Dillon and Wikramanayake 1997).

5. Factors That Contribute To or Inhibit the Establishment and Sustainability of TFCAs: Lessons Learned

Besides the political climate, which will be discussed in the following section, a number of important factors contribute to or inhibit the establishment of TBCAs.

5.1 Contributory Factors

In most cases, the three major factors that influence the establishment of a TBCA are as follows:

- Political will,
- Sustained funding, and
- Involvement of international agencies (nongovernmental organisations [NGOs] and international governmental organisations [IGOs]).

Castro-Chamberlain (1997) explained that success in developing the Si-A-Paz transboundary initiative was better than that of La Amistad because of these three factors. In the case of the La Amistad, political leaders did not convert their publicly displayed intent of establishing the TBCA into action. In contrast, the presidents of Costa Rica and Nicaragua were serious about the Si-A-Paz initiative and signed agreements to work cooperatively. Although these agreements have not passed the legislative process, the governmental agencies, especially both Ministries of Foreign Affairs, remain in periodic contact with each other. The Si-A-Paz was also strengthened by agreements that included funding mechanisms. Finally, Si-A-Paz benefited from the involvement of international agencies that supplied personnel, funding, and technical expertise. Involvement of NGOs has been a major driving force in putting TBCAs on national and international agendas. For instance, as mentioned, the Glacier-Waterton International Peace Park was established largely because of the efforts of Rotary International.

The following factors also contribute to the successful establishment of TBCAs:

Local communities and broad public participation. According to Milich and Varady (1998), who recently published a lessons-learned report on international river-basin accords, most accords tend to be “top down” and lack public participation in the decision-making process. These observations were key reasons for the failure of the accords. Thus, it is imperative that the process of establishing TBCAs include local and public participation.

Informal relationships. Informal exchanges at all levels have often led to more formal arrangements. Also, many TBCAs exist as informal entities driven by relationships formed through exchanges over time at all levels of management, as well as between neighbouring communities.

Regional agreements and organisations. Regional organisations are more effective if driven by local consensus rather than externally by donors and third parties. This affords an opportunity for regional goals to be effectively tackled, using local expertise and knowledge. Excellent lessons are provided by the Central American institution CCAD (Central American Commission for Environment and Development) that was funded by USAID (see Box 1). As an indigenous regional institution, CCAD could focus on local priorities rather than on donor priorities, even though large parts of its funding were from

external sources. In addition to institutions, regional conventions, such as the SPAW Protocol in the Caribbean, play an important role in establishing TBCAs.

Box 1. Lessons Learned from USAID Funding to CCAD

The following is a summary of the major lessons learned from USAID's funding of capacity-building efforts in Central America through the CCAD (Page and Schwartz 1996):

- **Use integrated channels of support**–USAID provided direct support through funding for ongoing technical assistance and collaboration with USAID staff, while also creating access for other donors and government officials. Unfortunately, there has been limited USAID coordination between regional and bilateral units in Central America. This somewhat constrained the progress CCAD had made in national environmental policy coordination.
- **Support local priorities**–Technical assistance was provided by USAID to facilitate Central American priorities, along with building national institutional capacity.
- **Support local leaders**–USAID provided programmatic assistance to the presidents and ministers, while promoting a lean organisation that focused on meeting the goals of the leaders without the bulky apparatus of large bureaucratic institutions.
- **Support appropriate institutional structures**–USAID supported CCAD's commitment to keep itself small and flexible, while providing state-of-the-art financial management and funding diversity from various sources.
- **Support appropriate capacity-building measures**–Examples include initiatives that promoted participatory and consultative methods for environmental policy-making by involving stake-holders in a vertical decision-making processes on regional agreements.

The SPAW Protocol provides a number of key lessons (de Fontaubert and Agardy 1998), including the following:

- It adopts a two-tiered approach, whereby the general and common objectives are agreed upon, but implementation is left to each state. Implementation by each state is based on the level of economic development, resource capabilities, and the dependence on the resources.
- Rather than imposing strong obligations, it aims to facilitate technical and scientific research and mutual assistance.
- Its underlying foundation is based on the ecology of the region and the necessary criteria for the longevity of the ecosystem.

  In the case of protected areas where the goal is the protection of the ecosystem and its processes, the underlying ecology in the region dictates the outer boundaries of the area to be protected...marine protected areas planners need to work towards conserving ecosystem integrity and thus to design networks of marine protected areas. Three approaches can be adopted in designating networks: preserving ocean or coastal "wilderness" areas; resolving conflicts among users; or restoring degraded or over-exploited areas. (de Fontaubert and Agardy 1998)

Established protected areas on both sides. Designation of protected areas on both sides of an international border facilitates the process by 1) demonstrating the importance of the natural resources to each state and 2) encouraging a commitment by the states toward conservation. Protected areas on both sides of an international border may be able to facilitate efforts to conduct joint research and solve common management problems under the auspices of a TBCA.

International recognition as World Heritage Sites or Biosphere Reserves. Weed (1994) shows that designating the protected areas comprising the TBCAs in Central America as World Heritage Sites or Biosphere Reserves demonstrates to the local communities the global importance of the resources and instils a sense of pride that has tended to speed up the process (see Box 2). In addition, these designations are usually accompanied by donor funding.

