

Opportunities for Transfrontier Protected Areas in Northern Pakistan

A very large number of possible candidates for transboundary protected areas exist, among Pakistan's neighbours, as well as within Pakistan, that could provide significant rehabilitated habitat for snow leopards if managed as complete ecological units. This assertion cannot yet be quantitatively proven, but sufficient anecdotal evidence is accumulating for researchers and snow leopard advocates to begin to reach consensus in this regard.

Chief among these are observations, including photographic evidence, that are emerging from the "Biodiversity Conservation Through Rural Community Development" project which is being implemented by IUCN (Gilgit) with funding from UNDP's Global Environment Facility Project. More and more reports from the project's six valleys speak of cattle depredation and hunting by snow leopards, and some of this information, besides having legitimacy as traditional knowledge, is also undoubtedly "scientifically" true. Government biologists regularly receive reports of winter-time goat and yak depredation, especially in spring, which could indicate an increase in snow leopard numbers or activity or alternatively a decline in natural prey species, forcing the predator closer to human settlements. Species like ibex (*Capra [ibex] sirbirica*) are being protected by some communities, including those at Hushe in the hopes of promoting and sustaining a trophy-hunting program. However, no census of snow leopards has been conducted, so that population estimates remain "guesstimates" at best; the paucity of data is appalling.

This paper has been prepared solely to identify some significant areas that may ultimately be available for habitat protection for snow leopards and other wildlife (see Figure 1). Unfortunately, hunting reports from Tajikistan and Afghanistan may entirely forestall the potential benefit of protecting such areas. Nevertheless here they are important.

Snow Leopard Habitats in the Karakorum

Although there are many areas worthy of leopard habitat protection in the Karakorum and Hindu Kush mountain ranges, many are indeed already protected (small and large). It is worthwhile to summarize the jewels in this crown. The most basic lesson learned by the Government of Pakistan with respect to major national parks began, with the now infamous Khunjerab National Park. One of three new officially gazetted parks in northern Pakistan (August 1996).

Khunjerab National Park: This is a 2270 km² area in northern Hunza that straddles the Karakorum Highway (KKH) to the Chinese border at the Khunjerab Pass. Most of Shimshal and the Khunjerab valley are included, but currently, only the area along the KKH is being actively managed. Wildlife biologist George B. Schaller recommended the establishment of this park in 1975 to the then Prime Minister, Zulfikar Ali Bhutto, who declared it such by fiat (Schaller 1979). Virtually nothing was done after the declaration. Marco Polo sheep (*Ovis ammon polii*), a magnificent species which was once abundant in the Khunjerab Pass region, were almost wiped out, ostensibly by the activities of the government's border guards. They may be slowly recovering thanks to efforts by WWF to develop sound management practices that respect the rights of local communities and directly involve them in decision making and resource management. Snow leopards and their sign have been

recently sighted in the area in fair numbers (Rodney Jackson pers. comm.). Efforts in this park must reform the national parks approach applied in the rest of Pakistan. The Khunjerab National Park (KNP) is staffed by officials from the Forestry Department, but local staff are under-equipped and untrained. The park office operates with an administrative headquarters in Gilgit by staff who seldom the field. Thus, wildlife protection has de facto become the responsibility of those villagers living near the park, and until WWF-Pakistan negotiated an agreement in which traditional grazing rights will be honored or alternatives provided, frequent requests for compensation for livestock killed by predators were made.

Figure 1:
Potential Leopard Recovery
Areas in Pakistan

In August 1996, the Government of Pakistan officially approved the Management Plan for Khunjerab, after years of consultation in an effort to improve relations with people from the Shimshal valley, who became involved in the discussion of the initial approach to Central Karakorum National Park as well. While initially antagonistic, the dialogue proved helpful to most local communities. However, it was discovered that there were gazetted boundary overlaps that remain unresolved today, and which must therefore be rationalized if management goals are to be achieved.

The new management plan details the twenty years of difficulty with considerable candor, which is unusual in Pakistan (at least without

recriminations). But quoting from the Management Plan itself (WWF-Pakistan 1996):

KNP was established in 1975 by notification of the Provincial Government of Northern Areas "To preserve fauna and flora in its natural state....." (A. Ahmad pers. comm.)

According to the management plan, the purpose of the park is to protect and preserve for all time:

the geo-morphological and biological characteristics of a unique area in the Hindu Kush-Himalayan Mountain region; an area known for its spectacular mountain scenery including such elements as glaciers, glacial streams, alpine meadows and a very actively eroding landscape;

the natural population and habitats of a range of endangered species including Marco Polo sheep, snow leopard, Tibetan wild ass and brown bear.

