LONG-TERM AMUR TIGER RESEARCH AND CONSERVATION

FINAL REPORT

TO

THE NATIONAL FISH AND WILDLIFE FOUNDATION
SAVE THE TIGER FUND

FROM THE

WILDLIFE CONSERVATION SOCIETY (WCS)

Grant Number: 2005-0013-025

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PROJECT SUMMARY

With less than 400 individuals left in the wild, the Amur (Siberian) tiger is critically endangered. Threats to their survival include poaching of both tigers and their prey, and destruction and fragmentation of remaining habitat. Key to dealing with these threats is development of comprehensive conservation plans that provide for the needs of both tigers and local people. This requires a sound knowledge of tiger ecology based on detailed, long-term scientific data. The Siberian Tiger Project has nearly completed its thirteenth year of data collection on radio-collared tigers on and near Russia's Sikhote-Alin Biosphere Zapovednik (SABZ). The primary goal of our field research is to develop the best scientific data set possible on Amur tiger ecology in pristine areas, i.e. the SABZ, and in surrounding disturbed areas. During the report period, we focused our research on two issues vital to comprehensive conservation planning: cub mortality and dispersal. Additionally, since 2000, we have been working with Inspection Tiger (a department of the Russian Ministry for Natural Resources) with the goal of alleviating tiger-human conflicts in ways that reduce tiger-mortality while protecting the welfare of local citizens.

In August 2004, we began a new aspect of our research designed to determine causes of mortality of young cubs. We captured and radio-collared three five-week-old cubs born to Pt56. We monitored the cubs daily until their collars failed when they were about a year old, documenting their survival through the first year of life. However, information from local hunters suggests that at least one cub was poached when it was about 13 months old. We recaptured another cub (Pt75) in October 2005 and fitted it with a permanent collar. Additionally, we collared three six-week-old cubs of Pt35 in October 2005, but all three removed their collars prematurely.

Data on dispersal are equally important. We have developed a habitat protection plan that includes a network of protected areas, guidelines for management of unprotected areas, and dispersal corridors between protected areas. However, our knowledge of what constitutes dispersal corridors and dispersal barriers is incomplete. During the report period, we monitored two male cubs (Pt64 and Pt69) born to Pt35 and one female (Pt75). One (Pt69) was poached in July 2006 along the primary road through Sikhote-Alin Zapovednik. Pt64 dispersed in August, when he was about 26 months old, marking the latest dispersal age recorded for the project (most cubs disperse when they are about 18 months old). He settled along the Kema River about 95 kilometers north of his birthplace. Pt71 began dispersing in February 2006 when she was 19 months old. She moved primarily to the south and was located as far as 35 kilometers from her natal home range. In May 2006, the tone of the signal from her radio-collar changed dramatically, suggesting a transmitter malfunction. A month later, we lost contact with her signal and assume that her radio-collar failed.

In 2005, we published "Tigers of Sikhote-Alin Zapovednik: Ecology and Conservation," a 26-chapter Russian-language monograph detailing the results of our work from 1992 to 2004.

Inspection Tiger asked for our assistance with one conflict situation during the report period. A tigress with a cub began killing dogs in the vicinity of the town of

Chernigovka, Primorski Krai, in January 2006. We responded and, together with Inspection Tiger, captured the tigress (Pt76) on 24 January. The tigress was very old (estimated at >13), but in good physical condition. We fitted her with a radio-collar, released her on site, and have monitored her regularly through the winter, scaring her with signal rockets whenever she approached human habitations. In December 2005, we anesthetized a cub (Pt71) at Utyos Wildlife Rehabilitation Center to assess its recovery from injuries sustained when shot in the face by a poacher in January 2005. With our assistance, the cub was treated by veterinarians from Alex Clinic, who wired its jaw back together. We found that the jaw healed well and the cub was in very good physical condition. However, because the cub received extensive close human contact during treatment, it was not fit for release into the wild, and was sent to a zoo.

Summary of results:

- Radio-collared four tiger cubs less than one year old to monitor dispersal (three after the report period).
- Continued monitoring a male cub that dispersed at a much later age than previously recorded on the Siberian Tiger Project.
- Radio-collared three five-week-old cubs to determine causes of mortality and/or dispersal.
- Assisted the government's Inspection Tiger Department with three conflict situations.
- Began a graduate-student study to compare techniques for estimating tiger density.
- Published "Tigers of Sikhote-Alin Zapovednik: Ecology and Conservation," a 26-chapter Russian-language monograph detailing the results of our work from 1992 to 2004.