Highly visible "target" species driving cooperative efforts. The presence of the endangered snow leopard and Marco Polo sheep and efforts to protect them are strongly influencing the establishment of the Khunjerab and Taxkorgan TBCA. Protection of the endangered mountain gorilla habitat may be a strong factor that could join the Virunga National Park and Rutshuru Hunting Zone in the Democratic Republic of Congo, Mgahinga Gorilla National Park and Bwindi Impenetrable Forest National Park in Uganda, and Volcans National Park in Rwanda to form a TBCA.

High-level demand to establish a political symbol of cooperation (regardless of ecological or cultural factors). This demand has facilitated the establishment of many TBCAs in post-Second World War Europe.

High level of cooperation between bordering communities, local management authorities, and central government agencies. Such cooperation has been the case for TBCAs between Nepal and Tibet, where the process has included community participation and other significant stakeholders.

Box 2. Lessons Learned from Central America's "Peace Parks"

The following factors were considered important in the process of establishing five "peace parks" in Central America (Weed 1994):

- **Intergovernmental agreements**, such as the CCAD.
- **Geography**. Most of the areas of these parks were isolated and inaccessible.
- **Political and economic climate**. Central American countries were similar in wealth, political stability and culture. This homogeneity of conditions facilitated the establishment of TBCAs. Moreover recent violent upheavals along the Si-A-Paz TBCA left a legacy of minefields that make the park inaccessible and contribute to its pristine state.
- **Official international (UN) designations**. These provided both international recognition and a concomitant inflow of funding.
- **Involvement of NGOs**. NGOs have been extremely instrumental in providing on-the-ground technical expertise and lobbying national governments about the importance of these TBCAs.

5.2 Barriers to the Establishment and Sustainability of TBCAs

Most TBCAs fail to materialise due to lack of sustained funding from the relevant national governments and from donors. Lack of necessary funding is one of the major obstacles in completing the La Amistad TBCA in Central America, primarily because of donor difficulties in appropriating funds regionally. One way to overcome this hurdle, according to Lusigi (pers. comm., 1998), is through Trust Funds. They may be one of the only truly viable options, as they can be managed for specific TBCA communities. However, trust funds also can suffer the consequences of failing global markets and political corruption. Other funding solutions include special donor country programmes, such as the U.S. Fish and Wildlife Service's Foreign Currency Program (see Box 3).

Box 3. A Funding Measure: U.S. Fish and Wildlife Service's Special Foreign Currency Program

Section 8(a) of the Endangered Species Act authorised the Department of the Interior to use foreign currencies owned by the United States for programmes to conserve threatened and endangered species in countries where such currencies are available. As the primary U.S. agency responsible for endangered species conservation, the Fish and Wildlife Service (FWS) has received congressional approval since 1976 to use such currencies in Egypt, Pakistan, and India. Nearly 100 species found in these three countries appear on the U.S. List of Endangered and Threatened Wildlife and Plants.

Generally, activities are conducted at the request of the foreign country, and carried out with its full participation. They fall into several broad categories: research, public awareness and professional training, and resource management. Egypt, Pakistan, and India differ in their flora and fauna, as well as in their management methods. While the FWS's approach in each country is consistent, the composition and structure of each programme vary.

Although the overall programme is coordinated in the FWS's Office of International Affairs, activities take place in the individual countries, using local personnel, with U.S. and international assistance as needed. Universities, NGOs, private foundations, State conservation departments, and federal agencies other than FWS may be called upon to provide expertise. The FWS has conducted multi-year projects under formal agreements, surveying endangered species and their habitats and developing management policies and plans for ecologically important areas. Funds have been used to produce environmental education materials, including films and posters in English and local languages; training activities enhancing local institutional capabilities; and cooperative international symposia on endangered species and their habitats. Also, they have been used to enhance ongoing efforts of host governments to encourage self-sufficient wildlife conservation activities and to help countries, such as Egypt and India, to establish regional programmes for wildlife conservation.

Source: USFWS (1998). *Special Foreign Currency Program*. USFWS/International Affairs: Washington, DC. (http://www.fws.gov/r9dia/global/sfcp.html) July 23, 1998.

Other important constraints include:

High political and economic transaction costs. States that have had strained relations for a number of years may not have the capacity or the sustained political will to undertake the lengthy negotiations required for establishing TBCAs. Assistance from NGOs, IGOs, and international conventions can significantly reduce these transaction costs by offering a forum for negotiation and funding. In areas where high opportunity costs favour present land-tenure patterns, it may be difficult for nations to alter consumption of natural resources patterns, especially if a state may not benefit as much from the TBCA as the neighbouring state would.

Unequal capacity and support, as well as conflicts of interest, among competing NGOs and IGOs. As Castro-Chamberlain (1997) pointed out, although the Si-A-Paz initiative achieved healthy levels of binational coordination, the fact that donors viewed Nicaragua more favourably than Costa Rica and gave that country more help dampened Costa Rica's interests to an extent that inhibited success.

Time involved in establishing a TBCA. A constraint that was pointed out by most people interviewed during this study was the time involved in establishing a TBCA. Establishing a TBCA is a lengthy and complex process that cannot and should not be forced, due to the large numbers of stakeholders involved. Many TBCAs may never get established because sustaining a political will over a number of years is required. Differing interests and priorities of succeeding governments may inhibit this process.