In accordance with this purpose, the plan has the following management goals:

to have management policies that are oriented towards conservation of natural resources of the region in general and KNP in particular, and which are based on realities with sufficient flexibility to accommodate the existing human uses until alternatives are available for local subsistence (which is not necessarily a long time);

to have clear, specific and problem-oriented management objectives for the park which, if achieved, could greatly help in meeting the overall purpose of the park;

to have specific and feasible management action programmes for achieving individual objectives of the plan which could be easily monitored and evaluated at various stages of implementation.

The details of the approved management plan are not outlined here, but three general themes appears to have been learned. These are:

broad, early, educational constituency building is essential long before introducing the more esoteric management objectives (e.g., local benefits must be identified and trust established);

once management activities are agreed and understood then formal collaborative management efforts are to be initiated, and followed through;

there must be a legal basis for local rights in protected area management, for local people.

The Government of Pakistan, in accepting the salutary work of WWF, has now largely endorsed the community-based approach. Resources are scarce as usual, however, and the work proceeds very slowly. After 20 years of endeavour it now appears that the benefits of the work of the new Central Karakorum National Park will be significant.

Central Karakorum National Park: This newly promoted protected area has been instrumental in establishing IUCN's work in the Northern Areas of Pakistan, and its history can be briefly summarized as follows:

- Initial Declaration in 1993
- IUCN help requested
- 1994 preparation meetings
- 1994 Workshop and Boundary Revisions
- 1995 Funding and government approval
- 1996 World Heritage Site Application and Boundary Renotification
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- 1997 Provisional Management Plan Completed

The proposed Management Plan for the Central Karakorum National Park (CKNP) is not described here, except to list some preliminary objectives based on discussions from the early preparatory meetings onwards (Fuller and Gemin 1995):

- To conserve biological diversity, including the full range of species To protect endemic, threatened and endangered fauna and flora. (The area is large enough to support a significant leopard population at recovery)

- To maintain the pristine quality of the park's air, water, geologic, natural, and scenic resources.

- To convey to visitors the geophysical, biological and human cultural phenomenal that contribute to the park's designation as a World Heritage Site.

- To make CKNP a destination for non-climbers as well as climbers, establishing the park as a principal anchor for the Northern Areas tourist traffic.

- To control appropriate development and use and develop marketing strategies that would encourage tourism; and pursue a path toward a more resource sensitive eco-tourism policy where visitors are willing to both abide by codes of ethics and to pay more for a quality experience.

- To limit visitor activities to those that contribute to the understanding and appreciation of local culture and park resources and restrict development in a manner that allows natural, cultural and scenic values to continue.

- To increase wilderness conservation and appreciation opportunities within the park.

- To stabilize, and provide necessary facilities along the Baltoro Glacier that can sustain limits of acceptable change with the least amount of damage to resources.

- To maintain visitor numbers in the park within the limits of acceptable change.

- To improve health and safety for climbers in the mountains.

- To reduce fuel wood consumption to a sustainable level by switching to alternate fuels that do not cause resource degradation or damage.

- To ensure that local communities derive shared benefits from the park.

Nanga Parbat: Although the Fairie Meadows portion of the Nanga Parbat massif has received protection under a local ordinance there are persistent reports of poor road construction practices (The News, Sept 20, 1996) as an excuse for excess logging. The mountain can be circumnavigated on foot and there are many jeepable roads.

Mountaineering, although not common, has a long and tragic history and the establishment bare camps cannot be considered clear or aesthetic. The area remains an accessible tourist destination for Pakistani and foreigner visitors alike. The snow leopard population is unknown, but is expected to be low.

High altitude meadows are common in many upper portions of the valley (particularly in the south and west), and subsistence agriculture, some local trade, illegal timber use and grazing (Kreutzmann 1995) are the principle economic activities. All of these relate to the singular presence of the Nanga Parbat ecosystem, albeit largely to low altitudes. Yet they are part of a system that interrelates in a unique, partially isolated system, which argues for a different approach that has perhaps not yet become the vogue in Pakistan: namely, one of true local ownership of land resources with a special trust system being established, possibly along the lines of Nepal's Annapurna Conservation Area which is managed by the King Mahendra Trust with financial support accruing from tourist entrance and trekking fees (Gurung 1992, Bhatia 1996 pers. comm.). Wildlife conservation can be a critical management objective. Therefore, in regard to a conservation proposal for the Nanga Parbat region, it would be useful to explore the establishment of a special Nanga Parbat Trust with the dependent villages working together, under legal sanction, for mutual economic benefit (including wildlife conservation). The same financial formula could be used for a Central Karakorum economic development zone, but with a different form of management responsibility and autonomy. It would be experimental to begin with, with the results being evaluated in due course, with adjustments being made as necessary. This could constitute an component of the Karakorum snow leopard recovery "system" mentioned above.