National Fish and Wildlife Foundation
Project Evaluation Form

Project Name and Number: Long-Term Amur Tiger Research and Conservation #2005-0013-025

Recipient: Wildlife Conservation Society

Project Location: Russia

1) Were the specific objectives as outlined in your application and grant agreement successfully implemented and accomplished? Explain.

A) *Radio-collar and monitor five-week-old cubs.*

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. We used transmitters with a protective casting to avoid failures experienced with transmitters on Pt56's cubs. 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 healthier and hence more playful. We will use a stronger collar material on subsequent litters. On 13 October, 2006, when the cubs were 13 months old, we recaptured all three and fitted them with permanent collars, so in the coming year we will be monitoring their dispersal.

B) *Monitor dispersing tigers.*

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; Table 1). Pt64 dispersed north about 95 kilometers 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 kilometers from her natal home range. In May 2006, the tone of the signal from her

radio-collar changed dramatically, suggesting a transmitter malfunction. A month later, we lost contact with her signal and assume that her radio-collar failed.

Table 1. Summary of radio-tracking data collected from tigers on the Sikhote-Alin Biosphere Zapovednik, August 2005 – July 2006.

Tiger no.	Sex	Age	Dates tracked From	Dates tracked To	Days Tracked	Number locations total	Number locations Report period	Notes
35	F	12	10/21/1999	7/31/2006	2,475	1,810	245	Three cubs born early 9/05
37	F	12	11/17/1999	7/31/2006	2,448	424	41	
49	M	8	5/22/2001	7/31/2006	1,896	496	72	
55	F	4	10/24/2002	7/31/2006	1,376	259	70	Pt37's daughter
56	F	4	10/24/2002	7/31/2006	1,376	462	131	Pt35's daughter
60	M	5	8/8/2003	7/31/2006	542	55	19	
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	0	Pt35's son. Poached.
72	F	0.12	10/11/2005	11/6/2005	26	12	12	Pt35's daughter. Slipped collar.
73	F	0.12	10/11/2005	12/14/2005	64	42	42	Pt35's daughter
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?

C) *Monitoring collared tigers on Sikhote-Alin Zapovednik to determine if the population can withstand current high densities.*

In July 2004, we monitored an unexpected event that may provide some of the most important data collected during the course of the project. Two tigresses (Pt55 and Pt56), captured as cubs in 2001 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, very young ages to have cubs. 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-year) 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 more than 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.

D) *Collection of data on 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 winter. Work on predation sequences will continue once we have tigers fitted with GPS collars.

E) *Develop a camera trapping study and identify students to take on this program.*

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 identification of individuals based on digital photos of tracks, DNA from scats and hair samples, and the use of dogs to identify individuals based on scent of scat and urine samples. We are conducting this work as a graduate student project. Svetlana Sutyrina, a graduate student from the University of Irkutsk, is leading the study, and we recently identified a non-Russian student, Meghan Riley, to work with her. Riley will work on the project as a MS student at the University of Wyoming.

F) *Complete construction of infrastructure (housing and office space) for students.*

While construction of office and housing facilities has not been completed, we are still hopeful that we will occupy the building by the end of 2006. Electricity, heating, and plumbing are installed, and we are currently finishing the interior.

G) *Train, assist, advise, and otherwise encourage and support graduate students currently conducting research; search for new students.*

See objective E, above.

H) *Assist Inspection Tiger with conflict situations, relocate tigers when necessary, and train Inspection Tiger personnel.*

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 a year before, after being shot in the face by a poacher (see annual report FY2005). 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 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 probably have aggressively protected 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 it with a radio-collar and monitor her intensively, using pyrotechnics to frighten her when approaching human habitations. The tigress was captured on 24 January. Surprisingly, she was 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 intention, at best, was to teach the tigress and cub to avoid preying on domestic animals through negative conditioning or, at worst, to 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 radio telemetry techniques. We then loaned Inspection Tiger a telemetry receiver and antenna so that they could continue monitoring.

   The pair was hazed from farms on five occasions with rockets. 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 kilometers 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 about five months old. The cubs were weak enough to be captured by hand and transported 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.

I) *Disseminate research findings.*

During the report period we published the Russian-language monograph, *Tigers of Sikhote-Alin Zapovednik: Ecology and Conservation* which includes 26 chapters with detailed analyses of data collected from 1992 to 2004 on tiger ecology and conservation, prey and competitor relationships, and tiger-human conflict issues. Two copies of this monograph were recently sent to Dr. John Seidensticker by Dr. Dale Miquelle. Selected chapters are included in the following bibliography, which also includes other publications from the report period. A complete bibliography from the project since its inception is attached at the end of this report.

