

International Cooperation for Snow Leopard and Biodiversity Conservation: The Government Perspective

Introduction

As a major consumer of natural resources, the United States has also recognized that it has a responsibility to seek ways to enhance the protection and conservation of biodiversity worldwide. Starting in the early 1900's, a series of international treaties, conventions and laws have gradually expanded the U.S. role to help carry out these responsibilities.

The Fish and Wildlife Service is the principal federal governmental agency given responsibility for the protection and conservation of wildlife and biodiversity in the United States and globally. The major legislative and international authorities under which the Fish and Wildlife Service carries out its duties pertinent to snow leopard conservation and protection of biodiversity in its Asian habitats include:

- 1) 1972 U.S.- U.S.S.R. Agreement on Cooperation in the Field of Environmental Protection (subsequently amended in 1994 to the U.S.-Russia Agreement on Cooperation in the Field of Environmental Protection);
- 2) 1973 U.S. Endangered Species Act;
- 3) 1975 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and
- 4) 1986 Protocol on Cooperation and Exchanges in the Field of Conservation of Nature Between the Department of the Interior of the United States of America and the Ministry of Forestry of the Peoples Republic of China (US-PRC Nature Conservation Protocol).

These formal agreements and legislation are the basic "marching orders" for our organization, but they also serve as "umbrella" legal mechanisms for involving assistance from non-governmental organizations to help accomplish the goals and objectives of the directives.

While the legal basis for engaging in international activities on biodiversity existed since the early 1970's, it was not until the late 1970's that the Fish and Wildlife Service was in a position to initiate any proactive campaigns. This paper will describe the Service's actions in Asia, primarily through its Office of International Affairs, to address its wildlife resource and endangered species responsibilities. Specific actions involving conservation attempts for snow leopard will be highlighted. One of the early initiatives involved the snow leopard. Detail on this initiative and the efforts required over the succeeding 15 years to continue the pursuit of activities on behalf of snow leopard conservation are included to emphasize the need for persistence and long-term investment in the region in order to achieve a meaningful contribution.

U.S. Fish and Wildlife Service Assistance on the Indian Subcontinent

While the Fish and Wildlife Service had long maintained an official representation for international activities, it was not until the 1972 US-USSR Environmental Agreement and the 1973 Endangered Species Act that the Service focused its resources to develop a sustained effort to address its more comprehensive international responsibilities.

The Service's Office of International Affairs was created in 1976 and one of the first activities was to generate a program in the South Asian countries of India and Pakistan to fulfill the 1973 Endangered Species Act directive of protecting endangered species. India and Pakistan (as well as Egypt) were selected to take advantage of the availability of local currencies (also known as Special Foreign Currencies) owed to the United States, which could be used for wildlife conservation projects, and also because of the high number of listed endangered species that occurred in these countries (over 100). In addition, there already existed formal bilateral ties between the United States and these countries to foster cooperation in science and technology.

The original approach, which eventually served as the model for cooperation runs as follows. The Service sought out appropriate projects of interest and priority to the local governments, then helped in the design of responses which would strengthen local institutions and increase the host country capacity to cope with wildlife management and conservation issues. In all cases, projects were initiated to insure the permanency of the contribution and to be self-sustaining. While the assistance was broad-based in scope, it generally fell under the categories of resource management, research, and education and training.

The Indian Subcontinent is a landmass diverse in terms of its physical landscape, climatic conditions, flora and fauna. Conditions range from the moist environs of tropical rain forests, to the sun-baked deserts of the Thar, to the cold, dry reaches of the Himalaya, home of the snow leopard. Besides this high mountain cat, the diverse physical features of the subcontinent - mountains, desert, plains, lowlands, and coastal areas, have spawned the rich biodiversity of the region which is reflected in over 20,000 species of plants, 500 species of mammals, 1300 species of birds and at least 20,000 species of insects.

This rich biodiversity probably had a lot to do with the establishment of one of the earth's early human civilizations which flourished in the Indus Valley over 5,000 years ago. The human population has continued to flourish ever since, increasing and extending ever outward to the point where the sheer numbers of people and their demands upon the environment have slowly, but effectively, led to the degradation of natural habitats such as the snow leopard. Today, approximately 100 of the wildlife species, including the snow leopard, are considered to be endangered or threatened.

Early in 1977, after several months of correspondence with local organizations, the Service sent separate study missions to Pakistan and India to investigate the interests of the host countries in cooperating in joint programs of wildlife conservation. Contacts were made with a variety of existing governmental and non-governmental organizations in the respective countries and successfully identified a number of activities of mutual interest. Implementation of the programs, particularly in Pakistan, however, proved more difficult due to political fluctuations, vicissitudes of governmental priorities, and perhaps a general apprehension for engaging in any new relationship.

Despite the difficulties, we persisted and opportunistically encouraged any activity from any local organization that showed some benefits for wildlife conservation. Once a need was identified, the search for a suitable response began. In that process, expertise was often obtained from outside the Service from a variety of U.S. federal, state and non-governmental organizations. This networking process over the years has created an important team of cooperators who have often continued their contributions beyond the initial project activities.

