

**Mountain Cultures, Keystone Species:
*Exploring the Role of Cultural Keystone
Species in Central Asia***



Final Report
(Grant 2005-2019)

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1. Executive Summary

In October 2005 the Snow Leopard Conservancy received a grant for a project entitled “Mountain Cultures, Keystone Species: Exploring the Role of Cultural Keystone Species in Central Asia” Activities commenced in 2005 and the project was given a no-cost extension until December 31 2006.

Ecologists recognize that keynote species, such as snow leopards, play important roles in determining ecological functioning and integrity. Similarly, in human cultures, there are plants and animals that form the contextual underpinnings of a culture, as reflected in their roles in language, ceremonies, narratives, diet, and medicine. In a region undergoing fundamental social, political and economic change, we believe concepts, such as cultural keystone species, that are rooted in cultural and social contexts can play a role in positively transforming tensions and conflicts between development and conservation.

Specific project objectives were to:

- 1) Explore and document the role of charismatic, keystone species like snow leopards, Marco Polo sheep, ibex, and brown bear as cultural icons to selected mountain communities and cultures;
- 2) Identify, explore and document other cultural keystone species (e.g., trees, medicinal and food plants) that play a role in the underpinnings of the same communities and cultures;
- 3) Generate and disseminate creative approaches, based on cultural keystone species, to positively link biodiversity conservation, strengthening cultural identities and community development; and
- 4) Outline and share a 3-4 year multi-stakeholder program for supporting environmental stewardship and sustainable livelihoods in ways that revive and sustain the role of traditional knowledge among stakeholders, including pastoralists, other natural resource dependent communities and Marco Polo hunting concessions.

Project activities included: conducting a literature review; holding planning meetings with key resource persons/organizations in Tajikistan; preparation of a participatory methodology for field-based investigations; field-based investigations in the Gorno Badakshan region of Tajikistan; preparation, review and dissemination of final reports and outputs; and preparation of a concept for a 3-4 year multi-stakeholder program for fostering environmental stewardship and sustainable livelihoods.

Key Findings included:

- Relationships between cultural identities and critical species are important but complex. For example, as residents of the Pamir, the Kyrgyz have a long tradition of hunting manifested in folklore, language and art with rules to govern numbers to be killed and how. However, poor economic conditions, widespread access to guns and lax enforcement of regulations have led local residents and newcomers, such as military personnel, to hunt Marco Polo sheep beyond the limits prescribed in Kyrgyz traditions and customs.
- Current patterns of animal hunting and plant extraction plants (both legal and illegal) are having negative impacts to the long-term viability of ecologically and culturally important

species in the Pamir, as well as ecosystems. In particular, illegal hunting of Marco Polo sheep in Tajikistan and neighboring Afghanistan poses a significant threat to the survival of the species.

- Loss of key fauna and flora, such as Marco Polo sheep and teresken, has significant implications on local livelihoods. In a region with relatively few economic opportunities, promising activities such as tourism will be negatively affected by the loss of attractions, such as wildlife, and increased land degradation.
- PhotoVoice, and similar participant-led explorations and learning exercises clearly energize individuals and communities, and have the potential to convert the energy into livelihood and conservation actions. Such tools do, however, need to be integrated into more comprehensive planning frameworks and conducted to influence policy-makers.

Objectives 3 and 4 were assessed by the extent to which specific ideas and methods were shared, along with the level and variety of demand for outputs like the PhotoVoice methodology. Project partners were very excited about this highly participatory tool, which will be further developed in order to make it even more applicable to local conditions and levels of expertise with regard to participatory planning and action. Participants from MSDSP have already shared the field methods with their colleagues, and SLC-India has successfully used PhotoVoice as part of its annual evaluation of community conservation and tourism.

Measuring change in local attitudes and actions toward cultural or biodiversity cannot be measured within a short time frame. Nonetheless a framework for ongoing participatory monitoring and evaluation has been developed, in which locally derived indicators, such as the nature and number of locally-initiated actions will be used to assess contributions to conservation of diversity during the implementation phase. Encouraging news continues to come from Murghab where META has undertaken a number of environmental education activities spurred on in part by their participation in the summer's activities. A high priority is to identify local persons who can both train and monitor future initiatives. At the onset of the next phase of implementation, it is proposed to provide local participants with further training. This will further serve to highlight potential opportunities, constraints and success factors. The Implementation Pre-Proposal submitted to The Christensen Fund covers these items.



2. Introduction

In October 2005 the Snow Leopard Conservancy received a grant for a project entitled “Mountain Cultures, Keystone Species: Exploring the Role of Cultural Keystone Species in Central Asia” Activities commenced in 2005 and the project was given a no-cost extension until December 31 2006.

Under the terms of the grant, narrative and financial reports have been prepared (the financial report is provided separately as Appendix 4). The purpose of this narrative report is to provide an overall review of project activities and findings, and a brief evaluation of outcomes. As such the report does not contain detailed field notes, interviews or the PhotoVoice results. Instead these have been listed in Appendix 1 and are available on request.

3. Summary of Project Background, Goal, Objectives and Activities

Ecologists recognize that keynote species, such as snow leopards, play important roles in determining ecological functioning and integrity. Similarly, in human cultures, there are plants and animals that form the contextual underpinnings of a culture, as reflected in their roles in language, ceremonies, narratives, diet, and medicine. In a region undergoing fundamental social, political and economic change, we believe concepts, such as cultural keystone species, that are rooted in cultural and social contexts can play a role in positively transforming tensions and conflicts between development and conservation.

The purpose of this project is to identify specific ways by which selected local communities can re-evaluate and then blend their own set of historical (traditional) values, folklore and local environmental symbols using the keystone species concept as an entry point. Based upon past work in mountain communities, and in light of contemporary realities following dissolution of the Soviet-imposed economic and social system, we believe that this approach can help communities to forge their own unique set of sustainable livelihoods.

Specific project objectives:

- 1) Explore and document the role of charismatic, keystone species like snow leopards, Marco Polo sheep, ibex, and brown bear as cultural icons to selected mountain communities and cultures;
- 2) Identify, explore and document other cultural keystone species (e.g., trees, medicinal and food plants) that play a role in the underpinnings of the same communities and cultures;
- 3) Generate and disseminate creative approaches, based on cultural keystone species, to positively link biodiversity conservation, strengthening cultural identities and community development; and
- 4) Outline and share a 3-4 year multi-stakeholder program for supporting environmental stewardship and sustainable livelihoods in ways that revive and sustain the role of traditional

knowledge among stakeholders, including pastoralists, other natural resource dependent communities and Marco Polo hunting concessions. The plan would be implemented by a national NGO or a consortium of NGOs working with government and possibly academia. Emphasis will be placed upon: fostering meaningful links between organizations, individuals and disciplines; and capacity-building for cultural conservation and natural resource management or restoration by encouraging sustainable livelihood enterprises that supplement existing agricultural and pastoral activities.

Primary project activities:

- A literature review covering the concept of cultural keystone species, field applications of the concept, representations of key species in Asian/mountain/pastoral communities and current and past natural resource management systems;
- Planning meetings with key resource persons/organizations in Europe and Central Asia;
- Final site selection for field investigations;
- Finalize a participatory methodology for field-based investigations;
- Field-based investigations at 4 primary GBAO sites/communities of iconic cultural keystone species;
- Preparation, review and dissemination of final reports and outputs based on the field investigations; and
- Preparation and circulation to partner organizations, potential donors and others, of a concept for a 3-4 year multi-stakeholder program for fostering environmental stewardship and sustainable livelihoods.

4. Activity Reporting

4.1. Planning Trip

Nandita Jain, Project Co-Investigator visited Tajikistan in January 2006, with the following objectives:

- Introduce the project to key organizations, agencies and individuals;
- Identify and establish technical and logistical sources of support; and
- Collect relevant literature for the project.

She visited Dushanbe and Khorog, and had planned to visit and meet with staff at the Centre for Development and Environment at the University of Berne, Switzerland. Unfortunately, bad weather in GBAO resulted in Ms. Jain missing her scheduled flight to Europe, and the trip to CDE had to be cancelled. In Tajikistan meetings were held with a range of organizations (e.g. ACTED, MSDSP, Aga Khan Humanities Project, GBAO Administration) and individuals working in biodiversity conservation, cultural heritage, handicrafts, tourism and community development. Local experts were identified for the field investigation, and META agreed to provide logistical support. A detailed trip report was prepared for the purposes of planning the field investigation, covering team composition, logistical arrangements and next steps.

4.2. Literature Review

We conducted a desk-based review of literature relating to the project area's setting, its resources and people, keystone and allied concepts used in promoting biodiversity conservation, and information on petroglyphs or the other representations of such keynote species in Asian mountain and pastoral communities. We consulted key resource persons and in-country organizations via email to prepare a list potential field sites and elements for selection that characterize or describe key ethnic or cultural groups, geographical and ecological attributes, livelihood development opportunities, biotic and cultural threats, and access to representative areas.

We obtained digital copies of all relevant CDE (Centre for Development and Environment, Berne, Switzerland) documents covering the GBAO, and we contacted other European experts or researchers for advice and information. Co-investigator Nandita Jain visited Central Asia in January 2006 to meet with key persons from MSDSP, the Aga Khan Humanities Program, ACTED, META, and the Pamir Biological Institute, among others. We completed a wide-ranging desk and internet review of available literature, the most notable of which is a book on GBAO by Frank Bliss (2006). The outputs from these activities resulted in several in-house status and resource reports helpful toward final site selection and refining of our participatory methodology for the summer's field-based investigations.

4.3. Methodology

A key activity for the project was to develop and field-test a participatory field-based methodology to explore the concept of cultural keystone species and similar concepts. Our methodology aimed to be creative, innovative, transferable and at the same time inclusive of different perspectives and disciplinary frameworks. PhotoVoice was included as an innovative approach to learning, inclusion and expression and to be developed as part of an overall participatory planning and management strategy. The complete methodology, including the application and assessment of PhotoVoice, is available as a separate output (see Appendix 1 for a list of project outputs). Here we focus on key lessons learned and recommendations emerging from the field investigation.

Our intention throughout the field investigation was to be as participatory as possible, seeking diverse perspectives and using a variety of learning tools. However, we recognized that for the subject under exploration that a balance would have to be struck between working with groups which would foster consensus and diversity, and working with individuals who would generate detail, insight and richness. In keeping with the principle of collaboration, the field team was multi-disciplinary with expertise covering natural and social sciences, had members from local organizations (including three TCF grantees) and was surprisingly international (five nationalities!).