Scientific

Goodrich, J. M. and D. G. Miquelle. 2005. *Translocation of problem Amur tigers to alleviate tiger-human conflicts*. Oryx 39:1-4.

Goodrich, J. M., K. S. Quigley, D. G. Miquelle, E. N. Smirnov, L. L. Kerley, H. B. Quigley, M. G. Hornocker, and D. Armstrong. 2005. *Blood chemistry and infectious diseases of Amur tigers.* Pages 43-49 in Miquelle, D. G., E. N. Smirnov, and J. M. Goodrich, editors, *Tigers of Sikhote-Alin Zapovednik: ecology and conservation.* PSP, Vladivostok, Russia. 224 pp. (in Russian).

Goodrich, J. M., L. L. Kerley, E. N. Smirnov, D. G. Miquelle, B. O. Schleyer, L. McDonald, T. L. McDonald. 2005. *Survival Rates and Causes of Mortality of Amur Tigers on and near the Sikhote-Alin Biosphere Zapovednik.* Pages 69-75 in Miquelle, D. G., E. N. Smirnov, and J. M. Goodrich, editors, *Tigers of Sikhote-Alin Zapovednik: ecology and conservation.* PSP, Vladivostok, Russia. 224 pp. (in Russian).

Goodrich, J. M., L. L. Kerley, D. G. Miquelle, E. N. Smirnov, H. B. Quigley, M. G. Hornocker. 2005. *Social structure of Amur tigers on Sikhote-Alin Biosphere Zapovednik.* Pages 50-60 in Miquelle, D. G., E. N. Smirnov, and J. M. Goodrich, editors, *Tigers of Sikhote-Alin Zapovednik: ecology and conservation*. PSP, Vladivostok, Russia. 224 pp. (in Russian).

Goodrich, J. M., D. G. Miquelle, L. L. Kerley, E. N. Smirnov, H. B. Quigley, and M. G. Hornocker. 2005. *Social Structure of the Amur Tiger Population on Sikhote-Alin*

Biosphere Zapovednik: Effects of Human-Induced Mortality and Implications for Social Regulation of Density. Pages 161-169 in E. V. Potikha, editor, *Results of Protection and Research of the Sikhote-Alin Natural Landscape*. Primpoligraphkombinat, Vladivostok, Russia. 516 pp. (In Russian with English summaries.)

Goodrich, J. M. and D. G. Miquelle. 2005. *Tiger Research on the Sikhote-Alin Biosphere Zapovednik: Importance and Application of Scientific Research to Tiger Conservation.* Pages 153-161 in E. V. Potikha, editor, *Results of Protection and Research of the Sikhote-Alin Natural Landscape.* Primpoligraphkombinat, Vladivostok, Russia. 516 pp. (In Russian with English summaries).

Miquelle, D. G., L. L. Kerley, J. M. Goodrich, B. O. Schleyer, E. N. Smirnov, H. B. Quigley, M. G. Hornocker, I. G. Nikolaev, and E. N. Matyushkin. 2005. *Food habits and conservation of Amur tigers on Sikhote-Alin Zapovednik and the Russian Far East.* 2005. Pages 125-131 in Miquelle, D. G., E. N. Smirnov, and J.M. Goodrich, editors, *Tigers of Sikhote-Alin Zapovednik: ecology and conservation.* PSP, Vladivostok, Russia. 224 pp. (in Russian).

Miquelle, D. G., P. A. Stevens, E. N. Smirnov, J. M. Goodrich, O. J. Zaumyslava, and A. E. Myslenkov. 2005. *Competitive exclusion, functional redundancy, and conservation implications: tigers and wolves in the Russian Far East.* Pages 179-207 in Ray, J., J. Berger, K. Redford, & Steneck, editors, *Large Carnivores and the Conservation of Biodiversity*. Island Press.

Miquelle, D.G., I. G. Nikolaev, J. Goodrich, B. Litvinov, E. N. Smirnov, and E. Suvorov. 2005. *Searching for the Co-Existence Recipe: A Case Study of Conflicts between People and Tigers in the Russian Far East.* Pages 305-322 in Woodruffe, R., and S. Thirgood, editors, *People and Wildlife: conflict or co-existence?* Cambridge University Press.