Unequal protected status on either side of the border. Protected areas on both sides of an international border may be of unequal status; for example, one side could be an area where hunting is allowed and the other a strict wildlife preserve. This unequal status raises many important issues related to resource conservation and utilisation that may not be easily solved. The ongoing discussions between Pakistan and China to establish the Taxkorgan-Khunjerab TBCA provide an important lesson in joining adjacent protected areas with unequal status, as the negotiations are lengthened due to the participation and input of local communities.

Unequal capacity of wildlife departments and other management authorities. This constraint may be an opportunity in disguise. As to overcoming unequal management capacity, joint training programmes and exchange of personnel may facilitate the sharing of knowledge and creating strong ties between the relevant management departments. These activities and bonds will assist in successfully establishing TBCAs.

In addition to the above constraints, several others should be noted, including:

- Unequal benefit-sharing between countries and between stakeholders,
- Incompatible or warring bordering communities,
- Attitudes and perception of local people toward wildlife issues that are inconsistent with TBCA goals, and
- Language barriers (both local and national languages).

6. Process of Establishing a TBCA

Before the stages that lead to the successful establishment of TBCAs are examined it is worthwhile to note that they do not require a formal international agreement or treaties, although this generally remains the best-case scenario. TBCAs are known to exist through informal cooperative agreements and have done remarkably well. For example, transboundary cooperation to manage parks and reserves along the Nepal and Tibet border is informal and has been successful in generating ecotourism and achieving a number of conservation objectives. This informal status in no way reflects the enormous amount of cross-border facilitation and consultations on sustainable resource management, tourism, and capacity building that occurs between the China and Nepal.

6.1 TBCA Typology

It is important to realise that whatever the reason for creating a TBCA—cultural, ecological or economic, TBCA creation remains essentially a political process and depends largely on the political climate that exists at the time. Based on the political climate there may be three broad arrangements/types of TBCAs (Table 5).

Table 5. TBCA Typology Based on Political Climate

Type of TBCA	*Political Climate*	*Primary Reason for Establishing TBCA*	*Examples*
Co-management (informal/ formal) De Jure TBCA	Warm relations	Ecological, cultural, or economic; as well as political symbols of friendship	• Glacier-Waterton International Peace Park between U.S. and Canada • Khunjerab and Taxkorgan TBCA between China and Pakistan
Complementary management (informal/ formal) De Jure TBCA	Cool but peaceful relations or post-war	Ecological, cultural, or economic; as well as to establish political symbols of friendship	• Quomolongma and Makula Barun TBCA between Nepal and Tibet Autonomous Region in China • Greater Serengeti Ecosystem between Kenya and Tanzania • A number of European parks after World War II
De Facto TBCA with little or no cooperation	Tense or strained relations	To establish a zone of peace	• Demilitarized zone between North and South Korea

Source: Singh (1997).

- ***Co-management***. When countries have cordial relations, the potential for creating TBCAs is excellent. Resulting TBCAs can be solidified formally through a treaty or informally through cooperation between corresponding resource management agencies. Where the economic conditions in both countries are similar, the process of cooperation may be easier than between countries with vastly differing economic conditions. Initiatives include creating a transboundary biosphere reserve between the U.S. and Canadian border,

running from Acadia National Park in the U.S. to Fundy National Park in Canada. Other examples include TBCAs in Central America, such as the La Amistad and Si-A-Paz (see Section 5).

- ***Complementary management***. When countries share peaceful, albeit cool, relations, the potential exists to warm the relationship by creating TBCAs to manage transborder ecosystems while sharing the TBCA's economic, social, and ecological benefits. Issues of sovereignty may not allow co-management, but complementary management maybe effective. In complementary management arrangements, the park agencies, through informal or, at times, formal consensus, agree to harmonise management methods. This type of management could lead to improved bilateral relations and possible co-management of border resources.

  An example of this type of TBCA is the Greater Serengeti Ecosystem, which has significant ecological and cultural importance. However, due to the unpredictable nature of the intergovernmental relations between Kenya and Tanzania, there has been little cooperation to manage this potential TBCA. Yet, there exists an exciting and unparalleled opportunity to build trust and goodwill between the two nations by establishing a TBCA that encompasses the entire Serengeti. This TBCA may also contribute quite favourably to their respective economies through tourism and its related industries.

  Additionally, after a major conflict or historically hostile relations, confidence-building measures can include creating TBCAs. Post Second World War saw a number of TBCAs created between Germany and its neighbours as symbols of peace.

- **De-facto *management***. Border parks can help countries maintain an uninhabited buffer zone to reduce border tensions. The concept of an international network of border parks as "zones of peace" is one of great potential (Thorsell 1990). For instance, establishing a TBCA between Turkey and Greece along the Evros River boundary is proposed to help protect the Lake Gala wetland site, an important resource for both nations. A classic example of a *de facto* TBCA that helped protect biodiversity between nations with tense, strained relations is the demilitarized zone (DMZ) between North and South Korea, which has become a *de facto* wildlife refuge.

The above levels may also be viewed as a dynamic path along which neighbouring nations may establish warmer relations through the establishment of TBCAs. For instance, in the 1980s, Guatemala and Belize had strained relations, as Guatemala did not recognise Belize's borders. Through regional institutions and discussions over the establishment of the La Ruta Maya cultural TBCA, a thawing of relations occurred, which eventually contributed to Guatemala recognising Belize's borders. The La Ruta Maya TBCA between the two nations may now be considered a complementarily managed TBCA.