Team members were as follows:

- Dr. Rodney Jackson – Project Manager and Investigator, Director – SLC-USA

- Nandita Jain – Co-Investigator, Advisor SLC-USA
- Ubaidullah Mamadiev – Logistics Manager and Guide, President - META
- Mairambek - Translator and Guide, META

The above persons participated throughout the field investigation

- Dr. Dovutsho Navruzshoev – Expert Botanist, University of Central Asia/Pamir Biological Institute
- Dastanbui Mamadsaidov, Social Scientist, Communications Officer, University of Central Asia
- Rinchen Wangchuk – Field Director, SLC India- Trust
- Marielle Leseur – Small Business Advisor, MSDSP
- Nilufar Saboieva – Translator, Program Assistant, Land Use and Management Project, GTZ
- Suyn - Culture Officer, ACTED, Murghab

The above persons participated in parts of the field investigation

Balancing capacity building and generating project outputs – Although building capacity in new concepts and methods was not specifically listed as a project objective, for SLC capacity growth is an important organizational goal and is integrated throughout its work. Working on a new concept with new learning tools was an opportunity to develop skills not only of SLC’s partner organizations, but also within the organization. While this was achieved as seen in the feedback from team members *“We gained knowledge about new topics, and experienced a change in attitudes; PhotoVoice was an opportunity to gain and improve communication skills; We liked and learned from methods such as time-lines, trend-lines, etc”*, more time for training and subsequent application would have generated richer, more detailed knowledge on the relationships between culture and biodiversity conservation.

Participatory processes – We initially had intended having numerous group based discussions and activities that represent a diversity of perspectives, as well as generate some level of consensus that would be useful for planning and implementing future activities. Given the constraints of time, language, availability and location group activities were not always possible to the extent that we would have liked. It was also evident that the subject matter did not always lend itself to investigation using traditional participatory approaches since there were clearly some individuals who were more knowledgeable than others. Although, we remain satisfied with the balance that was achieved in the time available, we recognize that more group discussions would have been ideal. We were, however, encouraged by the application of PhotoVoice which lends itself equally well as a learning tool for both groups and individuals.

PhotoVoice – SLC is committed to exploring new tools for planning and managing community stewardship initiatives. With the field testing of PhotoVoice (PV), it is SLC’s goal to offer a new tool for local organizations as well as adding to its existing tool-kit of participatory planning methods. In PV we see opportunities to combine new technologies such as digital cameras with more traditional concepts such as visual representation and expression. PV was conducted in a variety of settings, with individuals, groups, children, women, and with people who had a range of prior expertise with cameras. A small exhibition was prepared at short notice in time for the

TCF trustees visit to GBAO in August. This is currently housed in the small cultural museum in Murghab. A more comprehensive review of our application of PV is available in the detailed methodology.

Whether in the hands of individuals or groups, PV emerged as a powerful tool to energize and empower people to express ideas, experience and knowledge. Participants were excited to use digital cameras and with the immediacy of the results, to learn new skills and have opportunities to share their world with others (Box 1 and Appendix 5).

Box 1. Some observations on PhotoVoice

“The process gives confidence to participants and opportunities to explore new ideas and issues

PV gave an unbiased perspective of local voices, the process was led by the photographer/participant

The process generated an individual voice (as facilitators often we seek consensus),

It is very thought provoking – this is possible in pictures both in their interpretation and in taking the pictures themselves

PV provides a long-lasting testimony, and allows sharing with the outside world”

However, with its relative instant results and visual impact there may be a tendency to conduct PV exercises as an end in themselves without looking at opportunities for collective action. While there is clearly value in PV as a means to share ideas perspectives, concepts and even dreams within participants’ communities and a wider audience, PV can also play a critical role to in more comprehensive planning and action frameworks. In future activities, we will focus on the role of PV in planning approaches such as Appreciative Participatory Planning and Action, as a tool for monitoring and evaluation and a catalyst for action among key decision-makers such as government officials and policy-makers.

“Taking pictures was like having a rest. It made us feel very happy, but it is easier to take the pictures than to explain why we took them. We would like many people to see these pictures, especially in other countries since they can then learn about our lives: how we milk, look after our animals and life in the Eastern Pamir. For our next investigation or set of pictures, we would like to photograph wild animals, our beautiful mountains and marmots grazing!”

The above observation highlights a key feature of PV, the need to explore the reasons for taking and selecting pictures but in ways that put participants at ease, are not intimidating and without turning the process into an interrogation. It should be noted that it was only one group that expressed difficulty in discussing their pictures, all the other participants were quite forthcoming in presenting their explanations.

In reviewing the process, it evident that more attention needs to be paid to guiding and training participants in the use of cameras, in better context setting for their work, and improving the processes of photo selection, analysis and follow-up. Ensuring reliable and sufficient energy for cameras, computers and other equipment will also be critical. During the field investigation,

picture selection and analytical processes were often rushed due to limited energy supplies. Portable solar cells and adapters for using car batteries are promising avenues to pursue in the short-term. Beyond taking and selecting of pictures, we will have to consider how to integrate cost-effective ways to share the process and results with larger and more diverse audiences. Although laptop computers were very effective in sharing results quickly, only small groups were able to participate in the process and therefore the numbers taking part were not as high as we would have liked. Alternatives such as photographic displays can reach a wider audience, but take time to prepare and critical momentum can be lost as a result. As PV is integrated into a more collective planning process, we will need to consider how to best combine new technologies, e.g. projectors with more traditional techniques such as portable photographic displays, to make it a more inclusive process.

Finally, as we look to implementing a larger project, it is worth noting that there is limited organizational capacity to plan and manage community-driven conservation and sustainable livelihood activities. Not only are there very few organizations, but technically there is limited experience in designing and facilitating small-scale conservation and linked livelihood initiatives.

4.4. Field Mission - Key Findings

We selected field study sites based upon a mix of socio-economic and environmental conditions including:

- *Economic Factors*: Does the species positively or negatively affect the human lifeway? An example of the former might be a native rangeland plant highly prized as winter fodder for livestock, a medicinal plant sought after in a distant urban center or a Marco Polo sheep which attracts \$25,000 in trophy hunting fees from wealthy foreigners. Predators like the snow leopard or wolf that kill valuable livestock may be perceived as species negatively affecting the livelihoods of local herders. On the other hand, tourism operators may see these species as a potential asset to be nurtured and protected.
- *Ethnicity* (embracing related differences in language, religion or custom): In broad terms, one can separate the Pamir Mountains into the:
 - Western Pamir (primarily Tajik and Shugni speakers, Ismaili farmers and herders who live in more rugged terrain that is better suited to snow leopard and ibex).
 - Eastern Pamir (primarily Kyrgyz speakers, Sunnis whose traditional livelihood embraces herding and semi-nomadism, and who occupy more gently-rolling terrain preferred by Marco Polo sheep and wolf).
- *Geographic location*: As noted above, there are two distinct areas, the western and eastern Pamirs with the two main settlements or administrative centers consisting of Khorog and Murghab respectively, with outlying settlements of varying accessibility and isolation.
- *Opportunities for subsequent support and follow-up* – Managing local expectations after any exploratory and planning activity are critical. Therefore factors such as on-going support from partner organizations, or some level of support planned for the near future were also considered.

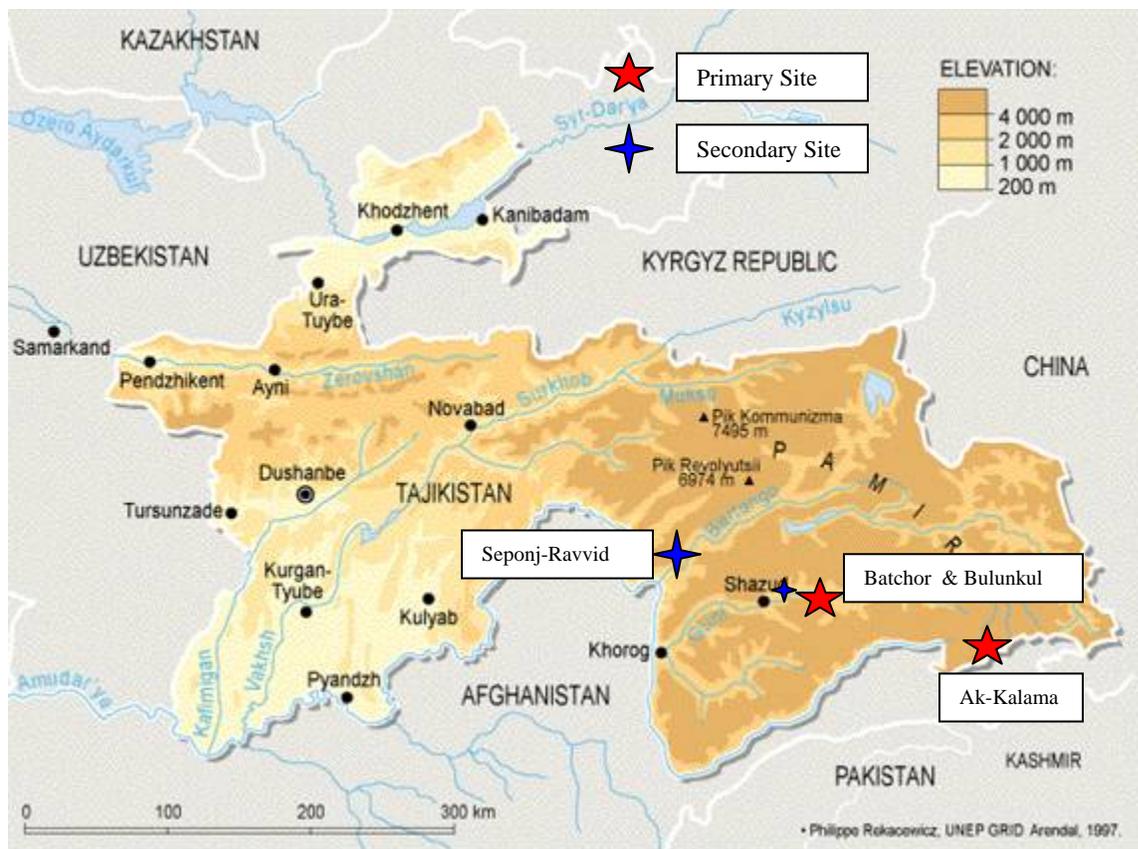
Primary site:

- Bulunkul, Murghab District – a settlement of about 30-40 households near to Yashi-kul and Bulun-kul. Although in the eastern Pamir, most families are Pamiri and Shugni speakers, with a few Kyrgyz households. Bulunkul's households are primarily engaged in animal husbandry, with some diversification into tourism with visitors mostly sent by META, and fishing. The village is notable for its use and knowledge of medicinal plants with a number of men and women engaged in herb collection.

Secondary sites:

- Ak-Kalama, Murghab District – a summer pasture for Kyrgyz herders that lies within the Jarty Gumbez hunting concession about 10km from the Afghan border. Between five to seven families tend to their animals and those of the hunting concession operator. The settlement occasionally receives tourists sent by META who stay with the families in their yurtas.
- Batchor, Rushan District – a settlement of up to 30 households to the west of Yashi-kul of Pamiri farmers and herders. Villagers have experienced incidents of snow leopard depredation, mostly recently in January 2006. The village lies in the rugged terrain favored by snow leopards and their primary prey, ibex.
- Seponj and Ravvid, Rushan District – two neighboring villages located in the Bartang Valley with a total of about 100 primarily Pamiri households. Seponj is home to a famous musician, and both villages lie in ideal ibex and snow leopard habitat as do most settlements in the Bartang valley.

Map showing the study sites



4.4.1. Ecologically Important Species

As conservationists seek to protect biodiversity hotspots, they tend to devote considerable effort toward identifying and evaluating plant or animal species playing important roles in determining ecological functioning and integrity, or whose presence or absence may reflect the well-being of the ecosystem in question.

