

THE SIBERIAN TIGER PROJECT™
ECOLOGY AND CONSERVATION OF THE SIBERIAN TIGER

Final Report To
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EXECUTIVE SUMMARY

This year marked the eighth year of field operations for the Siberian Tiger Project™. Given the chaotic economic and political realities of working in Russia, we feel our achievements are substantial. We have fostered important ties with colleagues, institutions, and communities, and provided an important framework for conservation. Most importantly, we have greatly increased our understanding of one of the most magnificent and captivating animals in the world, and its chances for survival. This report covers activities of the field research project, with brief summaries of directly related activities undertaken by Project biologists, and a general summary of overall research and conservation activities of the Siberian Tiger Project regionally (Appendix I).

The field project was successful in a variety of areas this year. In addition to the continued tracking of eight study animals as we entered this reporting year, the Project added six new radio-collared individuals through trapping efforts. Unfortunately, through poaching, collar failures, and disappearances, we track six animals at the time of this report. As in the previous three years, we have intensively focused our attention on the documentation of reproductive ecology, tiger demographics, and dispersal characteristics. Increased flying intensity and the presence of new litters will again provide good opportunity in the coming year for dispersal documentation.

Related activities in the development of our overall, comprehensive conservation plan have continued to occupy an increasing amount of time, energy and resources. We continue work on both wild boar and elk on our study area and continue to monitor brown bears and black bears using radio telemetry. Conservation education focused mainly on our poster/calendar campaign, directed at the public at-large, and opportunistic presentations in local schools. We continue to develop activities within the proposed tiger conservation corridor. In Primorski Province, these include work with newly developed hunting societies, local communities and government officials. A similar analysis is being planned for Khabarovsk Province. In our ongoing effort to expand our impact to all of Siberian tiger range, we completed surveys in Northeastern China and began planning for an international gathering to focus on the area.

This report is an update on the activities and accomplishments of the Siberian Tiger Project™ from 1 May, 1999, through April, 2000.

INTRODUCTION

The primary purpose of this report is to describe the Siberian Tiger Project™ field research activities, with brief summaries of related education and conservation programs. Thus, below, we provide the current status of radio-collared tigers in the Sikhote-Alin Zapovednik, our efforts to collar additional tigers in the area, re-capture activities, an update on personnel, a brief review of data obtained, environmental education work, and other issues and activities in the Russian Far East. However, in the space utilized here, we cannot nearly begin to adequately portray the effort currently underway to secure a future for Siberian tigers and their native habitat. What is currently underway – or has taken place over the reporting period of this document – is but a small window on the energies, activities, and resources necessary to reach this point. Below, a brief history of this underpinning will add perspective to the activities of the past year. The depth and breadth of the Siberian Tiger Project™ activities are all planned to provide the most effective and efficient route to secure the future for the Siberian tiger.

Field research efforts of the Siberian Tiger Project™ were begun in January, 1992, after nearly two years of planning by the Hornocker Wildlife Institute (HWI) and Russian cooperators. Maurice Hornocker and Howard Quigley, of HWI, along with more than a dozen Russian biologists, established two main goals for the Project. First, through a combination of modern and traditional field methods, we endeavored to create the best possible documentation of tiger ecology in the Russian Far East. Second, we wanted to utilize the data on Siberian tiger ecology to develop and implement programs for its survival.

The use of radio telemetry is an essential part of the study of large, secretive carnivores. Of course, in order to place these radio transmitters on study animals, they must be captured and safely anesthetized. The initial captures of all Siberian Tiger Project™ study animals have been made with the use of the Aldrich spring-activated foot snare. This technique is commonly used in North America, but had never been used in Russia prior to our activities. We have now made 27 such captures. However, recapture of these previously-captured animals is very difficult and time consuming using foot snares; and, recapture is essential for continued monitoring of study animals due to the finite battery life of the radio collars (about 30 months). Thus, we developed the technique of helicopter capture for recapturing study animals; ten such captures have been performed.

The combination of capture and recapture techniques has allowed the Project to monitor a large percentage of the tigers within the study area, and maintain long-term contact with individuals. This continuity creates a history on study animals that is important for analyzing a variety of tiger behaviors, but most importantly reproduction and mortality. For example, we have now followed one of our study animals, Tiger 01, since February, 1992, through dispersal from her mother, three litters of her own, and dozens of kills she has made.

The continuity, support, and enthusiasm of personnel on the Project have also

been an important part of its success. From the beginning, the Siberian Tiger Project™ has built and maintained a totally integrated team of Russians and Americans. Our Russian field coordinator, Evgeny Smirnov, has remained throughout the Project. Dale Miquelle, the original American field coordinator of the Project, is now regional coordinator for all Siberian Tiger Project™ activities in the Russian Far East. John Goodrich is now in his sixth year as field coordinator. Kola Reebin and Losha Kostera carry out much of the day-to-day responsibilities of radio-tracking, kill documentation, and capture, and have for seven and five years, respectively. Bart Schleyer has now acted as capture specialist for the Project for seven years, performing all helicopter recaptures and most snares captures.

In 1994, with two years of field data in hand, the Siberian Tiger Project™ expanded into a variety of conservation-related activities. A geographic information system (GIS) was established at the Sikhote-Alin Reserve headquarters in Terney; the mapping capabilities of the GIS have been critical to our ability to analyze tiger habitat use in the study area and extrapolate those conclusions to conservation planning issues throughout Siberian tiger range. In 1994, we undertook an analysis of education needs related to tiger conservation. As a result, we began an annual calendar/poster campaign, supplied small grants to local schools to improve programs, and helped fund summer ecology camps near Terney. The Project has also conducted tiger surveys, analyzed biodiversity region-wide, supported anti-poaching teams, undertaken community development projects, and a variety of field science studies related to tiger conservation. Some of these activities are described further on page 8.

With less than 400 individuals left in the wild, the Amur (Siberian) tiger is more endangered than any other tiger subspecies except the south China tiger. Short-term threats to their survival include poaching of both tigers and their prey, while the primary long-term threat is destruction and fragmentation of remaining habitat. One key to alleviating these threats is the development of comprehensive conservation plans that provide for the needs of both tigers and local people. Providing for the needs of tigers first requires a sound knowledge of tiger ecology based on detailed long-term scientific data. The Siberian Tiger Project is now in its ninth year of data collection on radio-collared tigers on and near the Sikhote-Alin Biosphere Zapovednik (SABZ). The primary objective of our field work is to develop the best scientific data set possible on Amur tiger ecology in as pristine an area as possible; i.e. the SABZ, and in disturbed areas surrounding the SABZ. Here we report on the results of our field research over the past year and summarize other, related activities.

Field Activities

Captures

Capture success was high this year; we captured six new tigers - a success rate matched only in the project's first year (Table 1). We trapped in the Ooct Shandooy

area from 30 April - 16 June with the primary objective of recapturing Tiger 23 to change her radio collar. Although we set snares on two of her kills and on mark trees and trails in areas she frequented, we were unable to recapture her. Apparently she has become very trap shy since her initial capture in 1997. However, we captured two new adult male tigers (Tigers 33 and 34) and one new adult female tiger (Tiger 32).

We also trapped along the Shepton River 19-25 June in an attempt to capture Tiger 21's orphaned cubs. Although tracks indicated the cubs were probably still using the area, Shepton River is public land and high human activity in the river bottom limited the areas in which we could set snares. Consequently, our efforts were unsuccessful.