6.2 Guidelines for Establishing a TBCA

Although TBCAs are not considered common property under international law, it is possible to apply the principles of common property management in order to develop management structures. Ostrom (1996) presented a set of design principles for common property regimes, which may be applied to TBCAs. It is important to realise that these guidelines are at best a framework and not a blueprint for designing TBCAs. Establishing TBCAs is driven by high levels of informal information-sharing, coordination, and leadership. The following TBCA design guidelines are adapted from

Ostrom's design principles for the management of natural resources shared by two or more communities:

1. ***Clearly defined boundaries***: Given the realities of modern-day governments, clearly defined borders help administrations allocate control to corresponding authorities. Boundaries must be clear to avoid confusion among competing land management bodies. However, demarcating boundaries may be difficult as tribal heritage territory borders, as well as ecosystem boundaries, tend to be fluid. Thus, it is important to stress the reasons that the TBCA is being established.
2. ***Collective-choice arrangements***: Regardless whether the TBCA is being co-managed or complementarily managed, an informal or (preferably) formal institutional framework for decision-making needs to established, where the interests of the various stakeholders are heard.
3. ***Conflict-resolution mechanisms***: Along with collective-choice arrangements, methods for resolving and dealing with conflicts are necessary. These mechanisms need to be low-cost, with easy access.
4. ***Monitoring and evaluation***: It is important that ecological, social, and economic indicators be designed that can be effectively monitored and that assumptions can be verified.
5. ***Nested enterprises***: Management of TBCAs need to be organised in both horizontal and vertical multi-layered, nested institutions at the local, regional, national, and international governmental jurisdictions.

   Consequently, among long-enduring, self-governed resources, smaller-scale organisations tend to be nested in ever-larger organisations. It is not at all unusual to find a larger, farmer-governed irrigation system, for example, with five layers of organisation each with its own distinct set of rules. In the Swiss Alps, day-to-day operational decisions have been made by local communities, while larger governance units have had the responsibility to monitor local performance by doing periodic, careful site visits on a rotational basis. (Ostrom 1998)
6. ***Role of contextual factors***: It is important to examine the contextual factors of each TBCA, including the physical setting and the relevant legal, political, social, and economic factors that are pertinent to TBCA establishment.

The process of establishing TBCAs is graphically represented in the Stages of TBCA Establishment (Figure 2). These stages can then be compared to the steps on establishing a TBCA between Pakistan and China (Figure 3). The model is a suggested format, as contextual factors play important roles in the variety of processes that a TBCA undergoes during establishment. Also, the stages focus on established protected areas on both sides, which can be used as core portions of a larger TBCA.

