



SIBERIAN TIGER PROJECT: Long-Term Research,  
Training, and Tiger-Human Conflict Mitigation  
in the Russian Far East

FINAL REPORT

TO

21<sup>ST</sup> CENTURY TIGER

FROM THE

WILDLIFE CONSERVATION SOCIETY (WCS)

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## PROJECT SUMMARY

The Amur or Siberian tiger (*Panthera tigris altaica*) remains severely threatened, although it does show some signs of recovery due to the multi-year commitment of the Wildlife Conservation Society (WCS) and others. 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, in the Russian Far East, international efforts to save the tiger from extinction have been conducted for more than 15 years. We are heartened, though, by signs of recovery, including a decline in poaching and a growing scientific understanding of the species' requirements.

WCS's Siberian Tiger Project (STP) began in 1992 when the Siberian tiger's ecology and status were little known outside the Soviet Union, although it was clear that populations were extremely low. STP objectives were simple: apply good science to tiger conservation to amass the best possible information on the ecology and dynamics of the species, creating the necessary database for conservation planning that would allow Siberian tigers to recover. Because sound conservation recommendations can only be made with well-founded knowledge, the STP intends to provide, through scientific studies, a comprehensive picture of the ecology of the Amur tiger and the role of tigers in the Russian Far East. By capturing and outfitting tigers with radio collars, we are able to study their social structure, land use patterns, food habits, reproduction, mortality patterns and their relation with other inhabitants of the ecosystem, including humans. Our hope is that these data compilations will contribute toward minimizing poaching threats due to traditional hunting.

In the intervening years, the STP has been productive on three fronts: (1) increasing local capacity to address human-tiger conflict with a Tiger Response Team (TRT), part of the Russian government's Inspection Tiger (Ministry of Natural Resources) which responds to all tiger-human conflicts; (2) continuing to enhance our large database on tiger ecology and conservation with the goal of creating a comprehensive Siberian tiger conservation plan – the research focus this year is on cub mortality and dispersal, tiger impact on prey populations, improved tiger density studies, and the interaction between populations, social structure, and poaching; and (3) training the next generation of Russian conservation biologists.

## PROJECT OBJECTIVES

### Tiger-Human Conflicts:

- Continue to assist Inspection Tiger with tiger-human conflicts, conduct necessary interventions, and monitor outcomes.
- Continue Tiger Response Team field training.

### Training and Capacity Building:

- Complete construction of housing and office for graduate students (the building is already in use).

- Continue training current students; select at least two new students.

#### Research Program:

- Collect the best scientifically-based data to support solid conservation planning.
- Continue radio-tracking cubs; begin ascertaining number of prey removed by tigers; field test various density estimation techniques.