For the fall season, we trapped in the Koonalayka and Hanov drainages 7-17 September and 7 October - 16 November. In the earlier trapping period, we set snares specifically for Tiger 03's cubs, who were orphaned when Tiger 03 was poached in July. At the time of her poaching, we were unable to locate the cubs, but they began wandering the main highway in the Koonalayka area in September. We set several snares baited with fresh meat around a cassette recorder playing the call of a squealing pig. We captured Tiger 36 at the cassette recorder on 16 September and closed snares on the following day because the lack of tracks indicated that the second cub was not in the vicinity.

In October, we set a more extensive trap line on trails and mark trees with the goal of capturing Tiger 03's remaining cub, Tiger 20 to replace his radio collar, and new tigers filling vacancies left by the deaths of Tigers 03 and 16. We captured Tiger 35, also at the cassette recorder, and Tiger 37 on a kill. This was the first time we captured an adult tiger at the cassette recorder; however, in the past we only set snares with the cassette player for short periods when cubs were known to be in the vicinity. In the case of Tiger 35, we had left the cassette player and associated snares for the entire trapping period in hopes of capturing Tiger 03's second orphaned cub. In the future, we intend to make the cassette record a regular addition to our snare lines.

We recaptured Tigers 01 and 20 by helicopter in spring 2000 to change their radio collars. Tiger 01 now wears her fifth collar of the Project.

Movement data (Radio- and snow-tracking)

One of our biggest logistical problems over the past several years has been aerial radio tracking because of high cost and low availability of the MI-8 helicopter. In early August, this problem was solved when an AN-2 biplane was stationed in Terney, primarily to fly for the Siberian Tiger Project. Because cost per hour is roughly half that of the helicopter and the AN-2 flies almost exclusively for the Siberian Tiger Project, we have been able to fly roughly 1.5 times per week, resulting in about a three-fold increase in data quantity. It also allowed us to fly approximately 20 hours in August and September to search for missing tigers, but with no positive results.

Ground-tracking activities between spring and fall capture seasons (July-August) focussed on intensive monitoring of Tiger 32 at her den site and of Tiger 01 to determine whether or not she had cubs. During the fall capture season, our focus shifted to monitoring new Tigers 35-37.

During winter, we began a more intensive tracking program that combined snow- and radio-tracking to collect data on hunting behavior, scent marking behavior and distribution, and the relationship between distance moved and straight-line distance between telemetry locations. We flew on two consecutive days each week and attempted to snow-track one or more tigers between consecutive locations, starting in early February and ending in late March when snow conditions became too poor for tracking. We attempted to track six tigers (two males and four females) between 12 different sets of consecutive locations. In general, tracking between consecutive locations required two people two to four days because deep snows hindered movement and access in some areas, data collection slowed observer movement, and tigers often walked in snow-free areas, requiring observers to lose time searching for tracks. We also attempted to locate Tiger 35 every day 7 February - 24 March to collect data on consecutive kills and more detailed data on home range use and movements. We located her on 41 of 46 days and there was never >1 day missed between locations, resulting in seven consecutive kills.

Predation data

Of 35 kills during the reporting period, 54% were boar, 37% elk, 6% sika deer, and 3% roe deer. Flying on two consecutive days and snow-tracking increased our ability to find kills. We found 57% of the kills during February-April, 2000. In addition, we located seven consecutive kills of Tiger 35 and eight of Tiger 36; although for Tiger 36, 7 of the eight were <1-yr-old wild boar killed at two different sites.

Status of radio-collared tigers

Tiger 01. – From April 1998 through December, 2000, Tiger 01 used only the southern portion of the home range that she used up until April 1998. She is the third tigress for which we have documented such a home range shift and we believe that all three gave up portions of their home ranges for their daughters. However, in January, 2000, she again began using the northern portion, likely in response to a vacancy created by the poaching of a tigress – in April, 2000, the tanned skins of two tigers were confiscated from a farm at the mouth of Bilombay River in the northern end of Tiger 01's original home range. One was an adult female and the second a young animal of unknown sex.

Although it has been >2 years since Tiger 01's last litter, she does not currently have cubs. Her movements in early spring 1999, indicated that she had given birth to a litter and unconfirmed reports of tracks of a tigress with cubs supported this. However, we were unable to confirm the presence of cubs despite extensive searches

for cub tracks in summer 1999 and winter 1999-2000. She may have given birth to and then lost a litter in spring 1999.

Tiger 03. – Tiger 03 was killed by poachers between 17 and 19 July. We found her collar, which the poachers had cut off and discarded on a high ridge on the Zapovednik east of the confluence of Koonalayka and Perivalney Creeks. We were unable to locate her remains, despite extensive searches by Project personnel and the Zapovednik's anti-poaching brigade. Nor were we able to locate any evidence of her cubs at the time of the poaching. This event and the disappearance of Tigers 16 and 28 earlier in 1999, triggered investigations by the Zapovednik, Primorye Krai's anti-poaching brigade, and the FSB (formerly KGB).

In late August, 1999, two cubs began wandering the main road along Koonalayka Creek. We set snares in the area and captured one cub, Tiger 36 (see below), who we believe is Tiger 03's son. The second cub was sighted occasionally until mid-October, but we were unable to capture it.

Tiger 16. – We last located Tiger 16 in April, 1999. Lack of tracks in winter 1999-2000, and the home range shift by Tiger 20 into Tiger 16's former home range, indicate he disappeared from the area and we conclude that he was poached.

Tiger 20. – In late spring and early summer, Tiger 20 limited his movements primarily to the eastern boundary of his territory. His limited movements are unusual; he formerly moved extensively over an area greater than 1,500 km². However, in August he began moving throughout his usual home range and began using portions of Tiger 16's former home range in August, 1999.

Tiger 20 died on 1 March when he fell through the ice into a pool on Haunta-mi Creek and drowned or froze to death. We sent him to Ussurisk for necropsy and are awaiting results to determine if injury or disease was the ultimate cause of death.

Tiger 23. – We lost Tiger 23's signal in mid-October and believe that the batteries in her radio collar failed. The collar was 3-years-old and well past due to fail. This was the first resident tiger we were unable to recapture to change its radio collar. We were unable to capture her via helicopter because she inhabited primarily closed-canopy conifer forest. We set snares on three of her kills and she spent three days in the vicinity of our trap line, but she always successfully avoided our snares.

Tiger 27. – Tiger 27 continued to use the upper Djigitofky River basin and was apparently the resident tigress in this area. In August, 1999, she began making forays into the Bol Ussurka (Iman) River basin, as far as 15 km from her territory boundaries. We found no evidence that she had had cubs since her initial capture in spring of 1998.

In December, 1999, she was poached and we retrieved her collar (which had been cut from her body) from under the ice in the Bol Ussurka River. The poachers attached the portion of her ear tag with the identifying number to her collar.

Tiger 32. – Tiger 32 was captured on 2 May, 1999, near the confluence of Toonsha and Shandooey Creeks (Table 1). To date, she has moved primarily within the Myca and Toonsha drainages south and west of her capture site. She gave birth to a litter of cubs on 14 July (birth date error ± 21 days) along Toonsha Creek about three

km below the confluence of Toonsha and Shandooye Creeks. On 4 December, when the first snowfall provided good tracking conditions, we documented that she had two cubs.

