Final Report for Phase I (October 1998 – March 2000)
National Fish and Wildlife Foundation Project:

Tiger Conservation and Priority Areas for Ecological Restoration: A Landscape Approach

Submitted by

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Executive Summary

The project, Tiger Conservation and Priority Areas for Ecological Restoration: A Landscape Approach, was approved in spring 1998 and initiated in October 1998 when Mahendra Shrestha started field work. Mahendra, Ecologist for the Department of National Parks and Wildlife Conservation (DNPWC) in Nepal was assigned to this project by the Director General of the Department and requested to develop a conservation plan for tigers that encompasses the entire Terai, or lowlands of Nepal and extends this landscape approach (through cooperation with India) to include tiger habitat in India. The regional goal is to manage the entire central Terai tiger metapopulation that stretches from Royal Chitwan National Park in the east to Corbett National Park in the West.

Mahendra's research focuses primarily on 2 components of a conservation plan develop for tigers in this region. He is assessing prey abundance in the matrix of national forest land that connects the protected areas in Nepal. He has surveyed 330 transects to accomplish this objective and is working with Drs. A. Joshi, S. Ahearn, and D. Smith to analyze these data in relation to Thematic Mapper satellite data covering the Nepalese Terai. Mahendra is also developing an overall landscape scale conservation plan for the Nepalese Terai. This plan has a strong focus on tigers but also includes other large mammals.

Bhim Gurung, who worked closely with Dr. Charles McDougal as a staff person at the International Trust for Nature Conservation, joined the project in 1999 and started field work to develop a tiger monitoring program to assess the current status of tigers throughout the Terai of Nepal. In 1999 Mahendra Shrestha held a Department workshop that approved the monitoring program develop by Bhim and other project investigators. In fall 1999 Bhim introduced a new technique for monitoring tiger activities outside protected areas. He recruited 30 "citizen" game scouts. This team monitors livestock depredation across the Terai and these data are used to determine the degree of connectedness between protected areas. The project held an evaluation seminar in March 2000 to discuss (with the "citizen game scouts) how to expand the scope of their project to include conservation education.

Anup Joshi, working with Shrestha, Ahearn and Smith developed a detailed analysis of the Chitwan, Parsa, Valmiki Tiger Conservation Area (the Chitwan tiger population) using GIS. This research is a pilot project for the research being conducted by Shrestha and explores use of digital remote sensing data combined and ancillary data to classify forest cover. The resulting forest cover data are the primary data required for developing a prey based model of tiger habitat.

Introduction

In Spring 1998, our proposal "Tiger Conservation and Priority Areas for Ecological Restoration: A Landscape Approach" was funded by the National Fish and Wildlife Foundation. The goal of the project was to support efforts to preserve and increase the effective land base that supports tigers in Nepal. Our objectives are to:

1) Establish a long term tiger monitoring program to determine tiger presence / absence, estimate prey abundance, and use satellite data to monitor habitat quality.
2) Identify priority areas for biological conservation through a GIS analysis of the Terai.
3) Develop a detailed management plan for the Terai that incorporates tiger and other biodiversity information, development activities and NGO supported conservation activities.
4) Select a pilot site, for restoration, from the priority areas identified through the GIS analysis.
5) Develop a Global Environmental Facility (GEF) for tiger conservation in the Terai.

Mahendra Shrestha traveled to Nepal in October 1998 to begin work on project objectives. Upon his arrival, the Director General of the Department of National Parks and Wildlife Conservation (DNPWC) asked him to undertake the following tasks:

1) Attain approval for the Nepal Tiger Action Plan from the DNPWC and from the Ministry of Forest and Soil Conservation. Approval required that the plan be submitted to the DNPWC for review and then to the Ministry for approval. See Appendix 1 for the approved Tiger Action Plan (TAP).
2) As part of the TAP and Department approval, Mahendra was asked to do the following:
    a) Draft a proposal to the GEF upon completion of the NFWF project, based on his plan
    b) Conduct trans-boundary surveys and liaison with tiger biologists in India on trans-boundary issues.
    c) Carry out the research plan as outlined in the NFWF proposal.