Figure 2. Stages of TBCA Establishment

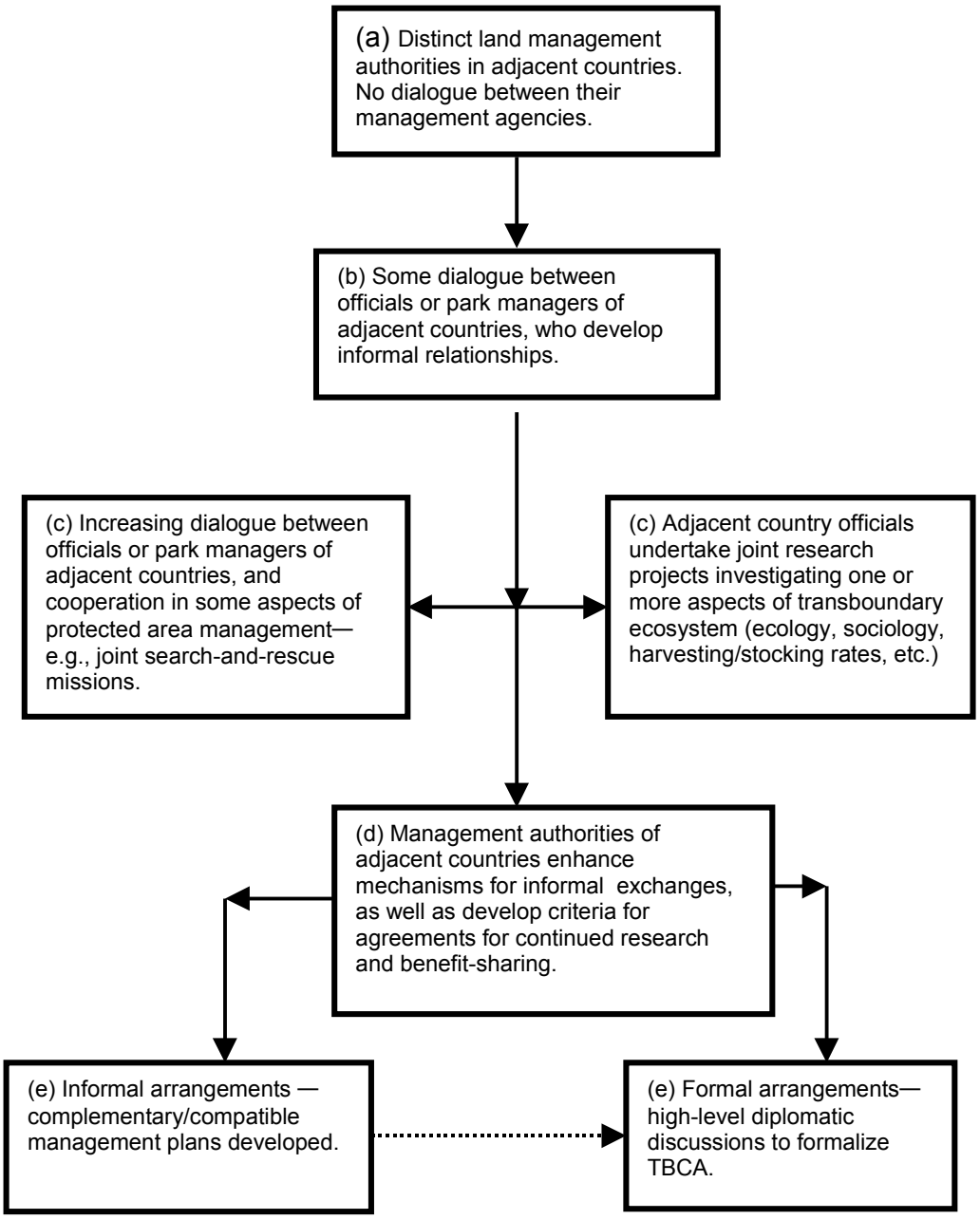
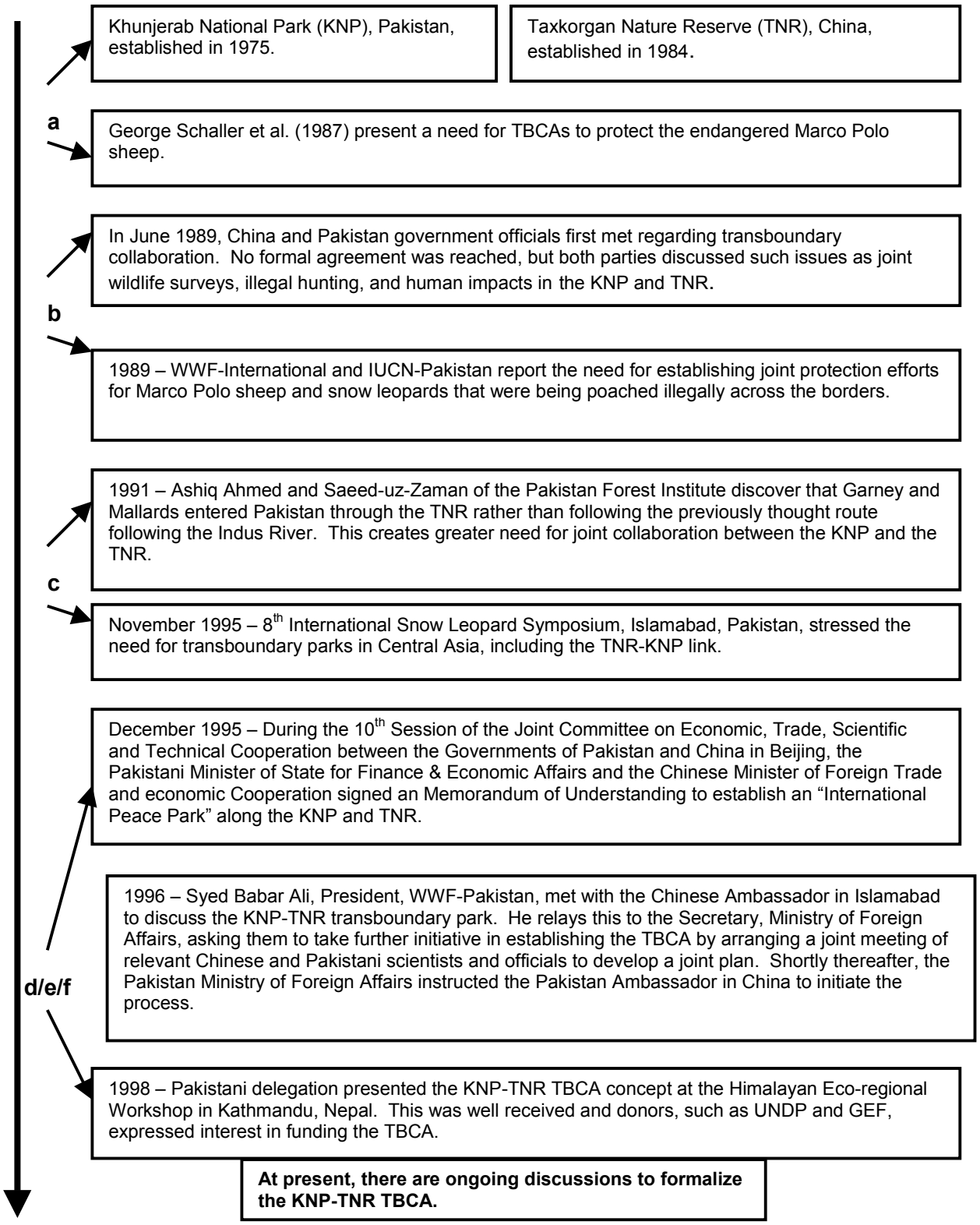


Figure 3. The Formation of a Central Asian TBCA: Linking the Khunjerab National Park, Pakistan with the Taxkorgan Nature Reserve, China*



* Letters a-e correspond to the stages of TBCA establishment in Figure 2.

TBCA planning involves not only discussions on the protection of biodiversity, but other aspects as well (see Box 4).