Early Attempts to Develop Projects in India and Pakistan

Interest in developing an activity on the snow leopard was initially piqued in early 1978 when Mr. Rodney Jackson, who had successfully worked on the species in Nepal in 1976, approached the Service's Office of International Affairs about conducting a snow leopard reconnaissance survey in the Nanda Devi high mountain area of India. Jackson was eager to test the survey methodology in India that he had devised in Nepal to see if a common means of census would be possible. A proposal was developed and submitted through the Service to the Government of India.

1. Snow Leopard Posters

At about the same time that Jackson's proposal was being vetted with the Indian Government, the Chief of the Service's Office of International Affairs met with a small non-governmental organization in New York City named RARE (Rare Animal Relief Effort, Inc.) to discuss an education campaign for the snow leopard that RARE had recently initiated in Pakistan. In conjunction with the New York Zoological Society, RARE had produced a color poster in English and Urdu (the local Pakistani language), designed to alert local people to the plight of the snow leopard after RARE's president, in a visit to Pakistan, had discovered snow leopard skins for sale in a Karachi market despite its being legally protected.

For the poster, RARE had commissioned Ms. Bonnie Marris, a young and talented wildlife artist from Grand Rapids, Michigan to paint a reclining snow leopard in its native habitat. The poster message read "The survival of this Great Cat depends on you. The snow leopard is almost extinct and it is protected by law in Pakistan. The export of a snow leopard skin is illegal and will jeopardize the survival of this beautiful animal." With the help of WWF-Pakistan, 2500 posters were reported to have been distributed in northern Pakistan for display both in metropolitan centers and in the rural areas.

RARE was concerned about the attitudes of the local villages and wanted to know where the posters had been deployed and what effect their message was having on the attitudes of Pakistanis and on the trade in skins. The Service agreed to inquire about the posters as opportunities arose. It was subsequently learned that the posters, perhaps because of their attractiveness, had mostly been kept as souvenirs and rarely reached the high mountain area intended destinations. This served as a useful lesson in how a good idea does not always pan out the way it was intended. In this case, there had been no plan for distribution of the posters and no monitoring or evaluation of the whole process.

In 1979, the Service received permission from RARE and Bonnie Marris to use the snow leopard artwork in making new posters for distribution in India. Working with the U.S. Information Service (USIS) in New Delhi and their SPAN Magazine staff, 11,000 snow leopard posters in English, Urdu, Hindi and Bengali were produced in 1980. The message carried on the posters was, "This beautiful animal is protected by law. But it cannot survive without your cooperation. Let it survive. It is a valuable asset to India." The posters also said, "The snow leopard is almost extinct and it is protected by law in India. The export of a snow leopard skin is illegal and will jeopardize the survival of this beautiful animal."

Distribution of the posters was accomplished through the Indian Forest Service network which was able to reach many remote areas. The Forest Service was asked to report on the distribution and longevity of the poster display.

2. Efforts To Start a Snow Leopard Program in the USSR

In late 1979, Ms. Helen Freeman, Curator of Education at Seattle's Washington Park Zoo and President of the fledgling International Snow Leopard Trust (ISLT), contacted the Service to investigate the possibilities of exchanging information on snow leopard captive breeding, field research and management programs with zoo officials in the Soviet Union under the auspices of the US-USSR Environmental Agreement. Communication with organizations in the Soviet Union was difficult and bilateral cooperative ventures were not possible except through formally accepted agreements such as the Environmental Agreement. The Service's Office of International Affairs has served as the coordinator of Area V - "Protection of Nature and the Organization of Reserves" of the US-USSR Environmental Agreement and agreed to raise the issue of including the subject of zoo exchanges with their counterparts at the next joint meeting scheduled for October 1980 for implementation in 1981.

Approval for such an exchange did not come, however, until 1982. Additional delays were finally overcome by Service efforts and in May/June, 1983 Ms. Freeman, accompanied by Dr. Kathleen Braden, Dr. Dan Wharton from the Bronx Zoo and Dr. Lief Blomquist of the Helsinki Zoo visited the Moscow and Alma Ata zoos. The result of that visit was, in addition to a tour of the zoos, an exchange of information on snow leopard captive breeding efforts and the development of a protocol that included discussion of a species survival plan for genetic management of snow leopard population, a list of animals to be exchanged between US and USSR zoos (including snow leopards), and a formal invitation to the Moscow Zoo Director to attend the upcoming 1984 International Snow Leopard Symposium scheduled in Krefeld, Germany.

The culmination of this exchange occurred in 1985 when the Bronx Zoo received a five year old male snow leopard from the Moscow Zoo in exchange for a three year old female from the Cincinnati Zoo to enhance the genetic diversity of breeding stock in the respective zoos. The following year, the Bronx Zoo received a female snow leopard from the Moscow Zoo and in June 1987, that female ("Olga") gave birth to two female young.