Miquelle, D. G., E. N. Smirnov, and J. M. Goodrich, editors. 2005. *Tigers of Sikhote-Alin Zapovednik: ecology and conservation.* PSP, Vladivostok, Russia. 224 pp. (in Russian).

Miquelle, D.G., J. M. Goodrich, B. I. Litvinov, I. G. Nikolaev, E. N. Smirnov, E. Suvorov, and Y. A. Darmin. 2005. *Searching for the Co-Existence Recipe: A Case Study of Conflicts between People and Tigers in the Russian Far East.* Pages 179-186 in Miquelle, D. G., E. N. Smirnov, and J. M. Goodrich, editors, *Tigers of Sikhote-Alin Zapovednik: ecology and conservation*. PSP, Vladivostok, Russia. 224 pp. (in Russian).

Seryodkin, I. V., J. M. Goodrich, A. V. Kostyrya, E. N. Smirnov, and D. G. Miquelle. 2005. *Food relationships between tigers and bears in Sikhote-Alin Reserve.* Pages 309-312 in E. V. Potikha, editor, *Results of Protection and Research of the Sikhote-Alin Natural Landscape.* Primpoligraphkombinat, Vladivostok, Russia. 516 pp. (In Russian with English summaries).

Seryodkin, I. V., J. M. Goodrich, A. V. Kostyrya, B. O. Schleyer, E. N. Smirnov, L. L. Kerley, and D. G. Miquelle. 2005. *Relationship between tigers, brown bears, and Himalayan black bears.* Pages 156-163 in Miquelle, D. G., E. N. Smirnov, and J.M. Goodrich, editors, *Tigers of Sikhote-Alin Zapovednik: ecology and conservation.* PSP, Vladivostok, Russia. 224 pp. (in Russian).

Slaght, J. C., D. G. Miquelle, I. G. Nikolaev, J. M. Goodrich, E. N. Smirnov, K. Traylor-Holzer, S. Christie, T. Arjanova, J. L. D. Smith, and K. U. Karanth. 2005. *Who's king of the beasts? Historical and recent body weights of wild and captive Amur tigers, with comparisons to other subspecies.* Pages 25-35 in Miquelle, D. G., E. Smirnov, and J. M. Goodrich, editors, *Tigers of Sikhote-Alin Zapovednik: ecology and conservation.* PSP, Vladivostok, Russia. 224 pp. (in Russian).

Popular

Goodrich, J. 2006. *Against All Odds*. Land Rover Lifestyles Magazine. *In press.*
Goodrich, J. 2005. *Capture of Galia's Cubs.* National Geographic, Russia 10:16-17 (in Russian).
Goodrich, J. 2005. *On the Sea of Japan*. Priroda 4:52-54. (in Russian)

2) Please assess project accomplishments as quantitatively as possible. For example:

a. Number of miles of stream/river corridor benefited. Categorize by type of benefit (e.g., protected, enhanced, restored, made accessible).

b. Total acres of land conserved. Categorize by conservation mechanism (e.g., restored, managed, acquired, placed under an easement) and by habitat type (e.g., wetland, deciduous forest, shortgrass prairie).

c. Species benefited. If possible, report number of individuals of each species.

Tigers are the primary species benefited by this program, however, most other wildlife species in the area likely benefit from tiger conservation; in particular, tiger prey species (red deer, wild boar, sika deer, roe deer). A tigress and cub that likely would have been killed were maintained in the wild as the result of our work with Inspection Tiger.

d. Number of meetings/events held.

None.

e. Presentations made.

Several presentations were made during the report period:

Presentations at the conference "Protection and Research of the Sikhote-Alin Natural Landscape, Sikhote-Alin Biosphere Zapovednik 70th Anniversary Conference," September 2005:

Food relationships between tigers and bears in Sikhote-Alin Reserve, presented by Ivan Seryodkin.

Tiger Research on the Sikhote-Alin Biosphere Zapovednik: Importance and Application of Scientific Research to Tiger Conservation, by John Goodrich.

Social Structure of the Amur Tiger Population on Sikhote-Alin Biosphere Zapovednik: Effects of Human-Induced Mortality and Implications for Social Regulation of Density, by John Goodrich.

The Importance of Protected Areas in Amur Tiger Conservation, by Dale Miquelle.

Other presentations:

Monitoring mammal populations for endangered species conservation: a conceptual framework, and *The Siberian Tiger Project: A long term research project and its application to tiger conservation*, "Seoul Conservation Biology Workshop" in January 2006, presented by John Goodrich.

The Siberian Tiger Project: A long term research project and its application to endangered species conservation. Presented to Korea National Parks, Jirisan National Park, January 2006, by John Goodrich.