## PROGRESS

### Tiger-Human Conflicts

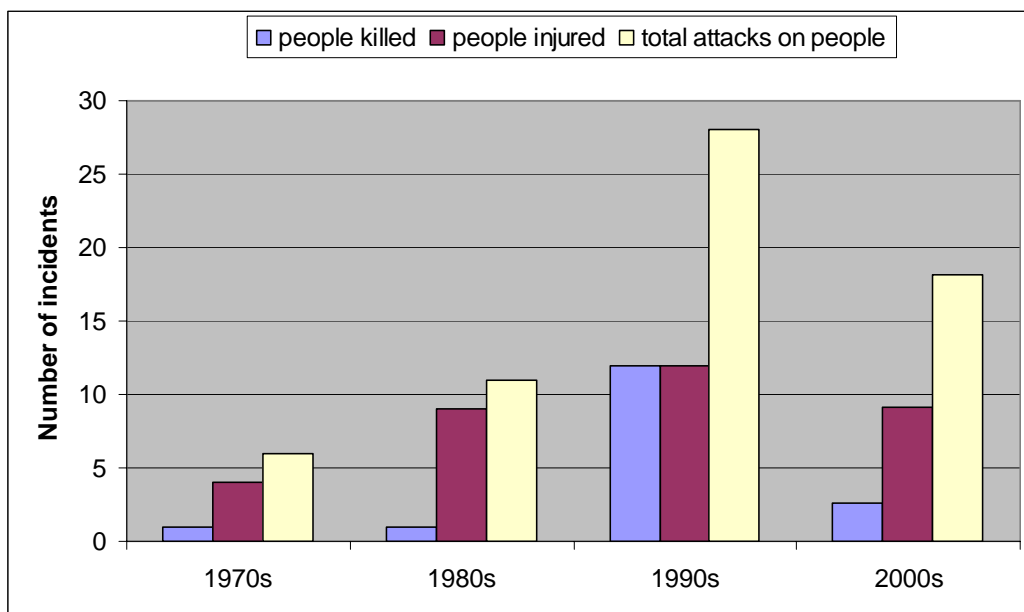
When humans live and work in close proximity to apex predators such as tigers, conflict is inevitable. When tiger-human confrontations occur and the tiger is not killed, it is frequently wounded, instigating its aggression. One of the STP's objectives is to provide an alternative to hunting and killing a tiger considered a threat to human security. Whenever possible, the Tiger Response Team attempts to intervene and determine if the tiger can be relocated. In the winter of 2007-2008, STP staff assisted Inspection Tiger in the following two tiger-human conflict situations. Unfortunately, an injured tiger is a particularly dangerous tiger; in both instances, the team had no choice but to kill the tiger.

- A large adult male tiger was shot and severely wounded by a poacher on January 1, 2008 near the village of Solontsovyi on the Ko River in the Khabarovsk Region. The tiger then attacked the poacher, wounding him. Ivan Seryodkin and Nikolai Rybin traveled to the conflict site and remained there January 12-16. They followed the tiger's tracks in the snow, attempting to determine the severity of his wounds and the potential for capturing him. Unfortunately, capture was not a possibility. The tiger was shot and killed when it charged Inspection Tiger staff.
- In mid-January 2008, a tiger was caught in a poacher's trap near the village of Dalnii Kut, on the Bolshaya Ussurka River in the Krasnoarmeisky District of Primorsky Krai. The trap was an illegal wire trap set for ungulates. The tiger was caught by the neck and seriously wounded during attempts to free itself from the trap. STP staff Vladimir Melnikov and Nikolai Rybin traveled to the conflict site and remained there January 26-27. They hoped to capture the tiger, but were unable to set snares before the tiger attacked Inspection Tiger staff, at which point it was shot and killed.

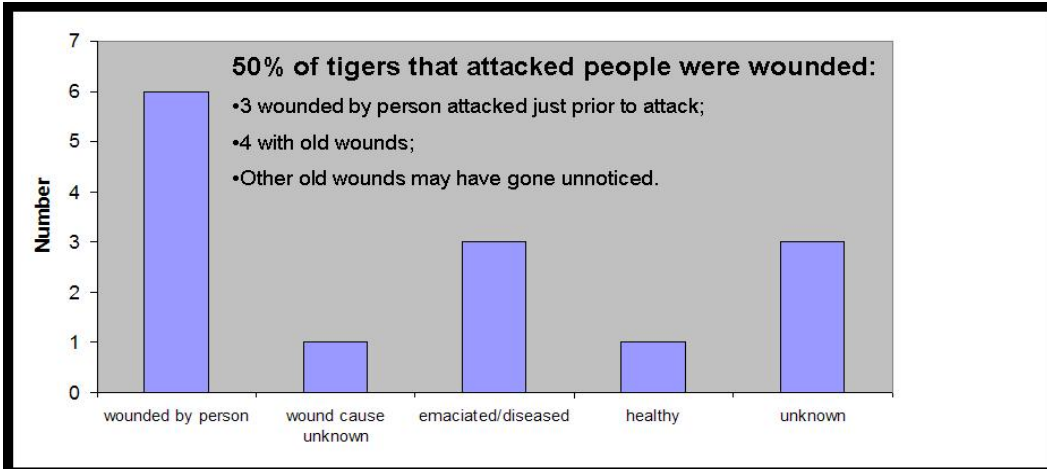
In addition to assisting with the aforementioned cases, Siberian Tiger Project staff traveled twice to the Utyos Rehabilitation Center in Khabarovsk Krai to provide tiger immobilization assistance (March 21-24, 2008 and April 11-13, 2008). The immobilizations were necessary for biomedical investigations, including a check-up and blood analysis for an orphaned cub slated for release later this year. Additionally, "Lyuti," the Center's resident tiger, needed some dental work and a health check.