Work Completed through October 1998-1 April 1999 (See Appendix)

1. Tiger Action Plan Approval

In December of 1998, the TAP was approved by HMG Nepal. The goal of the plan is to preserve, recognize, restore and increase the effective land base that supports tigers in Nepal. The premise of the plan is that ecosystem management, with an emphasis on building partnerships with local people, is crucial for maintaining tiger habitats outside protected areas. Some of the main points of the plan include: surveying and monitoring the status of tigers and their habitats; identifying priority areas for tiger habitat restoration; studying tiger biology; increasing public awareness; strengthening anti-poaching efforts; strengthening institutional development; coordinating trans-boundary tiger conservation action; developing stronger HMG collaboration with national and international agencies; developing organizations and research institutions; and developing

a proposal.

2. Surveys

a. Kanchanpur District (Royal Suklaphanta Wildlife Reserve and forest outside RSWR, extending as far as Corbet Wildlife Reserve in India)

Surveys for tiger presence / absence and tiger prey abundance were carried out inside the Royal Suklaphanta Wildlife Reserve (RSWR), and in forested areas outside the Reserve in the Kanchanpur District in far western Nepal. Streambeds and dirt roads were surveyed for tiger signs. Based on pugmarks, we estimate 16 - 18 breeding tigers in the Reserve. A total of forty-five 1.25 km long transects were surveyed to estimate prey abundance. Each transect had fifty 10 m^2 plots. The extension area of RSWR, although promising habitat with potential for a healthy prey base and hence, a good tiger population, is currently under various human pressures. Because of these pressures, the prey base in the extension area is poor. Relocation of some human settlements out of the extension area has become a conservation challenge. In addition to the RSWR (core and extension), the Laljhadi forest (outside the protected area) is potential tiger habitat. Unfortunately, the connecting link between Dudwa National Park, India, and the Laljhadi forest (about a 3 km gap) that ultimately connects with the RSWR through the forest in the northern foothills has been lost on the Nepal side due to a prior government supported settlement program.

b. Kailali District

Surveys for tiger presence / absence and tiger prey abundance were carried out in the forested areas of the Kailali District in far western Nepal. A new small tiger population was located in the Basanta forest (about 20 Km east of Dhangadhi) of the Kailali District. At present, this is the only promising tiger habitat in the District; however, it may be able to support more tigers if some management measures are undertaken. (In 1986, Mahendra observed a tiger in the same forest while serving in the Kailali District Forest Office). Fresh scats, urine and ground scratch marks were recorded, and the pugmarks of 3 different tigers (1 male and 2 females) were identified. A total of 42 transects was surveyed to estimate prey abundance. A fairly good prey base (mainly spotted deer) with good ground cover was recorded during the survey. Interestingly, this is the largest forest patch in this District that extends north- south, and is connected to the eastern end of Dudwa National Park in India. Human pressure is fairly low in the forest.

3. Trans-boundary Activities

A Regional Symposium on Conservation of the Royal Bengal Tiger was held in Royal Chitwan National Park, Sauraha, 12-15 December 1997. The Symposium was jointly convened by the Department of National Parks and Wildlife Conservation, the King Mahendra Trust for Nature Conservation, and WWF Nepal Program. The Symposium

was attended by more than 57 participants from Bangladesh, Bhutan, India, Myanmar, Nepal and representatives from the IUCN Cat Specialist Group, WWF-UK, WWF-US, WWF-Bhutan, WWF-India, WWF-International, Wildlife Institute of India, Institute of Forestry - Nepal, Global Tiger Forum, National Fish and Wildlife Foundation, and the International Trust for Nature Conservation.

During the Symposium, representatives from India and Nepal met separately to discuss trans-boundary conservation issues. Expertise and experiences on conservation were shared and further opportunities for cooperation between the two countries were discussed. Contact persons and cooperation opportunities along trans-boundary protected areas were identified. The issue of conservation at a regional scale was discussed. It was agreed that issues of this type would be further discussed in the trans-boundary consultative meeting on biodiversity conservation to be held in India. The focus of the meeting was the tiger and prey abundance study in the Terai of Nepal supported by the National Fish and Wildlife Foundation (NFWF). A plan was laid out to identify the connecting links between large forest patches and protected areas in India and Nepal. The NFWF study was directed to look for corridors and connectivity between the protected areas in the trans-boundary region between Nepal and India.