Four presentations on Amur tiger research and conservation presented to children from northern Primorye by John Goodrich.

f. Publications and extent of distribution.

See publication list, above.

g. Other

3) Assess the number of people reached through your work (e.g., landowners, students, organizations, agencies). Did other land managers benefit from the project?

More than 100 students from northern Primorye attended lectures and field demonstrations by the Siberian Tiger Project. Presentations at the Sikhote-Alin Zapovednik conference were given to an audience of 50-70 scientists and conservationists from throughout Russia. Lectures in South Korea reached about 40 students and employees of Korea National Parks, influencing their ideas and activities regarding large carnivore (tiger, leopard and Asiatic black bear) reintroduction and management.

Our monograph was distributed to members of nearly all agencies and organizations in Russia involved in tiger conservation.

Cooperating organizations for our research project include Sikhote Alin Biosphere Zapovednik, Irkutsk State University, and the University of Wyoming.

Cooperating organizations for our tiger-human conflict work include Sikhote-Alin Zapovednik, Primorski Krai Tiger Response Team, Inspection Tiger Department, Ministry of Natural Resources, Primorski Veterinary Service, Primorskaya State Academy of Agriculture, Far Eastern Branch of the Russian Academy of Sciences, Omaha Zoo, Moscow Zoo, Montana Department of Fish, Wildlife & Parks, 21st Century

Tiger, Zoological Society of London, Utyos Wildlife Rehabilitation Center, and The Phoenix Fund.

4) Were any surveys or interviews conducted with partners to help gauge the success of your efforts?

We have not formally conducted surveys or interviews with our partners to gauge the success of our projects, but we are in constant contact with our partners and continuously discuss and evaluate our work. We are in contact with Sikhote-Alin Zapovednik on a daily basis and with Inspection Tiger on a weekly basis.

5) How will the project be evaluated in terms of monitoring or assessment of cause-and-effect response? Describe the evaluation timescale (e.g., one year, five years, ten years). How will monitoring results be reported?

We evaluate the short-term (annual) effectiveness of our research program in terms of volume of data collected and the long-term (five to ten-year) effectiveness in terms of publications and use of our results in tiger conservation plans. For our work with tiger-human conflicts, we evaluate short-term effectiveness in terms of tigers saved that would probably have otherwise been killed in the absence of a Tiger Response Team. Other effects of this work, such as improved public awareness and attitudes towards tiger conservation are more difficult to evaluate. In the long run, effectiveness is evaluated in terms of advances in our knowledge and ability to deal with tiger-human conflicts, and in the creation of a Tiger Response Team that can work independently of WCS. For our student training program, short-term effectiveness will be evaluated in terms of degrees completed by students in our program. Long-term effectiveness will be measured in terms of the number of our trainees who remain active in tiger conservation, and who are absorbed into university and government ranks within the Russian Far East.

6) Does this project fit into a larger program, spatially or temporally? If so, how has that program benefited from your work? (For example, an easement or on-the-ground work that connects or benefits other protected properties.)

Both projects fit into WCS's conservation programs for tigers in the Russian Far East and throughout their range. Our research provides data for input into other programs. For example, data on tiger movements, especially of dispersers, will allow us to refine tiger track counts and these data may be useful for population monitoring programs in Russia and other countries. Dispersal data may help improve habitat protection plans, including the Federal Decree for Amur Tiger Conservation.

7) Does the project incorporate an adaptive management component? If so, please explain. Any lessons learned that will guide future implementation of this, or similar, projects?

Neither project contains a formal adaptive management component. Nonetheless, together with our partners, we constantly evaluate and attempt to improve upon our work.

8) Was there a local/regional/national response? Any media/press involvement?

During the report period, our research program was featured on national television news. Tiger-human conflicts are always high-profile, and often reported in local, national and international news. For example, our examination of the cub at the Utyos Wildlife Rehabilitation Center was featured on national television (Russia Today) and in US and UK newspapers. Media/press coverage of our research project, as a whole, has been considerable. It includes production of several documentary films, including *Tigers in the Snow* (National Geographic), *In the Shadow of the Tiger* (Discovery Channel), *Tigers Fighting Back* (National Geographic), as well as numerous popular publications and news reports (see #2 above).

9) To what degree has this project contributed to the conservation community as a whole?

