Amur Tigers and Far Eastern Leopards in Russia:

Research, Training, and Capacity Building

in the Russian Far East

INTERIM REPORT

TO

21ST CENTURY TIGER

FROM THE

WILDLIFE CONSERVATION SOCIETY (WCS)

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PROJECT SUMMARY

Although showing some signs of recovery thanks to the multi-year commitment of the Wildlife Conservation Society (WCS) and others, the Amur, or Siberian, tiger (*Panthera tigris altaica*) remains severely threatened. As a classic landscape species inhabiting a variety of human-influenced terrains, tigers compete with man for critical habitat and resources. Amur tiger populations remain perilously low, and international efforts in the Russian Far East to save them from extinction have continued for more than 16 years.

WCS's Siberian Tiger Project (STP) began in the Sikhote-Alin Biosphere Zapovednik (SABZ) in 1992, when the Siberian tiger's ecology and status were little known outside the Soviet Union. STP objectives were straightforward: apply good science to Siberian tiger conservation to supply the best possible information on the ecology and dynamics of the species, creating the necessary database for conservation planning to allow Siberian tigers to recover.

Sympatric with Amur tigers at the very southern tip of their range in Russia is the Amur, or Far Eastern, leopard. There are only about 30 individuals of this subspecies left in the wild, making it one of the most endangered of all cats. Tigers in this area exist in a very small, isolated or semi-isolated subpopulation in Southwest Primorsky Krai, along the border with China and North Korea. This subpopulation is the primary source of wild tigers in China, and is critical as a source population for tiger recovery in the country. In autumn of 2006, WCS began a new research project to collect biomedical and ecological data on Amur leopards, along with their bigger cousins, Amur tigers, in Southwest Primorye.

WCS has also established an intensive training and capacity-building program in an attempt to produce the next generation of conservation biologists in the Russian Far East. When we began the Siberian Tiger Project in 1992, there was a cadre of excellent biologists working for tiger conservation within the zapovednik (protected area) system and at the Russian Academy of Sciences. However, many of these biologists have left the field or retired, and there remain few young biologists to take their place because salaries are too low. Recognizing this, WCS has begun a program to identify, attract and support promising young students and graduate students in conservation-related fields. Our research programs are the primary vehicle for training such students.

This report describes STP field research in SABZ, field research on Far Eastern leopards and Amur tigers in Southwest Primorsky Krai, and training and capacity-building efforts for the period from July 1, 2008 to December 31, 2008.

PROJECT OBJECTIVES

Research Program:

- Collect the best data for use in conservation plans for Amur tigers and Far Eastern leopards. This includes conducting scientific field research on Amur tigers, both in the central part of their range in SABZ and at the southern edge of tiger habitat in Southwest Primorsky Krai, and conducting research on Far Eastern leopards in Southwest Primorsky Krai.
- Continue biomedical evaluations of tigers and leopards to identify potential inbreeding and disease-related problems in Southwest Primorsky Krai.
- Continue capture, radio-tracking, and snow-tracking activities in SABZ, and capture and year-round tracking of study animals in Southwest Primorsky Krai.

Training and Capacity Building:

- Continue training current students; bring on at least two new students.
- Continue training Russian project coordinators in fundraising, project administration, and management.

PROGRESS

The Siberian Tiger Project: Long-Term Research in SABZ

Background and update on radio-collared tigers. We monitored two adult female tigers (Pt55 and Pt56), one adult male (Pt85), and two juvenile males (Pt88 and Pt89, cubs of Pt56) during the study period (Table 1). Pt88 and Pt89 were captured in the spring of 2008 and began dispersal movements in the summer. Pt88 left his natal home range and

Table 1. Location data from collared tigers on Sikhote-Alin Zapovednik, July 1 – December 31, 2008.

Tiger no.	Sex	Age	Dates tracked		Days tracked	Number of locations		Notes
			from	to		total	report period	
55	F	7	10/24/2002	12/31/2008	2,260	376	27	Gave birth to cubs in May, 2008
56	F	7	10/24/2002	12/31/2008	2,260	680	35	
85	M	9	10/14/2007	07/12/2008	78	6	0	Body found in July, 2008
88	M	2	05/03/08	08/21/08	142	26	5	Moved out of study area
89	M	2	05/23/08	08/04/08	74	43	21	Slipped collar

moved north, and we continued to track him for several months by plane, until we lost contact with him. Pt89 slipped his collar in August 2008. In July, we found the body of Pt85, an adult male residing in the northern part of the reserve; he appears to have died a natural death.

