



## LONG TERM RESEARCH AND CONSERVATION OF THE SIBERIAN TIGER

A 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*) is a classic landscape species, ranging across a variety of human-influenced landscapes, and competing with people for critical habitat and resources. Their population has been at perilously low levels, and in the Russian Far East (RFE) international efforts to save them from extinction have been ongoing for more than a decade. In recent years—partly due to WCS’s 13-year-long efforts—the tiger has begun to show signs of recovery. Poaching has declined, and improved scientific understanding of the species’ requirements has enabled planners to take actions including: 1) protected area planning and management; 2) establishment of protected areas in China; 3) establishment of a legal basis for corridors between protected areas; 4) road closures to reduce mortality of tigers and their prey; 5) management of game populations outside protected areas to benefit both humans and tigers; 6) education and outreach to ensure a local understanding of the role tigers play in the ecosystem; 7) bi-lateral discussions to establish transboundary reserves to connect tiger populations in the RFE and northeast China; and 8) efforts to reestablish viable tiger populations in China. However, despite 13 years of research, there are at least five key reasons why we feel the Siberian Tiger Project (STP) must continue.

1. Data are lacking in several areas (e.g., cub survival and causes of cub mortality, dispersal, and predation rates). These data have proven extremely difficult to obtain. While significant progress has been made in recent years, continuing efforts are necessary to complete our understanding of these key features of tiger biology.
2. Long-term radio telemetry and monitoring studies provide invaluable insights into tiger ecology and conservation that cannot be derived from short-term studies. For instance, results from 2004 suggest that when tigers are well protected from poaching not only do survivorship and reproduction increase, but density of adult females may also increase by as much as 100%. Further monitoring is needed to determine if the system can support the current high densities and reproduction in our core study area.
3. We are formalizing and expanding our efforts to prepare the next generation of conservation biologists in the RFE, as well as international conservation biologists, using the STP as a vehicle for intensive field training and as an introduction to the problems of international conservation efforts. This includes the construction of the Sikhote-Alin Research Center.
4. Inspection Tiger (Ministry of Natural Resources, Russian Federation) relies on our skilled staff to assist with tiger-human conflicts. Despite continuing efforts to train Inspection Tiger staff, turnover and inconsistencies in the organization have limited their capacity to become self-sufficient.
5. Results of our research demonstrate our competence as biologists, and provide a strong platform for making conservation recommendations. As a conservation entity in the RFE, WCS is unique in that our work is science-based. This gives us a powerful position in discussions of conservation questions, because we are the only organization with such a wealth of knowledge and understanding of tiger ecology. The continuation of the STP is critical to maintaining our position as a leader in the conservation community here and enables us to ensure that science-based recommendations are included in the dialog on how to proceed with tiger conservation in Russia.

## PROJECT OBJECTIVES

### Research Program:

The goal of our research program is to collect the best scientifically-based data possible for use in conservation plans. A second goal is to train the next generation of Russian tiger conservation biologists. Specific objectives for this year include:

- Monitor cubs (two litters expected) to determine survival rates, and sub-adults (two collared) to determine dispersal movements.
- Monitor tigers in our core study area to determine if recent increase in density and reproductive output is sustainable.
- Collect at least six month-long predation sequences.
- Develop plans for a camera trapping study in Sikhote-Alin Zapovednik, secure funding for acquisition of equipment, and identify students to initiate this program.
- Complete construction of housing and office for graduate students, continue training students currently conducting research on the project, and search for new students.

### Tiger-Human Conflicts:

- Continue assisting Inspection Tiger with tiger human conflict situations as the need arises, conduct the necessary intervention, and monitor the outcomes.
- Continue the ongoing field training of members of the Tiger Response Team.