John Goodrich has begun analyzing data from conflict situations responded to by the Tiger Response Team from 2000 through 2006. His goal is to examine characteristics of

conflicts and responses by the Tiger Response Team in an attempt to evaluate the team's effectiveness. Analyses are nearly complete and will be included in a future report and/or publication. Preliminary results suggest that the impact of the Tiger Response Team on depredations on domestic animals will be difficult to evaluate. However, attacks on humans decreased dramatically between the 1990s and 2000s (Figure 1), and we believe that the Tiger Response Team was at least partly responsible for this decrease, as the team removed several very sick or severely wounded tigers from the wild, and the majority of attacks on people are perpetrated by such tigers (Figure 2). While human safety remained at the forefront, at every opportunity the Tiger Response Team attempted to immobilize and assess the possibility of relocating the tiger. Traditionally (before the implementation and efforts of the Tiger Response Team), such conflicts were usually resolved by simply killing the tiger.



**Figure 1.** Attacks on people by Amur tigers from the 1970s – 2000s. Data were collected through 2006 only, and extrapolated for the remaining three years of that decade. Attacks decreased considerably after the inception of the Tiger Response Team in 1999.



**Figure 2.** Characteristics of Amur tigers that attacked people in Russia 2000-2006. Nearly all animals were wounded (most by people) or diseased.

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### Training and Capacity Building

We are putting the finishing touches on the three-story Sikhote-Alin Research Center in Terney (Photo 1). Currently, the building can provide housing space for eight residents, and we have nearly completed construction of permanent office space for Drs. Dale Miquelle, John Goodrich, and Ivan Seryodkin, as well as student work space. Additionally, there is a room for field equipment, computer access, and office space for field technicians to easily access data forms, maps, etc.

During 2007-2008, WCS hosted nine graduate students at the Research Center (five Russian, four foreign). As of mid-July 2008, six graduate students were living at the Center and using the office facilities. These students are conducting research and collecting materials for their dissertations, and/or are working as field assistants for the Siberian Tiger Project. In addition, during the past year, WCS has provided support for two M.S. students collecting material and receiving training while engaged in the Far Eastern leopard research in Southwestern Primorsky Krai.



Photo 1. The Sikhote-Alin Research Center, Spring 2008. ©WCS

Over the past year, we have supported the following students and projects:

- An assessment of survey methods (camera trapping, DNA and fecal analysis, etc.) for estimating tiger densities, with work based in Sikhote-Alin Biosphere Zapovednik (SABZ), led by **Svetlana Soutyrina** (Candidate of Science from Irkutsk University), see Photo 2, and **Meghan Riley** (M.S. student from the University of Wyoming). Both students worked together in SABZ from June 2007 to May 2008, during which time they conducted extensive camera-trapping surveys in SABZ, covering a total area of over 1,200 square kilometers. They have also collected hair, scat, and blood samples for analysis. Currently, Svetlana plans to continue camera-trapping in the northern part of SABZ in the fall; Meghan is in the United States analyzing data collected over the past year.

This project not only allowed both students to exchange knowledge and experience (Svetlana has studied tigers in SABZ for her Master's degree, and has been living and working in Terney for seven years, while Meghan brought invaluable experience in project planning and the scientific method), but also underscored the potential for cultural and linguistic exchange. (Meghan, who had no previous knowledge of Russian, attended weekly Russian classes, while Svetlana, whose English is already nearly fluent, attended weekly English classes). They became close friends through their work together, and Meghan's positive attitude and commitment allowed her to quickly befriend Siberian Tiger Project staff and Terney residents. We are hopeful

that through joint projects like this one, Russian and foreign graduate students will form collaborative relationships that will last into their professional careers as well.