Pt55 gave birth to cubs in spring of 2008. We were unable to capture these cubs, as most of Pt55's home range is not easily accessible on foot, and we could not find her den site. We ascertained from tracks in the snow that Pt55 had two cubs as of November, and since then we have been closely tracking the family, which is mostly keeping to more remote, higher elevations away from the road and SABZ cabins.

Although Pt56's cubs dispersed in the summer, she has not yet given birth to another litter. It is possible that it has been difficult for her to find a mate.

We had an unsuccessful fall 2008 capture season, partially due to delays obtaining safety permits, which forced us to postpone our start date. We trapped for Pt56 and her female daughter, whose fate is unknown (she may have settled in her natal home range, dispersed, died of natural causes or was poached). This fall and winter, we are conducting extensive camera-trapping activities in Pt55 and Pt56's home ranges, which should allow us to identify the presence of other tigers in these areas (for example, there may be another female in the upper reaches of Pt55's home range, and there is also a resident male in this area). Camera-trapping should allow us to determine the routes these tigers most frequently travel, in preparation for the spring 2009 capture season.

It appears we have finally obtained GPS permits, and will fit tigers with GPS collars for the first time in 2009. This will allow us to obtain much more detailed information on individual movements, visit locations where animals spend several hours at a time, and track tigers using exact information about the time they visited a given location. If a tiger wearing a GPS collar leaves our study area boundaries, we will not lose contact with the tiger, which can happen when using radio-collars. We will also continue to use radio-collars.

Photo 1. Siberian Tiger Project field technician Vladimir Melnikov listens for radio-collared tigress Pt56. Photo by Cheryl Hojnowski, WCS.

Cub mortality and dispersal patterns. Pt55 gave birth to cubs in May 2008. We are following the family closely by radio-tracking Pt55, and by snow-tracking on foot in order to find her tracks and the tracks of both cubs. We will continue to follow the family and will seek to fit the cubs with GPS collars after they have reached a year in age. We expect Pt56 to give birth to a litter soon. As Pt56's home range is much more easily accessible than that of Pt55, we will attempt to locate Pt56's den site and fit her cubs with expandable radio-collars at the age of approximately five weeks.

We were successful in capturing two of Pt56's juvenile cubs (Pt88 and Pt89, both males born in 2006) in the spring of 2008, and followed them as they began dispersal movements in the summer. However, we lost contact with Pt88 when he moved far north of his natal home range, and it became possible to track him only by plane (which, due to expenses and logistics, is possible only one or two times per month). The last time we were able to pinpoint his location was in late September, after which we were unable to locate him again by air. Pt89 slipped his collar before completely leaving his natal home range in the summer. We were unsuccessful in capturing Pt56's daughter, with whom we suspected Pt56 may divide her home range. However, at this point, Pt56 seems to be using the entire territory of her home range, and her daughter's fate is unknown to us.

Impact of tigers on prey populations. We expect to fit tigers with GPS collars in May and June 2009 to begin this study.

Comparison of techniques for estimating tiger densities. This component of our field work has been led by graduate students Svetlana Soutyrina and Meghan Riley (who worked on the project from June 2007 to May 2008). In the summer and fall of 2008,

Svetlana conducted camera-trapping in the northern part of SABZ, where a total of 23 pairs of camera traps were set over a 726-square-kilometer area.

Photo 2. A camera-trap photo of Pt55. ©WCS.

Camera-trapping in the northern part of SABZ was completed in early December 2008 and represented the final phase of field work for this density-estimation project, which has encompassed the entire territory of SABZ (4,000 square kilometers) and has been conducted over a period of 2 ½ years (since May 2006). In the course of this project, more than 400 photographs of tigers were taken, and a total of 26 different tigers were identified (10 females, 11 males, and 5 undetermined). These camera-trapping results are similar to estimates of SABZ tiger densities made both on the basis of STP radio-tracking research, and on the basis of winter track counts conducted annually by zapovednik staff.

In addition to camera-trapping, 42 hair samples and 24 scat samples were collected to identify tigers using non-invasive genetic techniques.

More detailed analysis of camera-trapping results is ongoing. This project represents the first attempt to use camera-trapping to survey Amur tiger populations, and has demonstrated that camera-trapping can be used successfully even when tigers exist at low densities.