India Set-back

The snow leopard field study proposal submitted to the Government of India in 1979 was turned down. Since any Indo-US project needed state and federal government approval, following the rejection of this proposal, the Service thought maybe it had mistakenly not taken the opportunity to develop the proposal with a state forest department and this had led to the rejection at the federal level. Dr. Rodney Jackson was advised and he subsequently instigated correspondence with the Government of Jammu and Kashmir state forest officials. They showed immediate interest. Out of this interaction came a one-year proposal for surveying the ecological needs of the snow leopard using radio telemetry in the Zaskar region of the Himalaya which the Service submitted to the Government of India. To cover his bets, Jackson also approached the Government of Nepal about a predator-prey conservation study.

The proposal to India was again turned down. This time we found out that the Himalaya, because of the presence of international boundaries, were considered "sensitive" and "off limits" to foreigners conducting scientific studies.

Discouraged by the India decision, Jackson turned his attention back to Nepal and in 1981 received a Rolex Award to conduct snow leopard research there which became known as the Himalayan Snow Leopard Project.

Relations between the governments of the United States and Pakistan broke down for several years in the early 1980's because of internal Pakistani disputes and political fluctuations which at one time resulted in the burning of the US Embassy in Islamabad, a freeze in US-Pakistan diplomatic relations, and subsequently, the toppling of the Pakistani civilian government by the military.

Progress

The next opportunity in India occurred in early 1983 with the U.S. visit of Mir Inayat Ullah, Chief Wildlife Warden of Jammu and Kashmir, who contacted both the Service and the International Snow Leopard Trust about possible cooperation in snow leopard conservation. Ms. Freeman thought this interest might be ideal for trying a snow leopard reintroduction program that she had long felt was a natural progression of their successful zoo captive breeding programs for snow leopards. She approached the Service with a proposal to introduce Woodland Park Zoo-bred snow leopards into Upper Dachigam National Park in Jammu and Kashmir. The Service was not convinced that enough was known about the status of the snow leopard to warrant consideration of a reintroduction experiment. However, the time seemed right to explore the possibilities of some kind of activity. A proposal for a preliminary survey of the snow leopard in Kashmir looking at the leopard's distribution, abundance and habitat requirements by Dr. Kurt Johnson from Utah State University was put forward in March 1983, but nothing developed.

So in October/November 1983, the Service sent Ms. Freeman and Dr. Eric Dinerstein from the University of Washington to India to meet with Jammu and Kashmir and federal wildlife officials, visit some potential

snow leopard sites and explore possibilities for a cooperative venture. The meetings went well and Freeman and Dinerstein were able to journey to Dachigam National Park to assess its situation as a possible reintroduction site. They also assessed the park as a potential site for carrying out some environmental education activities. As a result of the discussions with Indian officials and site visits, it was concluded that snow leopard reintroduction should be viewed as a last resort; efforts should be focused on investing in areas that still supported viable populations of prey species. Most encouraging was that the Acting Director of the fledgling Wildlife Institute of India, Mr. V.B. Saharia, expressed a strong interest in developing a joint field project with the Trust and the Service.

The Wildlife Institute had only recently been created, a culmination of the Government recognition that wildlife was an important resource in India and needed a separate designation to elevate it from the shadow of the Forest Department. Located in the Himalayan foothill city of Dehra Dun, the Institute was launching an ambitious multi-disciplinary program for training and research. One of the programs was planned to focus on high altitude ecology and it was felt that initiating a project to study the snow leopard would be helpful in training their faculty in the requirements of high altitude research.

Thus, a three year proposal entitled "Ecological Survey of Snow Leopard Populations and Associated Prey Species in Northern India" was prepared in 1983. The proposal laid out a plan to assess over a one year period the status of snow leopard populations and their associated prey based in two or three selected areas by a joint US-India team, adapt current techniques for estimating predator and prey populations to the field investigator and to develop techniques for assessing habitat quality relative to snow leopard in Northern India. These surveys would form the basis for identification of a suitable site for an in-depth study of the ecology of the snow leopard in subsequent years.

The proposal was revised and resubmitted to the Government of India in April 1984 to incorporate Indian concerns and suggestions as well as to reflect a change in US personnel. Originally, Dr. Eric Dinerstein was slated to be the US field person in the project, but left for another position. In his place, Dr. Joseph Fox, a recent graduate from the University of Washington who had completed his doctorate studies on habitat selection by mountain goats, was designated. The revised proposal was to center around a field study of the ecology of snow leopard in Northern India and included US-based training of Indian researchers in the techniques for doing surveys and studies. The proposal was also to develop printed educational material on the snow leopard and a film related to snow leopard conservation in the wild. The project was anticipated to start in the summer of 1984.

Government of India approval was not forthcoming, however, as delays were experienced because of difficulty in obtaining security clearances, in the selection of a permanent Director for the Wildlife Institute, and delays in appointment of Indian researchers. The security issues centered on the Government concern about foreigners going into the "Inner Lane Areas" (high mountain areas near the Indo-China border), the same concern that killed Jackson's earlier proposals. To complicate matters still more, general elections were coming up and because of the political climate, obtaining clearances

from the states of Punjab and Jammu and Kashmir were deemed difficult. We were told that by mid-1985, the Institute would be in better shape and the project could start in June of that year.