After the Symposium, the Department of National Parks and Wildlife Conservation assigned Mahendra Shrestha to explore and identify opportunities for joint/complementary projects between India and Nepal along the trans-boundary areas for tiger conservation. Mahendra visited the official of the Forest Division in India that adjoins the Royal Suklaphanta Wildlife Reserve (RSWR). He was accompanied by Mr. Ram Prit Yadav, Chief Warden, RSWR while visiting Dudwa National Park and Corbett National Park. A team made up by Mr. Laxmi P. Manandhar, Chief Warden, Royal Chitwan National Park, Dr. Anup R. Joshi, Arun Rijal, and Mahendra Shrestha visited Valmiki Tiger Reserve (VTR) in India. In addition to meeting with field officials and sharing conservation issues, they also conducted prey surveys in the VTR.

a. Officials Visited in India

Mr. Harish Kumar SRF, Researcher, Dudwa National Park, Dudwa
Mr. S. Khan, Sub-Divisional Officer, Terai East Forest Division, Khatima
Mr. G. S. Suhaga, Divisional Forest Officer, Terai East Forest Division, Haldwani
Mr. A. K. Singh, Divisional Forest Officer, Haldwani Forest Division (Tanakpur portion), Haldwani - Not available
Mr. M.K. Banerjee, DFO, Pilibhit Forest Division (southern part of RSWR) - could not visit
Mr. R. C. Gautam, Director, Corbett Tiger Reserve, Ram Nagar, Nainital
Mr. A. K. Parmar, Range Officer, Gonauli Range, Valmiki Tiger Reserve
Mr. Bhubaneswor Ray, Range Officer, Madanpur Range, Valmiki Tiger Reserve
Mr. A. K. Jha, Forester, Madanpur Range, Kotraha, Valmiki Tiger Reserve
Mr. Bhubanewor Khan, Forester, Gonauli Range, Valmiki Nagar, Valmiki Tiger Reserve

b. Report for the Trans-boundary Meeting, India

A country status paper was prepared by Mahendra Shrestha for presentation in the Second Trans-boundary Consultative Meeting on Biodiversity Conservation between India and Nepal (Feb 28 – March 1, 1999) and International Tiger Symposium (March 3-4, 1999) in India. The reports were based on the tiger and prey abundance surveys and visits to the trans-boundary protected areas. A report was also prepared for the Royal SuklaPhanta Wildlife Reserve for the same trans-boundary meeting. Potential linkage(s) between Royal Bardia National Park, Nepal and Katarniaghat Wildlife Sanctuary, India, the protected area in Pilibhit District, India adjoining to Royal Suklaphanta Wildlife Reserve, and the extension of Koshi Tappu Wildlife Reserve were discussed and agreed upon. These initiatives ensure close collaboration on wildlife conservation issues between conservation officials of India and Nepal. These actions will result in landscape level biodiversity conservation for the region.

c. Participants from Nepal in the Trans-boundary Meeting in India

Dr. Tirtha M. Maskey, Director General, Department of National Parks and Wildlife Conservation
Mr. Narayan Poudel, Ecologist, DNPWC
Mr. Laxmi P. Manandhar, Chief Warden, Royal Chitwan National Park
Mr. Ram Prit Yadav, Chief Warden, Royal Suklaphanta Wildlife Reserve
Mr. Shiva R. Bhatta, Act. Chief Warden, Royal Bardia National Park
Mr. Jagannath Singh, Warden, Koshi Tappu Wildlife Reserve
Mr. Rabi Sharma Aryal, Legal officer, Ministry of Forest and Soil Conservation
Mr. Darshan Das Shrestha, Under Secretary, Ministry of Forest and Soil Conservation

4. Conservation Program for Tiger Conservation Unit

In March 1999, J.L.D. Smith, S. Ahearn, A. Joshi, and M. Shrestha jointly worked on a remote sensing image and on the ground, to detect habitat change in Parsa Wildlife Reserve, Royal Chitwan National Park, and Valmiki Tiger Reserve in India.