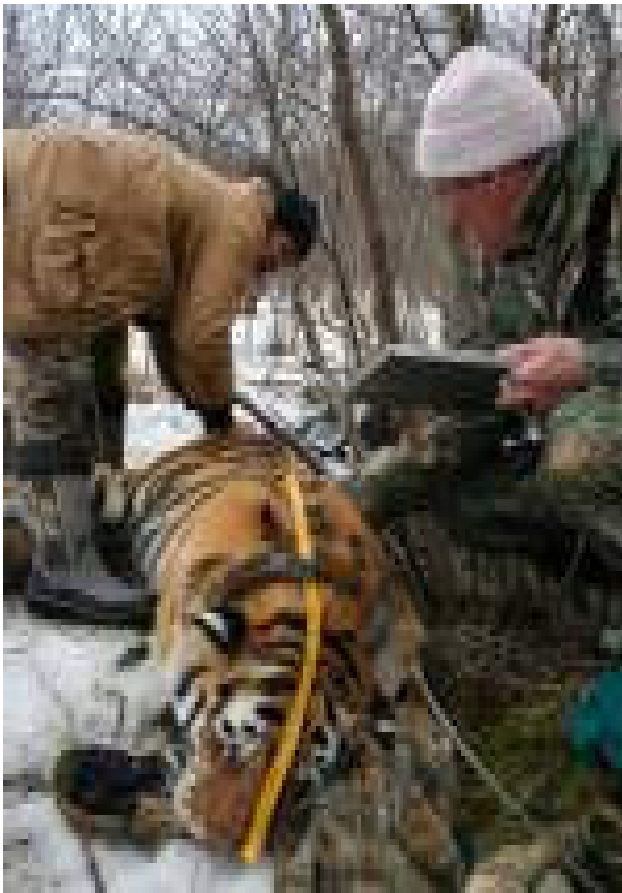
## PROGRESS

### Field Study

*Capture activities.* On 11 October 2005, we captured three six-week-old cubs (Pt72, Pt73, and Pt74) that were born to Pt35 in September to determine causes of mortality of young cubs (Photo 1). We captured the cubs by hand and handled them without anesthesia. We fitted them with collars designed to expand to 49 cm (large enough for an adult female) and break off within one year. Pt35 was captured as an adult when she immigrated to the study area in 1999 and this was the fourth litter she had produced since that time. We will attempt to recapture



*Photo 1.* Nikolai Rybin labels a sample container while holding one of Pt35's cubs, which was just fitted with a radio-collar. Photo by J. Goodrich/WCS.



*Photo 2.* Vladimir Melnicov (right) and Nikolai Rybin measure Pt35 after she was captured via helicopter.

*Cub survival:* To estimate cub survival rates and determine causes of mortality, we monitored a litter of three cubs born to Pt56 in July 2004 and fitted collars on three cubs born to Pt35 in September 2005 (Table 1). We successfully monitored Pt56's litter through their first year of life, although two of the three transmitters failed seven to ten months after implementation (likely because siblings chewed on them). Nonetheless, we documented that all three were alive at one year of age. In October 2005, we captured and collared three five-week-old cubs born to Pt35 (photo 1). However, over the course of two months, all three cubs chewed each other's collars off. It is unclear why this happened with Pt35's litter but not that of Pt56, but we believe that Pt35's cubs were simply more healthy and hence, more playful.

these cubs in autumn 2006 to fit them with permanent collars.

On 28 October, we captured tiger Pt75, the 15.5-month-old daughter of Pt56. This cub was originally collared in August 2004 when it was five weeks old. At that time, three cubs were captured (Pt66, Pt67, Pt68), but it was unclear which of these cubs was Pt75 because she had slipped her collar. However, genetic analysis will later determine her identity. Together with Pt75, we recaptured Pt56 and changed her radio-collar because the batteries were due to fail.

We recaptured Pt35 via helicopter in April 2006 to change her radiocollar (Photo 2). She was in very good physical condition, despite old age (estimated 13-14), broken teeth (photo 3), and having raised three cubs through the winter. We also attempted to recapture Pt55, via helicopter and with snares, but she so far has avoided our efforts. We intend to fit this tigress with a GPS collar if and when we capture her.



*Photo 3.* Despite three broken canines, Pt35 was in very good condition.

We documented through tracks and visual sightings that all three cubs were alive in late June 2006.

*Subadult monitoring:* We monitored three subadults, Pt64, Pt69, and Pt75, during the report period. All were born to radio-collared tigresses (Pt64 and Pt69 were Pt35's cubs and Pt71 was Pt56's cub). Pt64 dispersed north about 95 km from his natal home range when he was just over two years old, and at least temporarily settled along the Kema River. This was the oldest dispersal age recorded on the Siberian Tiger Project. He was fitted with an expandable break-away collar when captured because he was too small for an adult sized collar. His collar broke away (fell off) in March of 2006. Pt69 began dispersing to the west when he was about 22 months old, but then returned to his natal home range where, in July 2005, he was poached along the main road that passes through the zapovednik. Pt71, the second dispersing female monitored on the Project, began dispersing in February 2006. She moved primarily to the south and was located as far as 35 km from her natal home range. In May 2006, the tone of the signal from her radiocollar changed dramatically, suggesting a transmitter malfunction. A month later, we lost contact with her signal and assume that her radio-collar failed.