Tiger 33. – Tiger 33 was captured on 3 May, about 300 meters from Tiger 32's capture site (Table 1). The two tigers were probably travelling together on 2 May. Since his capture, we located him with Tiger 23 and based on his movements, we believe that he was the resident male within her territory.

We lost contact with Tiger 33 in March, 2000; he was last located on the Bilombay River on 22 March. We have not been able to locate him despite several aerial searches and conclude that he was poached.

Tiger 34. – Tiger 34 was captured on 12 June, about one km northwest of the confluence of Toonsha and Shandooye Creeks (Table 1). His home range borders that of Tiger 33 to the south and west and includes the Myca, lower Toonsha, and middle to upper Serebryanka drainages and overlaps extensively with Tiger 32's home range.

Tiger 35. – Tiger 35 was captured on 21 October, along Koonalayka River (Table 1). She was in fair to good physical condition and weighed 113 kg. Since her capture, she has been located in the Blogadatna, Haunta-mi, Inacov, and Koonalayka drainages; that is, she uses an area very similar to that used by Tiger 15. We believe that Tiger 35 inhabited Tiger 26's former home range and expanded her home range into the Koonalayka area following the death of Tiger 03.

Tiger 36. – We believe Tiger 36 is the orphaned cub of Tiger 03. He still had milk teeth, was within the size range expected of a 9.5-month-old cub, and was never located in association with an adult tiger; he was clearly an orphan. Despite having lived two months without his mother, he was in good physical condition, with a full stomach, at the time of his capture. Scat at the capture site contained wild boar hair and he killed a small boar in October. Until April, 2000, he moved primarily within the lower Koorima, Koonalayka, and Djigitofki River basins. However, in April he began to disperse south as far as Dal'negorsk.

Tiger 37. – Tiger 37 was captured on a kill on lower Hanov Creek in November, 1999. She was thin and judged in fair physical condition at the time of capture. She has not returned to the Hanov area since her capture; rather, she moves primarily within the Koorima River basin. We equipped her with a satellite collar to test the collar in an area with gentler topography and different forest types than areas used by Tiger 27, the only other tiger equipped with a satellite collar. Although the collar transmits twice per week, we have received only eight locations (about one/month) since her capture and most locations are of poor quality (i.e., resulting from only two to three satellite "hits"). Nonetheless, the collar performs better than Tiger 27's collar, presumably because of differences in habitat and topography.

Poaching Documentation

Starting in 1997, loss of radio-collared tigers to poaching increased. Poaching rates were high again this year; two tigresses were poached (Tigers 03 and 27) and one

tiger is missing (Tiger 33) and believed poached. Largely due to poaching, we have lost large amounts of potential data, particularly on lifetime reproductive success, longevity, and dispersal and home range acquisition. Indeed, of 6 tigers with functioning radio-collars at the end of this reporting period, only 1 (Tiger 01) has had a collar for more than one year. However, these losses provide a unique opportunity to examine the effects of human-induced mortality on tiger populations. We recently analyzed data on the distribution of poaching and found a simple and clear result: nearly all tigers with roads in their home ranges have been poached, while none in road less areas were poached (see Kerley et. al., Publications section below). We also found poaching effects tiger populations well beyond the loss of the individual poached. That is, cub mortality was statistically higher in areas with roads and tigresses moving into new areas did not reproduce right away. Over the next several years, our new group of tigers will provide further data on many other important aspects of the effects of human-induced mortality on tiger populations, including patterns of replacement, and changes in reproductive rates and social structure.

Other Activities

The Siberian Tiger Project's tiger research is the core of our activities in the Russian Far East, but, by no means, the only activity underway. This report summarizes field activities of the Project, and additional, offshoot and supportive work performed by Project biologists. However, the Siberian Tiger Project is an amalgamation of research and conservation activities carefully designed and implemented to effect tiger conservation, and resource conservation overall, in the region. A summary of Siberian Tiger Project activities is provided in Appendix I.

Presentations and lectures

In August, 1999, John Goodrich and Evgeny Smirnov provided Zapovednik summer camp lectures to children about the Siberian Tiger Project and general issues in tiger conservation. John Goodrich presented similar lectures to 1st, 2nd, 5th, and 6th-grade classes at the Livermore Public School in Colorado in January, 2000. John Goodrich, Nikoli Reebin, and Alexei Kosterya gave presentations about the background and history of the Siberian Tiger Project and demonstrated telemetry, capture, and immobilization techniques at a meeting for Zapovednik science directors in October, 1999. Lastly, Dale Miquelle presented a habitat protection plan for Amur tigers and John Goodrich presented data on the effects of human disturbance on tigers, and data on the social structure of tiger populations at the Siberian Tiger Project 10-Year Commemorative Workshop, held in Terney, April, 2000. Alexei Kosterya and Alexander Reebin demonstrated radio-tracking, capture, and immobilization techniques at the Workshop.

Tiger-human conflicts

As part of the Siberian Tiger Project's programs to reduce tiger-human conflicts, Project field personnel frequently assist the Primorye Krai Committee for Environmental Protection's Tiger Department in investigating tiger depredations on domestic animals. In the past, Krai officials have usually tracked and shot problem tigers when necessary. However, the Siberian Tiger Project is coordinating with Krai officials to develop alternatives for dealing with problem tigers, such as hazing tigers from areas, or capturing and moving them. The majority of depredating tigers are either young or wounded, and hazing or moving them may be useful alternatives to killing, particularly for young animals. However, Krai personnel are not trained in capture, immobilization, or hazing techniques, so we provide assistance, advice, and training wherever possible.

In most cases, our assistance involved snow-tracking tigers that had killed or threatened livestock in and near Terney to estimate the animal's sex, age, and physical condition, and to provide recommendations about how to deal with the problem. In one instance, the Administration requested we capture a tiger that had killed several dogs in the town of Nagornaya in northwestern Primorye Krai, so that the tiger could be moved or euthanized, depending on its condition. John Goodrich and Alexander Reebin spent four days in the area, during which time they captured the tiger, which was later euthanized by Krai officials based on the recommendations of a local veterinarian. The tiger had badly damaged feet, possibly the result of hormonal and nutritional deficiencies.

Personnel

Nikoli Reebin, Alexander Reebin, and Griesha Shaulsky are the principle Russians conducting field work on the Siberian Tiger Project. Their primary responsibilities are radio-tracking from the ground and assisting with trap lines. All have been trained to set snares and both Reebins, but especially Nikoli, have received extensive training in, and are proficient at, all aspects of immobilization and handling. Alexei Kosterya does most of the aerial radio tracking, but Alexander Reebin is now trained and proficient at aerial tracking as well. Evgenny Smirnov spends little time in the field. However, he is currently involved in several projects, including the development of a protocol for dealing with problem tigers and an insurance fund for compensating tiger depredations on domestic livestock. Bart Schleyer was in Russia to oversee capture activities for the spring and fall trapping seasons and returned in February and March to assist with recapturing Tiger 01 and Tiger 20 from the helicopter.

Nikoli Reebin's leg did not properly heal after it broke when a rock fell on it while he was tracking a tiger in February, 1999. His leg was operated on, reset, and pinned in February, 2000. Following the operation, his leg was in a cast for six weeks, and although he was walking by 31 April, he is still not fit to do field work.