Table 1. Concepts in Ecologically Important Species

Term	Concept/Definition	Examples	Selected References
Keystone Species	A species “ <i>whose impact on the community or ecosystem is disproportionately large relative to its abundance</i> ”	Five major categories recognized are predators and their prey species; plant pollinators & seed dispersers; hosts required for reproduction; and habitat or energy modifiers	Paine, 1969, Mills et al. 1993; Power et al. 1996
Indicator Species	An organism “ <i>whose characteristics (e.g., presence or absence, population density, dispersion, reproductive success) are used as an index of attributes too difficult, inconvenient, or expensive to measure for other species or environmental conditions of interest.</i> ”	closely linked predator-prey species; species whose abundance reflects local plant or animal richness or diversity; invasive species indicator of ecosystem	Landres et al. (1988)
Umbrella Species	A species “ <i>whose conservation is expected to confer protection to a large number of naturally co-occurring species.</i> ”	Used as tool for determining the minimum size for protected areas, selecting sites for inclusion in reserve networks, etc	Roberge & Angelstam (2004); Wilcox (1984)
Focal Species	“ <i>Taxa targeted for management through vegetation-restoration efforts because they are the ones most influenced by threatening processes.</i> ”	single or set of species for defining spatial & compositional attributes that must be present within a landscape (e.g., area-sensitive, dispersal, resource & ecological process limited taxa)	Lambeck (1997)
Flagship Species	Species chosen to represent “ <i>an environmental cause, such as a critical ecosystem or habitat in need of conservation.</i> ”	Selected for vulnerability, attractiveness or distinctiveness in garnering public support & acknowledgement (e.g., giant panda, tiger, snow leopard, Marco Polo sheep)	Simberloff, D. (1998); Bowen-Jones & Entwistle (2002)
Surrogate Species	Used as proxies for a wider range of plants and animals, thus intended as “shortcuts” for monitoring an ecosystem or community with respect to anthropogenic disturbances, population change or richness of biodiversity.	Also used with terms like indicator, umbrella and flagship	Caro and O’Doherty (1999)

We reviewed the literature pertaining to species of ecological importance, including key terms and their ecological significance and potential conservation context. Table 1, summarizes commonly-accepted definitions for these terms along with their conceptual context. Keystone species are considered to be plants or animals “*whose impact on the community or ecosystem is disproportionately large relative to its abundance,*” there are in fact very few examples upon which ecologists seem to agree. Among the species more often cited are the elephant, beaver and American prairie dog all of whom physically modify their habitat and predators like the sea otter, starfish and Canadian lynx that substantially affect prey abundance and/or community species richness and trophic structure.

However, the *Keystone Species Concept* is difficult to apply to the real world, hardly surprising given the inherent diversity of most ecological systems or the internal complexity of key ecological processes and intra- or inter-species interactions, as well as the general lack of knowledge about how these function. This holds especially true for ecosystems outside of Europe, North America or the Tropics where very few (if any) long-term, in-depth ecological studies have been undertaken.

Consequently, scientists have expanded their approach in defining what constitutes an ecologically important species. For example, among the most important assumption being made is the notion that a species may serve as a surrogate for conserving an entire ecosystems along with its imbedded habitats, diverse plants and animals. This led researchers to focus on more broadly defined, loosely applied terms or concepts, such as a surrogate or indicator species, umbrella species, focal or keynote species and flagship species (to mention the main ones appearing in the literature). For example, protected area managers and conservationists use these concepts to promote the protection of a particular habitat or ecosystem (e.g., snow leopard, tiger, giant panda), as indicators of environmental health (e.g., spotted owl and old-growth forests), and as taxa indicators for predicting areas of high biodiversity. Not unexpectedly, ecologically important species may also be endangered. Thus, the *Red Data Book for Tajikistan* lists 58 species of threatened invertebrates, 4 fish, 21 reptiles, 37 birds, 42 mammals, and 226 plant species, of which 4 are fungi, 14 mosses and ferns, 27 trees and shrubs and 181 species of herbs.

We initiated this project by extending the keystone species concept from its biological underpinning to the role they may play in human culture, for example in local language, ceremonies, narratives, diet, and medicine. Garibaldi and Turner (2004) defined a *Cultural Keystone Species* (CKS) as “culturally salient species that shape in a major way the cultural identity of a people, as reflected in the fundamental roles these species have in diet, materials, medicine, and/or spiritual practices.” As examples, they cited the western red-cedar (*Thuja plicata*) and edible red-layer seaweed (*Porphyra abbottiae*), important plants used by the Northwest Coast (First Nation) Indian culture of North America. Garibaldi and Turner suggested that without such “cultural icons” the society these species supported would likely be completely different. They described six elements that they considered best characterized a CKS (Box 2).

CKS are seen as an effective starting point for species and biodiversity conservation or even habitat restoration, since they build upon traditional ecological knowledge and support locally developed practices of resource use, including plants and animals protected by social taboo (Colding et al. 2001). The concept appears to offer a means for reinforcing and studying the

relationship of local communities to place, as well as for examining environmental change and community resilience in the face of global warming or other environmental disturbances.

Box 2: Elements in Determining Cultural Keystone Species

1. Intensity, type, and multiplicity of use;
2. Naming and terminology in a language, including the use as seasonal or phenological indicators;
3. Role in narratives, ceremonies, or symbolism;
4. Persistence and memory of use in relationship to cultural change;
5. Level of unique position in culture, e.g., it is difficult to replace with other available native species; and
6. Extent to which it provides opportunities for resource acquisition from beyond the territory (e.g., for sale or trading).

More importantly, several researchers thought that biodiversity conservation could be enhanced if CKS also served as ecologically important species on the grounds that those communities who embraced plants or animals as keystones should have the most reason for wanting to see sustainable returns. Certainly, CKS are more likely to have the most direct influence on wildlife species and their habitats, especially in remote areas like the Pamirs where government presence is presently weak. It may even be possible to motivate local communities to restore habitats where a particularly valued CKS has been overused or depleted. However, many CKS are listed as threatened or endangered, and thus protected under national and international laws. Alternative species or substitutes may be lacking or there may be a risk of introducing exotic or invasive species to the site where none existed before.

During the 2006 summer field trip, we interviewed local experts, pastoralists, farmers and government officials, made a field survey and reviewed the literature, to develop a list of ecologically important plants and animals. We describe them in more detail in Section 4.4.3. Some of the more widely recognized protected species are listed in the Ecologically Important Species paper that is available separately, along with other papers in Appendix 1.

4.4.2. Cultural Keystone Species – Applying the Concept

The choice of the cultural keystone species concept as an entry point and tool for linking cultural identities and biodiversity conservation in the Pamir was premised on a number of ideas and observations.

The region is known for a number of iconic species, such as Marco Polo sheep and ibex that have featured prominently in art, folklore and livelihoods for several centuries, and which also are integral components of Pamiri ecosystems. However, dramatic social, economic and political changes over the past hundred years have altered attitudes and practices regarding these species with the result that questions and concerns hang over their future survival and even the communities that live with them. Could species and associated cultural traditions and narratives, ceremonies, songs and discourse that potentially play a unique role in shaping and characterizing

the identity of the people that rely on them, serve as a tool for biodiversity conservation and sustainable livelihoods? Using the definition developed by Garibaldi and Turner (2004) – we sought to identify and examine species that shape in a major way the cultural identity of a people or peoples and the extent to which such a concept could foster community stewardship of biodiversity and support sustainable livelihood strategies in the Pamir.

Key Findings

As pointed out by Garibaldi and Turner, an absolute quantification of the significance of a particular cultural keystone species is not always possible, and this indeed is what we discovered. Although quantification of the significance was difficult, and we made some attempt at doing this, of more value was the exploration of elements given in Box 2, which did allow for a fairly thorough review of what makes for cultural significance. We found that the process of identifying species and constructing a picture of their history, representation and function offered an opportunity for all parties to consider the value and role of species even though comparisons between them were not made. At the same time we were concerned that the process not be perceived as interrogation, but rather one of shared learning with value for all parties. Consequently we had to be flexible and respectful in our relationships with local experts and communities; if people did not want to participate or felt unqualified there was no point forcing a response in order to get a ranking. Nonetheless, it was quite challenging and not always possible to develop and implement practical methods that simultaneously sought to address community needs and those of research, although tools such as PhotoVoice have the potential to jointly frame questions and analyses and offer participants considerable freedom to explore ideas.

It was evident early on in the investigation that knowledge about the elements of what determines cultural importance either did not exist or was unevenly held among community members. Furthermore, living under the Soviet regime has clearly affected the extent to which any previously held knowledge has been retained in the current population. We heard from even elderly people that their parents knew about the rituals, folklore and uses associated with certain species, but they themselves knew very little if anything at all. On the other hand there were younger people, including women whose knowledge of and interest in medicinal plants, had survived the dominance of modern medicine under Soviet times if only because such medicines are no longer available or affordable and alternatives are needed. Access to technology, and significant changes in social and economic systems have all contributed to how local populations relate to biodiversity. Defining definitive trends is difficult with our limited knowledge base, but it is evident that compared to pre-Soviet times there is currently less emphasis placed on the role of species in rituals, etc., and more on the utilitarian value of species, e.g. food, medicines.

Overall, the concept of cultural keystone species as described by Garibaldi and Turner in their context of Native American communities does not hold in the same way for communities in the Pamir. There is no single or group of species that plays a pivotal role in shaping the lives of a people and which if removed would result in a detrimental impact in their cultural identity. The species that comes closest to the concept, and one that we would consider to be of cultural significance rather than a keystone, is the Marco Polo sheep (discussed in more detail in Section 4.4.3.). This species is clearly associated with the Kyrgyz and their folklore, songs, and livelihoods in the Eastern Pamir, but which would not appear to affect the Kyrgyz irrevocably if

it were to disappear. We say this in part since there seems to be little or no widespread concern over the levels of hunting on the part of local communities. It is possible that the ibex may be of similar value to the Pamiri communities of the Western Pamir, but since our time in the region was limited this would require further investigation. One interesting observation is that even for the predominantly and relatively recently arrived (during the Soviet era) Pamiri community of Bulunkul in the eastern Pamir, the Marco Polo sheep appeared to be of more cultural significance to them rather than the ibex. This seems to indicate, albeit based on one observation, that cultural values can change according to the landscape and the resources available and are not necessarily determined by ethnicity alone.

As mentioned earlier in this section, of value in the cultural keystone species concept was the process of exploration rather than the quantification of significance. Exploring the concept has allowed us to propose species of cultural significance or importance which is what we consider the Marco Polo sheep to be, along with a number of other species including plants (see Section 4.4.3.). We generally agree with Garibaldi and Turner that in exploring culturally important species does begin to reinforce the relationship of local communities to place, and serves as a starting point for analyzing environmental change and community resilience in the face of such change. The examples of Marco Polo sheep and teresken and their apparent over-harvesting and implications for ecosystem health and livelihoods are cases in point.

Furthermore, learning about histories and patterns of use of particular species, along with the practice of rituals and other cultural representations in legends, songs, etc, generates opportunities to develop conservation and livelihood strategies that address sustainable use and build upon cultural values.