Box 4. Various Aspects of Joint Collaboration of TBCAs

—Regional management plans for wildlife

—Joint hunting/culling quotas

—Grazing regimes

—Plant harvesting quotas

—Water management

—Community-based natural resource management activities

—Local management of resources

—Border security geared toward natural resource management

—Opportunity for transborder movement of pastoralists/nomadic groups

—Opportunity for local transborder trade

7. Conclusion

TBCA formation is still a new concept in which the potential benefits of TBCAs are yet to be realised to make any definitive statements. However, the potential does exist, through TBCAs, to foster political cooperation and sustainable cross-border ecosystem management. In developing plans for TBCAs, three distinct questions need to be addressed (Miller 1996):

1. How do you create national and regional capacity to manage complex and integrated programmes?
2. How do you enhance and/or link current institutions, as well as identify new ones? and
3. How do you establish a meaningful dialogue with and include interests of all stakeholders involved?

Based on the literature reviewed, the following principles are critical in order to address the above questions:

- ***Focus on the ecoregional biodiversity***: Since an ultimate goal is to conserve biodiversity, the plan must be ecologically sound.
- ***Focus on sustainable use***: Based on sound ecological principles, TBCA management must recognise the interests of communities dependent on the resources. Thus, plans must include channels for multiple stakeholder participation and mechanisms to deal with competing resource use.
- ***Seek long-term political commitment and involve public participation***: States involved must be committed to a long-term action plan that involves multiple layers of bureaucracy. Moreover, in many cases, national governments may find it necessary to involve NGOs and local communities in partnerships to build capacity and manage these resources.
- ***Adopt adaptive management***: Since TBCA management is a learning process, institutions need to flexible enough to make rapid and effective decisions.

These principles are evident in the efforts to establish Central American TBCAs, as described in Section 5. Establishing TBCAs is a complex and lengthy process. The better the confidence, trust, and informal relationships developed, the more sustainable the TBCA will be. Thus, in addition to the above points, long-term funding and political commitments are needed to establish frameworks for success. Moreover, before any gains may be realised, it is important that efforts to establish TBCAs be harmonised with the economic and development policies of these nations.

References

Asiwaju, A. I. (1985a) The Conceptual Framework. In A. I. Asiwaju (ed.). Partitioned Africans: Ethnic Relations across Africa's International Boundaries, 1884-1984 (pp. 1-18). Lagos, Nigeria: University of Lagos Press.

Asiwaju, A. I. (1985b) The Global Perspective and Border Management Policy. In A. I. Asiwaju (ed.). Partitioned Africans: Ethnic Relations across Africa's International Boundaries, 1884-1984 (pp. 233-251). Lagos, Nigeria: University of Lagos Press.

Asiwaju, A. I. (1985c) Partitioned Culture Areas: A Checklist. In A. I. Asiwaju (ed.). Partitioned Africans: Ethnic Relations across Africa's International Boundaries, 1884-1984 (pp. 252-259). Lagos, Nigeria: University of Lagos Press.

Bailey, R. G. (1996). Ecosystem Geography. New York: Springer-Verlag, Inc.

Blake, G. (1993). Transfrontier Collaboration: A Worldwide Survey. In Westing, A. H. (ed.). Transfrontier Reserves for Peace and Nature: A Contribution to Human Security, (pp. 35-47). Nairobi, Kenya: United Nations Environment Programme.

Blake, G. (1997). The Geopolitics of Transboundary Cooperation: An Overview. In the Conference Proceedings of the Parks for Peace: International Conference on Transboundary Protected Areas as a Vehicle for International Co-operation (Draft of 30 January, 1998). Gland, Switzerland: IUCN.

Brock, L. (1991) Peace through Parks: The Environment on the Peace Research Agenda. Journal of Peace Research, (vol. 28:4), pp. 407-423.

Castro-Chamberlain, J. (1997) Peace Parks in Central America, Successes and Failures in Implementing Management Cooperation. In the Conference Proceedings of the Parks for Peace: International Conference on Transboundary Protected Areas as a Vehicle for International Co-operation (Draft of 30 January, 1998). Gland, Switzerland: IUCN.

de Fonatubert, A. C. and Agardy, T. (1998) "Critical Analysis of the SPAW Protocol: The Dilemma of Regional Cooperation." In press. Washington, DC: IUCN-US.

Desanker, P.V., P.G.H. Frost, C.O. Frost, C.O. Justice, and R.J. Scholes, (eds.). (1997). The Miombo Network: Framework for a Terrestrial Transect Study of Land-Use and Land-Cover Change in the Miombo Ecosystems of Central Africa, IGBP Report 41. Stockholm, Sweden: The International Geosphere-Biosphere Programme (IGBP).

Dillon, T. C. and Wikramanayake, E. D. (1997). A Forum for Transboundary Conservation in Cambodia, Laos, and Vietnam. Hanoi, Vietnam: WWF and UNDP.

Finnemore, M. (1996). National Interests in International Society. Ithaca, New York: Columbia University Press.

Griffiths, I. L. (1995) African Boundaries and National Parks. In Blake, G. et al (ed.), The Peaceful Management of Transboundary Resources, (pp. 357-370). London: Graham & Trotman/Martinus Nijhoff.

Grundy-Warr, C and Rajah, A. (1997) Security, Resources and People in a Borderlands Environment: Myanmar and Thailand. In Blake, G., et al. (ed.), International Boundaries and Environmental Security: Frameworks for Regional Cooperation. London, The Hague and Boston: Kluwer Law International.