Batura National Park Proposal: One of the lesser known protected area proposals in Northern Pakistan is the Batura Glacier drainage. This is single glacier system located west of the Karakorum Highway between the villages of Passu and Sost. It is a nationally significant geomorphological feature which was extensively surveyed and mapped during the 1970's, in order to understand the glacial mass balance and potential effect on the KKH, which crosses the snout and a supraglacial moraine system. The system is easily accessed for trekking purposes, and includes world class, but seldom availed mountaineering opportunities. Batura I is a difficult climbing opportunity and there are complementary and relatively straightforward opportunities for trekking, wildlife viewing, and photography.

The valley is used for grazing by local community livestock (with winter livestock depredation by snow leopard) although there is no permanent settlement given the severe winters. Several local communities already derive extra income from tourism-related activities. There is a large local student environmental organization (The Khunjerab Students' Federation) and many other village organizations exist for complementary social welfare purposes. The IUCN Biodiversity Project has a well-developed programme in the local villages and other groups have a long history of involvement with the management planning process in the Khunjerab National Park, albeit often tendentiously. Community involvement in a collaborative management scheme for the park would need to begin as quickly as the

park proposal is publicly discussed. Indeed this has already commenced, and snow leopard conservation is a principal topic.

The President of the Islamic Republic of Pakistan suggested establishment of the Batura National Park in a speech to the Alpine Club of Pakistan in December 1995. The secretary of the Northern Areas is generally supportive of this proposal and there is increasing concurrence among local elected and village officials, particularly as the decentralized local community management regime gains credibility.

Due to the proximity to Khunjerab National Park, however, there may be misunderstandings about the value of yet another protected area. This is a fair enough concern, yet it will be essential to stress the distinctly different management objectives of each. KNP is designed for wildlife protection (along with the local sanctuaries and access to China), Batura would be at least a summer destination, recreational and mountaineering objective, although leopard sightings are also likely! It would also be of significant economic benefit to most local communities in terms of income opportunities through provision of services such as the provision of fuel, accommodation, and food. There is also potential for a cultural interpretation component given that Ismaili summer grazing is often undertaken by women, who frequently speak English and are relatively friendly to foreigners.

Deosai Wilderness Proposal: The Deosai Plateau is located south of the Karakorum Mountains proper and coincidentally adjacent to the cease fire line between India and Pakistan in Kashmir. It is a high altitude plateau most dissimilar to the rest of northern Pakistan. The northern portion is used as a popular destination recreation area during the summer time, with a truly remarkable golden marmot population, and display of alpine vegetation, while the southern area, largely off limits to the average tourist, is the site of the ongoing Himalayan Brown Bear Research Project. Snow leopards are rare but likely present along the fringes of the plateau.

Although designated as a wilderness area under local ordinance, this has little impact or effect on actual use patterns, the area, wildlife, flora or other disturbances. Roads proliferate and there is virtually no grazing management scheme, although the local social control patterns are centuries old. Population pressures, as elsewhere, are tending to suggest that competition with wild species for habitat is increasing. There is also debate about the viability of preserving a viable megafauna population of the brown bear. Data from the Government of Pakistan suggest a population of some 200 bears, but local researchers estimate the number at 50 or less. These data need to be reconciled and the status of snow leopard determined.

In terms of the Karakorum conservation proposal, there is clearly a need for a strict wilderness/research zonation to ensure the protection of a highly endangered species (brown bear). In the northern portion, there is not likely any reasonable or feasible management system to control human use, other than leaving the road system in poor condition, or to decommission some of the less necessary roads constructed during the WAPDA Snow and Ice Hydrology Project in the 1980's.

Shandur/Hundrup National Park: This locally designated protected area includes two separate valleys in the Northern Areas' Ghizar district adjacent to the upper Swat valley: the 1000 square kilometer Hundrup River valley and the 650 square kilometer Shandur Pass area. The Hundrup River is a world-class trout stream and the Shandur Pass is the site of an annual polo tournament cultural fair that has received world-wide attention. The area was declared a park in an attempt to control the huge human population at the polo tournament, who are not inclined to clean up their litter. Now, however, tour operators are cleaning up after the tournament, but garbage still accumulates in the high meadows beside Shandur Lake.