A New Look At Pakistan

After diplomatic relations between the US and Pakistan returned to a relatively even keel, the Service began re-exploring possible areas of cooperation in wildlife conservation. By late 1983, due in large part to Service-supported investigations on crane conservation by Dr. Steven Landfried, there appeared to be several leads on interest in other subject areas as well. The author accompanied Dr. Landfried to Pakistan in April 1984 and among other things learned of interest on doing cooperative work on snow leopard in the Northwest Frontier Province (NWFP).

Following discussions with Mr. Mumtaz Malik, Chief Conservator of Wildlife, NWFP, the International Snow Leopard Trust was alerted to the NWFP interest in pursuing activities related to snow leopard conservation such as an initial survey to determine snow leopard abundance including livestock predation, hunting, grazing competition and the need for conservation education.

The April trip was followed by a second in September 1984 to attend the US-Pakistan Subcommittee Meeting on Science and Technology where wildlife conservation activities including research on snow leopard were endorsed as areas of mutual interest. In anticipation that work on snow leopard would soon be starting in Pakistan, the Service tried to contact Ms. Bonnie Marris in February 1985 on behalf of the Trust to utilize her art work for posters and an environmental education program. The Service then sent a team representing the Service and WWF-US to Pakistan in June 1985 to flesh out and prepare full proposals from the ideas previously identified. The Service also arranged for Dr. Fox to meet with the US team in Pakistan to confer with Mr. Malik, visit Chitral Gol National Park and develop a proposal under the auspices of the US-Pakistan Science and Technology program. This resulted in the proposal drafted by Dr. Fox entitled, "Ecology of the Snow Leopard, Markhor and Ibex in Chitral Gol, Pakistan" in August 1985. This three year proposal's goals were to describe the ecology of snow leopard, markhor and ibex, including predator-prey dynamics, and to provide technical training to Pakistani personnel. However, before anything developed on this proposal, several other things happened.

Training Opportunities

During the initial meetings with Mr. Mumtaz Malik in 1984, it was learned that he had obtained a fellowship grant from UNESCO to pursue a Masters Degree training program in wildlife conservation. However, having decided to approach a university in the US, he was having trouble getting admitted because of problems in achieving a high enough score on the English language proficiency tests. Mr. Malik's English comprehension and speaking ability seemed to be excellent, but his test scores were not reflecting this.

Recognizing that Malik was a key wildlife official in the NWFP and enhancing his knowledge and experience in wildlife studies would be in the long term best interests of wildlife conservation in Pakistan, the Service initiated a series of actions to assist Mr. Malik to expand his

wildlife skills and broaden his exposure among international colleagues. The first opportunity arose in May 1985 when the Service supported his attendance at an international workshop in Kathmandu, Nepal on Management of National Parks and Protected Areas in the Hindu Kush, Himalaya.

We also initiated a dialogue with the University of Montana. Dr. Bartholomew O'Gara, a Service employee and Head of the Fish and Wildlife Cooperative Research Unit at the University was contacted and agreed to serve as the Service's field project leader in Pakistan. As part of the Service team sent to Pakistan in June 1985, O'Gara was able to interact with Malik and assess his abilities first-hand. Subsequently, he was able to arrange the admittance of Malik to the University's Masters Degree wildlife program starting in October 1985.

Malik pursued an extremely heavy academic schedule from October 1985 to March 1987 taking as many credit hours as possible. During breaks in the academic schedule, the Service facilitated and supported visits of Malik to wildlife research labs, field sites and management areas in the US as well as one trip back to Pakistan in June-August 1986 to obtain additional data on the status of listed wildlife species for his Master's thesis. During this time, Malik was also put in contact with Ms. Freeman and the Snow Leopard Trust.

Malik received his MS Degree in wildlife conservation from the University of Montana in March 1987. In the process, he had achieved a nearly perfect academic record and was deemed one of the best wildlife students to have come out of the university. In carrying such an extensive course load, he had also succeeded in completing sufficient credits to fulfill academic requirements for a PhD degree.

However, Malik was unable to stay beyond the March 1987 deadline because of the limitations of the UNESCO fellowship grant. So he returned to his position in the NWFP. The Service continued to work with Malik on a variety of activities including wetlands and crane conservation, big game management, and environmental education. In June 1990, Malik came to the US to discuss the holding of a training workshop on snow leopard survey methods to be held in Pakistan with the Snow Leopard Trust. During the period of August/September 1990, the Service supported his travel to Nepal, Bangladesh, Thailand and Indonesia as part of an information gathering effort for his PhD thesis entitled "Wildlife Conservation Through Human Resource Management in Developing Countries." The consummation of Malik's academic pursuits occurred in 1994 when the Service facilitated his return to the University of Montana between October and December to complete, submit and defend his thesis. The PhD was awarded to Malik in December 1994.