Hamilton, L. (1997) Guidelines for Effective Transboundary Cooperation: Philosophy and Best Practices. In the Conference Proceedings of the Parks for Peace: International Conference on Transboundary Protected Areas as a Vehicle for International Co-operation (Draft of 30 January, 1998). Gland, Switzerland: IUCN.

Hanks, John. (1997) Protected Areas During and After Conflict: The Objectives and Activities of The Peace Parks Foundation. In the Conference Proceedings of the Parks for Peace: International Conference on Transboundary Protected Areas as a Vehicle for International Co-operation (Draft of 30 January, 1998). Gland, Switzerland: IUCN.

Hardin, G. (1968). The tragedy of the commons. Science 162:1243-8.

Hargreaves, J.D. (1985) The Making of Boundaries: Focus on West Africa. In A. I. Asiwaju (ed.). Partitioned Africans: Ethnic Relations across Africa's International Boundaries, 1884-1984 (pp. 19-27). Lagos, Nigeria: University of Lagos Press.

Jackson, R., and A. Ahmad. (1995) (ed). *Proceedings of the Eighth International Snow Leopard Symposium*. International Snow Leopard Trust and WWF-Pakistan.

Kaplan, R. D. (1994) The Coming Anarchy. The Atlantic Monthly, vol. 273, pp. 44-76.

Katerere, Y. (1997) Parks Without Peace. In the Conference Proceedings of the Parks for Peace: International Conference on Transboundary Protected Areas as a Vehicle for International Co-operation (Draft of 30 January, 1998). Gland, Switzerland: IUCN.

Keohane, R. O. (1984). After Hegemony: Cooperation and Discord in the World Political Economy. Princeton, New Jersey: Princeton University Press.

Keohane, R. O. (1989). International Institutions and State Power: Essays in International Relations Theory. Boulder, San Francisco and London: Westview Press.

Keohane, R. O. and Goldstein, J. (ed.s). (1993). Ideas and Foreign Policy: Beliefs, Institutions, and Political Change. Ithaca, New York: Cornell University Press.

Krasner, S. D. (1986). International Regimes, fourth printing, paperback edition. Ithaca, New York: Cornell University Press.

Krasner, S.D. (1993) Westphalia and Beyond. In: R.O. Keohane and J. Goldstein (ed.s). Ideas and Foreign Policy: Beliefs, Institutions, and Political Change. Ithaca, New York: Cornell University Press.

Krukoski, W. R. M. "Frontiers and Boundaries." Article obtained from the author that is posted on the internet at: http://www.info.lncc.br/wrmkkk/artigoi.html, July 30, 1998.

Leader-Williams, N., Kayera, J.A. and Overton, G.L., Eds. (1996) Community-based conservation in Tanzania. Gland, Switzerland and Cambridge, UK: IUCN.

Lieff, B. and Lusk, G. (1990) Transfrontier Cooperation between Canada and the US. In J. Thorsell (ed.), Parks on the Borderline: Experience in Transfrontier Conservation (pp. 39-49). Gland, Switzerland: IUCN.

Litfin, K. T. (1998). The Greening of Sovereignty in World Politics. Cambridge, MA: The MIT Press.

Machlis G.E. and D.L Tichnell, (1985). The State of the World's Parks: an International Assessment for Resource Management, Policy and Research. Boulder, Colo.: Westview Press.

Mathews, J. (1989) Redefining Security. Foreign Affairs, vol. 68, pp. 162-177.

McNeely, J. A. (1993). Conservation and Development: How Protected Natural Areas Can Contribute to Local Communities. In Westing, A. H. (ed.). Transfrontier Reserves for Peace and Nature: A Contribution to Human Security, (pp. 48-58). Nairobi, Kenya: United Nations Environment Programme.

McNeil, R. J. (1990) International Parks for Peace. In J. Thorsell (ed.), Parks on the Borderline: Experience in Transfrontier Conservation (pp. 39-49). Gland, Switzerland: IUCN.

Milich, L. and Varady, R. G. (1998). Managing Transboundary Resources: Lessons From River-Basin Accords. Environment, vol. 40, no. 8., pp. 10-41.

Miller, K. R. (1996). Balancing the Scales: Guidelines for Increasing Biodiversity's Chances Through Bioregional Management. Washington, DC: World Resources Institute.

Odegaard 1990. In: *Parks on the Borderline: Experience in Transfrontier Conservation*, ed. J. Thorsell. Gland: IUCN.

Ostrom, E. (1996) Governing the Commons: The Evolution of Institutions for Collective Action. (7th ed.) Cambridge University Press: New York City.

Ostrom, E. (1998). "Scales, Polycentricity, and Incentives: Designing Complexity." In Guruswamy, L. D. and McNeely, J. A. (ed.s). Protection of Global Biodiversity: Converging Strategies. Durham, NC: Duke University Press.

Page, K and Schwartz, M. (1996). USAID Capacity Building in the Environment: A Case Study of the Central American Commission for Environment and Development. Washington, D.C.: USAID.

Phiri, S.H. (1985) National Integration, Rural Development and Frontier Communities: The case of the Chewa and the Ngoni astride Zambian boundaries with Malawi and Mozambique. In A. I. Asiwaju (ed.). Partitioned Africans: Ethnic Relations across Africa's International Boundaries, 1884-1984 (pp. 105-126). Lagos, Nigeria: University of Lagos Press.

Reid, W. (1994). "Testimony in Support of Senate Ratification of the Convention on Biological Diversity given to the Senate Foreign Relations Committee." Washington, DC.