The originator of the idea, the then Chief Commissioner of the Northern Areas, an avid big game hunter, also recognized the availability of world class (and safe) trekking opportunities into the nearby Dir Kohistan, and Swat/Kalam areas, all of which could attract both foreign and Pakistani trekkers, holiday travelers and mountaineers. So the principle management objective here would be both biological and human.

It is not an area without problems, however, and even a simple designation as a protected area as in so many other cases, could lead to additional management difficulties, and some eventual safety considerations. There are anecdotal reports of robbery. Reports of snow leopard presence are rare but not entirely unknown.

Wildlife Reserves and Game Sanctuaries: Pakistan currently recognizes just three categories of protected areas: national parks, wildlife sanctuaries, and game reserves, which are described in more detail below. These now outdated categories and the equally outdated legislation severely restricts Pakistan's management of its wilderness resources. Current IUCN sanctioned categories number six in all, with a wide range of management options, most of which could be used in Pakistan. A provisional list of wildlife reserves and game sanctuaries which are located within potential snow leopard range in Pakistan are shown indicated in Table 1.

Almost all of Pakistan's protected areas in the Karakorum and Hindu Kush were once the property of local princes. When the princely states were absorbed into Pakistan, the government assumed ownership of these areas. Local people, who had traditionally used the areas for pasturing and wood gathering, saw themselves as the inheritors of the high mountains' valleys and grasslands. The resulting disputes are still with the courts in the main locations, including Chitral District.

In addition, these mountain areas have now also become the object of desire of a number of competing interests, including resort hotels, polo tournaments, adventure tourism, big game hunting, and the military. Pakistan's understaffed, under-equipped, and under-trained wildlife officers are unable to handle the growing complexity of protected areas management. With the

government as the owner, and all others as users, no one has complete control over resources, and effective management seems very difficult to achieve under the present system.

Although the list of wildlife reserves and game sanctuaries provided may be considered as forming part of the overall Karakorum conservation

complex, their management is so sporadic and undocumented that, while worth listing, it would be an error to utilize the size statistics in any cumulative evaluation of the total area under some form of protected status. It creates an impression of size that is more of a social artifact than an ecological reality. However, these are important wildlife habitats, whether or not the wildlife in fact are using the respective areas. These areas may also not be the most useful or productive wildlife sites, especially where access to other resources (e.g., micro-hydro) has been provided, since their original establishment during the last two centuries by the princely families.

Table 1: List of Wildlife Sanctuaries and Game Reserves in Pakistan within Potential Snow Leopard Range

Wildlife Sanctuaries	Area	Location
Agram Besti	30,000 ha	N.Chitral
Astor	146 km ²	Nanga Parbat
Baltistan (contiguous with Astor)	415 km ²	NW of Astor
Kargah	445 km ²	NW of Gilgit
Naltar	273 km ²	N of Gilgit
Satpara (adjacent to Deosai)	unknown	S of Skardu
Game Reserves	Area	Location
Chassi/Bahushtaro	37,000 ha	Yasin
Chinan/Purit Gol	6,500 ha	Chitral
Dainyor	44,000 ha	Gilgit
Drosh Gol	2,000 ha	Chitral
Ghariet Gol	4,800 ha	Chitral
Golen Gol	50,000 ha	Chitral
Kilik/Mintaka (east of Khunjerab National Park)	65,000 ha	Gilgit
Naz Bar Nala	33,000 ha	Yasin
Nar Ghoru	7,000 ha	Skardu
Pakora (adjacent to Naltar)	7,500 ha	Gilgit
Sherquila	17,000 ha	Gilgit
Stak Nala	13,000 ha	Skardu
Tooshi	1,000 ha	Chitral

Community Biodiversity Conservation Initiative: In the years leading up to and after the United Nations Conference on Environment and Development (UNCED), a new funding mechanism known as the Global Environment Facility was established. GEF, as it is commonly referred to, is managed collaboratively among the World Bank, the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP). Projects are funded under several criteria, one of which is the conservation of biodiversity. Several other criteria are also used to approve projects.

In Pakistan, the UNDP, after several years of negotiations, approved an initiative now known by the moniker, "Maintaining Biological Diversity in Pakistan Through Rural Community Development." Under this programme, several pilot village clusters have been self-selected for

Lutkho valley	(S of Tirich Mir)1
Turikho valley	(N of Tirich Mir)1
Yasin valley	(far north)2
Ishkon valley	(far north)2
Bagrat and Harmash	(CKNP)2
Kaghan valley	(NWFP)3
Salturo valley	(Baltistan)4
Kordus valley	(Baltistan)4
Hush valley	(Baltistan)4

-
1. Possibly part of Tirich Mir
 2. Possibly part of Thui
 3. Possibly part of Malika Parbat
 4. Possibly part of CKNP

So although not actually included in the proposed part of the formally designated Karakorum Constellation, they are sufficiently close to be part of any interpretation plan and economic benefit zone.