Success in India

The other reasons, besides the absence of Mumtaz Malik, that the snow leopard proposal for Pakistan was not pursued, were the beginnings of real progress in India. In July 1985, the Service supported the travel of Ms. Freeman to India to investigate other possibilities of cooperative work on snow leopard. One probe was to the Darjeeling and Delhi zoos to inquire about interest in captive breeding. Another was to explore the possibility of holding an international symposium on the snow leopard in India. Held every two years since 1978, the symposia

brought together field scientists and zoo personnel to discuss conservation of the snow leopard in captivity and the wild. The Fourth Symposium held at the Krefeld Zoo, Germany in September 1984 had suggested at its conclusion that the subsequent meeting be held near the habitat of the snow leopard and Kashmir, India had been proposed.

Both inquiries paid off. India agreed to host the Fifth Symposium in 1986 and the Padmaja Naidu Himalayan Zoological Park at Darjeeling was the first zoo in Asia to set up a breeding center for snow leopard. They had acquired a pair of snow leopards from European zoos on loan. The pair had mated several times but no young had been produced. After the discussion with Ms. Freeman, the Darjeeling Zoo began negotiations in February 1986 to get a pair of snow leopards from the US. In June 1986, the Service was contacted by Ms. Freeman to help in the shipment and to help support the accompaniment of Ms. Glennous Favata, Curator of Mammals for the Toledo Zoo. Air India agreed to cover the cat travel expenses. However, due to lack of appropriate permits from the Government of India, the shipment was postponed.

The shipment was rescheduled for 1988, but as luck would have it, an earthquake in Northern India ruined the cages at the Darjeeling Zoo and the shipment was postponed yet again. Finally, everything was in place in January 1989. Last minute Air India engine problems threatened to derail this last attempt, but after a few days delay, the pair of snow leopards (a male from Little Rock Zoo and a female from the Toledo Zoo) arrived in Delhi and were transported to Darjeeling by an Indian Air Force plane. Mating took place in the third week after arrival and two cubs were born May 20, 1989 giving the distinction as the first South Asian country to succeed in captive breeding of snow leopards.

Snow Leopard Field Study in India

The other main reason snow leopard work was not pursued in Pakistan in 1985 was that finally, late that year, the Indo-US ecological field study on snow leopards was approved by the Government of India. It had changed once again and was now only a nine-month survey project, with a possibility for extension if the preliminary phase showed promise. The project was launched in November 1985 with Dr. Fox and three Indian Research Fellows, Messrs. Satya Priya Sinha, Raghu Chundawat and Pallav Kumar Das in the states of Jammu and Kashmir, Uttar Pradesh and Himachal Pradesh in northwestern India.

Carried out under the auspices of the Wildlife Institute of India, major funding was provided by the Service in cooperation with the Trust. Additional support was supplied through grants from WWF-US, Brookfield Zoological Society, and the National Wildlife Federation. Cooperation and logistical support was also provided by wildlife departments within the states where surveys took place as well as from the US Embassy Science Office in New Delhi. Donations of equipment were made by six separate US companies.

The main result of the project was a survey of a representative biogeographic cross-section of snow leopard habitat. Snow leopard presence was found to be most abundant in Central Ladakh (Jammu and Kashmir), less so in Southern Ladakh, and least abundant on the Southern side of the Himalaya in Northern Uttar Pradesh and the Pir

Panjal range in Himachal Pradesh. Snow leopards were found to use cliffs and river bluffs. The surveys were conducted in proposed or existing national parks and wildlife sanctuaries, thus making the results applicable in formulating recommendations for conservation site location and management in these areas.

The Government of India was a major sponsor of the project. Three research scholars from the Wildlife Institute of India participated as full-time field investigators during the entire project. Two or three local wildlife officers, from the wildlife department within the Indian state being surveyed, accompanied the project as participants and interpreters. Local residents were hired as guides and interviewed as sources of indigenous knowledge on wildlife.

The project was designed to provide training to the three research scholars and the local wildlife officers participating in the project. Local government officials in each of the areas surveyed were included in discussions concerning the project objectives and regional or site-specific conservation problems. At least 13 scientific papers, 9 reports, and 7 popular articles have been produced as a result of the project. In addition, 11 presentations have been made at various conferences including the Fifth International Snow Leopard Symposium in Srinagar in 1986.

Plans for the next phase of the project, a detailed study of snow leopard ecology in the Hemis National Park, Jammu and Kashmir, were developed as well as a draft recommendation for the expansion of the Park. The state of Jammu and Kashmir extended its protection to 16,000 square kilometers of the Himalayas and initiated a "Snow Leopard Recovery Programme" in which they highlighted the snow leopard as a key species in the development of Hemis and Kishtwar national parks and Karakorum (Nubra Shayok) Wildlife Sanctuary.

Before the second phase of the Indo-US field study could be carried out at Hemis starting in 1986, it was put on hold due to lack of Indian government clearances. Several major changes were occurring in the Indian government including the creation of a new Ministry of Environment which took over wildlife and protected area responsibilities from the Ministry of Agriculture. With these changes came new officials and new ways of reviewing projects and activities.