Box 3. What I value in my natural environment – samples of narratives from PhotoVoice

“Ticken chop - This plant is useful not only for humanity, but also for wild animals. It is also useful for the stomach diseases of wild animals. And people also eat this plant for headache and blood pressure. In present times there is not as much of this plant as there used to be”

“Khipexk – this plant has medicinal meaning for the local population. It flowers in spring (towards the end of June), its roots are useful. We put the plant into oil and use it for nose drops – let the oil stay there for 1-2 mins and then drip out. Many people know about this plant in Bulunkul. There is some demand from outside for this plant (from Dushanbe and Tashkent) – companies will pay up to \$3/kg but we are not allowed to sell since we are in a national park. It is also a natural dye for leather – red. In the winter the plant may be grazed.”

However, such approaches need to be placed within a larger context of stewardship of ecosystems and habitats, and building capacities for community-based approaches in particular. In a country and a region where conservation efforts are poorly-resourced and yet where livelihoods are so dependent on natural resources, community-based approaches offer opportunities to improve the efficiency of resource conservation in ways that also support sustainable livelihood strategies.

4.4.3. Culturally Important Species

Using the general descriptions provided by Garibaldi and Turner, the team identified and assessed to the extent possible a number of plant and animal species with the potential to be cultural keystone species and which would feature in a conservation and sustainable livelihoods strategy. These species are summarized in the Tables below where each of the critical elements of a cultural keystone species is described and rated for each identified species. In rating the species, a number of opinions and perspectives were sought including team members and local people, and the number given represents a consensus of views and not an average.

Notes to Tables of Culturally Important Species

Name of Species:

- Scientific name
- Local Names (English, Russian, Kyrgyz, Tajik, Shugni)

Ecological Significance: Ecological and/or functional role played by species, where this is known.

Type of Use and Intensity of Harvesting:

Economic – species used for food or forage, medicine, dyes and to other economic benefit by humans and/or their livestock; *Social* – species used in ceremonial or ritualistic practice or folklore narratives.

S = species has a single use only; M = species has multiple uses

The rankings indicate the intensity of such use during the specified time period, as follows.

- 5 = yes, species used at very high rate
- 4 = yes, used at a high rate
- 3 = yes, used at a moderate rate
- 2 = yes, used at a low rate
- 1 = yes, used at a very low rate or infrequently
- 0 = no, not used

Persistence: Persistence and memory of use in the relationship to cultural or socio-economic change. Note that awareness of a species may vary according to economic or political change and its effect upon local customs and livelihoods. Some settlements exhibit stronger awareness or values than others.

- 5 = yes, species has very strong position in cultural values, and is ubiquitous among communities in different areas
- 4 = yes, species has strong cultural value
- 3 = yes, species has moderate cultural value
- 2 = yes, species has little cultural value, being rarely present in local awareness
- 1 = yes, species has very low value
- 0 = no, species has no value

Current Status: The present status and geographic distribution of the species, based on information from the Tajikistan Red Data Book and/or expert knowledge

Tolerance to Harvesting: The relative degree to which the species can be harvested without threatening its future existence, along with whether it can be substituted by another species or product

5 = yes, species is very tolerant of being harvested or removed, and readily recovers

4 = yes, species is tolerant of being harvested or removed

3 = yes, species has moderate tolerance of being harvested or removed

2 = yes, species has a low tolerance to harvesting or removal

1 = yes, species is very intolerant of being harvested or removed

0 = no, species is intolerant to any use or harvesting

Substitutes: Whether the use can be replaced by another species or suitable substitute from a cultural perspective.

Yes = substitutes are available; No = there are no other species or natural substitutes for the current use(s)

Rating System: The values listed above were adapted from Garibaldi and Turner (2004). Note that these have been generalized, since both perceptions and use according among individuals, as well as cultural or ethnic groups, and even from one settlement to another with the same ethnic grouping, depending upon the presence, absence or influence of individual persons with strong traditional knowledge or understanding of the systems eroded or lost entirely during the Soviet era, from the 1930's through 1991.

For the purposes of this study we considered uses according to the periods of time defined by the dominant socio-political system in place, as follows:

H = historical period, prior to Soviet influence in GBAO

S = period with strong Soviet influence, from the early 1930's through the dissolution of the USSR in 1991 (used where appropriate)

C = contemporary period

Table 1. Culturally Important Plant Species

Species	Local Names	Ecological Significance	Economic Uses & Intensity	Social Uses & Intensity	Persistence of Tradition	Current Status	Tolerance to Harvesting	Substitutes
<i>Juniperus schugnanica</i> (trunk, branches, needles)	Archa (Kyrgyz), ambrkhts (Shugni); mozhzhevelnik (Russian)	Prevention soil erosion, wildlife food, cover & nesting habitat	Timber (house construction) fuelwood [historic] fuel = 5 (0) timber = 5 (0)	Burials (protect body) & “New Year” tree burial = 4 (1) tree = 0 (5) Some stories, Incense: H = 5; C = 1-3	H = 5 C = 3	Very rare, highly depleted	Very low (extremely slow growing, does not reseed naturally, climatic change & grazing effects)	None
<i>Anaphalis virgata</i> (stem, flowers)	Ysryk (Kyrgyz); Strakh (Shugni); Anafalis (Russian).	Not known	Vitamin C & medicine for stomach, liver, jaundice & bone complaints H = 5; C = 2-3	Incense for purification prior to traveling (good luck & health) H = 5; C = 3	H = 5 C = 3 [use elders = 5; by youth = 1]	Uncommon	Moderate – high	None
<i>Rhodiola heterodonta</i> (rootstock)	Altyn tamyр (Kyrgyz); Tiloiवेश (Shugni); Rodiola, zolotoy koren (Russian).	Prevents soil erosion	Medicine (energy & nervousness tonic, stomach problems) H = 0; C = 5 Dye (red) for cloth & pelt H = 5; C = 2	None	H = 2 C = 5	Sparsely distributed	Very low (involves removal of rootstock; plant is slow-growing)	None
<i>Pyrethrum pyrethroides</i> (flowers)	n/k (Kyrgyz); Kukchivir (Shugni); Romashnik (Russian).	Helps prevent soil erosion	Livestock fodder (autumn) H = 5; C = 5 Traditional medicine for stomach, fever high BP H = 5; C = 5	None	H = 5 C = 3	Common	High	Yes, can be substituted with <i>Matricaria</i> or romaska (Russian) / kukhchivir (Shugni)
<i>Nepeta glutinosa</i> (stem)	n/k (Kyrgyz); Khichikhorth (Shugni); Kotovnik (Russian).	Eaten by livestock if ill, soil binder	Medicine (antibiotic applied to cuts, broken bones) H = 5; C = 3	None	H = 5 C = 1	Common, but sparsely distributed	Low	None

<i>Ziziphora afghanica</i> (stem)	Boz nich (Kyrgyz); Chambilak vokh (Shugni); Zizifora (Russian).	Soil binder, livestock forage	Autumn/winter forage Medicine used stomach ailment, memory loss, high BP, sore throat, endoparasites H=5; S = 0; C = 2	None	H = 5 C = 4	Common, widely distributed	High	None
<i>Primula macrophylla</i>	Teke jalbusak (Kyrgyz); Guli bunavsha (Shugni); Pervotsvet (Russian).	Good for soil formation; prevents soil erosion	Livestock, ibex & marmot forage H = 5; C = 2 Medicine (throat, lung congestion, control of diarrhea, improves sight (Kyrgyz) H = 5; S = 3; C = 1	None	H = 5 C = 0	Common in wet places & drainages	Moderate	None
<i>Ferula badachschanica</i> (stem; leaves)	n/k (Kyrgyz); Rof, Revstak (Shugni); Ferula (Russian).	Soil binder, seeds used by birds	Diet: Stems eaten as salad by humans; ibex consume leaves H = 5; C = 5 Medicine (tuberculosis, boils, syphilis, stomach ailments, diabetes, sedative, tooth ache H = 5; C = 5	Purifier for bad spirits. People keep dried plants inside home H = 5; C = 1	H = 5 C = 1	Common, widespread distribution	Moderate (plant cycle 4-5 years, less in wet years when tolerance is higher)	None
<i>Macrotoma</i>	Erdik (Kyrgyz);	Soil binder	livestock fodder	None	H = 5	Common,	Moderate	None

<i>euchroma</i> (rootstock)	Khibeh (Shugni); Macrotoma (Russian).		– use slight Dye (red) H = 5; C = 0 Medicine (headache, treatment boils or skin problems, childbirth complications, high BP) H = 5; C = 5		C = 5	widespread	(recovery 8- 10 yrs after removal root)	
<i>Ephedra intermedia</i> (berries, stem)	Checkendi (Kyrgyz); Amochak (Shugni); Efedra (Russian).	Soil binder, berries eaten bird, nesting cover	Livestock forage (berries) Diet (vitamin C) H = 5; C = 0 Medicine (toothbrush, menstruation, throat/gland swelling, narcotic or stimulant, itchy skin, heart tonic, bone problems) H = 5; C = 3	Some stories	H = 5 C = 1+	Common, widespread	High	None
<i>Hedysarum cephalotus</i> (flowers)	Kyzyl butma (Kyrgyz); Rosh jamol (Shugni); Kopeechnik (Russian).	Soil binder with associate <i>Anthacamperi um</i> eaten by Marco Polo, ibex, marmot	Medicine (high blood pressure) H = ? C = ?	Not known	Not known	Common	High	not known
<i>Ceratoides papposa</i> Teresken (entire plant)	(Kyrgyz); Tsuthm (Shugni); Teresken (Russian).	Soil binder, cover for wildlife, forage for MP, ibex & livestock	Forage (livestock) H = 5; C = 5 Fuel (heating & cooking) H = 5; S = 1; C = 5	None	Not known	Common, highly depleted near settlements	Low (slow growing plant, very poor natural replacement)	Yes, cattle, sheep, goat dung
<i>Lindelofia stylosa</i> (leaves)	Chop chai (Kyrgyz); Chei okhak	Soil binder, associate with <i>Carex</i>	Medicine (high BP) H = 5; C = 0	No	H = 5 (k) S = 0 C = 0 (k)	Common	Low	Yes Replaced by green tea,

	(Shugni); Lindefolia (Russian).		Tea (prior to Soviet era) H = 5; C = 0					possibly <i>Ziziphora afghanica</i>
<i>Hippophae rhamnoides</i> (berries)	Chychyrkanak (Kyrgyz); Khin schuth (Shugni); Oblepikha (Russian).	Soil binder Food & cover for wildlife	Diet: berries (Vitamin C, juice or jam) H = 5; C = 5 Medicine (tonic, liver or stomach ailments, skin sores & burns) H = 3; C = 5 Livestock fencing Used for leather processing H=3; C=0/1 Fuel wood S=1; C=5	None	H = 3 C = 5	Common gravel bed or riverine species	High	None
<i>Rosa huntica</i> (buds, leaves, rootstock)	n/k (Kyrgyz); Khar (Shugni); Shipovnik (Russian).	Cover for wildlife, food, soil binder	Diet: berries (Vitamin C), salad (young stem, leaves) Medicine (stomach, diarrhea, relaxant, antimicrobial, anticoagulant, blood sugar) H = 3; C = 5 Dye (root, yellow & red) H = 5. C = 0	None	H = 2; C = 5	Common in W. Pamir, rare in East Pamir	High	None
<i>Menta Asiatica</i> (leaves)	Withzm (Shugni) Myata (Russian)	Livestock fodder, prevents soil erosion	Medicine (high blood pressure, kidneys, altitude sickness, stomach, appendicitis), H=5; C=5 Forage for	None	C = 5	Common	High	Can be replaced by strakh for stomach or tsherefts for high blood pressure.