Expanding the Concept: Transfrontier Opportunities

Northwest Frontier Province: Although not technically part of the Karakorum region, the northern portion of the NWFP province, in the Hindu Kush, has many excellent protected area opportunities. It is not the intention here to be comprehensive but it is useful to identify them for future reference:

Malika Parbat: spectacular scenery, and great hiking opportunities on the Kaghan valley borders with Azad Jammu and Kashmir. Wildlife census is incomplete;

Siran/Palnas: upper multi-valley area between two Pakistani drainages. Conservative Kohistani resistance is proving difficult to overcome, but there is hope. Wildlife work is underway but focusing only on endangered species;

Falaksir: the star attraction of the western Swat valley. Excellent walking and hiking opportunities. No systematic wildlife data;

Tirich Mir: highest peak in the Hindu Kush, should eventually include Chitral Gol National Park and is a potential World Heritage Site, along with an associative cultural landscape. Many snow leopard reports and excellent habitat for thousands of square kilometers;

Buni Zom: relatively unknown, beautiful peak in central Chitral. Access is difficult with steep ascents and deep gorges. Wildlife unknown and uncensused;

Thui Peaks: needle shaped mountains surrounded by high altitude pastures and important migratory bird habitats. Also close to routes with "Great Game" significance. Wildlife likely limited however by harsh winters and lack of prey species.

The Hindu Kush Corridors: Major opportunities are presented to cooperate with Afghanistan, over the long term. In Nuristan, in combination with Tirich Mir, there is an opportunity for a major international peace park including a wildlife reserve with benefits for

snow leopards. "Pristine" forests still exist in Nuristan, and there is potential for the area supporting a vibrant wildlife complex. Of course the situation is still politically complicated and thus that the situation is largely not viable at present.

Since the 1970's there have been proposals for establishing hunting reserves in the Big Pamir in the Wakhan Corridor. This possibility still exists and there are active hunting lobbies, interested in the wild sheep that have a sustainable yield in the area. This may have a negative ecological effect but potential positive economic effect on snow leopards.

Into Central Asia: Since the late 1980's proposals have existed for a major protected area in the former Soviet Union particularly in the southern Pamirs (a spectacular range in itself). However, there is no budget, no staff and little training, other than a well-meaning superintendent and some scientific researchers to implement such an idea. Depopulated by Stalin for cotton production in the lowlands (with disastrous effects on the Aral Sea), it provided useful and productive wildlife habitat. With repopulation, some form of collaborative management programme could occur, along with a returning human population. There are massive mountains, superb climbing and great trekking or walking in this region.

Then there is Kyrgyzstan, but that is another story.
Conclusions

This paper has only attempted to identify areas that can potentially be rehabilitated for snow leopards, at least in theory. No specific recommendations are forthcoming, except that if key ungulate species recover, addressed under a recovery programme, there is no reason that predator populations would also not recover. Potentially, at least, the end of the Stones of Silence may be at hand.

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Stephan Fuller and Dr. Javed Ahmed

Introduction

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could indicate an increase in snow leopard numbers or activity or alternatively a decline in natural prey species, forcing the predator closer to human settlements. Species like ibex (*Capra [ibex] sibirica*) are being protected by some communities, including those at Hushe in the hopes of promoting and sustaining a trophy-hunting program. However, no census of snow leopards has been conducted, so that population estimates remain "guesstimates" at best; the paucity of data is appalling.

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critical management objective. Therefore, in regard to a conservation proposal for the Nanga Parbat region, it would be useful to explore the establishment of a special Nanga Parbat Trust with the dependent villages working together, under legal sanction, for mutual economic benefit (including wildlife conservation). The same financial formula could be used for a Central Karakorum economic development zone, but with a different form of management responsibility and autonomy. It would be experimental to begin with, with the results being evaluated in due course, with adjustments being made as necessary. This could constitute an component of the Karakorum snow leopard recovery "system" mentioned above.

Batura National Park Proposal: One of the lesser known protected area proposals in Northern Pakistan is the Batura Glacier drainage. This is single glacier system located west of the Karakorum Highway between the villages of Passu and Sost. It is a nationally significant geomorphological feature which was extensively surveyed and mapped during the 1970's, in order to understand the glacial mass balance and potential effect on the KKH, which crosses the snout and a supraglacial moraine system. The system is easily accessed for trekking purposes, and includes world class, but seldom availed mountaineering opportunities. Batura I is a difficult climbing opportunity and there are complementary and relatively straightforward opportunities for trekking, wildlife viewing, and photography.