In this interim, advisors of the FAO (United Nations Food and Agriculture Organization), which was assisting the Government of India in establishing the Wildlife Institute, channeled some funding and assistance to enable the project to continue with two research scholars, Messrs. Raghu Chundawat and S.P. Sinha. FAO purchased radio telemetry and additional field equipment and Mr. Chundawat carried out a detailed ecological study on the snow leopard in Hemis National Park from October 1987 to February 1990 entitled, "The Ecological Studies of Snow Leopard and its Associated Prey Species in Hemis High Altitude National Park, Ladakh."

Fifth International Snow Leopard Symposium

As mentioned earlier, the Fifth International Snow Leopard Symposium had been proposed to be held in India in 1986. The Service was a major advocate of this event and helped facilitate Ms. Freeman's travel to India to brief officials and to assist in planning in July 1985.

That visit was the start of a subsequent 15-month planning effort by the Trust and assisted by the Service that led to the October 13-15, 1986 international symposium that was held in Srinagar, Jammu and Kashmir, India. Sixty delegates from 21 countries including 30 wildlife officials and scientists from India attended this meeting. The Service supported the participation of 14 delegates (full support for eight participants from the US, one from the U.K., and one from Pakistan and partial support for four other participants from the US). The Service also facilitated the shipment of 40 copies of the June 1986 National Geographic issue featuring story by Rodney Jackson and Darla Hillard on the snow leopard for distribution to the participants.

The symposium included snow leopard status reports by countries, current field research in Nepal and India, prospects for reintroduction in the wild, and status and management of snow leopard in captivity. It was the first symposium held in a snow leopard range country and succeeded in focusing local as well as international attention on the status of the snow leopard and emphasizing that the species is an indicator of the condition of the habitat.

As a result of the symposium, the Government of India's Ministry of Environment and Forests announced the launching in 1988 of the Snow Leopard Conservation Scheme. An ambitious species and habitat protection program patterned after Project Tiger, the program emphasizes the need for creation of special reserves for snow leopards to promote their conservation and high altitude ecosystem. Also as a result of the symposium and the central government's program, the Government of J&K established a senior wildlife position to handle the Ladakh section of the state as a reflection of the recognition of the presence of snow leopard and the importance of its enhanced protection.

Immediately following the symposium, a Service-sponsored participant, Ms. Rika Cecil, Assistant Curator of Education at the Woodland Park Zoo and Educational Coordinator for the Trust, traveled to Ahmedabad, Gujarat to meet with the Centre for Environment Education about developing conservation education materials relating to the snow leopard for use in Himalayan villages. A year and a half collaborative proposal between the Centre and the Trust was developed to create and print environmental education materials, and to train Indian personnel to implement the program at the local level.

The Service continued working with the Trust to facilitate the educational program, but it never got off the ground. Despite this setback, the Service also worked with the Trust to get the symposium proceedings printed and distributed. The Trust compiled and edited all the papers and the Service, through the US Embassy Science Office in New Delhi, identified a printer in Bombay and brought Mrs. Freeman there in early 1988 to work out final details. In June 1988, 1500 copies were printed at Service expense and then distributed free to individuals and organizations all over the world.

Mapping Input and GIS

Starting in 1986, Mr. Don Hunter in the Service's National Ecology Research Center at Fort Collins, Colorado, was approached by Rodney Jackson to apply the Geographic Information System (GIS) to mapping snow leopard data collected by Jackson and his associates from their work in Nepal. Subsequently, the information generated under the snow leopard research by the Wildlife Institute of India was also integrated into the mapping effort. This association between Jackson and Hunter has continued to the present with mapping detail being constantly refined and updated to include new information.

The use of the GIS and Hunter's expertise became an important component of a five year Indo-US cooperative program between the Service and the Wildlife Institute of India. Starting in 1989, the Service provided a series of US experts in a dozen subject areas to transfer information and technology to Institute faculty, developed training visits to US facilities for the faculty and participated in joint exercises in India to present the results of the collaboration to other faculty, administrators, and managers.

One of the first cooperative activities was the development of a High Altitude Ecology Unit at the Institute. Dr. Joseph Fox, who had participated in the 1985-86 snow leopard ecology study, was selected as the US technical advisor for this component. Together with Fox and Hunter, who was selected as the US technical advisor for the GIS component, the author led a team of US wildlife scientists to Dehra Dun to plan the High Altitude Ecology, GIS, and other components set for the coming years. Initially envisaged as a relatively modest affair, the GIS component was consistently found to be useful across all the subject areas. Hunter and the Service played a major role in helping the Institute design and build a GIS system reflecting these needs as well as for snow leopard and its Himalayan habitat. This association continues to this day.

As part of the High Altitude Ecology component, the Service and the Trust hosted Mr. Raghu Chundawat in the US during the summer of 1989. Chundawat, one of the three Indian Research Fellows on the 1985-86 snow leopard ecology study, had continued the study in Hemis National Park from October 1987 and was using the study to complete his PhD. As Chundawat was being considered for a permanent position at the Institute, the US visit was structured to augment his training in remote sensing for land capability, land use and habitat characteristics, relationship of forest, wetland and grazing land management to wildlife ecology and conservation, modeling of natural and perturbed ecosystems, and human culture and wildlife conservation. Chundawat interacted with the University of Montana, Hunter's GIS lab in Colorado, and ISLT in Seattle, Washington. Upon his return to India, Chundawat continued his study into early 1990. His study benefitted not only from the US study tour but by the provision of cold weather clothing and equipment from the Trust and shipped to India by the Service.