			livestock					
<i>Salix schugnanica</i> (branches and trunk)	Wan (shugni) Iva Shugnanskaya (Russian)	Soil binder, (maintains river banks)	Construction, Fuel wood S=2 C=5 Forage for livestock	None	C=1	Common gravel bed or riverine species. Decreasing since collapse	Moderate	Can be replaced by ablepex for construction material and fuel wood and by dung for fuel wood.
<i>Bunium badachshaunicum</i> (seed)	Zira (shugni) Zira Badakhshanskaya (Russian)	Prevents soil erosion. Livestock and wildlife forage	Medicine (high blood pressure, stomach) C=3 Spice, e.g. in plov, etc. C = 5	None	Unknown	Common in specific area	High	Can be replaced by withzm for high blood pressure and stomach, or starch for stomach cannot be replaced for food.
<i>Angelica ternata</i> (entire plant except roots)	Tsherefts (shugni) Dudnik troychatyy (Russian)	Prevents soil erosion, livestock and wildlife forage	Medicine (high blood pressure) C=4	None	Unknown	Found in rocky areas.	Low	Replaced by withzm and strach

Table 2. Culturally Important Animal Species

Species	Local Names	Ecological Significance	Economic Uses & intensity	Social Uses & Intensity	Persistence of Tradition	Current Status	Tolerance to Harvesting	Substitutes
<i>Ovis ammon polii</i> Marco Polo Sheep	Arkar (Kyrgyz); Nakhovir (Shugni); Pamirskiy baran, Baran Marko-Polo (Arkhar) (Russian).	Dominant herbivore of the high Pamir Main prey species for wolf, some taken by snow leopard Endangered species	Foreign hunter's trophy H = 0; S = 2; C = 5 Meat (local people) H = 4; S = 2-3; C = 5 Clothing, boots local people H = 4; S = 1-2; C = 1 Tourism H = 0; S = 0, C = 1	Sacred animal, symbol of purity & pride Horns in shrine (W Pamirs) H = 5; S = 3-4; C = 4-5 (value varies by livelihood, very low among military, higher among pastoralists) Some folklore	Declining reverence for species H = 4-5 S = 2-3? C = 3 or less	Populations rapidly declining, especially near settlements Populations are considered vulnerable or very vulnerable to disturbance Up to date population counts lacking	Low – moderate	Yes: by mutton (but is twice as costly) Social or totem – none
<i>Capra [ibex] sibirica</i> Ibex	Echki Teke (Kyrgyz & Shugni); Sibirskiy gorniy kozel (Russian). Nachtchir (shugni) Turgak (young male) Ligver (young female) Katabotch (big male) Golavaz (old female)	Other dominant herbivore of the Pamir Main prey for snow leopard, also taken by wolf	Trophy hunting (westerners): H = 0; S = 1; C = 3 Meat: ibex is highly liked by local people H = 5; S = 3-4; C = 5 Leather items locals H = 5; S = 4; C = 4 Woolen items locals C = 1 Horns used to make souvenirs and decoration of houses C = 3	Sacred species, widely depicted in petroglyphs Horns in shrines (W pamirs) H = 5; C = 4-5 (Varies by location & community) Some folklore	H = 4-5 C = 3	Not listed as threatened Considered common, but populations are declining & vulnerable to depletion Note: current population data lacking. Note: local opinion suggests that population is increasing again in W Pamirs in past 3-4 years.	Moderate	Yes = meat from livestock No as a totem or trophy
<i>Uncia uncia</i> Snow Leopard	Irbis (Kyrgyz); Palange kaye	With wolf, dominant carnivore of area; keynote	Fur-trade (highly prized in some countries, illegal) H = 4; C = 1/0	Bones, teeth, nail, genitals of female SL used as talisman H = 3; C = 0/1	Not known	Rare, endangered species. Population size not	Low	None

	(Shugni); Irbis, Snezhnyy bars (Russian).	species & “indicator” of a healthy ecosystem Endangered	Bone trade H = 0/1; C = 3? Livestock depredator H = 1; C = 2-3?	Little folklore		known, most common in W. Pamirs Endangered population estimated at 250?		
<i>Lynx Lynx isabellinus</i> Asiatic lynx		Rarely seen medium- sized cat preying upon Tolai hares	Use not known May occasionally depredate domestic livestock (sheep/goats)	Not known	not known	Scarce, occurring sporadically Endangered	Low	None
<i>Canis lupus</i> Wolf	Urch (Kyrgyz); urch (Shugni); boru, volk (Russian).	Dominant large predator of dog-family (others are introduced dhole & ubituquous fox)	Livestock pest – trapped & hunted at every opportunity Fur: used for rugs or hats	Widely despised predator; depicted in folklore as “bad guy” Bone of the leg used as talisman.	H = 5; C = 5 Formerly controlled by Soviet government laws	Widespread & considered common Not threatened (species of Least Concern)	High	None
<i>Ursus arctos isabellinus</i> Brown bear	(Kyrgyz); (Iourkh) (Shugni); medved (Russian)	Excavates marmot dens, aerates soil; predator of marmots	Trade of body parts used in traditional Asiatic medicine H = 0/1? C = 2? Demand from nearby China may encourage trapping	Not known	Not known	Likely declining. Population crudely estimated at 100-150 Endangered	Low or very low	None
<i>Marmota caudata</i> Marmot (long-tailed)	Khitchif (shugni) Surok (Russian)		Skin, oil and meat used as medicine (rheumatism, frostbites, tuberculosis, bronchitis, etc.) C=3 S=3	Some legends	C=3	Common	High	Oil can be replaced by bear oil.

Arkar, Nakhovir, Pamirskiy Baran, or the Marco Polo sheep (*Ovis ammon polii*)

From relatively recently created mosaics on bus-stops in GBAO to statues at the boundary of Murghab district to centuries-old petroglyphs, the Marco Polo sheep occupies an important and yet what appears to be a changing cultural place for the peoples of the Pamir. Arkar (Kyrgyz) or Nakhovir (Pamiri), as it is locally known, is the closest that the communities of the Pamir, especially the Kyrgyz, have to a species that equates to a cultural keystone species. A long tradition of hunting, for example as seen in petroglyph depictions that include both bows and firearms¹ and numerous folktales, indicates its significance as a source of food and other products; its meat is considered “tasty”, while the skin and wool have provided raw material for boots and other items of clothing. As discussed in Section 4.4.4. and despite regulations to the contrary, hunting of Marco Polo sheep continues, especially by local people and border officials for food. Stories also exist about local people, particularly hunters, who used to collect the droppings of Marco Polo sheep and ibex, light them, and then place the glowing pellets on their stomachs to keep warm whilst sleeping outdoors in the winter.

Box 4. Hunting Traditions of Ancestors (p21 in Pamir Kyrgyz, 2003, translated from Kyrgyz²)

Experienced hunters taught younger generations (ages 12-15 years) how to hunt. They would take the youths out with them and teach them hunting, showing where to hunt and when. After all the adults had hunted, they would let the boys hunt.

Pamir Kyrgyz never considered someone as a good hunter if they began hunting after the age of 20. Whoever started with a successful hunt had to invite the villagers and treat them with the meat. After eating the meat, local people would wish that he would become a lucky hunter. Any hunter had to give all the meat of the prey to local people. He was only allowed to keep the head and bust.

Within the Kyrgyz communities of Pamir, the significance of the Marco Polo sheep is also seen through their specialized vocabulary for distinguishing the species by gender and age (see Box 5). The species acquires further significance in local communities with use of these terms as place names in the Pamir, e.g. Ak Arkhar. Although few place names are marked on the most comprehensive map of the region, *The Pamirs*, produced by ACTED and Markus Hauser, conversations with local people indicated that there are numerous unmarked places associated with Marco Polo sheep.

Perhaps, because of its important economic function and its very impressive physical appearance, the Marco Polo sheep is considered a symbol of pride and to some extent sacredness. Modern representations, for example statues at the boundary of Murghab District indicate a sense of pride about the species as do local sentiments such as “Pride of Pamir, Pride of Badakshan”. Its horns can found adorning shrines near yurtas and houses but within the current population there is little or no understanding or knowledge of the associated rituals and symbolism. The general response to questions about rituals and symbolism is that grandparents (even of older people) were more

¹ Tashbayeva T., Khujanazarov M., Ranov Z., and Samashev Z., (2001) Petroglyphs of Central Asia, International Institute of Central Asian Studies, Samarkand, 220pp.

² Zandarbaev A., Temurkylov K.,(eds) (2003) Pamir Kyrgyz, ACTED, Osh, 296pp

knowledgeable about such traditions, but these have been lost as livelihoods and practices changed under the Soviet regime.

Box 5 Ages of Marco Polo Sheep in Kyrgyz (p22 in Pamir Kyrgyz, 2003)

Kylga (male)	Arkar (female)
1 year. Kozuga	Kozuga
2 years. Bodo	Bodo
3 years. Kokmok	Eki tishti arkarchak
4 years. Deldegel	Arkarchak
5 years. Kak muiuz	Tort tishti arkarchak
6 years. Chary chykma muiuz	Alty tishti arkar
7 years. Gulgacher	Arkar
8 years. Gulga	Gez kairtargun arkar
9 years. Bir ailangen gulga	Harygan arkar
10 years. Uch ailangen gulga	
11 years. Gez kaitargun gulga	
12 years. Haryan kylga	

However, in the both the western and eastern Pamir, there are individuals for whom the natural environment provides inspiration for artistic expression, and that too independent of any organized efforts to encourage such efforts. A much admired songwriter, Lidouch, from Khorog who died in 1998 left behind a legacy of songs in which the wildlife, flowers, rivers, etc. of the Pamir and Badakhshan feature strongly, e.g. Pomir kuyen, Ar Badakhshon savam. In the Eastern Pamir we came across one active musician whose songs about wildlife emerge from a sense of pride in their presence as well as concern over their disappearance (see Marco Polo song in Box below). Although he noted that young people today prefer songs about love, he was aware of other musicians in villages who continue to write and perform songs about wildlife (e.g., Box 6). But like others, he also noted that in his childhood more people were interested and informed about the range of folklore associated with the Pamir landscape and the rituals and symbolism connected to the region's fauna and flora.

Box 6 Marco Polo Song – written by Jaanbai Oljochiev, Madian, Murghab District.