Both aspects of this project have conservation implications above and beyond the species level. Data from our research program on Amur tigers provide valuable insights into factors that influence population dynamics, movements, and social structure of Amur and other tiger subspecies. Additionally, field research techniques we are developing for tigers should prove useful for other subspecies and species (e.g. Goodrich et al. 2001). Examples of how our results have been used include: (1) our habitat protection plan (Miquelle et al. 1999), based in part on our home range estimates, that was incorporated into the federal strategy for tiger conservation; (2) data regarding roads and tiger survival (Kerley et al. 2002) has encouraged managers in many areas of Primorye to close roads to protect tigers and their prey; (3) our work with tiger-human conflicts is also applicable to other subspecies and species.

Making data and lessons learned available is essential if we are to contribute to the conservation community as a whole. Our data are well published (see attached publications list). Specifically, data on tiger-human conflicts have been published in both scientific and popular outlets (e.g. Goodrich and Miquelle 2005, Miquelle et al. 2005, on attached publications list). Our publications, including the Russian-language monograph, have made results of our research on tigers, their prey, and competitors available to managers and conservationists in Russia and throughout the world. We are currently working on an English version of the monograph.

10) Did your work bring in additional partners, more landowners, et cetera, who would be interested in doing similar work on their land in the future? If so, please describe.

Neither project brought in new partners during the report period. However, both projects are ongoing and we will continue our work with existing partners (see #3 above).

11) Do you have any suggestions for NFWF to guide improvement of our project administration?

Please share any additional information that you feel is important to the evaluation of your program.

Tiger Conservation Unit (TCU) Survey
Long-term Amur Tiger Research and Conservation
#2005-0013-025

Name: John Goodrich, PhD Date: October 31, 2006

Postal address: WCS Russia Program, Apt. 31, Bld.17a, Aleutskaya St., Vladivostok 690090, Primorski Krai, Russia

Email address: tiger372@yahoo.com

Phone number: + 7 (4232) 41-00-33

Name of your institutional affiliation: Wildlife Conservation Society

Postal address of your institutional affiliation: 2300 Southern Blvd., Bronx NY 10460

Does this survey refer to a TCU? _X_ Yes _____ No

If Yes, what is the TCU Identification number: _Russian Far East_____
(refer to accompanying map of your region)

If No, indicate the area on the map and provide a name or number here:

_____
(To fill out the rest of the questionnaire, please substitute '*TCU*' with '*specified area from the map'*).

I. Status of Tigers

1. Has there been an **attempt** to scientifically document tigers in this TCU during the **last 8 years** (1995 – present)?

_X___ Yes ____ No ____ Don't Know

If you answered 'No' please skip to question #4

2. Have tigers been scientifically documented in this TCU in the **last 8 years**?

__X__ Yes ____ No ____ Don't Know

3. If yes, using what methods? (Please explain):
Capture, camera trap photos, visual sighting, tracks, telemetry

4. Is there any other documentation (besides scientific) of tigers present in the TCU in the **last 8 years**?

__X__ Yes ____ No

If yes, please explain:
Reports by local citizens

5. Have tigers been scientifically documented in this TCU **since January 1, 2003**?

__X__ Yes ____ No ____ Don't Know

6. If Yes, using what methods? (If methods used are same as in question #3, write "same"):
same

7. Is there evidence of tigers breeding in this TCU during the **last 8 years**?

_X___ Yes ____ No ____ Don't Know

8. If Yes, what is that evidence of tigers breeding (check all that apply):

__X_ Cubs Observed __X_ Den Found _____ Pregnant Female Observed

_____ Observed Tigers Mating

9. Other (please explain):

10. Is there a **scientifically documented population estimate** for tigers in this TCU?

_X___ Yes ____ No ____ Don't Know

11. What is the estimated number of tigers in that population?

_____ 1 – 10 _____ 10 – 20 _____ 20 – 50 _____ 50 – 100 __X__ more than 100

_____ Other _____ Don't Know

12. What scientific method was used to determine the population estimate? (Please explain):

Track counts

II. Threats to Tigers

1. Please rank all the threats to tigers, which you believe apply to this TCU over the **last 8 years.** Rank their severity, urgency, etc based on the following criteria given beneath the table:

Threats	**Severity**	**Urgency**	**Recovery time**	**Percentage of TCU affected by threats**	**Probability of occurrence**
Directed hunting of tigers	2	3	1	3	1
Incidental hunting of tigers	2	3	1	3	1
Hunting of tiger prey	2	3	2	3	1
Local trade in tiger parts	1	3	1	3	0.75
Export of tiger parts to other areas	2	3	1	3	1
Lack of legal protection	2	3	1	3	1
Lack of enforcement	2	3	1	3	1
Habitat degradation	2	3	2	3	1
Habitat destruction	1	3	2	0	1
Lack of connectivity	1	3	2	1	1
Competition from other carnivores	1	3	1	3	1
Low tiger population size	1	3	2	3	1
Civil unrest					
Resource exploitation	1	3		3	1
Disease	1	3	2	3	1
Other:					
Other:					
Other:					