Schrijver, N. J. (1993). Sovereignty and the Sharing of Natural Resources. In Westing, A. H. (ed.). Transfrontier Reserves for Peace and nature: A Contribution to Human Security, (pp. 21-34). Nairobi, Kenya: United Nations Environment Programme.

Shine, Clare. (1997). Legal Mechanisms to Strengthen and Safeguard Transboundary Protected Areas. In the Conference Proceedings of the Parks for Peace: International Conference on Transboundary Protected Areas as a Vehicle for International Co-operation (Draft of 30 January, 1998). Gland, Switzerland: IUCN.

Singh, J. (1997) "Transfrontier Conservation Areas – Creating Opportunities for Cooperation," presented at the Seventh Biennial Linear Parks Conference, September 11-13, 1997, Lake Junaluska, NC. Due to be published as part of proceedings Summer 1998.

Thorsell, J. (1990a). Through Hot and Cold Wars, Parks Endure. Natural History, vol. 6/90, pp. 59-60.

Thorsell, J. and Harrison, J. (1990) Parks that Promote Peace: A Global Inventory of Transfrontier Nature Reserves. In J. Thorsell (ed./), Parks on the Borderline: Experience in Transfrontier Conservation (pp. 3-21) Gland, Switzerland: IUCN.

Trolldalen, J. M. (1992) International Environmental Conflict Resolution: The Role of the United Nations. Oslo, Norway and Washington, D.C.: World Foundation for Environment and Development.

Weed, T. J. (1994) Central America's "Peace Parks" and Regional Conflict Resolution. International Environmental Affairs, (vol. 6), pp. 175-90.

Westing, A.H. (1998) Establishment and management of transfrontier reserves for conflict and prevention and confidence building. Environmental Conservation 25(2): 91-94.

World Bank 1990A Kyrgyz Republic – GEF Central Asian Transboundary Biodiversity Project Document. Washington, DC. World Bank

World Bank. (1996). Mozambique. Transfrontier Conservation Areas Pilot and Institutional Strengthening Project. Report No.15534-MOZ. Washington, DC: World Bank.

WCMC. (1997). Natural Datasheet on the Serengeti National Park. Cambridge, UK: WCMC. (http://www.UNesco.org/whc/nwhc/pages/sites/main.htm).

WWF-US. (1998). Proceedings: Ecoregion-Based Conservation Workshop held January, 1998 in Washington, DC. Washington, DC: World Wildlife Fund-US.

Young, O. R. (1989). International Cooperation: Building Regimes for Natural Resources and the Environment. Ithaca, New York: Cornell University Press.

Zbicz, D. and Green, M. (1997) In the Conference Proceedings of the Parks for Peace: International Conference on Transboundary Protected Areas as a Vehicle for International Co-operation (Draft of 30 January, 1998). Gland, Switzerland: IUCN.

Appendix: List of Contacts

I would like to thank and acknowledge the following people who were instrumental in providing me with critical information and ideas concerning TBCAs.

Alcorn, Janis - Director, Asia and Pacific, BSP, 1250 24th Street, NW, Washington, DC 20037.

Bisson, Jerry - Biodiversity Team Leader, G/ENV, USAID.

Bruce, John - Land Tenure Center, Madison, WI.

Chang, Elsa - World Resources Institute, Washington, DC.

Freundenberger, Mark - Chemonics, Madagascar.

Gill, Cynthia - Biodiversity Specialist, G/ENV, USAID.

Jackson, Rodney - Conservation Director, The International Snow Leopard Trust, 4649 Sunnyside Ave., North, Suite 325, Seattle, Washington 98103.

Lusigi, Walter - Senior Environmental Specialist, Natural Resources Management, GEF Secretariat, 1818 H Street, NW., Washington, DC 20433.

Marks, Stuart - Director Research and Community Development, Safari Club International, 441-E Carlisle drive, Herndon, Virginia 20170.

Mishra, Hemanta Raj - Biodiversity Specialist, GEF Secretariat, 1818 H Street, NW., Washington, DC 20433.

Newman, Kate, Director - East and Southern Africa, WWF-US, 1250 24th Street, NW, Washington, DC 20037.

Oglethorpe, Judy - Executive Director, BSP, 1250 24th Street, NW, Washington, DC 20037.

Orians, Gordon - Professor Emeritus, Dept. of Zoology, University of Washington, Seattle, WA 98195.

Osofsky, Steve - WWF-US, 1250 24th Street, NW, Washington, DC 20037.

Pratt, D. Jane, President and CEO, The Mountain Institute, Dogwood and Main Street, Franklin, West Virginia 26807.

Rowen, Mary, AAAS Science and Diplomacy Fellow, G/ENV, USAID.

Sherpa, Mingma - WWF-US, 1250 24th Street, NW, Washington, DC 20037.

Somè, Laurent - Senior Program Officer, BSP, 1250 24th Street, NW, Washington, DC 20037.

Symington, Meg - WWF-US, LAC, 1250 24th Street, NW, Washington, DC 20037.

Waugh, John - Senior Program Officer, IUCN-US, 1616 P Street, NW, Washington, DC.

Weickoff-Baird, Barbara - Independent Consultant, Silver Spring, Maryland.

Wetterberg, Gary - Ecosystem Management Coordination, USDA Forest Service (NFS), 1400 Independence Avenue SW, Washington, DC 20250-1104.