- | | |
|--|--|
| 1. They are in the far pastures
Everybody admires them
They are harmless animals
They live in big groups | 3. They are big interest for foreigners
And hunters come from abroad to them
They kill them for their horns and head
Firms take their prices for this |
| 2. Marco Polo, the pride of Sary-Kul
Inhabitants of rocky values
The beauty of mountain is this animal
Do not kill them please, let's save them | 4. They are the wealth of nature and earth
It is a sacred animal, don't kill them
They might disappear
Please, humanity save them |

In most of the elements that indicate a cultural keystone species, the Marco Polo sheep appears to rate highly. It is a species that has a multiplicity of uses with a relatively high intensity of use, albeit primarily through illegal hunting at present. It should be noted that hunting is not a new phenomenon, but one with a long history and associated traditions and rituals among the peoples of the region. A detailed terminology in language indicates its importance to at least the Kyrgyz population, and its role in narratives and symbolism suggests a level of significance that is only

matched by the ibex. The persistence and memory of use of the species in relationship to cultural change is interesting in that it remains a much discussed species despite the dramatic changes of the past century, but it seems less important as a cultural symbol and serves more of an economic and utilitarian function to a diverse population. However, one group to whom the species does serve an important cultural function is international hunters who prize the animal above all other wild sheep. For this group it would be difficult to replace such value with another species, but for the majority of illegal hunters the alternative of mutton is unfortunately more expensive under current conditions.

Although there is recognition of threats to the Marco Polo sheep at the government level, the official ban on hunting seems to have little effect in the absence of its enforcement. At a more local level, there is no significant indigenous response to control the hunting of Marco Polo sheep, even though people are aware of the illegality of their actions and signs of a decline in numbers, e.g. smaller herd sizes, fewer sightings, herds are further away from settlements. For impoverished local populations (both resident and non-resident such as military personnel) with relatively easy access to guns, the species continues to be an important source of food, perhaps even more so than in the past.

If anything, the case of the Marco Polo sheep highlights the complexities of developing integrated conservation strategies that build upon cultural and social values especially in regions and populations that have undergone dramatic political and economic change. As we have discovered, some of the strongest traditions and cultural values associated with the species are related to hunting, which in recent years have taken on a new twist with the arrival of international trophy hunters. In the next section, we explore in more detail the role of hunting and its potential relationship with conservation strategies for the Marco Polo sheep.

In concluding this section, it is evident that the Marco Polo sheep is clearly associated with the Kyrgyz and their folklore, songs, and livelihoods in the eastern Pamir. As noted in the piece below “Without Marco Polo sheep, the mountains are dull”, but whether it qualifies as a cultural keystone species is not so clear. Of more value has been the approach to exploring the concept which has highlighted opportunities for further investigation and action.

Sanat (no author, undated, p221, from Pamir Kyrgyz),

Without ducks and goose

The lake is dull

Without women and girls

The people are dull

Without Marco Polo sheep

The mountains are dull

4.4.4. Hunting – A clash between cultural traditions and conservation?

Historical Context: Judging by the common and widespread representation in petroglyphs of ibex, Marco Polo sheep and even brown bear, along with the inclusion of fire-arms (from Petroglyphs of Central Asia, 2001) hunting has been part of Central Asian human life for centuries. Such

practices remain strong, with Kyrgyz pastoralists especially passionate about hunting Marco Polo sheep or using falcons to chase after small game like hares and snow cocks for fur and meat. Some herdsmen even use wild-caught golden eagles to help guard their sheep flocks from predators.

Anthropologists believe these kind of traditional practices become deeply imbedded within the culture, through a combination of rituals, ceremonies, legends and social taboos, and thereby forge deep connections and respectful relationships between people and nature. Traditional hunting laws promulgated under the Holy Qur'an and more specifically through the book *Risolai piri palavon* or “Rules of Master Hunter” written by Ahmadi Zamchi – along with the use of primitive weapons (initially bows and arrows and then muzzle-loading guns) – controlled the number of animals killed during hunting trips. Wildlife populations readily absorbed this limited hunting pressure, as suggested by the explorer Sven Hedin, as well as the early eighteenth century Russians, or later by British hunters like C.S. Cumberland who saw large herds of wild sheep and goats.

Unfortunately this rich reservoir of traditional knowledge and custom has broken down and resulted in the widespread and unregulated hunting of wildlife, especially Marco Polo sheep whose meat now sells for less than half the price of mutton. Attention to protecting species during breeding and other vulnerable stages of their life history has waned, along with temporal restrictions placed on harvesting levels. Socio-economic and political change brought about by the ‘Great Game’ and Russian annexation drastically altered land-use and resource management patterns in the Pamirs and GBAO. The traditional role of the elderly or respected teachers as carriers of knowledge has almost entirely disappeared, so that the intergenerational transmission of hunting values and laws has been seriously eroded over the past century. .

The Current Situation:

“If you think you are poor, try the life of a nomad”
- Kyrgyz proverb

This Kyrgyz proverb aptly describes many of Murghab District’s 14,000 residents, especially those herding livestock. People were well cared for during the Soviet era under the centralized state-controlled economy which provided life’s necessities for the collective farms where nearly all households were employed. The system provided mobile medical and veterinary services, along with electrified winter homes and sufficient fodder for livestock to survive the cruel Pamiri winter. All such services collapsed in 1991 when the Soviets withdrew and Tajikistan became a republic. Livestock was divided among households and all is now private, although the original grazing areas of the collectivized households have been maintained among its former residents.

The dissolution of the Soviet Union quickly led to widespread food-deficiencies, further exacerbated by the ensuing civil war (see Bliss 2006). Military-grade firearms became freely available, and were used with devastating effect, often killing entire herds of Marco Polo sheep, including females with their young. With such widespread illegal hunting, Marco Polo sheep populations plummeted. Although exact figures are lacking, they now thought to number a mere fraction of what existed as recently as the late 1970’s (Schaller 2003). There are likely less than 10,000 and perhaps as few as 5,000-8,000 animals left in Tajikistan, many of which are concentrated within a few isolated “hunting blocks.”

1) Commercial Hunting: Programs catering to international hunters started in 1987. The basic fee ranges from U.S. \$22,000 to \$27,000 or more depending on the hunter's nationality and size of the trophy. The season officially opens on September 15 for three months, with 40-60 licenses being issued annually. However, there are persistent rumors that an unknown number of "unofficial" licenses are available, especially to foreign hunters who are brought to Murghab district directly from Kyrgyzstan, thus bypassing Dushanbe. Corruption is thought to be pervasive, for there is no public accountability by government for funds generated by the program, a concern raised even in local newspapers. Both the Ministry of Forestry and the Ministry of Nature Protection can issue licenses, but in effect Nature Protection controls the hunting program. According to local officials, Murghab District – where nearly all trophies are taken – seldom sees any money from such Marco Polo sheep hunts. This includes the Tajik (Pamir) National Park, although hunts within its borders have generated considerable money. And with few exceptions, neither do local communities receive any direct benefit from commercial hunting, although it often occurs within lands that they use and manage, albeit de facto.

According to Schaller (2003), eight companies (each with its own defined concession area) cater to Marco Polo sheep and ibex trophy hunters (mostly Americans) in Murghab District, but only three operations attract clients with any consistency. These are the companies of "Badakhanshan" with its base of operation within the Pamir National Park, "Shorbulak" operating south of Rangkul, and "Murghab" in the South Alichur Range near the Afghan border which has the reputation of being the best managed operation. Currently local benefits to local people range from short-term employment as guides to accompany foreigners on their hunts to longer-term employment as seasonal or year-round "wildlife watchers" for the hunting area, payment (cash or livestock products) in return for managing livestock owned by the concessionaire, and access to vehicular transport for moving livestock or household belongings between summer and winter pastures.

It has become internationally acknowledged that money derived from trophy hunting of wildlife must benefit the species' conservation as well as local communities who may share the land, thus offering incentives to protect and manage these resources wisely. So far, Marco Polo sheep hunts in Tajikistan do neither.

2) Illegal Hunting: However, at present, the greatest threat to Marco Polo sheep, ibex, brown bear, snow leopard, fox and other wildlife comes from uncontrolled hunting or trapping by local people, the border guards, and officials from public agencies like the security bureau, police and others.

The Tajik Border Guards stationed along the frontier with China and Afghanistan are extremely poorly paid and provisioned, especially since the departure of their Russia counterparts. For example, guards in the Zorkul *zapovnik* (strict scientific reserve) along the Wakhan Corridor reportedly receive a salary equivalent to \$1.50 per month, despite being stationed in a very remote and difficult area. Reports indicate the guards are resorting to killing Marco Polo and other wildlife for food, but the intensity of such illegal hunting is not known. Certainly such actions by officials do not serve as good examples to the general public. Furthermore, some soldiers are known to loan their *kalashnikovs* to family members during winter when the wild

sheep come closer to roads and the automatic weapons can be used with devastating impact. Without proper incentives, education, policing or law enforcement, illegal hunting will be virtually impossible to stop or control.

Before significant changes in social, political and economic systems in the last century, there were often only one or two hunters in each village. Now there are many more who hunt; in fact, many rural settlements now operate their own annual hunts aimed at supplying themselves with meat for the harsh winter. People either quietly endorse or actively support such illegal hunting, even turning a blind eye to the killing of pregnant females and nursery groups – a practice for which penalties such as going blind, bad luck, etc., carried more weight and foreboding than they do now. Instead of seeing herds of up to 100 Marco Polo sheep or ibex near the village, one must travel 4-5 hours or more away and herd sizes are counted in tens or less.

We frequently heard comments like, “All the officials hunt, so why not we?” or “There is little food for us, our livestock are too valuable, and Marco Polo meat tastes very good.” Our interviews suggested that the typical hunter in settlements like Bulunkul may each kill 5-10 Marco Polo or ibex annually; if we extrapolate this to the 20+ similar-sized communities located within Marco Polo range, the number of wild sheep harvested annually must easily exceed 200-300. This figure would not include animals killed by military personnel, the police or persons from other locations.

Box 1 lists some of the relatively strict traditional set of rules no longer followed, but which could help bring hunting pressures back to more sustainable levels. It was widely held that “something bad” would happen to any hunter failing to respect these rules. For example, in the community of Batchor we heard of a deceased hunter by the name of Aidermamat who had killed 8 ibexes at a time. When he returned home, blood came out of his nose and ears, and he died soon afterwards.

Box 7: *Risolai piri palavon* (Rules of the Hunting Master).

Beside an extensive set of rituals governing pre- and post-hunting behavior, the book states:

- You should not kill more than 3 animals at a time
- You cannot put more than 3 bullets in your gun at a time
- Hunting is not allowed in spring because ibex are pregnant and slim then
- You can only shoot big males and old females. It is not allowed to kill females or their lambs
- The hunter should share the animal's meat in 3 portions: one for himself, one for his household, one for guests. The meat should not be sold or bartered

Moving Forward: Tajikistan's legal framework for environmental protection and biodiversity falls under *The Law on Nature Protection* (promulgated in 1993 and revised in 2003) with oversight from the State Committee for Environmental Protection (SCEP), and implementation by the Ministry for Nature Protection. Trophy hunting management comes under Regulation No 24 (2001). The Tajik Government is currently implementing its 1998 – 2008 National Environmental Program aimed at ensuring rational use of natural resources, maintaining the optimal state of land, forests, pastures, water resources, and air, biological balance, and protecting rare and disappearing types of flora and fauna.

There is widespread recognition of the importance to better enforce and streamline Tajikistan's nature protection laws, and a multi-pronged effort is currently underway with financial and technical support from the UNDP, World Bank and European Union.