Expected Activities for Spring and Summer 2000

During May and June, we intend to trap in both the Koonalayka and Nevedeemka areas. In Koonalayka, our goal is to capture the male tiger, or tigers, replacing Tiger 16 and Tiger 20; in Nevedeemka, our goal is to capture both male and female tigers replacing Tiger 20, Tiger 27, and Tiger 28. In August, we intend to begin trapping for Tiger 32's cubs by setting snares at kills.

We will continue to fly twice per week, although roughly half the flight time will be used to locate bears. Ground radio-tracking activities will focus on Tiger 35 during the trapping season because she is readily accessible from the Koonalayka trap line. We will attempt to locate Tiger 35 every day from late May through late July to collect more data on kill rates. In addition, we hope to track her and other tigers more closely and walk in to locations whenever possible to collect more detailed data on frequency of predation on smaller prey animals, such as badgers.

Publications

Published

- Goodrich, J. M., L. L. Kerley, D. G. Miquelle, E. N. Smirnov, I. G. Nikolaev, H. Quigley, M. Hornocker, B. Schleyer, N. N. Reebin, and A. V. Kosteeria. 1999. Preliminary analysis of the system of home ranges of Panthera tigris altaica in Sikhote-Alin Biosphere Reserve. Pages 89-97 in A. A. Arictov, editor, International Conference on Rare Mammal Species in Russia and Adjacent Territories. Russian Academy of Sciences, Moscow. In Russian with English summaries.
- Smirnov, E. N., I. G. Nikolaev, D. G. Miquelle, Goodrich, J. M., L. L. Kerley, H. Quigley, M. Hornocker, B. Schleyer, N. N. Reebin, and A. V. Kosteeria. 1999. New data on Amur tiger reproduction. Pages 414-426 in A. A. Arictov, editor, International Conference on Rare Mammal Species in Russia and Adjacent Territories. Russian Academy of Sciences, Moscow. In Russian with English summaries.

Submitted

- Kerley, L. J. Goodrich, E. N. Smirnov, D. G. Miquelle, H. B. Quigley, and M. G. Hornocker. *In revision*. Effects of roads and human disturbance on Amur tigers. Conservation Biology.
- Goodrich, J. M., L. L. Kerley, B. O. Schleyer, D. G. Miquelle, K. S. Quigley, E. N. Smirnov, I. G. Nikolaev, H. B. Quigley, and M. G. Hornocker. *In review*. Capture and chemical immobilization of Amur (Siberian) tigers. Wildlife Society Bulletin.

Table 1. Tigers captured by the Siberian Tiger Project on the Sikhote-Alin Biosphere Zapovednik, 1 May 1999 - 31 April 2000.

Tiger no.	Sex	Estimated age (yrs)	Weight (Kg)	Date	Type of Capture	Notes
32	f	4	122	99/05/02	snare	
33	m	7	178	99/05/03	snare	
34	m	6	188	99/06/12	snare	
35	f	6	113	99/10/21	snare	
36	m	0.8	64	99/09/16	snare	Tiger 03's orphaned son.
37	f	7	115	99/11/16	snare	Has not yet reproduced.
20	m	12	205	00/02/26	helicopter	Heaviest wt recorded for project.
1	f	9	NA	00/03/18	helicopter	

Table 2. Summary of location data collected from radio-collared tigers on and near the Sikhote-Alin Biosphere Zapovednik, 1992-2000.

Tiger number	Dates tracked		Number of days tracked	Number of locations	
	from	to		total	report period ¹
1	02/11/92	04/28/00	2999	502	66
3	10/17/92	07/19/99	2466	335	16
20	11/01/95	03/01/00	1582	168	64
23	10/16/96	10/18/99	1097	82	26
27	05/15/98	12/24/99	588	103	26
32	05/02/99	04/28/00	362	72	72
33	05/03/99	04/28/00	361	45	45
34	06/12/99	04/28/00	321	48	48
35	10/21/99	04/28/00	190	112	112
36	09/16/99	04/28/00	225	100	100
37	11/17/99	04/28/00	163	39	39

¹ 1 May 1999 - 28 April 2000

APPENDIX I

Siberian Tiger Project Activities in the Russian Far East, Northeast China, and North Korea

EXECUTIVE SUMMARY

As the political and financial instability continues in Russia, biodiversity conservation and environmental concerns remain secondary issues for the average person and the politicians. Only those governmental organizations directly charge with such responsibilities, and a small cadre of committed individuals and NGO's are addressing conservation issues. Development, and potential sources hard currency income are the primary concerns of administrators looking for means to provide minimum public facilities to their constituencies. At the local level, people of forest villages, either without jobs or the mentality to create or hold real jobs, turn to the forest for livelihoods.

At the same time, in amongst the chaos of present-day Russia are opportunities for real advances in conservation. There exists a history of conservation awareness, and a bond to the "taiga" not found in many societies. Through a combination of research and directed conservation-actions, we are working to address key conservation issues in the Russian Far East, with linkages to China as well. Other than the tiger field research project, total of 8 projects were underway in 1999 in the Russian Far East and Northeast China that are all directed towards the primary goals of large carnivore and biodiversity conservation. Many of the projects focus on research and surveys which lead to conservation recommendations and conservation actions for the Amur tiger and the Far Eastern leopard, as well as biodiversity conservation in general. These projects range from strictly research-oriented to community-based outreach and environmental education programs. Nonetheless, all projects share a common theme: conservation of the remaining natural ecosystems of northeast Asia, which are the last remaining habitats of several rare large carnivores, and a host of endangered animals and plants. New information emanating from China suggest that what were formerly considered extremely fragmented, non-viable populations of tigers and leopards in Russia may in fact be connected to suitable habitat across international boundaries, and new contacts have presented the opportunity for potentially managing the metapopulation of tigers across those international boundaries. At the same time, new threats and continuing fragmentation of habitat within Russia make it urgent that habitat protection plans be immediately initiated. Even if all proposed protected areas plans are implemented, a large majority of tiger habitat will be unprotected. Therefore, strategies need to be developed to provide for multiple-use management of unprotected lands that is compatible with tiger conservation. Towards that end we are developing relationships with local hunting organizations to develop mutually beneficial management programs.

In summary, projects other than the tiger field research project in the Russian Far East fall under one of 4 categories:

1. Conservation-based research and survey work;
2. Transboundary issues (managing the metapopulation of tigers and leopards);
3. Landscape management, including 1) protected areas planning and implementation of plans for a network of protected areas; and 2) management regimes on unprotected lands that are compatible with tiger conservation;
4. Environmental Education.

1. HABITAT USE AND HOME RANGE SIZE OF HIMALAYAN BEARS AND BROWN BEARS IN THE SIKHOTE-ALIN MOUNTAINS

Project Objectives.

To catch and radio-collar brown bears and Himalayan black bears;

To collect field data (habitat preference by bears; elevations; den entry and emergence dates and descriptions of dens and den sites; daily and seasonal activity patterns; the relation to water, to roads and to human disturbance);

To evaluate other factors influencing the bear population - including interactions with sympatric tigers and bear species;

To assist in development of the Himalayan bear population management plan for local organizations with responsible authorities.

Activities. Five brown bears and one Himalayan black bear were captured in this reporting period. Five of these animals were females, including the Himalayan black bear, which is the first female black bear to be collared in our project. Bears were captured in a region with a good acorn crop production (see below), where bear densities were temporarily exceedingly high.

Radio-tracking activities focused on collecting locations to estimate home range and habitat use, as well as activity patterns and identification of den sites. In August a small bi-plane became available for tracking activities, greatly reducing flight costs and increasing our ability to fly regularly.