Another aspect of the WII-FWS High Altitude Ecology Unit cooperative project was the organization of a workshop to present the work being done to other faculty members, and wildlife research scientists and managers. Such a workshop was held at Dehra Dun July 3-5, 1990. Sixty nine participants attended, 32 from WII and 37 from outside WII. Projects in three areas were reviewed - Indian trans-Himalaya (Ladakh

and Himachal Pradesh), the western Himalaya (Kashmir and Uttar Pradesh), and the eastern Himalaya (Arunchal Pradesh). One of the recommendations was the need for a workshop on survey techniques for high mountain mammals and birds.

Project Snow Leopard

The Trust had been developing a database on high altitude reserves and was formulating an information system for snow leopard for use across snow leopard range countries. Chundawat's 1989 US visit and India work provided an impetus that resulted in the Trust contacting Hunter and the entering into of a cooperative agreement with the Service's National Ecology Research Center for assistance. Hunter joined with Rodney Jackson in designing a prototype system which was planned as a standardized approach for collecting data on mountain habitats and species. Eventually designated as the Snow Leopard Inventory and Monitoring System or SLIMS, it consisted of a standard computer program for parks and protected areas and a standard approach for collecting data on mountain habitats and species. Coupled with regional environmental education programs, it became Project Snow Leopard.

This major multi-national conservation program centered on the snow leopard but ultimately aimed at conserving biodiversity in Central Asia. It was based on a strategy of partnerships to be established over an 8-10 year period among US agencies and responsible organizations in the eight plus snow leopard range countries.

The Service agreed to help the Trust introduce the program into India and Pakistan as a first step. Subsequently, in October/November 1991, the Service facilitated the travel of Freeman, Hunter and Jackson to Pakistan and India to explore the possibility of holding a snow leopard survey techniques training workshop in Northern Pakistan in 1992. The objective was to pursue the establishment and application of the SLIMS data base both in Pakistan and India and to identify some potential environmental education opportunities.

The first action in transferring SLIMS is to conduct workshops on the computer program and field survey methodology. After meeting with a number of governmental and non-governmental organizations in Pakistan, it was decided that the North West Frontier Province was the best site to implement SLIMS. However, a decision on a specific organization was left pending resolution of a number of local problems.

In India, the WII was selected as the most suitable site for the establishment of the SLIMS program. For various reasons no immediate subsequent progress was made in scheduling SLIMS training workshops in either Pakistan or India. Instead, the nod went to China.

First SLIMS Workshop: China

Programmed into the US-China Protocol on Cooperation and Exchanges in the Field on Conservation of Nature between the US Department of the Interior and the People's Republic of China Ministry of Forestry for the 1991-92 season, a joint research exchange on snow leopard was approved for implementing SLIMS. Unfortunately, the exchange, due to take place immediately following the Seventh International Snow Leopard Symposium in July 1992 in China, was postponed at the last minute by

the Chinese Ministry of Forestry due to difficulties coordinating with the provincial governments. The Service/Trust instructor team composed of Hunter and Jackson, were forced to be satisfied with meeting Chinese officials to make rescheduling plans.

Subsequently, the following year in 1993, the first SLIMS workshop was held in Gansu Province, China in the Qilian Mountain National Nature Reserve, located along the northern edge of the Tibetan Plateau. One of China's newest reserves, it spans the entire length of the range that forms the northern limit to the Tibetan Plateau along the boundary between Qinghai and Gansu provinces. Led by Hunter and Jackson, the 12-day workshop provided classroom lectures and field applications to nine biologists from throughout China. The trainees received practice on the various field techniques, completed data forms on the survey area, studied key management issues of poaching, livestock grazing and reestablishment of viable populations of blue sheep and other large ungulates.

Second SLIMS Workshop: Pakistan

As a result of the Pakistan in-country visit in November 1991 by Freeman, Hunter and Jackson supported by the Service, the second SLIMS training workshop was held in Chitral Gol National Park, Northwest Frontier Province June 8-16, 1994 followed by a four day field survey of Kalash Valley in the park. Led by Jackson and Hunter whose participation was supported by the Service, the initial workshop hosted 12 participants representing a variety of professions and disciplines related to wildlife conservation, protected area management, and village leadership. Five additional people from the local WWF office and wildlife department also attended. Training included field census techniques, people-wildlife conflict resolution, biodiversity assessment, trophy hunting programs, and community involvements in wildlife habitat.

One exercise called upon the trainees to list all the reserves with snow leopard and to prioritize them according to the need for field surveys. At the top of the list was Khunjerab National Park, a protected area established in 1975 as a haven for snow leopard and other rare species such as Marco Polo sheep, blue sheep, brown bear and kiang (wild ass).