Severity of threat ___

No effect on tigers	0
Small effect on density or distribution	1
Substantial effect on density or distribution, but local eradication unlikely	2
Serious effects, local eradication a possibility	3

Urgency of threat ___

Will not happen in > 10 years	0
Could happen over 3-10 years	1
Could or will happen within 1-3 years	2
Threat is currently happening	3

Time it would take for tigers to recover from the threat ___

Immediate or < 1 year	0
1 - 10 years recovery	1
10 - 100 years recovery	2
100 + years or never	3

Percentage of TCU affected by threat ___

1 - 10%	0
10 - 25%	1
25 - 50%	2
> 50%	3
Probability of occurrence	0 - 1

III. Conservation of Tigers

1. Please indicate the conservation measures which have been taken over the **last 8 years** in this TCU and rank their effectiveness; if the conservation measure does not currently exist, please indicate if you believe it might exist in the near future.

Present in last 8 years? Yes / No	**Conservation Measures**	**Effectiveness of conservation measures** **Not effective**				**Fully effective**	**If not present will it be in the near future? Yes / No**
Y	Monitoring of tigers in the field	1	2	3	4	***5***	
Y	Monitoring of prey populations	1	2	3	***4***	5	
	Monitoring of trade in tiger parts	1	2	3	4	5	
	New laws/policies regarding tigers	1	2	3	4	5	
Y	Anti-poaching patrols	1	***2***	3	4	5	
Y	Anti-trafficking enforcement	1	***2***	3	4	5	
Y	Enforcement of protected area policies	1	2	3	4	5	
Y	Training of protected area staff	1	***2***	3	4	5	
Y	Enforcement of existing laws regarding tigers	1	***2***	3	4	5	
Y	Provisioning or monetary support to protected area staff	1	2	***3***	4	5	
Y	New / upgraded protected area	1	2	3	***4***	5	
Y	Habitat restoration	1	2	***3***	4	5	

Y	Habitat enhancement	1	2	***3***	4	5	
Y	Education of local people	1	2	***3***	4	5	
Y	Education of schoolchildren	1	2	***3***	4	5	
N	Translocation of local people out of protected area	1	2	3	4	5	N
Y	Local publicity about tigers	1	2	***3***	4	5	
Y	Ecotourism ventures	1	***2***	3	4	5	
N	Reintroduction of tigers	1	2	3	4	5	N
N	Captive breeding facility	1	2	3	4	5	N
Y	Compensation programs:	1	***2***	3	4	5	
Y	Conflict management/mitigation	1	2	3	***4***	5	
	Other:	1	2	3	4	5	
	Other:	1	2	3	4	5	
	Other:	1	2	3	4	5	

2. Name all protected areas which occur on some part of this TCU and evaluate the effectiveness of the actual security (not the legal protection) which that protected area affords:

There are many protected areas, but Dr. Goodrich is only familiar enough with Sikhote-Alin Zapovednik.

Protected Area Name	Effectiveness of Actual Protection Not Effective				Fully Effective	
Sikhote-Alin Zapovnik	1	2	3	***4***	5	Don't Know
	1	2	3	4	5	Don't Know
	1	2	3	4	5	Don't Know

3. What government agencies, if any, are responsible for tiger conservation in this TCU?
Ministry of Natural Resources

4. What other species of conservation interest are present in this TCU (give common name)?
Asiatic black bear, brown bear, Amur leopard, wolf, Eurasian lynx, musk deer, sika deer, fish owl, Stellar's sea eagle, and many others.

IV. Researchers collecting information on tigers in the TCU during the last 8 years.

1. Have you worked in this TCU during the **last 8 years**? ___X__Yes _____ No

2. Who else has worked on tigers in this TCU during the **last 8 years**?

There are probably 100 people or more that have been involved in tiger work in one way or another in the Russian Far East over the past 8 years. A fairly comprehensive list would be the list of participants at the conference in Khabarovsk in 2001, which members of STF attended.