The valley is used for grazing by local community livestock (with winter livestock depredation by snow leopard) although there is no permanent settlement given the severe winters. Several local communities already derive extra income from tourism-related activities. There is a large local student environmental organization (The Khunjerab Students' Federation) and many other village organizations exist for complementary social welfare purposes. The IUCN Biodiversity Project has a well-developed programme in the local villages and other groups have a long history of involvement with the management planning process in the Khunjerab National Park, albeit often tendentiously. Community involvement in a collaborative management scheme for the park would need to begin as quickly as the park proposal is publicly discussed. Indeed this has already commenced, and snow leopard conservation is a principal topic.

The President of the Islamic Republic of Pakistan suggested establishment of the Batura National Park in a speech to the Alpine Club of Pakistan in December 1995. The secretary of the Northern Areas is generally supportive of this proposal and there is increasing concurrence among local elected and village officials, particularly as the decentralized local community management regime gains credibility.

Due to the proximity to Khunjerab National Park, however, there may be misunderstandings about the value of yet another protected area. This is a fair enough concern, yet it will be essential to stress the distinctly different management objectives of each. KNP is designed for wildlife protection (along with the local sanctuaries and access to China), Batura would be at least a summer destination, recreational and mountaineering objective, although leopard sightings are also likely! It would also be of significant economic benefit to most local communities in terms of income opportunities through provision of

services such as the provision of fuel, accommodation, and food. There is also potential for a cultural interpretation component given that Ismaili summer grazing is often undertaken by women, who frequently speak English and are relatively friendly to foreigners.

Deosai Wilderness Proposal: The Deosai Plateau is located south of the Karakorum Mountains proper and coincidentally adjacent to the cease fire line between India and Pakistan in Kashmir. It is a high altitude plateau most dissimilar to the rest of northern Pakistan. The northern portion is used as a popular destination recreation area during the summer time, with a truly remarkable golden marmot population, and display of alpine vegetation, while the southern area, largely off limits to the average tourist, is the site of the ongoing Himalayan Brown Bear Research Project. Snow leopards are rare but likely present along the fringes of the plateau.

Although designated as a wilderness area under local ordinance, this has little impact or effect on actual use patterns, the area, wildlife, flora or other disturbances. Roads proliferate and there is virtually no grazing management scheme, although the local social control patterns are centuries old. Population pressures, as elsewhere, are tending to suggest that competition with wild species for habitat is increasing. There is also debate about the viability of preserving a viable megafauna population of the brown bear. Data from the Government of Pakistan suggest a population of some 200 bears, but local researchers estimate the number at 50 or less. These data need to be reconciled and the status of snow leopard determined.

In terms of the Karakorum conservation proposal, there is clearly a need for a strict wilderness/research zonation to ensure the protection of a highly endangered species (brown bear). In the northern portion, there is not likely any reasonable or feasible management system to control human use, other than leaving the road system in poor condition, or to decommission some of the less necessary roads constructed during the WAPDA Snow and Ice Hydrology Project in the 1980's.

Shandur/Hundrup National Park: This locally designated protected area includes two separate valleys in the Northern Areas' Ghizar district adjacent to the upper Swat valley: the 1000 square kilometer Hundrup River valley and the 650 square kilometer Shandur Pass area. The Hundrup River is a world-class trout stream and the Shandur Pass is the site of an annual polo tournament cultural fair that has received world-wide attention. The area was declared a park in an attempt to control the huge human population at the polo tournament, who are not inclined to clean up their litter. Now, however, tour operators are cleaning up after the tournament, but garbage still accumulates in the high meadows beside Shandur Lake.

The originator of the idea, the then Chief Commissioner of the Northern Areas, an avid big game hunter, also recognized the availability of world class (and safe) trekking opportunities into the nearby Dir Kohistan, and Swat/Kalam areas, all of which could attract both foreign and Pakistani trekkers, holiday travelers and mountaineers. So the principle management objective here would be both biological and human.

It is not an area without problems, however, and even a simple designation as a protected area as in so many other cases, could lead to additional management difficulties, and some eventual safety considerations. There are anecdotal reports of robbery. Reports of snow leopard presence are rare but not entirely unknown.

Wildlife Reserves and Game Sanctuaries: Pakistan currently recognizes just three categories of protected areas: national parks, wildlife sanctuaries, and game reserves, which are described in more detail below. These now outdated categories and the equally outdated legislation severely restricts Pakistan's management of its wilderness resources. Current IUCN sanctioned categories number six in all, with a wide range of management options, most of which could be used in Pakistan. A provisional list of wildlife reserves and game sanctuaries which are located within potential snow leopard range in Pakistan are shown indicated in Table 1.