Trophy hunting is often seen as depleting wildlife. The supply of large males may be reduced or eliminated unless the number of animals killed is strictly controlled, and accurate data are available concerning the sustainability of shooting males of a certain size. Scientists believe that large, robust-horned males are essential to the population as they do most of the breeding during the autumn-winter rut. These of course are the very age group most sought after by trophy hunters. Systematic, scientifically-credible sex/age counts and monitoring are lacking. A hunting program requires scientific involvement, regular monitoring, tight control, transparent supervision and open discussion about potential problems or poor practices. So far Tajikistan has not addressed these important issues. But if properly managed, there is little evidence to indicate that trophy hunting can harm a large population: problems are most likely to arise when numbers have been severely depleted and habitat deteriorates. This is inevitable given current trends in illegal hunting patterns and the lack of public incentives to conserve.

The following legal and conservation actions are urgently needed in order to ensure the survival of viable populations of Marco Polo sheep, ibex, snow leopard and other wildlife in the Pamir:

- Review and enforce hunting regulations, with the control of firearms a high priority. Severe and prompt penalties are warranted for the military, Public Security, police or anyone else renting out or loaning firearms in return for wildlife meat. Without such controls, the protection and management of Marco Polo sheep or ibex is not possible.
- The salaries of border guards merit attention, along with means for improving their living conditions and reducing their poaching activities. Besides increasing base salaries, border guards need regular provisions of basic food supplies to deter them from hunting for either food or cash.
- Enhancement, as well as the establishment of mechanisms to ensure trophy hunting operators and government authorities better distribute profits from hunts to local communities. For example, a percentage of profits could be contributed to local communities, along with the provision of jobs (for example, as guides or guards for patrolling the area) and other benefits linked directly with nature protection and stewardship. Simple actions like Schaller's (2003) suggestion that the meat from trophy animals be donated to communities could help change present attitudes of "if we don't hunt immediately, there will be nothing left for us" to "this is a species worth more alive than dead."
- The trophy hunting program needs to be managed in more accountable and transparent ways in order to address questions relating to corruption, while the bag limit needs to be set scientifically and with respect to each sub-population. Revenues from the program need to reach the field for supporting and expanding conservation efforts by staff of the Nature Protection Department. With virtually no funds and low wages, they can do little to reverse factors threatening Tajikistan's biodiversity.

- Our interviews repeatedly confirmed the resentment locals feel by being prohibited from hunting without compensation, yet observing rich foreigners doing so within their area. This, along with poor pay for Border Guards and freely available firearms, present the greatest threats to the Pamir's unique wildlife and biodiversity
- Further investigations are warranted to determine how long-held cultural values and customs of the Pamiri's, Kyrgyz and Tajiks may be revived and adapted, in order to foster community-based stewardship of nature in ways that conserve ecosystems and habitats – in addition to focusing on particular species since these resonate culturally and economically, and also provide a certain visibility and popular appeal to conservation efforts. We see this as critical strategy, since a large proportion of the country's rare plants and animals are located outside of protected areas, often in habitats vital to farmers and pastoralists. Further, we recognize that these issues must be addressed incrementally and with sensitivity because of their contentious nature. It is extremely important to involve local, national, and international organizations and conservation leaders in efforts to encourage transparency and more equitable benefits from trophy hunting, in controlling poaching, and toward engendering community stewardship for the wise use of the Pamir's fragile natural resources.

5. Implementation Pre-Proposal Outline

The following summary provides background information and the primary objectives of the pre-proposal prepared as an output of this planning phase. The full pre-proposal along with a detailed budget is available, and has been submitted to the Christensen Fund for a further two years of support.

Mountain Voices and Community Actions: Local Initiatives in Biodiversity Conservation and Livelihoods in Central Asia

The Snow Leopard Conservancy is requesting a grant to implement a project to support community-driven initiatives in the stewardship of biological diversity and the development of sustainable livelihoods in the Pamir Mountains of Tajikistan and Afghanistan. The project builds upon “Mountain Cultures, Keystone Species” which explored the concept of cultural keystone species in the mountain communities of Tajikistan's Pamir mountains (October 2005 to December 2006) and opportunities for fostering community-based conservation of biodiversity. Key findings from this exploratory phase included:

- Relationships between cultural identities and critical species are important and complex. For example, as residents of the Pamir, the Kyrgyz have a long tradition of hunting manifested in folklore, language and art with rules to govern numbers to be killed and how. However, poor economic conditions, access to guns and lax enforcement of regulations have led local residents and newcomers, such as military personnel, to hunt Marco Polo sheep beyond the limits prescribed in Kyrgyz traditions and customs.
- Current patterns of animal hunting and plant extraction plants (both legal and illegal) are having negative impacts in the long-term viability of ecologically and culturally important

species in the Pamir, as well as ecosystems. In particular, illegal hunting of Marco Polo sheep in Tajikistan and neighboring Afghanistan poses a significant threat to the survival of the species.

- Loss of key fauna and flora, such as Marco Polo sheep and teresken, has significant implications on local livelihoods. In a region with relatively few economic opportunities, promising activities such as tourism will be negatively affected by the loss of attractions, such as wildlife, and increased land degradation.
- PhotoVoice, and similar participant-led explorations and learning exercises clearly energize individuals and communities, and have the potential to convert the energy into livelihood and conservation actions. Such tools do, however, need to be integrated into more comprehensive planning frameworks and conducted to influence policy-makers.
- There is limited organizational capacity to plan and manage community-driven conservation and sustainable livelihood activities. Not only are there very few organizations, but technically there is limited experience in designing and facilitating small-scale conservation and linked livelihood initiatives.

Based on these and more extensive findings from the planning phase, plus consultations with local organizations and experts, project objectives are to:

1. Build capacity in local organizations for participatory planning and action in community and culturally-based stewardship of biodiversity. We see particular value in integrating innovative tools such as PhotoVoice into planning methods such as Appreciative Participatory Planning and Action (APPA).
2. Support local organizations in implementing at least three community-based biodiversity conservation and livelihood initiatives with a focus on sustainable extraction, hunting practices, species / habitat conservation and linking these with livelihood strategies.
3. Design and support sustainable hunting initiatives for the Pamir drawing upon cultural values and customs and in partnership with local communities and organizations, hunting companies and government authorities.
4. Improve access by local practitioners and policy-makers to participatory planning and similar tools, and project outputs through exhibitions, translation into local languages, and inclusion in local and regional websites, etc.

Our overall goal is to strengthen and give support to mountain voices and their abilities to take actions as mountain communities. SLC's approach is highly participatory, and characterized by creativity, openness and innovation, plus a commitment to collaboration. SLC will continue to collaborate closely with other TCF grantees as it did during the planning phase providing opportunities for staff training, joint activities and sharing of resources and information.

6. Evaluation

Project evaluation covered direct outputs, as well as anticipated results beyond the life of the grant period. Weather-related delays in Tajikistan precluded Nandita Jain from conducting face-to-face meetings with several experts residing in Europe. Instead these were undertaken via email. While this delayed our review of the literature, it had little or no adverse impact on the

project overall, and except for Professor Ranov and several other persons who were out of station, the team was able to meet with all proposed local contacts during the two visits to Tajikistan. Thus, we completed the initial field visit, literature review and field methodology largely on schedule (Objectives and outputs under proposal items 1 and 2). However, in order to gather more field site-specific information, we requested a 45-day No-cost extension, with the Final Field Report being due December 31, 2006.

We assessed field-related outputs from Objectives 3 and 4 by the extent to which specific ideas and methods were shared, along with the level and variety of demand for outputs like the PhotoVoice methodology. Project partners were very excited about this highly participatory tool, which we will further develop in order to make it even more applicable to local conditions and levels of expertise with regard to participatory planning and action. Participants from MSDSP have already shared the field methods with their colleagues, and SLC-India has successfully used PhotoVoice as part of its annual evaluation of community conservation and tourism.

Once key materials from the project have been translated into Tajik and Russian, we plan on placing selected outputs on the SLC website so that they can be shared more widely.

Our site-specific list of important plant and animal species is biased toward the Eastern Pamir, as lack of time precluded similar efforts in the Western Pamir. In general, however, we are able to make an assessment of intensity, type and multiplicity of species use, value for home-use, sale or trading, constraints imposed by ecology or phrenology, and the availability of culturally acceptable alternatives. Due to the excessively long list of ecologically and culturally important plants and animals, we did not conduct an assessment of their ecological or restorative needs (except perhaps for the Marco Polo sheep). Our preliminary assessment of livelihood opportunities in which culturally important species can play a critical role focused on this species along with the endangered snow leopard. Through an associated CF grant to Dr. John Mock, we will be forging linkages with possible cross-border tourism between Tajikistan and Afghanistan.

Obviously, measuring change in local attitudes and actions toward cultural or biodiversity cannot be measured within a short time frame. Nonetheless we have developed the framework for ongoing participatory monitoring and evaluation, in which locally derived indicators, such as the nature and number of locally-initiated actions will be used to assess contributions to conservation of diversity during the implementation phase.

Encouraging news continues to come from Murghab where META has conducted a number of activities with SLC support. Two surveys have been conducted for community-based tourism products focusing on wildlife viewing, one of which will be developed further in early 2007. In October 2006 META and the Nature Protection Group held the second Nature Protection Awareness Festival "We and Nature" among 14 schools in Murghab district, featuring competitions, theatre performances, concerts, discussions, and the collection of local legends and stories about keystone species and nature protection. A high priority is to identify local persons who can both train and monitor future initiatives. At the onset of the next phase of implementation, we propose to provide local participants with further training, along with undertaking a participatory SWOT analysis. This will further serve to highlight potential

opportunities, constraints and success factors. The Implementation Pre-Proposal submitted to The Christensen Fund covers these items.