As part of the effort to better understand bear movements and distributions, we conducted a survey of mast crop (Mongolian oak acorns and Korean pine cones) production over the central part of our study area in Dgigitovka Basin within the Reserve. Results revealed virtually no Korean pine nut production this year (as expected since last year was a "bumper crop") and very spotty distribution of acorn production. Bears appeared to locate and concentrate in these small patches of acorn production. One such area, highly accessible, and also located at the site where we were trapping for orphaned tiger cubs (see Tiger project report) provided a rare opportunity to observe bears. The density of bears was astonishing. Both Himalayan black and brown bears were easily located and observed (up to two observations/hour of walking) in a very small patch of forest. Himalayan black bears, who readily climb trees, were the first to take advantage of this patch, and decimated most of the mast producing trees in the area by breaking branches to gain access to hanging acorns. This gathering process by black bears must impact potential mast production in such areas, as it will take years for such trees to recover and again produce acorns. We hope to institutionalize this sampling process for mast production, so that it is done as part of the yearly monitoring process for the Reserve. Data is also important in understanding wild boar distribution, as well as a host of other species.

One satellite collar has already been deployed on a Himalayan black bear, with limited success. We hope to assess problems, and attempt deployment again this coming season. Both species of bears, but particularly brown bears, travel large distances, and we frequently lose contact with collared animals, making our results suspect. Only satellite collars provide an opportunity to determine real movement patterns and home range size.

2. HABITAT SELECTION AND POPULATION DYNAMICS OF THE MANCHURIAN RED DEER AND USSURI WILD BOAR: UNDERSTANDING PREDATOR -PREY DYNAMICS OF THE AMUR TIGER AND ITS PRINCIPAL PREY

Executive Summary. We are into the second year of a program focusing on habitat selection and population dynamics of the Amur tiger's (*P. t. altaica*) principal prey, the Manchurian red deer (*Cervus elaphus xanthopygus*) and the Ussuri wild boar (*Sus scrofa*)

ussuricus). A better understanding of habitat selection by and predation on prey species has important conservation implications. Our primary intent is to: 1) better understand how to manage habitat for tigers, by a better definition of what is key habitat is for the prey species in the Russian Far East; and, 2) to better understand the predator-prey relationship by studying prey survivorship, sex-age structure, recruitment, and predation on prey, as well as assessing long-term changes in predator and prey numbers.

This project is composed of three components, including, computerization and standardization of the long-term (30-year) monitoring data within Sikhote-Alin Zapovednik, which will demonstrate changes in abundance of ungulate species over time, and which can be linked to similar existing data on tigers (Smirnov and Miquelle 1999). In the second and third components, we will employ radio-telemetry and snow-tracking data for elk and wild boar, respectively, to better understand movements and habitat selection of these respective prey. The process of capturing boar has only begun after considerable consultation with others who have experience in wild pig capture techniques.

Activities:

1) Compilation of the long-term monitoring data-base is nearly completed. This spatially-linked (GIS) database will provide an opportunity not only to assess changes in relative abundance over time, but because it is linked to existent forest cover, elevation, and various other habitat parameters that have been digitized, an analysis of habitat selection over time will be possible.

2) Seventeen elk have been radio-collared through December 1999. As of July 1999, 11 had functioning collars, including 1 adult male, 8 adult females, and 2 subadult females. A total 1,372 locations over those 6 months demonstrated that 7 of the 11 retained overlapping summer and winter home ranges, while four moved 20 to 45 kilometers between seasonal ranges. Additional, sex and age structure of elk (as well as roe deer and sika deer) can be estimated from observations of group size and composition (640 groups totaling 2,100 animals for this 6-month period).

3) One wild boar - a male - was captured in December 1999. We are using both baited traps, and free-range darting to capture more boar, and are hopeful that several more can be collared this winter.

3. SURVEY OF TIGERS AND LEOPARDS IN NORTHEAST CHINA INCLUDING TRANSBOUNDARY REGION ADJACENT TO RUSSIA

Executive Summary. We await final results of the winter 1999 survey conducted in Heilongjiang Province. General outline of project objectives and results were provided in the previous 6-month report. We await a draft report from the Wildlife Institute of Heilongjiang. A second report, to be developed by Professor Ma Yaqing, will provide a review of tiger distribution in northeast China over the past century, and should provide a starting point for assessing conservation opportunities in the region.

In a related program, in association with Endi Zhang we are overseeing deployment of a monitoring program in Heilongjiang based on reports by trained local individuals, followed by expert assessment by Yu Xioachen of the Heilongjiang Wildlife Institute. This project will be reported by Endi Zhang.

In another related development, we have secured funding from the Tiger-Rhino Conservation Fund to host a workshop to develop a recovery plan for tigers in northeast China. We plan for the workshop to occur in April 2000 in Harbin, Heilongjiang Province, and to include Russian and International interested parties, as well as biologists and administrators from Beijing, Jilin, and Heilongjiang Provinces.

4. A MONITORING PROGRAM FOR THE AMUR TIGER

Executive Summary. Millions of dollars have been invested in tiger conservation and

research programs, both in the Russian far East, and elsewhere across tiger range. Yet, to date there exists no mechanism to assess the effectiveness of conservation dollars in the most fundamental sense: "how are tiger populations responding to conservation actions and the continuing threats to their survival". This monitoring program of tigers, prey, and their habitat is intended to provide a statistically sound basis to assess trends in the tiger population, and includes the following components:

- A. a winter track count in large, well-dispersed sample units throughout tiger range;
- B. an estimate of changes in the relative number of tigers in each sample unit over time;
- C. an estimate of relative numbers of ungulates;
- D. a habitat monitoring program to assess changes within monitoring units over time.

We have finished the second year of this monitoring program, and are half-way through the third season. Sixteen survey units have been selected that span the breadth of variation in tiger habitat types and quality. A standardized sampling method has been developed, and the entire database has been developed into a GIS, spatially related database that will provide for long-term data preservation, and the opportunity for a wealth of comparisons to be made.

A fundamental limitation to this program is the cost associated with yearly monitoring. We estimate that the full cost of the program is approximately \$45,000/year. Yet, when viewed in context, (i.e., we are surveying the status of the entire subspecies across its entire existent range, something that is not done with any other of the subspecies) the cost seems reasonable. This is a relatively large sum that will not be assumed by the Russian governmental agencies in the near future. Monitoring, in and of itself, is not a "sexy" project that will easily elicit support from donor agencies. Yet it is fundamental if we are going to be able to track changes in tiger populations over time.

5. POPULATION SURVEY AND HABITAT ASSESSMENT OF THE FAR EASTERN LEOPARD

Summary. Recent surveys (Pikunov et al. 1997, and Aramilev et al. 1998) have highlighted the need to develop a standardized approach to surveying and monitoring the status of the Far Eastern leopard. With a population of less than 50 individuals, it is imperative that regular surveys assess distribution, reproduction, and relative abundance as a means of providing an "early warning system" to detect changes in the status of the population. This information must be maintained in a permanent database that will allow retrospective assessment, interpretation and analysis of data from a variety of perspectives.

At the same time, it is imperative to apply this data to conservation of the leopard. Presently, there is considerable debate in the Russian Far East concerning leopard conservation, in particular what areas and what type of protection can be most effective for leopard conservation. Survey data, in combination with a GIS database of vegetation types, ungulate densities, landownership and use, and human impact, can help identify key areas for leopard conservation and potential weak points in a protected areas system for leopards.