<u>Ecology of Amur tigers and Far Eastern leopards in Southwest Primorye</u>

Field research for this project takes place in the Nezhinskoe Hunting Lease and part of Borisovskoye Plateau Regional Zakaznik, or wildlife refuge (see Figure 1), which represents some of the best remaining habitat for tigers and leopards in Southwest Primorsky Krai, Russia.

Figure 1. Southwestern Primorsky Krai, including location of protected areas and study area (Nezhinskoe Hunting Lease is shaded in red).

Capture activities. We conducted captures for Amur tigers and Far Eastern leopards from September 28, 2008 through November 17, 2008, along the Bolshaya Elduga River Valley on the territory of Borisovskoye Plateau Regional Zakaznik, where we established a tent-camp as a base for our activities. Snares were set along two trap lines, one on a ridge top at the northern edge of the valley, and the other along an old road at the valley bottom. The capture team consisted of John Goodrich, Ph.D. (WCS), Alexander Rybin (WCS), John Lewis, Ph.D. (Wildlife Vets International), Clay Miller (WCS), Viktor Starozhuk (WCS), and Alyona Salmanova (WCS, graduate student). We monitored snares 24 hours a day, and visually checked snares at least once every morning. A radio-transmitter attached to the snare emitted a signal when an animal was captured (with a specific frequency for each snare). When a signal was received, day or night, we immediately checked the snare and anesthetized the captured animal.

Two leopards were caught during the fall 2008 capture season (Table 2), bringing our total number of study animals to four leopards. The male leopard Pp02 was captured for the third time (he had been captured in fall of 2006 and 2007). Pp04 is the second female we have captured under this project.

Table 2. Notes on animals captured in Southwest Primorski Krai, Russia, fall 2008.

Date	ID No.	Sex	Estimated age (yrs)	Weight (kgs)	Notes
10/08/2008	Pp02	M	9-10	61	Leopard; re-captured
10/18/2008	Pp04	F	8-9	39	Leopard

Both leopards were in excellent physical condition. Dr. Lewis, with assistance from WCS staff, collected biological material (blood, tissue, sperm) necessary to identify problems associated with disease and inbreeding, and conducted a full biomedical examination of all captured individuals. We also used ultrasound technology to listen to the animals' heart muscles and to take EKGs. Heart murmurs were possible in both individuals, but we are still waiting for a cardiologist to conduct a thorough analysis of data collected using the ultrasound and EKG in order to make a final conclusion on health status.

Clinical laboratory findings conducted in the field demonstrated that both cats had good red blood cell counts (neither was anemic), both were negative for feline leukemia virus and feline immunodeficiency virus, and both were negative for heartworms. Serum will be tested to look at the overall health of Pp02 (serum chemistry panels) and will be screened for exposure to disease agents known to be pathogenic to non-domestic felids. We hope to be able to export all biological material to the U.S. for full analysis in 2009.

We are continuing to track both of these animals, as well as two additional leopards (Pp01, a male, and Pp03, a female) captured in 2006-07 in order to collect data on a variety of ecological parameters, e.g., to identify movement corridors between subpopulations and countries, sources of conflict between human activities and tiger and leopard conservation; and areas of conflict and compatibility between tiger and leopard conservation.

We were unsuccessful in capturing tigers during the fall of 2008. One male tiger walked by our snares in the valley, but we were unable to capture him. In the past, we have tracked a total of three tigers under this field research project, but all were poached within a relatively short period of time in 2006-07. We hope to have more success capturing tigers during our spring 2009 capture season.

Photo 3. John Lewis of Wildlife Vets International (right) examines Pp04, with assistance from Clay Miller (WCS), October 2008. Photo by Andrew Harrington.

Tracking. We are currently tracking four leopards (two males, two females). Two of our study animals, the male Pp02 and female Pp04, live almost exclusively on the territory of Borisovskoye Plateau Zakaznik. It appears the male Pp01, who lives on the territory of Neshinskoye Hunting Lease, maintains the largest home range of our study animals, and has a much larger territory than the male Pp02. This may be due to lower prey densities on the territory of Neshinskoye Hunting Lease in comparison to Borisovskoye Plateau Zakaznik. However, we need to collect more data to better understand both individuals' home range sizes. The female Pp03 lives mainly on the territory of Neshinskoye Hunting Lease, and her home range overlaps with both Pp01 and Pp02. We will continue work to better understand home range and habitat requirements of our study animals.