*Monitoring of resident adults in our core area:* In July 2004, we monitored an unexpected event that may provide some of the most important data we have collected during the course of the project. Two tigresses (Pt55 and Pt56) captured as cubs in 2001 and who settled in their natal home ranges, gave birth to their first litters of cubs. Pt56 was just three years old and Pt55 was just under three when they gave birth, i.e., they gave birth at a very young age. This marked a very important change in the tiger population in our core study area, i.e., the density of adult tigresses doubled, and all four of the resident tigresses had cubs. This change was likely made possible by social stability created by a long (about five years) period during which human-induced mortality was eliminated in our core study area. That is, when resident adults survive long enough, densities may increase dramatically as their offspring settle in their natal home ranges. It has now been two years since the change in density and it appears that the situation is stable. These data have strong implications for conservation, suggesting that when well protected, adult female densities may reach levels two times greater than previously believed. During the report period, all four resident adults in our core area were with cubs and territory boundaries appeared stable two years after the divisions between mothers and daughters.

*Predation sequences:* We purchased two GPS collars and are attempting to capture tigers Pt56 and Pt60 to fit them with the collars. We were unable to capture either tiger via helicopter in winter 2006. We will conduct capture work on the ground in autumn 2006 and from the air in the winter. Work on predation sequences will continue once we have tigers fitted with GPS collars.

**Table 1.** Summary of radio-tracking data collected from tigers on the Sikhote-Alin Biosphere Zapovednik.

Tiger no.	Sex	Age	Dates tracked		Days tracked	Number locations		Notes
			From	To		total	Report period	
35	F	12	10/21/1999	6/30/2006	2444	1810	235	3 cubs born early Sept. 2005.
37	F	12	11/17/1999	6/30/2006	2417	424	38	
49	M	8	5/22/2001	6/30/2006	1865	496	67	
55	F	4	10/24/2002	6/30/2006	1345	259	66	Pt37's daughter.
56	F	4	10/24/2002	6/30/2006	1345	462	122	Pt35's daughter.
60	M	5	8/8/2003	6/30/2006	511	55	15	
64	M	2	5/24/2004	3/1/2006	646	240	31	Pt35's son.
69	M	1.3	9/16/2004	7/29/2005	316	152	1	Pt35's son. Poached.
72	F	0.12	10/11/2005	11/6/2005	26	12	12	Pt35's daughter.
73	F	0.12	10/11/2005	12/14/2005	64	42	42	Slipped collar.
74	F	0.12	10/11/2005	12/11/2005	61	35	35	Pt35's daughter.
75	F	1.3	10/28/2005	6/30/2006	245	34	34	Pt56's daughter. Collar failed?

*Camera trapping.* In April 2006, we began a new study to compare techniques for estimating tiger densities. The study will focus on camera trapping, but will likely also incorporate hair snagging to collect DNA samples and identification of individuals based on digital photos of tracks. We are conducting this work as a graduate student project. Svetlana Sutyryna, a graduate student from the University of Irkutsk, is leading this study and we are currently searching for a non-Russian student to work with her.

*Graduate student program:* Construction of our office and housing is well underway (photo 4) and we hope to complete construction in 2006. We will continue our search for graduate students when the building nears completion.



*Photo 4.* Office and graduate student housing under construction in Terney, September 2005. Photo by J. Goodrich/WCS.

### Tiger-Human Conflicts

*Conflict situations.* We dealt with three conflict situations during the report period:

1. In December 2005, Utyos Wildlife Rehabilitation Center in Khabarovski Krai requested our assistance to anesthetize and evaluate the health of a tiger cub. The cub had been taken into captivity one year ago after it had been shot in the face by a poacher (see final report 2005). At that time, the cub underwent an operation to treat its wound and wire its shattered jaw. One year later, the cub's wounds had healed well, although the jaw was slightly crooked and several teeth were missing. The cub was also very tame after a year in captivity and intensive care. Thus, we declared the cub unfit for release into the wild and it was later sent to a zoo in Khabarovsk.