- **Sergei Pizyuk**, who is studying bear behavior in SABZ and in Khabarovsk Krai for his Candidate of Science degree, began working as a field assistant for the Siberian Tiger Project in the fall of 2007. Sergei was fully engaged in Amur tiger radio-tracking and snow-tracking activities in 2007-2008, and plans to continue working for STP during bear hibernation in the winter.
- In May 2008, Sergei and **Erin Latham** (formerly of Parks Canada, who will begin her Master's degree later this year) began a three-month hair-snagging survey to estimate bear densities in SABZ. Field results will be analyzed in 2008-2009.
- **Jon Slaght**, PhD Candidate from the University of Minnesota, in association with **S. Surmach**, Candidate of Science, Institute of Biology and Soils, continued his second year of a four-year study of habitat use and resource selection by Blakiston's fish owl (*Ketupa blakistoni*), and management and conservation implications.
- **Nancy Sherman**, PhD Student, University of Virginia, in association with **Elena Pimenova**, botanist at SABZ, led field work (with a team of Russian scientists from SABZ) in September 2007 to apply the FAREAST Model to assess the impact of potential climate change on Amur tiger and leopard habitat in Russia and China.
- In the spring of 2008, two new students began working out of our research center in Terney. **Gennady Tukhbatolin** started as a field assistant for the Siberian Tiger Project in April 2008, to gain experience in large carnivore research and conservation. Gennady will collect material for his Master's thesis, which is on musk deer, beginning this winter. **Lika Sagatlova**, who completed her Master's degree at Moscow State University this spring, arrived at Terney in June. Although Lika completed her Master's degree on marine mammals, she intends to study large carnivores for her Candidate of Science degree, which she will begin this fall. She is participating in Siberian Tiger Project field work over the summer, and assessing options for her dissertation research.
- **Elena Salmanova**, an M.S. student who recently completed her undergraduate thesis on the application of radio-tracking in the study of Amur tiger ecology, was engaged in radio-tracking, snow-tracking and camera-trapping of the Far Eastern leopard in Southwest Primorye in the winter and early spring of 2008. In June and July, she worked as a field assistant for the Siberian Tiger Project.
- **Alexander Rybin**, a long-term field technician for the Siberian Tiger Project, finished his Master's degree on Far Eastern leopards in June 2008 (with Dale Miquelle as one of his advisors), and will begin research for his Candidate of Science degree this fall. Alexander also works full-time as field crew leader for our leopard research project in Southwest Primorsky Krai.





**Photo 2.** Graduate student Svetlana Soutyrina listens for Pt88, a two-year-old male tiger captured and radio-collared in May 2008. ©WCS

### Research

***Background and update on radio-collared tigers:*** We monitored two adult female tigers (Pt55 and Pt56), one juvenile female (Pt80), and one adult male (Pt85) during the study period (Table 1). Pt56 was with a litter of three cubs born in the summer of 2006. In the fall of 2007, we recaptured Pt55 to change her collar which had failed earlier in the year. Additionally, we captured adult male Pt85, who we had believed moved into the area to replace Pt49, the resident male that was poached in late 2006. However, camera-trapping photos indicated that Pt85 was the resident male from the neighboring territory to the north. He eventually returned to his original territory and camera-trapping data indicate that a new male has moved in. This male was photographed in a territory further north in both 2006 and 2007, suggesting he was a resident adult there. In the spring of 2008, we captured two male cubs (Pt88 and Pt89) born to Pt56 in 2006. Both had begun dispersal movements at the time of this writing. Pt56 expanded her territory to the north, taking over Pt80's former territory after Pt80 was poached (see next section).