The two goals of this program are: 1) development of a standardized system to monitor changes in leopard abundance and reproduction across the existent range in the Russian Far East; 2) conduct an assessment of leopard habitat, identify key areas for leopard habitat, and make recommendations for leopard habitat based on the analysis.

This program began in December 2000, and should be completed by summer 2000.

6. PROMOTING EFFECTIVE MANAGEMENT OF HUNTING LEASES AS A MECHANISM FOR TIGER CONSERVATION IN PRIMORYE KRAI, RUSSIA

Introduction. The last viable population of Amur tigers resides in the Russian Far East Provinces of Primorye and Khabarovsk. There are approximately 156,000 km² of tiger habitat remaining in the Russian Far East (Matyushkin et al. 1996), and the majority of this habitat (over 78%) is in Primorye Krai. Most tiger habitat is unprotected: only 8.4% of Primorye's forested lands is protected as zapovedniks (reserves) or zakazniks (wildlife refuges), and even if extensive habitat protection plans are implemented (Miquelle et al. 1999), no more than 28% of the land base would be protected, and some percentage of even that would not represent high quality tiger habitat. It is clear, therefore, that if the Amur tiger is to survive in the wild, tiger management cannot be restricted to nature reserves. A successful "recipe" for tiger conservation in the Russian Far East will combine a system of protected areas with a management regime in unprotected lands that gives high priority to tiger conservation.

Two million people inhabit Primorye, and a large percentage of them rely on the fish, timber, and natural resources to provide income. With this economic reality, halting natural resource exploitation is not an acceptable alternative. Thus new forms of conservation for large predators are needed.

The key parameter defining quality tiger habitat in the Russian Far East is prey density (Miquelle et al. 1996), and therefore a key component of successful management on unprotected lands in Primorye will be management of hunters and their use of ungulate populations. Primorye has recently reorganized management of game populations: whereas formerly hunters were mostly "professional" and employed by the state, there now exists the opportunity for local individuals to "lease" hunting rights, and take responsibility for managing game populations on prescribed hunting units. This transfer of power to local individuals marks an important shift in natural resource management philosophy, away from a state-controlled monopoly (although the state still sets quotas and is ultimately responsible for enforcement), to a system in which local villagers can have a major impact on how resources are utilized and managed. This situation also provides a great opportunity to influence management regimes for the benefit of tiger populations: most of the individuals or organizations who have only recently gained control of game resources do not have the capital to make the initial investments necessary to initiate a program that could eventually be self-sustainable. Additionally, many do not know how to manage their resources properly. This provides the opportunity for small investments and some guidance to pay big dividends for tiger conservation. Investment in a new hunting "enterprise" will provide leverage to maintain management regimes beneficial to tigers and their prey. Most importantly, leasing can be done quickly, efficiently, and without the bureaucratic struggle associated with state-owned protected lands.

With proper management, hunting areas can sustain relatively high densities of ungulates, as hunters are just as interested as conservationists in large numbers of game. Collection of furs, berries, herbs, mushrooms, and a host of other non-timber forest products can help to turn a leased territory into a self-sufficient enterprise capable of long-term, sustainable production. Up until 1985 there were dozens of such hunting enterprises in Primorski and Khabarovski Krai which produced many non-timber forest products and sustained high densities of ungulates and tigers. These enterprises were unable to survive the economic turbulence of the past decade, but there now exists the potential for such enterprises to be economically viable and ecologically sustainable if financial support can be provided for start-up expenses. The expertise demonstrated by a well-managed hunting enterprise could have a "ripple effect" with analogous enterprises of the region, thus helping to sustain high population densities of Amur tigers, while at the same time providing employment and salaries for the local inhabitants of taiga villages.

The present is a critical period and a great opportunity for individuals and organizations interested in tiger conservation to influence management regimes over vast territories of tiger habitat, and have a major impact on Amur tiger conservation outside protected areas.

Objectives

The goal of this project is to assist, at a variety of levels, in the deployment of effective hunting management on hunting leases to create well-controlled use of renewable wildlife resources, increase populations of ungulate species, and protect endangered species (particularly tigers) on those hunting leases. To obtain that goal, the following objectives must be achieved:

- 1) identify those issues that inhibit effective management of hunting leases (financial, administrative, legal, social), and develop mechanisms to alleviate those problems wherever possible;
- 2) increase the numbers of ungulate species that are primary prey for tigers;
- 3) decrease rate of poaching through more effective patrolling and better control of access to lands;
- 4) where feasible and necessary, develop a road closure program to limit access to portions of hunting unit, thereby increasing security of area to tigers and prey;
- 5) develop and maintain a monitoring program for the Amur tiger and ungulate populations on the hunting unit.
- 6) Where possible, increase quality of habitat of ungulate populations through hayfield "easements" and supplying salt licks;
- 7) create permanent and temporary employment for local inhabitants (for seasonal harvest of non-timber forest products, game, and furs);
- 8) provide a demonstration and education to local people (and policy makers) on how an efficient hunting management enterprise can be compatible with Amur tiger conservation;

Accomplishments.

Our activities in the last half year have focused on the following components:

1. Development of a database on hunting leases - Stage 1.
We have been developing a basic database of the 94 leases in Primorski Krai to gain a better understanding of the types of leases, wildlife densities and distributions, their material and financial resources, and their organizational structure. A database has been developed that includes name of leasee (individual or organization), address and contact information, area of hunting lease, and survey data on numbers and density of animals. This database will be expanded and serve as the basis for a financial analysis (see future plans).
2. Development of manuals for more effective management of hunting leases.
Although changes in the regional organizational structure have provided the opportunity to empower local citizens with responsibility to manage hunting leases, many of these people are poorly trained and ill-equipped to address the bureaucratic tangle and management needs (both financial and for wildlife) associated with maintaining a lease. Some representatives of the responsible agencies (e.g., the Hunting Department) may find this situation to their advantage, in that it is an accepted adage in Russian that knowledge is power. To counter that tendency of concentrating power, we seek to provide and disseminate that knowledge to the local level as is yet another means of empowering the local organizations. Therefore, we have contracted the development of two manuals that

are considered key to proper management of hunting leases.