Appendices

Appendix 1

List of Additional Outputs (available upon request)

1. Unifying Concepts and Operating Hypotheses
2. Literature Review of Key Concepts
3. Planning Trip Report
4. Project Synopses – Russian and English
5. Field Investigation Methods
6. PhotoVoice Results – CD
7. Detailed Culturally Important Plant and Animal Species Matrices
8. List of Threatened and Endangered Species in Tajikistan
9. Field Notes – Interviews, Trip Reports, etc.
10. Photographic Library – CD
11. Pre-proposal for Next Phase of Implementation
12. References

Appendix 2

July – August, 2006, Field Itinerary

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						July 1
2	3		5	6	7	8
9	10 NJ/RJ arrive in Almaty on LH (around 23.00hrs)	11 NJ & RJ: Almaty to Dushanbe (Tajik Airlines, 13.30hrs)	12 Dushanbe RW: Delhi to Almaty	13 Dushanbe RW: Almaty to Dushanbe	14 Depart for Khorog, overnight en route in Kalai-Kum	15 Arrive in Khorog
16 Khorog – KIIs, trip preparations, team meeting	17 Khorog Seminar, team meeting	18 Start field activities with META Khorog to Roshtkala/Taberse	19 Taberse to Jawshangoz	20 Jawshangoz to Jelondy	21 Jelondy to Bulunkul	22 Bulunkul
23 Bulunkul	24 Bulunkul	25 RW to Kalai-Kum Other team members to Khorog Rest to Alichur	26 Alichur to Murghab RW to Dushanbe	27 Murghab	28 Murghab – Seminar RW to Almaty To Jarty Gumbez	29 Ak-Kalama RW: Almaty to Delhi
30 Ak-Kalama	31 Ak-Kalama to Murghab, via Tokhtamish	August 1 Murghab	2 Murghab	3 Murghab Complete field activities with META	4 NJ/RJ to Osh	5 NJ/RJ to Arslan Bob
6 NJ/RJ to Bishkek	7 Bishkek	8 Bishkek	9 RJ -To Almaty (by road on LH Bus) NJ – To Dushanbe	10 RJ - To USA (LH around 01.00hrs)	11	12
13	14	15	16 NJ: Dushanbe to Bishkek and Almaty	17 NJ –Almaty to London	18	19

Appendix 3

Key Participants and Persons Consulted

- Dr. Rodney Jackson – Director, SLC-USA
- Nandita Jain – Advisor, SLC-USA
- Ubaidullah Mamadiev – President - META
- Mairambek - Translator and Guide, META
- Dr. Dovutsho Navruzshoev – Scientist, University of Central Asia/Pamir Biological Institute
- Dastanbui Mamadsaidov, Communications Officer, University of Central Asia (currently MA student)
- Rinchen Wangchuk – Field Director, SLC India- Trust
- Marielle Leseur – Small Business Advisor, MSDSP
- Nilufar Saboieva – Program Assistant, Land Use and Management Project, GTZ
- Suyn - Culture Officer, ACTED, Murghab
- Christopher Belperron, Base Manager-Murghab, ACTED
- Khujadsho, Guide, Bulunkul, Murghab
- Attabai, Guide and Pack Animal Operator, Bulunkul, Murghab
- Benazir, VO Chairman, Bulunkul, Murghab
- Jaanbai Ojochiev, Herder and Songwriter, Madian, Murghab
- Bekmurodi Attabek, Hunting Concession Operator, Murghab Hunting Company, Jarty Gumbez, Murghab
- Toilibek, Assistant to Attabek, Jarty Gumbez, Murghab
- Surat Toimastov, Trekking Agent, Photographer,
- Julie Desage – Ecotourism Coordinator, ACTED, Dushanbe
- Fatullo Nusairiev – Regional Manager, MSDSP, Khorog
- Bekmurodi Aydibek Shrinbekzoda – Deputy to the Governor of GBAO, Khorog
- Dr. Yasmin Lodi – Director, AKHP, Dushanbe
- Dr. Saidmir Somansurov – Deputy Director, Pamir Biological Institute, Khorog
- Maxad Shukrikhudoev, Assistant to Regional Manager, MSDSP, Khorog
- Andre Fabian, Coordinator, Land Use and Degradation Project, GTZ, Khorog
- Stefan Michel, Natural Resources Consultant, Almaty
- Dr. Kadamshoev Mamadsho, Zoologist, Pamir Biological Institute, Khorog.
- Nazardod Jonbaboshoev, Journalist, Khorog
- Nazar Bublat, Education and PR Staff (part-time), Nature Protection Department, Murghab
- Sang Gulomshoev, Deputy Director, Nature Protection Department, Murghab
- Bulunkul Village - Olam Davlatshoeiva, Rudoba Nabieva, Mahbuba Nabieva, Gul, Kurbon, Zafargul, Madish, Fayzullo, Paishambe, Pokisamo, Oistamo, Kurbonbegim, Amor and Zulfia
- Tokhtamish Village - Arstenbek and Adeldek
- Ak-Kalama - Taip, Urustom, Kengezbek, Mairambek, Gulmairam, Boroshoboi, Ilgiz, Genjevik, Mamatumar, Fatima, Nargiza, Samar, Zamurat, Rabia, Salamat
- Batchor Village - Sultansho Keorboniev, Paishambe Nobovarov, Sombolmo Bodurova, Ranogul Marodmamadova

- Gund Valley - Amatbek Shodmanbekov, Davlatsho Mamadshoev
- Bartang Valley - Djomboz Dushanbiev, Sabzbahor Mirzoshoeva, Odina Davlatmamadov, Khodjamir Safarmamadov, Dilovar Dastambouiev, Davlatnazar Tolibekov, Mirshozoeva Sabzbahor, Dilovar Dastambouiev, Bozmamad Shomamadov,

Appendix 4

References (Partial listing only)

- Baker, S. *Picturing the Beast: Animals, Identity and Representation*. Manchester; Manchester University Press, 1993.
- Berkes, F. 1999. *Sacred Ecology: Traditional ecological knowledge and resource management*. Taylor and Francis, Philadelphia and London, UK.
- Berkes, F., J. Colding and C. Folke. 2000. Rediscovery of traditional knowledge as adaptive management. *Ecological Applications* 10(5):1251-1262.
- Berkes, F. and C. Folke (editors). 1998. *Linking social and ecological systems: management practices and social mechanisms for building resilience*. Cambridge University Press, Cambridge, UK.
- Bliss, F. 2006. *Social and Economic Change in the Pamirs (Gorno-Badakhshan, Tajikistan)*. Routledge Press, London and New York. 378 pages.
- Bowen-Jones, E. and A. Entwistle. 2002. Identifying appropriate flagship species: the importance of culture and local contexts. *Oryx* 26(2):189-195.
- Caro, T.M. and G. O'Doherty. 1999. On the Use of Surrogate Species in Conservation Biology. *Conservation Biology*, 13 (4):805–814.
- Centre for Development and Environment (CDE). 2003. *The Tajik Pamirs: challenges of sustainable development in an isolation mountain region*. Berne, Switzerland.
- Colding, J. and C. Folke. 1997. The relations among threatened species, their protection, and taboos. *Conservation Ecology* (online) <http://www.ecologyandsociety.org/vol1/iss1/art6/>
- Colding, J. and C. Folke. 2001. Social taboos: "Invisible" systems of local resource management and biological conservation. *Ecological Applications* 11 (2): 584-600.
- Davic, R. D. 2002. Herbivores as keystone predators. *Conservation Ecology* 6(2):r8. [online] URL: <http://www.consecol.org/vol6/iss2/resp8>.
- Davic, R. D. 2003. Linking keystone species and functional groups: a new operational definition of the keystone species concept. *Conservation Ecology* 7(1):r11. [online] URL: <http://www.consecol.org/vol7/iss1/resp11>.
- Garibaldi, A. and N. Turner. 2004. Cultural Keystone Species: Implications for Ecological Conservation and Restoration. *Ecology and Society* 9(3): 1. [accessed online] URL: <http://www.ecologyandsociety.org/vol9/iss3/art1>

- Jackson R., and R. Wangchuk. 2004. A community-based approach to mitigating livestock depredation by snow leopards. *Human Dimensions of Wildlife* 9:307-315.
- Jianchu Xu, Erzi T. Ma, Duoje Tashi, Yongshou Fu, Zhi Lu and David Melick. 2005. Integrating Sacred Knowledge for Conservation: Cultures and Landscapes in Southwest China. *Ecology and Society* 10(2): 7. [accessed online] URL: <http://www.ecologyandsociety.org/vol10/iss2/art7/>
- Kremen, C. 1992. Assessing the indicator properties of species assemblages for natural areas monitoring. *Ecological Applications* 2: 203–217.
- Lambeck, R. J. 1997. Focal species: a multi-species umbrella for nature conservation. *Conservation Biology* 11:849–857.
- Landres, P. B., J. Verner, and J. W. Thomas. 1988. Ecological uses of vertebrate indicator species: a critique. *Conservation Biology* 2:316–327.
- Mills, L. S., M. E. Soulé, and D. F. Doak. 1993. The keystone-species concept in ecology and conservation. *BioScience* 43: 219–224.
- Noss, R. F. 1990. Indicators for monitoring biodiversity: a hierarchical approach. *Conservation Biology* 4:355–364.
- Núñez, M.A. and D. Simberloff. 2005. Invasive Species and the Cultural Keystone Species Concept [Response to Garibaldi and Turner. 2004] [accessed online] URL: <http://www.ecologyandsociety.org/vol10/iss1/resp4/>
- Posey, D.A. (ed) *Cultural and Spiritual Values of Biodiversity*, London, UNEP/IUCN/ITDG Publications. 1999.
- Power, M. E., D. Tilman, J. A. Estes, B. A. Menge, W. J. Bond, L. S. Mills, G. Daily, J. C. Castilla, J. Lubchenko, and R. T. Paine. 1996. Challenges in the quest for keystones. *BioScience* 46:609–620.
- Roberge, J.M. and P. Angelstam. 2004. Usefulness of the umbrella species concept as a conservation toll. *Conservation Biology* 18(1):76-85.
- Schaller, G.B. 2003. *The Conservation Status of Marco Polo Sheep In Tajikistan*. Unpub. Report submitted to The Wildlife Conservation Society and National Geographic Society (Grant No. 7488-03). 25 pages + appendices.
- Simberloff, D. 1998. Flagships, umbrellas and keystones: is single-species management passé in the landscape era? *Biological Conservation* 83:247–257.
- Simmons, I.G. *Interpreting Nature; Cultural Constructions of the Environment*, London, Routledge, 1993.

Tashbayeva, K., M. Khujanazarov, V. Ranoz and Z. Samashev. 2001. Petroglyphs of Central Asia. Institute for Central Asian Studies, Samarkand and Biskek. 219 pages.

Walpole, M.J. and N. Leader-Williams. 2002. Tourism and flagship species in conservation. *Biodiversity and Conservation* 11: 543–547, 2002.

Appendix 5:

Selected photographs from summer field trip



Bulunkul herder examining his digital pictures



Nandita Jain working with children to select pictures for sharing with the Ak-Kalama community



Women's group discussing pictures (Ak-Kalama)



Yellow poppy – the Pamirs are rich in wildflowers



Herder's camp near Alichur



Teresken fuel supply – a rapidly disappearing resource



Murghab Hunting Company "welcome sign"



Typical landscape near Alichur

Selected Photographs from Traveling PhotoVoice Exhibit (see text for explanation)



There are beautiful things hanging in our yurt. We live in a beautiful yurt, where there are many places to hang things like our clothes. We are proud of the nice things in our yurt which are well-made and valuable.



This picture is of Kokjilga “The Blue Valley”. Here there are many plants that are grazed by wild animals, mainly Marco Polo sheep and ibex which like the area a lot. Domestic animals also graze here. We walked about 2-3km to take the picture.



Kyzyl Burma (*Kyrgyz*)

This is one of the best plants in the area but it is disappearing. It is tasty for all animals, and especially good for milk animals



Radiola or the Golden Root.

This is a medicinal plant that we should protect. It plays an important role for local people who use it for various complaints – liver, memory, stomach. There is interest from pharmaceutical companies in this plant. People know about this plant, and we think that we should plant more of this species and cultivate it.



This is a kuljan (Kyrgyz for male Marco Polo sheep). I like to embroider using wool, especially wild and domestic animals. My son drew the sheep and then I embroidered. Note: when asked which wild animals she likes most she said Marco Polo.

PhotoVoice

Promising tool for community-based planning

- Photos enable communities to dynamically identify & represent themselves
- Accompanying stories (narratives) provide meaningful context, encourage participation & dialogue
- People-friendly: PhotoVoice gives communities their own voice, power & greater confidence for planning
- Energizes local communities around issues of culture and biodiversity conservation