Work completed 1 April 1999 – 15 June 2000

1. Nepal Monitoring Project

Bhim Gurung conducted tiger presence/ absence surveys throughout Nepal. Starting in late March through June 1999. His survey teams used wildlife technicians from 2 research institutions (the Nepal Conservation and Research Training Center and the International Trust for the Conservation of Nature) and the game scouts from the Department of National Parks and Wildlife Conservation. They found tiger sign throughout the Terai of Nepal. Of significance is that tiger sign occurred in areas where the prey base was determined to be too low to support resident breeding tigers. Based on

these preliminary survey results we realized that tigers are occasionally using degraded habitat as dispersal corridors, but that tiger use of this habitat was a rare event that was difficult to assess by our current status of occasional field surveys, by expert tiger technicians. We hypothesize that tigers may use degraded habitat as dispersal corridors; therefore, metapopulation structure may be more "connected" than we previously realized.

In late April 1999 Smith and Gurung decided to recruit local villagers (e.g. herdsmen, local leaders) to monitor tiger presence/ absence by recording geo-referenced data on where tigers kill domestic livestock. Three villagers were hired to monitor tiger depredation of domestic livestock. Citizen staff were trained to recognize the difference in size between tigers and leopards based on track size. They also learned to distinguish between kills made by tiger and leopard. Bhim hired 2 of his wildlife technicians to coordinate and record data obtained by villagers. At the workshop participants were tested in their field skills, and they learned to use the GPS. This effort proved to be an important improvement over previous monitoring tiger presence/absence. These villagers spread the word in their villages that they wanted any information about tiger tracks, killing of livestock, or other sign of tigers or indication of tiger human interactions. Bhim decided to expand this network to encompass the entire Terai of Nepal. When he returned to Nepal in October 1999 he hired 30 local people from Sukla Phanta in the far west to people living in the Trijuga area in eastern Nepal. During November he recruited 30 local people to establish a country wide, citizen based, tiger monitoring network.

Bhim held a 2 day, training workshop in December 1999 at Royal Bardia National Park.

2. Prey Assessment Survey

From October 1998 through April 2000 Mahendra Shrestha surveyed prey abundance throughout the Terai of Nepal. To reduce variation in pellet numbers (due to variance in number of days since the monsoon), Mahendra confined his prey surveys to February through April of each field season. He completed 330 transect surveys; each consisted of a 600 m long transect with 25 10 m^2 plots spaced at 25 m intervals. Each transect was conducted in a single habitat type and the data are organized in a spatial data base. Prey relative abundance will be analyzed in relation to forest cover obtained from Thematic Mapper Data. Other spatial data layers such as roads, permanent water, slope, aspect, and human activity will be weighed and the summation of these scores will be used to calculate a predicted prey density surface. Transect data will be randomly divided into a set for building and a set to test the model. The prey abundance surface will be used to devise and evaluate different land management scenarios.

3. Assessment of Human/Tiger Issues throughout Terai of Nepal

In April 2000, Mahendra Shrestha initiated a survey of government and NGO field staff throughout the Terai of Nepal. He currently is interviewing the 20 district forest officers stationed in the Terai to determine what they consider to be the pressing

conservation issues in each of their districts. They are also being asked to suggest how to address these issues and describe the constraints they face in dealing with these problems. NGOs are asked to make a similar assessment of critical issues and to provide Mahendra with detailed information of current and planned project activities. These surveys are designed to determine the extent to which NGOs and government organizations perceive the same issues as important to conserving biodiversity in the Terai. This information is critical for Mahendra as he develops a Global Environmental Fund proposal for tiger and biodiversity conservation in the lowlands of Nepal.

4. Habitat analysis of the Chitwan, Parsa, Valmiki Tiger Conservation Unit

In March and December, 1999 Joshi, Ahearn and Smith established ground truth plots in the southern parts of Parsa Wildlife Sanctuary and adjacent habitat in Bara Forest Reserve. These plots have been used to do a forest classification of Parsa using Thematic Mapper and Spot satellite imagery. Ahearn is developing a model to predict prey abundance based on the type and quality of forest cover and the impact of human use of these forest lands. Preliminary results of this research were presented at the Eastern Himalayan Ecoregion Workshop held in Kathmandu in December 1999.