2. In January 2006, Inspection Tiger requested our assistance with a tigress with a cub that had been killing dogs in and near the town of Chornigovka in southwestern Primorski Krai. The tigress was traveling with a five-to-six month old cub. Her behavior was extremely bold - on several occasions, tracks indicated that she walked the streets of the town of Chornigovka, hunting dogs, with her cub. Although no aggressive encounters were reported, it was likely only a matter of time before she encountered a

person at close range, in which case she would likely aggressively protect her cub. Hazing the tigress was ineffective because she killed dogs unpredictably over a large area in three different towns and surrounding farms. However, because she was with a cub, translocation was also out of the question. Thus, it was decided to capture the tigress, fit her with a radio-collar and monitor her intensively, using pyrotechnics to frighten her when she approached human habitations. The tigress was captured on 24 January and was surprisingly in good physical condition. We estimated her age to be 11-14 years old based on very worn and stained teeth.

A team of two people (one from Inspection Tiger and one from WCS) immediately began intensive monitoring. The intension was to at best, through negative conditioning, teach the tigress and cub to avoid preying on domestic animals, or at worst, prevent the pair from preying on domestic animals until the cub became independent and the mother could be translocated. Prey densities were extremely low in the area so in addition to negative conditioning, the pair was fed sika deer on three occasions. The deer were placed in the forest in close proximity to the tigress and far from human habitations. Every attempt was made to reduce the amount of human scent and tracks at the feeding site. WCS personnel worked with Inspection Tiger for approximately one month to train their personnel in radiotelemetry techniques. We then loaned Inspection Tiger a telemetry receiver and antenna so that they could continue monitoring.

The pair was hazed with rockets from farms on five occasions. The immediate effect was that they left the area, but there was little apparent long-term effect, i.e., the depredations continued through the winter. This was likely, in part, because there was little wild prey in the area. At the time of this writing, Inspection Tiger reported that they had not heard a signal for over two months, but admitted that they had monitored infrequently. Reports from locals suggested that the tigress was still in the area, but depredations had ceased, perhaps because small prey animals such as badgers and raccoon dogs become available in summer.

This was a difficult situation with no good solution because of the presence of the cub. The tigress's behavior was extremely bold and local people were very upset. Our course of action was expensive, labor intensive, and while it likely prevented a number of depredations, ultimately it did not seem to change her behavior. However, with wild prey nearly non-existent in the area, the tigress had little choice but to prey on domestic animals. Our presence did alleviate local concerns and, through discussions with local people, officials, and press, brought to light the problems associated with heavy poaching of prey in the area.

3. On 9 March 2006, WCS received a report of two emaciated tiger cubs at a logging camp about 50 km north of Terney. Nikolai Rybin and Vladimir Melnicov responded to the scene (both Miquelle and Goodrich were out of the country). They found two emaciated tiger cubs that were about five months old. The cubs were weak enough so that they captured the cubs by hand and transported them to Terney in the cab of a pick-up truck. We held the cubs for four days, during which time the condition of one rapidly improved while the condition of the other deteriorated. Inspection Tiger collected the cubs and transported them to Vladivostok, where presumably they would receive veterinary treatment. The weaker cub died en route to Vladivostok. The remaining cub was sent to a zoo.



*Inspection Tiger*. The Ministry of Natural Resources underwent reorganization in 2004, resulting in considerable changes. A significant change relative to our work with tiger-human conflicts was that Boris Litveenov no longer heads the Tiger Response Team. Indeed, all Inspection Tiger personnel that have received significant training from WCS have left Inspection Tiger. Additionally, apparently all crates used for transporting tigers were lost in the reorganization. Thus, our assistance with tiger-human conflict situations has become more important. In the future, we intend to continue assisting with conflict situations and will continue training Inspection Tiger personnel to deal with tiger-human conflicts.

## **PUBLICATIONS**

During the report period we published the Russian-language monograph, *Tigers of Sikhote-Alin Zapovednik: Ecology and Conservation*. The monograph includes 26 chapters with detailed analyses of data collected from 1992-2004 on tiger ecology and conservation, prey and competitor relationships, and tiger-human conflict issues. Selected chapters are included in the following bibliography.

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