1. Vladimir Aramilev, and other representatives of the Institute of Sustainable Use of Natural Resources, are developing a manual for acquiring and managing hunting leases. This manual should address the legal issues required for maintaining a lease, and key organizational and wildlife management issues that face all hunting leasees in Primorski Krai. In the face of a constantly changing legal picture, and in light of a continuing struggle for control of hunting resources between the Administration of the Primorski Krai government and Federally managed Hunting Department (a classic state-federal legal battle), it is clear that such a manual will have a limited life span. Nonetheless, development and dissemination of such a manual work is considered important enough that it be done immediately, in realization that a stable legal process is still a long ways off. This manual has been produced, reviewed by the regional administration and the Hunting Department, and has been submitted to the publisher. We hope to have final printed editions by March 2000
 2. Yuri Dunishenko, of the All-Russia Institute of Hunting Management, has development a techniques manual on how to conduct wildlife surveys on hunting leases, entitled "How many animals in the forest?". Because yearly surveys are a requirement of every hunting lease, failure to conduct leases, or conduct them poorly, could be grounds for retracting leasing rights. The manual developed by Dunishenko is an easy to understand "How to" manual that untrained individuals can comprehend and implement. The outlay of this manual has been developed by a graphic artist, and the text is in the review process. We hope to have this manual published by the end of winter.
3. Support to Hunting Department
- There are two reasons why support to the Hunting Department is critical to success of our efforts.
1. Although each individual hunting lease has responsibility for patrolling and preventing illegal hunting activities, ultimately it is the responsibility of local okhotoveds, or hunting inspectors, to patrol and control designated regions (that usually includes a number of leases). The okhotoved, in contrast to leasees, is a professional, trained wildlife management and enforcement agent. As such, he is a potentially important ally who can assist in anti-poaching activities, and has the legal authority to make arrests and confiscate firearms. Presently, these regional hunting inspectors are extremely underpaid, and are often without resources to execute their duties. In some cases, okhotoveds "make ends meet" by actively engaging in illegal activities themselves (including poaching activities). Therefore, on the one hand they are potentially key personnel in the battle against poaching, while on the other they are often the people engaged in such activities. Support, if well managed, could have positive effects by alleviating the need to engage in illegal activities, and provide honest okhotoveds the incentive and capabilities to carry out their duties.
 2. The Hunting Department is responsible for overseeing hunting leases, insuring that leasees are meeting requirements as designated by law, and are also responsible for providing hunting licenses. The ability of individual hunting leases to survive financially will be largely dependent on the types of fees they must pay, and the types of fees they are able to collect for providing hunting opportunities to members or guests at each lease. There must be a balance in

collection of fees between local leases and the Hunting Department. Our ability to enter into discussions concerning fee allocation, and other responsibilities of individual hunting leases, will be dependent on our relationship to the Hunting Department. Providing support is one way of insuring an ongoing dialogue.

We have initiated a support program for a limited number of okhotoveds that the Hunting Department would like to sponsor. Because we have "informed people" throughout the Krai, we have conducted "background" checks on each of these individuals, to assess their credibility. We are providing supplemental salary and funds for more effective work (mostly for transportation costs). The funds provided to each individual are relatively small, but we hope that this open support for specific individuals will send a message to other okhotoveds as well as the upper management of the Hunting Department.

4. Defining issues inhibiting effective game management.

We have sought out a wide variety of people in an attempt to assess what needs to be done for more effective management of hunting leases. There have been repeated meetings with hunting leases and hunting societies across the Krai, with representatives of the Krai Society of Hunters and Fishermen, the Naval Society of Pacific Fleet Hunters (a very powerful group), Ussuriysk Military Society of Hunters, the Krai Hunting Department, as well as representatives of hunting leases in Krasnoarmeyskiy, Lesozavodskiy, Lazovskiy, Olginskiy, Nadexhdinskiy, Ussriyskiy, Khasankiy, Mikhailiovskiy, and Anuchenskiy raions. Additionally, specialists from other regions of Russia (including Sakhalin Oblast, Khabarovsk Krai, Amur Oblast, Jewish Autonomous Region, Chitinskay Oblast, Buryatia Oblast, and the Altai), have also been consulted in an effort to define the key issues. These issues will provide the structure for a series of meetings to discuss future directions of Hunting management in Primorski Krai.

The first meeting will be held with key lease managers to understand their concerns. Four key issues will be discussed:

1. Problems in developing a financially secure hunting lease.
2. Legal issues and problems associated with hunting lease management in Primorskii Krai
3. Effective surveys and monitoring of game and endangered species.
4. Developing an agenda for lease management in Primorskii Krai.

This first meeting will be followed by a second meeting that includes administrative branches responsible for hunting management, as well as leasees, to discuss how specific agendas can be promoted. This process should lead to a specific set of recommendations that should be implemented for promotion of more effective management.

7. CONSERVATION OF AMUR TIGERS ON UNPROTECTED LANDS IN NORTHEAST PRIMORYE KRAI, RUSSIA: CONSERVATION, COMPENSATION, AND EDUCATION

Executive Summary. Conservation of tigers on unprotected lands in the Russian Far East will depend largely on how local people relate to tigers. This project seeks to reach two groups⁸ that feel the greatest impact of tigers (hunters and farmers) and to reach the local population with educational material. The first two components of the project are site-based, while educational materials will have a greater distribution. In addition to hunters (see Projects 7-9 for an overview of this activity), livestock owners are the other group of local inhabitants who directly suffer economic losses to tigers. This project seeks to reach out to all components of society that are affected by the presence of tigers, and

develop a better relationship between local people and the tiger.

Objectives

1 : Develop cooperative agreements with livestock owners.

There are relatively few farms in northeast Primorye, and nearly all are adjacent to forest lands. In fact, in many instances there are substantial tracts of forests that have been allocated to farms. Thus there is a high probability that tigers will travel through or near farmlands, and will be tempted by domestic livestock. Many farmers (who are often hunters as well) are not adverse to the presence of tigers, and some enjoy knowing that tigers travel in the vicinity of their farms, as long as tigers do not inflict damage.

Small-time local farmers cannot sustain repeated "raids" by tigers, but the original government-financed compensation program is not longer active due to a lack of funds. Direct compensation programs are often fraught with difficulties because they are ineffective in changing situations where depredations occur, and are often unsustainable. Our experience suggests that the majority of depredations on domestic stock are done by young tigers, or those in poor condition. Such animals often outgrow this tendency, or are not fit enough to survive for long. Just as importantly, it is possible that many depredation events can be prevented with minor shifts in how livestock are managed.

Therefore, we believe that a depredation program should be presented as a cooperative agreement with local farmers to have lasting benefits. Such an agreement would draw farmers into the conservation plan for tigers by making them part of the process. Farmers would have responsibilities to maintain habitat, where such exists on their land, and to follow specific protocol in maintaining domestic livestock. In return, farmers receive some benefits: 1) an education program on how to care for livestock in tiger habitat; and 2) in cases where depredation does occur, compensation for lost stock, when it can be confirmed that tigers were responsible. Problem situations are usually of relatively short duration, and the compensation received by a farmer is the best goodwill gesture possible to convince him to tolerate tigers on his grazing lands.

Activities within Objective 1: With \$1000 dedicated from the London Zoological Society, Evgeny Smirnov has created an official foundation that will act as an insurance program for farmers that suffer depredation from tigers. The objective of this program is the development of a self-sustaining compensation program that farmers buy into, much as they would an insurance policy. The support from the London Zoological Society is sufficient to cover legal expenses, register the foundation, and obtain permission from the necessary organizations.

The objective now is to "endow" the fund with sufficient money to sustain itself for 1-3 years as it gets established, after which time it is our hope that premiums collected from farmers/livestock owners on a yearly basis will sustain the program. We know that, based collected over 15 years in the Terney region, an average of 4 depredations occur within the confines of Terney village and surrounding lands. Based on \$250 compensation fees (which are now being paid by the Siberian Tiger Project), on an average year, a total of \$1000 would be paid out. Therefore, if it is possible to accumulate 20 permanent "policy holders", who pay a premium of \$50/year, the program will become self-sufficient. However, the fund requires an initial "endowment" in case start-up years incur above average depredation rates.