Tracking on foot is also revealing more information about predation. After Pp04's capture in October, we were able to find two of her kills, a young sika deer and a raccoon dog. Through snow-tracking thus far this winter we have found four additional leopard kills, three sika deer and a yellow-throated marten, as well as a tiger kill (a wild boar). We are interested in learning more about the role of smaller mammals (such as raccoon dogs and martens) in tiger and leopard diets.

Training and Capacity Building

In the summer of 2008 we finished the interior of the Sikhote-Alin Research Center, our office and housing facility in Terney, which included completing staircases and third-floor offices for Dale Miquelle and Siberian Tiger Project Field Coordinator Ivan Seryodkin, and installing carpeting throughout the building. This facility also provides housing for graduate students, computer and internet access, and office space for graduate

students and field technicians to access data forms, maps, etc. We still need to have telephones installed in the building, and purchase various items of furniture.

During the reporting period, we supported four graduate students (three Russian, one American) at the Sikhote-Alin Research Center in Terney (working in SABZ), and two graduate students (both Russian) at our Amur tiger and Far Eastern leopard research project in Southwest Primorye:

- Svetlana Soutyrina (Candidate of Science student, University of Irkutsk) completed the field work component of her dissertation research on camera-trapping the Amur tiger and comparing tiger density estimation techniques in SABZ (see Siberian Tiger Project research activities, above). Sveta began processing data for her dissertation and working on two scientific publications on her work in late 2008. We expect that she will defend her dissertation in 2009.

Photo 4. Graduate student Svetlana Soutryina checks a camera trap set in tigress Pt56's home range on the coast of SABZ. Photo by Cheryl Hojnowski, WCS.

- Sergei Pizyuk (Candidate of Science student, Institute of Biology and Soils, Russian Academy of Sciences Far Eastern Branch) is completing his dissertation research on Asiatic black bear behavior, and has been working as a field assistant for STP since the fall of 2007. In the summer of 2008, Sergei worked with Erin Latham (previously of Parks Canada, now a Master's degree student) to implement a non-invasive hair-snagging methodology to survey bear populations in SABZ. This three-month study represented the first attempt to use hair-snagging to survey bear populations in the Russian Far East. In the fall-winter of 2008, Sergei participated in capture, radio- and snow-tracking activities under STP.

- After finishing her undergraduate degree at Moscow State University, Lika Sagatelova (Candidate of Science student, Moscow State University) spent the summer of 2008 working as a field assistant for STP and assessing options for her dissertation research. Lika—a new student for us—has decided to conduct field work for her dissertation on rehabilitating orphaned Asiatic black bears; and when not engaged directly in her dissertation research (i.e., from late fall to early spring), she is continuing to work as an assistant for STP.

- Alyona Salmanova completed her undergraduate thesis on the use of telemetry to study the Amur tiger, and WCS is now supporting her field work for a Master's degree thesis on Far Eastern leopard habitat use. Since the fall of 2007, Alyona has continuously worked as a field assistant for our Amur tiger and Far Eastern leopard research project, where she has gained experience in tracking on foot, snow-tracking and camera-trapping of tigers and leopards. In addition, in the summer of 2008, Alyona spent a month in Terney learning hair-snagging techniques for surveying brown and Asiatic black bears (together with Sergei Pizyuk and Erin Latham). Last fall, she returned to Southwest Primorye, where she participated in her first capture season and now continues tracking our study animals. Alyona is scheduled to complete her Master's degree in 2009.

Photo 5. Alyona Salmanova with female leopard Pp04, captured in Southwest Primorye in October 2008. ©WCS.

- Alexander Rybin, a long-term field technician for STP, completed his Master's degree thesis on camera-trapping of Far Eastern leopards in June 2008 (with Dale Miquelle as one of his advisors), and will begin research for his Candidate of Science degree in the spring of 2009. Alexander also works full time as the field crew leader for our leopard research project in Southwest Primorsky Krai.

(A Candidate of Science degree is equivalent to a level between a Master's and a PhD in the United States.)

CONCLUSION

We sincerely appreciate 21st Century Tiger's role as a key partner in our ongoing efforts to protect the remaining Siberian tigers in the Russian Far East. Our training activities continue apace, enhanced by our new research office in Terney, and our field research programs in both SABZ and Southwest Primorye are providing important data needed for conserving Amur tigers and understanding interactions between tiger and Far Eastern leopard populations. We are grateful to 21st Century Tiger for its long-term partnership in our conservation programs.

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