Table 1. Location data from collared tigers on Sikhote-Alin Biosphere Zapovednik (SABZ), July 1, 2007 – June 26, 2008.								
Tiger no.	Sex	Age	Dates tracked		Days tracked	Number locations		Notes
			from	to		total	report period	
55	f	6	10/24/2002	6/30/2008	1,894	376	78	Collar batteries died. Recaptured 10/2007.
56	f	6	10/24/2002	6/30/2008	1,894	607	97	
80	f	2	10/13/2006	11/20/2007	403	209	151	Poached 11/2007.
85	m	8	10/14/2007	2/08/2008	78	8	8	Moved out of study area.
88	m	2	5/03/2008	6/30/2008	58	20	20	Pt56's cub.
89	m	2	5/30/2008	6/30/2008	31	22	22	Pt56's cub.

***Cub mortality and dispersal patterns:*** No cubs were born during the study period. However, we radio-tracked one tigress (Pt80) born to Pt35 in the fall of 2005. Pt35 was poached early in 2007 and Pt80 settled in her mother's territory. However, she was an unusual tiger, moving less than normal, and less than her two sisters when she was a cub. Additionally, she displayed little fear of humans and was frequently observed on the main road through SABZ. On several occasions, we attempted to scare her from the road using signal rockets and fireworks, with little apparent effect. In November 2007, we lost contact with her signal and assume she was poached. This assumption was supported by the fact that we observed none of her tracks during the winter, and no photograph of her was captured by camera traps. She had been our most frequently photographed tiger (Photos 3 and 4).



**Photo 3.** Tigress Pt80 dozes nonchalantly on the edge of the paved road through SABZ just ten meters from an STP vehicle. This behavior eventually led to her being poached, despite STP personnel's best efforts to scare her from the road. Photo by J. Goodrich/©WCS.

***Impact of tigers on prey populations:*** We expect to fit tigers with GPS collars in the fall of 2008 to begin this aspect of the study.

***Comparison of techniques for estimating tiger densities:*** Our graduate students, Svetlana Soutyrina and Meghan Riley, have nearly completed the field portion of their study comparing density estimation techniques. In 2007 and early 2008, they conducted camera-trapping to estimate tiger density in two separate areas (southern and central) in SABZ, demonstrating that camera-trapping can be used on tigers, even when they exist at very low densities (Table 2). For example, based on prior research (snow tracking by SABZ staff and radio-tracking by Siberian Tiger Project staff), we expected to find seven adult tigers and four subadults in southern part of SABZ, where Svetlana and Meghan conducted camera trapping from September 2007 to April 2008. They captured all these tigers, and obtained results using different methods to corroborate each other. In April, they began camera-trapping in the very remote northern section of SABZ, and Svetlana will conclude this work in the fall of 2008.

**Table 2.** Capture-recapture density estimates for Amur tigers from camera trapping in two different study areas on Sikhote-Alin Zapovednik, July – December 2007.

Area	Area with camera traps (km <sup>2</sup> )	Effective area (km <sup>2</sup> )	Density 100 km <sup>2</sup>	
			Model M(0)	Model M(h)
Southern SABZ	496	1,328 ± 90.3	0.8 ± 0.4	0.9 ± 0.3
Central SABZ	540	1147	0.6 ± 0.3	0.8 ± 0.2

**Table 3.** Characteristics of tigers photographed in southern Sikhote-Alin Biosphere Zapovednik, September 2007-April 2008. A question mark next to age indicates that it was unclear if the animal was a juvenile or an adult, but it was clear that the animal was not a cub.