Almost all of Pakistan's protected areas in the Karakorum and Hindu Kush were once the property of local princes. When the princely states were absorbed into Pakistan, the government assumed ownership of these areas. Local people, who had traditionally used the areas for pasturing and wood gathering, saw themselves as the inheritors of the high mountains' valleys and grasslands. The resulting disputes are still with the courts in the main locations, including Chitral District.

In addition, these mountain areas have now also become the object of desire of a number of competing interests, including resort hotels, polo tournaments, adventure tourism, big game hunting, and the military. Pakistan's understaffed, under-equipped, and under-trained wildlife officers are unable to handle the growing complexity of protected areas management. With the

government as the owner, and all others as users, no one has complete control over resources, and effective management seems very difficult to achieve under the present system.

Although the list of wildlife reserves and game sanctuaries provided may be considered as forming part of the overall Karakorum conservation complex, their management is so sporadic and undocumented that, while worth listing, it would be an error to utilize the size statistics in any cumulative evaluation of the total area under some form of protected status. It creates an impression of size that is more of a social artifact than an ecological reality. However, these are important wildlife habitats, whether or not the wildlife in fact are using the respective areas. These areas may also not be the most useful or productive wildlife sites, especially where access to other resources (e.g., micro-hydro) has been provided, since their original establishment during the last two centuries by the princely families.

Table 1: List of Wildlife Sanctuaries and Game Reserves in Pakistan within Potential Snow Leopard Range

Wildlife Sanctuaries	Area	Location
Agram Besti	30,000 ha	N.Chitral
Astor	146 km ²	Nanga Parbat

Baltistan (contiguous with Astor)	415 km ²	NW of Astor
Kargah	445 km ²	NW of Gilgit
Naltar	273 km ²	N of Gilgit
Satpara (adjacent to Deosai)	unknown	S of Skardu

Game Reserves	Area	Location
Chassi/Bahushtaro	37,000 ha	Yasin
Chinan/Purit Gol	6,500 ha	Chitral
Dainyor	44,000 ha	Gilgit
Drosh Gol	2,000 ha	Chitral
Ghariet Gol	4,800 ha	Chitral
Golen Gol	50,000 ha	Chitral
Kilik/Mintaka (east of Khunjerab National Park)	65,000 ha	Gilgit
Naz Bar Nala	33,000 ha	Yasin
Nar Ghoru	7,000 ha	Skardu
Pakora (adjacent to Naltar)	7,500 ha	Gilgit
Sherquila	17,000 ha	Gilgit
Stak Nala	13,000 ha	Skardu
Tooshi	1,000 ha	Chitral

Community Biodiversity Conservation Initiative: In the years leading up to and after the United Nations Conference on Environment and Development (UNCED), a new funding mechanism known as the Global Environment Facility was established. GEF, as it is commonly referred to, is managed collaboratively among the World Bank, the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP). Projects are funded under several criteria, one of which is the conservation of biodiversity. Several other criteria are also used to approve projects.

In Pakistan, the UNDP, after several years of negotiations, approved an initiative now known by the moniker, "Maintaining Biological Diversity in Pakistan Through Rural Community Development." Under this programme, several pilot village clusters have been self-selected for the development of village or valley conservation management plans. Through the economic use of flora and fauna species, funds are generated which create an opportunity for development projects. However, the sustainability of the programme depends on an indigenous understanding, definition and endorsement of the appropriate conservation initiative.

Six pilot areas in the Northern Areas and in the province NWFP and a variety of village management plans have been created. Included are opportunities for hunting, ecotourism, food collection and the identification of medicinal plants. Although the areas involved are not large, the long-term intention is to have at least some form of conservation area which will function in a loosely defined manner as Category VI- IUCN Protected Areas. The management objective is to ensure that sustainable use and human occupations are acceptable; no other alternative would work in any event.

Three of the pilot valleys are located in Chitral District, and are considered so successful that fourteen additional village clusters have

spontaneously expressed interest in such a programme (Div. Forest Officer pers. comm.). With an additional year to run, it is hoped that a second "up to scale" replication will occur. But the efficiency of this model is dependent yet again on the machinations of the Global Environmental Facility functional components.

In any event many of the areas involved complement the more famous and larger sites within the Karakorum region. Eventually, zoning will likely be needed, and observations of snow leopards should become more frequent.