Smirnov has received endorsement from the local Committee for Environmental Protection, and the local Association of Farmers, who have agreed to co-support the program. This support should include some financial support, although at present that amount is unknown. If sufficient "endowment" funds are provided, plans call for the capital to be used as low-cost loans to farmers for improving conditions for livestock that would also reduce the chances of tiger depredation (e.g. better fencing, sheds for overnight protection, etc.). It is our hope to develop a working capital of approximately \$10,000 to meet compensation needs and to act as a source for farmer loans.

With the legal paperwork nearly completed, the primary task now is to make the program operative. This will require the following steps, which are now being engaged

upon:

- 1) develop information bulletin, describing the cooperative agreement between TTT and local farmers.
- 2) develop information bulletin on how to minimize risks of tiger depredations on domestic livestock.
- 3) develop strict criteria for assessing depredations, and develop appropriate scale of payments based on the species, sex and age of the stock.
- 4) travel to all local farms in the vicinity of the Zapovednik to explain the concept, and secure agreements with as many as possible.

2: Support sustainable use of game animals within a leased hunting unit buffering Sikhote-Alin Zapovednik.

Activities within Objective 2: This program is being initiated on the lands immediately adjacent to Sikhote-Alin Zapovednik. Support provides for forest guards salaries, but to effectively control key sections of the Hunting Lease, we have already initiated two road closures. Road closures are critical in this region because easy access from the villages of Terney and Plastun has decimated game populations in the proposed closure areas. Controlling access to these regions by vehicle should reduce the amount of poaching year round, and allow prey populations to recover, thus eventually aiding both the legal hunter and the tiger.

3: Environmental Education. Two booklets authored by E. N. Smirnov that have been already published with very low circulation are being reprinted by Zov Taiga publishing. Both are aimed at educating local people about tiger biology, and the need to protect tigers. One booklet, "Kouza talks" tells the story of scientists studying tigers through the eyes of a tiger. The second booklet "100 Meetings with Tigers" provides brief accounts of encounters with tigers, as well as providing information on tiger conservation. Its main focus is demonstration that nearly all encounters with tigers in the wild are usually ones in which the tiger is not aggressive, and almost always not fatal to the human.

Activities within Objective 3: A contract with Zov Taiga has been signed, and printing is in process.

8. IMPLEMENTING A PROTECTED AREAS PLAN FOR KHABAROVSKI KRAI

Executive Summary . A total of over \$750,000 is sought for a three-stage program for creation and support of new and existing protected areas and ecological corridors in Khabarovski Krai. We seek mechanisms that will provide minimum risk investments for potential sponsors and incentive-driven support to key governmental and non-governmental Russian agencies for implementation of the program. In total, this network for tiger conservation would protect nearly 25,000 km², including 13,895 km² as core areas (zapovedniks and zakazniks) and nearly 11,000 km² as ecological corridors. Key to success of the program will be the process of bringing a variety of potential sponsors to cooperate under the umbrella of a single program, and securing support from key sectors of the Russian government.

Objectives.

1) Create a system of protected areas linked with ecological corridors that would provide a core protected areas for tigers and biodiversity conservation in southern Khabarovski Krai.

Accomplishments.

1. Creation of plan. The protected areas plan is based on the proposed protected areas plan proposed by Miquelle et al. 1999, but has been modified to take into account changes in the ensuing period between development of the plan and the present political situation.

2. Creation of a new Wildlife Refuge "Mopay".

The Zakaznik "Mopay" has been created, and signed into law by the Governor of Khabarovsk Krai. Work to develop the documentation necessary for creation was sponsored by STF funds. This 54,000 ha wildlife refuge is at the very northern fringes of tiger habitat, and although there is no evidence in the recent past of resident reproducing females, this zakaznik provides a secure corridor linking the coastal population of tigers in Khabarovsk with the inland population (which are largely separated by the crest of the Sikhote-Alin). Tigers have been reported in the area now designated as a zakaznik. The need for this zakaznik arose with the creation of a new road through the area, which provided accessibility and a real threat to the prey species that winter in the area (moose and elk). With the continuing expansion of tigers on the coastal portion of Khabarovsk (for instance, the existence of a tigers in Botchinski Zapovednik), it is feasible that tigers may become more of a permanent fixture in Mopay. On a longer time span, if predictions of global warming for the region are correct, some time in the future, when we're no longer here, Mopay may become important habitat for resident, breeding females.

In the broader picture, Mopay is an important link in conserving biodiversity of southern Khabarovsk Krai, and an important link in their system of protected areas.

3. Leveraging additional support: seeking a GEF. One of the rationales for obtaining the original grant from Save the Tiger Fund was to use those funds as leverage for additional support. Since summer of 1998 we have been courting opportunities to seek an medium-sized grant from GEF (maximum allowable amount - \$750,000). The first step in submitting a concept paper to the World Bank requires a letter of support from the GEF country representative. Some substantial political obstacles have slowed the process considerably, partially created by some mistaken assumptions about medium-sized grants in Moscow, and by other organizations that viewed the application as a competition. In April 1999 we finally secured a letter from the Head of the Committee of Environmental Protection that was an endorsement of the project, but there still remained many questions about how implementation should occur. Therefore in May, 1999 another trip was made to Khabarovsk where a meeting was held with the Khabarovsk Biodiversity Advisory Group to discuss many of the organizational questions. Many of these questions were resolved, and the group again demonstrated its endorsement of the process and the program. In August, 1999, I was able to briefly discuss the proposed plan with the vice governor of Khabarovsk Krai, who also gave his approval to our process. Therefore, in September 1999, I traveled to Moscow with Victor Krukov, of the Khabarovsk Krai Administration, to discuss any remaining questions and secure a final letter of approval from the GEF country representative.

Meetings of that meeting (which also included a discussion of a second GEF proposal by GSN) follow in a letter circulated by Karin Elliot and myself:

The meeting in Moscow on September 22 1999 was attended by Karin Elliot (GSN), Dale Miquelle (WCS), A. Amirkhanov (Head State Committee for Environmental Protection), A. Averchenko (GEF country representative), V. Ilyashanko (SCEP), G. Kolonin (SCEP), Igor Chestin (WWF), and representatives of our local major stakeholders, M. Bibikov of Primorye Committee for Env. Protection, and V. Krukov from the Dept. Natural Resources of Khabarovsk Administration. Our objective was to discuss the two medium-sized GEF projects presently proposed to SCEP, and to determine SCEP's position on moving forward on these projects. Karin and I have decided to send this letter jointly.

As we see it, the main three points of this meeting were:

1. Amirkhanov and Averchenko agreed to write letters of support for both medium sized grants, and recognize that the projects cover different topics and are spatially separated as well. We received these letters of support on Friday, September 24, and

the World Bank has accepted this concept paper, and requested us to develop a full proposal.

2. Igor Chestin agreed that it is possible to avoid duplication with a large GEF which WWF is developing, and that there is no reason for these projects not to go forward. I already met with Evgeny Shvarts of WWF on September 23rd to insure that duplication with their larger GEF proposal is eliminated from the Khabarovsk project.

3. It was still not clear to all those present how disbursement and procurement would occur under the medium-sized projects. This was reflected in the letter of support that was signed by Amirkhanov. Of primary concern is the question of whether or not it is necessary to involve MinFin in the process, or can disbursements be made directly to a local NGO. Proposed mechanisms for both projects, as they now stand, are for disbursements to be made directly to local, Russian NGO's (Phoenix Fund for Primorye, and Wildlife Foundation of Khabarovsk). World Bank representatives have agreed with this process in principle.

PUBLICATIONS AND REPORTS

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