Tiger No.	Age/Sex	Number of "captures"	Number of pictures	Notes
T 02	Female, adult	3	6	radio-collared (Pt56)
T 05	Female, adult	30	44	radio-collared (Pt55)
T 06	Female, adult	10	18	
T 09	Male, adult	2	4	radio-collared (Pt85)
T 16	Male, adult	8	15	
T 19	Female, subadult	5	9	radio-collared; killed by poachers in November 2007 (Pt80)
T 20	Male, subadult	3	12	cub of T 02
T 21	?,?	1	1	
T 22	Female, subadult	2	6	cub of T 02
T 23	Female, adult	2	5	

Additionally, samples (scat, hair, urine, blood from tracks, photos of tracks) were collected to estimate tiger numbers using non-invasive genetic techniques, “sniffer dogs” that can identify individual tigers, and identification of individuals from their tracks. To collect hair, Velcro hair-snags were scented with Calvin Klein’s *Obsession* – a perfume with which zoo tigers (and other cats) are literally obsessed. However, wild tigers seemed to ignore or perhaps even avoid the scent, so hair was collected from natural rub trees. Preliminary results suggest that collecting sufficient samples to estimate density from any one type of DNA or sniffer-dog samples (scat, hair,

blood, or urine) would probably be too labor intensive, but using *all* types of samples, combined, may be an efficient way to monitor tiger populations.



**Photo 4.** A camera-trap photo of collared tigress Pt80 taken as part of a study to compare techniques for estimating Amur tiger density. Pt80 was our most photographed tiger until she was poached in November 2007. This was the last photo taken of her.  
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***Relationship between poaching, social structure, and population dynamics:*** From 1992 to 1999, tiger density in our core study area was relatively stable. Although poaching rates were moderate to high, this seemed to have had little effect on population density because poached animals were quickly replaced by immigrants. Because tigresses are territorial, we mistakenly assumed that they maintained territories just large enough to meet the energetic demands of raising cubs, as is typical of most carnivores. In 2004, however, we detected dramatic changes in land tenure, density, and reproductive output in our core area, suggesting that when tigers are well protected from human-induced mortality for long periods, female adult density may increase dramatically. We found that when survivorship of adult females was high, the mothers divided their territories with their daughters once the daughters reached maturity. We realized the population had not been at carrying capacity because immigrating females maintained territories much larger than they needed to meet their energetic demands, presumably so that they could then “donate” half their territory to their daughters. This complex relationship between poaching, social structure, and population dynamics took us more than twelve years to decipher, illustrating the importance of long-term research.

The winter of 2006-2007 was marked by heavy poaching in the study area, and we lost adult females Pt35 and Pt37 as well as adult male Pt49. This was the end of the period of stability that followed the heavy poaching in the late 1990s. It appeared that the population had reached carrying capacity, but instead of all female cubs dispersing, both Pt35 and Pt37 appeared to be attempting to expand their home ranges to allow juvenile daughters to settle in their natal home ranges. Unfortunately, both tigresses were poached during this period of expansion, making results inconclusive.

## CONCLUSION

21<sup>st</sup> Century Tiger is a critical partner in our ongoing efforts to protect the remaining Siberian tigers in the Russian Far East. Our training activities continue apace, enhanced by the new research office in Terney. We stand ready to continue our efforts to assist the government's Tiger Response Team when reacting to tiger-human conflicts; and our research program is yielding important data on cub mortality, tiger density estimates, and the complex relationship between poaching, social structure, and population dynamics. We remain deeply grateful to 21<sup>st</sup> Century Tiger for its long-term interest and partnership in this important conservation program.

## PUBLICATIONS DURING REPORT PERIOD

Chapron, C., D. G. Miquelle, A. Lambert, J. M. Goodrich, S. Legendre, and J. Clobert. *In review*. The impact of poaching versus prey depletion on tigers and other large solitary felids. *J. Appl. Ecol.*

Goodrich, J. M., L. L. Kerley, E. N. Smirnov, D. G. Miquelle, L. McDonald, H. B. Quigley, M. G. Hornocker, and T. McDonald. 2008. Survival Rates and Causes of Mortality of Amur Tigers on and near the Sikhote-Alin Biosphere Zapovednik. *Journal of Zoology. In press.*

Goodrich, J. M., D. G. Miquelle. 2008. Tiger Telemetry. In: Tilson, R. and P. Nyhus (eds.) *Tigers of the World*. Noyes Press.

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