Researcher #1

Name:

Institution:

Address:

Phone: Fax: Email:

Researcher #2

Name: _____

Institution: _____

Address: _____

Phone: _____ Fax: _____ Email: _____

Researcher #3

Name: _____

Institution: _____

Address: _____

Phone: _____ Fax: _____ Email: _____

V. Additional Comments:

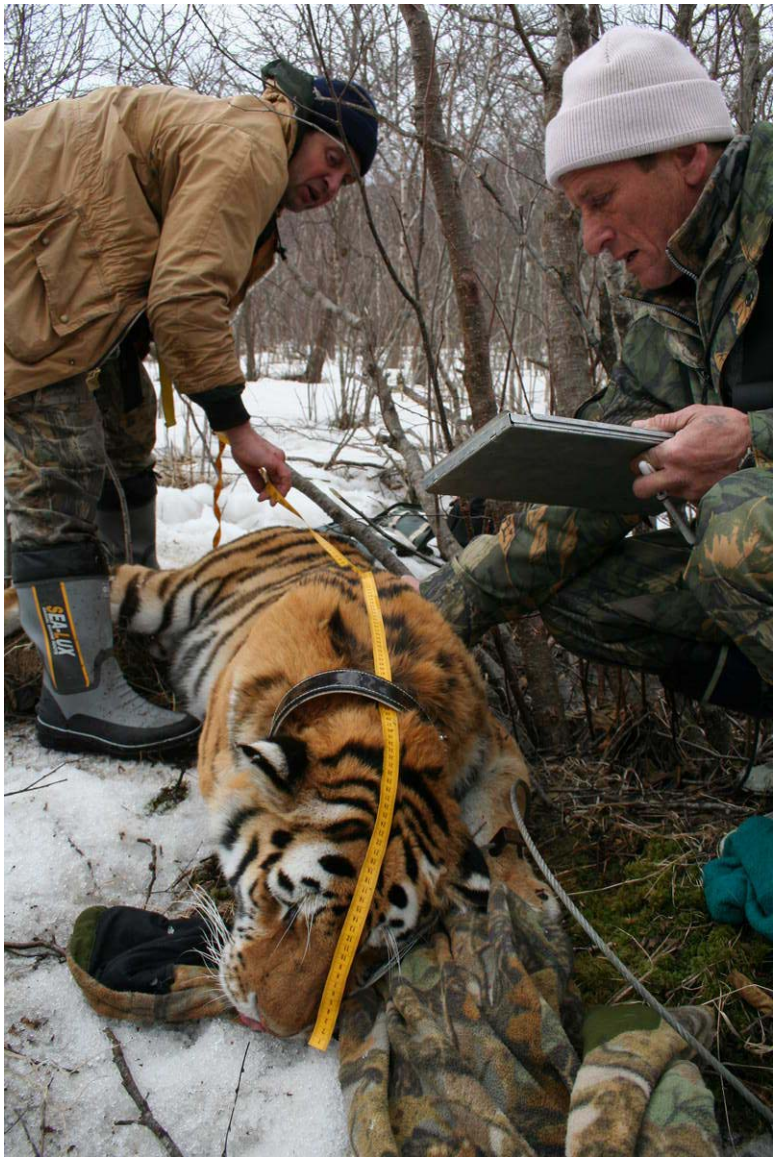
_____

_____

Photographs

Roman Kozhichev monitors the signal of a Siberian tiger on Sikhote-Alin Zapovednik, where tigers often wander the coast of the Sea of Japan.
Credit: John Goodrich/WCS. File name: *Roma telemetry by JGoodrich.jpg*

Veterinarians give tiger cub “Volya” a health check up. The cub was taken into captivity a year earlier because he was shot in the mouth by poachers who killed his mother. Surgery to repair his shattered jaw and intensive care by the Kruglov’s at the Utyos Wildlife Rehabilitation Center saved the cat’s life, but left the cub too tame to be released back into the wild.
Credit: John Goodrich/WCS. File name: *volya (pt71) by JGoodrich 0012 small.jpg*



Nikolai Rybin (left) and Vladimir Melnicov measure Amur tigress “Lida” (Pt35) when she was recaptured to change her radio-collar because the batteries were due to fail.
Credit: John Goodrich/WCS. File name: *Lida 2006 by JGoodrich_0109small.jpg*

Nikolai Rybin has his hands full with one of Lida's three cubs that were captured in autumn 2005. To determine survival rates and causes of mortality during their first year of life, cubs are fitted with radio-collars designed to expand and eventually fall off.
Credit: John Goodrich/WCS. File name: *Pt35 cubs 2005 by JGoodrich 79small.jpg.*

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