The Kalash Valley field exercise after the workshop involved only three trainees in addition to the two instructors. The primary aim of this activity was to train a few people as resident experts in the Project Snow Leopard survey methodology. The park is under consideration as a candidate for a World Heritage Site and has considerable cultural significance and tourism potential. The survey indicated that poaching is the primary threat to snow leopard because of severe depletion of prey species. The three trainees received a full exposure to the standard census techniques for snow leopard and large ungulate species. All data was recorded on survey forms provided by Project Snow Leopard.

Khunjerab National Park Survey

Khunjerab National Park is bordered on the north by China, where in the 1980's, the Chinese established Taxkorgan Nature Reserve on their side

of the border in recognition of the importance of the area to the transboundary ranges of endangered species, especially Marco Polo sheep.

In anticipation of Pakistan hosting the Eighth International Snow Leopard Symposium, a joint survey of the Khunjerab National Park and the Taxkorgan Nature Reserve was discussed. The Service submitted a proposal to the Chinese in 1994 for consideration under the US-China Nature Conservation Protocol. The Chinese chose not to endorse this activity. In lieu of a Pakistan-China survey, WWF-Pakistan and the Trust decided to survey Khunjerab without Chinese participation. Timing of the survey was scheduled so that results would be reported at the Eighth Symposium. The Fish and Wildlife Service agreed to support the effort for Khunjerab.

Organization of the Khunjerab survey was handled by Jackson and Hunter in conjunction with WWF-Pakistan. Due to a reorganization within the US Department of the Interior, Hunter had been transferred from the Fish and Wildlife Service to the newly created National Biological Service. Messrs. Iftikhar Khan and Mohammed Wali from WWF-Pakistan were joined by Jackson and Hunter. During the period October 30-November 5, 1995, a portion of Khunjerab National Park from the international Khunjerab highway pass between Pakistan and China was surveyed. The results of this survey have been reported in this conference.

Eighth International Snow Leopard Symposium

This international meeting in Islamabad, the eighth in the series, brings us up to the present and represents a synopsis of the title of this paper as well as the theme of the conference: international cooperation for snow leopard and biodiversity conservation. The Fish and Wildlife Service has continued to play its role as catalyst and facilitator by supporting programs on snow leopard conservation and education. Preliminary planning and preparation for this meeting was assisted by Service support of Dr. Kurt Johnson's October/November 1994 visit to Pakistan to meet with WWF-Pakistan and the support of six participants to the symposium itself. Recommendations and follow-up activities from this symposium will be taken up as appropriate.

Other Activities for Snow Leopard

Besides the major endeavors supported by the Fish and Wildlife Service for snow leopard described, a number of lesser opportunities over the years have also arisen. While seemingly disconnected from each other, they all have added to the overall fabric of the conservation program for snow leopard and represent opportunities taken.

These include a 1987 Government of India decision to bring out a snow leopard commemorative stamp to launch the snow leopard conservation plan and the Service assistance in obtaining color transparencies from the Trust and ensuring their safe shipment to and from India; a 1988 Service assistance effort in getting snow boots from a US contributor via the Trust to Mr. Ashish Chandola in India doing a film on snow leopard; the 1989 Service facilitation of eleven dozen snow leopard posters from the Trust to Raghu Chundawat for distribution in Ladakh in conjunction with his snow leopard survey; Service assistance and

support for the Sixth International Snow Leopard Symposium (October 2-7, 1989) in Alma-Ata, USSR; Service support and facilitation to Ms. Erica Wiberg of Syracuse University, an environmental education specialist with experience in India, in 1991 to work on snow leopard environmental education materials at the Trust; Service assistance in getting a slide projector to the Northwest Frontier Province, Pakistan donated by the Trust for snow leopard education programs by the local wildlife department; and the facilitation of Dr. Steven Landfried to help with preparing snow leopard environmental education programs and materials in 1992 and 1993.

Conclusion

The US Fish and Wildlife Service has been an advocate and active catalyst over the last twenty years in promoting the conservation of biodiversity including the snow leopard and its high mountain habitat in Asia. This long-term commitment is the result of the recognition that the United States has an international responsibility to seek ways to enhance the protection and conservation worldwide. It is also a recognition that single events or projects, while important, cannot address all the needs in a given situation in a timely manner. Efforts to overcome conservation problems can only be addressed in an effective manner by long-term commitment, flexible approaches, and the ability to respond to local needs when they arise.

The snow leopard is a keystone species representing high mountain habitats. Its survival over the millennia has probably been due to the remoteness of its habitat and the general unsuitability of this habitat for human occupation. This situation is changing, unfortunately, with encroachments from domestic grazing occurring more and more often and precipitating the inevitable clashes with wildlife usually to the latter's detriment. If this conflict area is not addressed in a meaningful way, the snow leopard and the biodiversity represented with it will be continually threatened.

While Service efforts in the past have supported both surveys and research studies to determine snow leopard status as well as training to strengthen in-country capability to continue these surveys and studies, sustaining these requires strong commitment of resources by local organizations which they may not have or be willing to commit. Service efforts in the future on behalf of snow leopards will be focused on programs to facilitate the resolution of human/wildlife conflicts including environmental education and community outreach activities.