Other Initiatives: In a major report submitted to the IUCN Community Biodiversity Project, O'Neil and Mock (1996) produced a detailed survey of eco-tourism potential in the biodiversity project area. This was focused on six valleys; however, they have just completed another major work, the soon to be released Lonely Planet guide which should encourage trekking to northern Pakistan. This guide is based upon visits to every major potential trekking and recreational area northern Pakistan, and will serve as a useful reference work. It is more of a resource about the protocols of tourism and adventure with an appropriate focus on local cultural, environmental impacts, regulations, outfitters (local, national and international), fees and existing (1996) facilities. Thus, it should be read in combination with a series of other documents both applied and academic, local and regional, to assist in the design of a broader sustainable development programme.

What it does achieve, which is of considerable value, is to identify several potential portions of the Karakorum that are either little known, or very little utilized. It is useful to list some of these areas for the readers as they are remote enough to potentially support "pristine" wildlife populations and habitat which could have commensurate benefit for snow leopards. This list is not comprehensive but provides a sample of places that may deserve additional attention and evaluation, at least once some of the other major areas are better managed, and additional capacity within government is available.

Shishi valley	(lower Chitral)
Lutkho valley	(S of Tirich Mir)1
Turikho valley	(N of Tirich Mir)1
Yasin valley	(far north)2
Ishkon valley	(far north)2
Bagrat and Harmash	(CKNP)2
Kaghan valley	(NWFP)3
Salturo valley	(Baltistan)4
Kordus valley	(Baltistan)4
Hush valley	(Baltistan)4

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1. Possibly part of Tirich Mir
 2. Possibly part of Thui
 3. Possibly part of Malika Parbat
 4. Possibly part of CKNP

So although not actually included in the proposed part of the formally designated Karakorum Constellation, they are sufficiently close to be part of any interpretation plan and economic benefit zone.

Expanding the Concept: Transfrontier Opportunities

Northwest Frontier Province: Although not technically part of the Karakorum region, the northern portion of the NWFP province, in the Hindu Kush, has many excellent protected area opportunities. It is not the intention here to be comprehensive but it is useful to identify them for future reference:

Malika Parbat: spectacular scenery, and great hiking opportunities on the Kaghan valley borders with Azad Jammu and Kashmir. Wildlife census is incomplete;

Siran/Palas: upper multi-valley area between two Pakistani drainages. Conservative Kohistani resistance is proving difficult to overcome, but there is hope. Wildlife work is underway but focusing only on endangered species;

Falaksir: the star attraction of the western Swat valley. Excellent walking and hiking opportunities. No systematic wildlife data;

Tirich Mir: highest peak in the Hindu Kush, should eventually include Chitral Gol National Park and is a potential World Heritage Site, along with an associative cultural landscape. Many snow leopard reports and excellent habitat for thousands of square kilometers;

Buni Zom: relatively unknown, beautiful peak in central Chitral. Access is difficult with steep ascents and deep gorges. Wildlife unknown and uncensused;

Thui Peaks: needle shaped mountains surrounded by high altitude pastures and important migratory bird habitats. Also close to routes with "Great Game" significance. Wildlife likely limited however by harsh winters and lack of prey species.

The Hindu Kush Corridors: Major opportunities are presented to cooperate with Afghanistan, over the long term. In Nuristan, in combination with Tirich Mir, there is an opportunity for a major international peace park including a wildlife reserve with benefits for snow leopards. "Pristine" forests still exist in Nuristan, and there is potential for the area supporting a vibrant wildlife complex. Of course the situation is still politically complicated and thus that the situation is largely not viable at present.

Since the 1970's there have been proposals for establishing hunting reserves in the Big Pamir in the Wakhan Corridor. This possibility still exists and there are active hunting lobbies, interested in the wild sheep that have a sustainable yield in the area. This may have a negative ecological effect but potential positive economic effect on snow leopards.

Into Central Asia: Since the late 1980's proposals have existed for a major protected area in the former Soviet Union particularly in the southern Pamirs (a spectacular range in itself). However, there is no budget, no staff and little training, other than a well-meaning superintendent and some scientific researchers to implement such an idea. Depopulated by Stalin for cotton production in the lowlands (with disastrous effects on the Aral Sea), it provided useful and

productive wildlife habitat. With repopulation, some form of collaborative management programme could occur, along with a returning human population. There are massive mountains, superb climbing and great trekking or walking in this region.

Then there is Kyrgyzstan, but that is another story.

Conclusions

This paper has only attempted to identify areas that can potentially be rehabilitated for snow leopards, at least in theory. No specific recommendations are forthcoming, except that if key ungulate species recover, addressed under a recovery programme, there is no reason that predator populations would also not recover. Potentially, at least, the end of the Stones of Silence may be at hand.