25b, 25d) while in the other three sites (Borisovkoe Plateau, Sineya, and Terney Hunting Society) sika deer populations appear to be decreasing (Figures 25c, 25e, 25f). In all but one of these sites, the P-value is less than 0.1, suggesting that trends are significant and real. These results suggest that the southern coastal populations of sika deer may be expanding, while others are going through a contraction phase. Of particular concern is the Borisovkoe Plateau region, which is important for both tigers and leopards, and where red deer populations are very low. If sika deer numbers continue to show declines, it may be necessary to take remedial actions in this region.

Roe deer. Track densities of roe deer vary with protected status ($F = 12.15$, $P = 0.001$) and latitude ($F = 46.23$, $P = 0.0001$) but not with proximity to coast (($F = 0.62$, $P = 0.434$). Roe deer showed the same pattern as do red deer, with densities in the central monitoring sites highest (Figure 16), but there were significant differences only between the northern areas and the other latitudes. Roe deer densities are nearly two times higher in zapovedniks than unprotected areas (Figure 18).

Roe deer numbers showed the greatest stability of all 4 prey species reviewed, but there was nonetheless a very slight and nearly significant increasing trend to the population estimates (Figure 26). The increase is very slight, considering the wide confidence intervals, but in a regression analysis this tendency is nonetheless very clear (Figure 26).

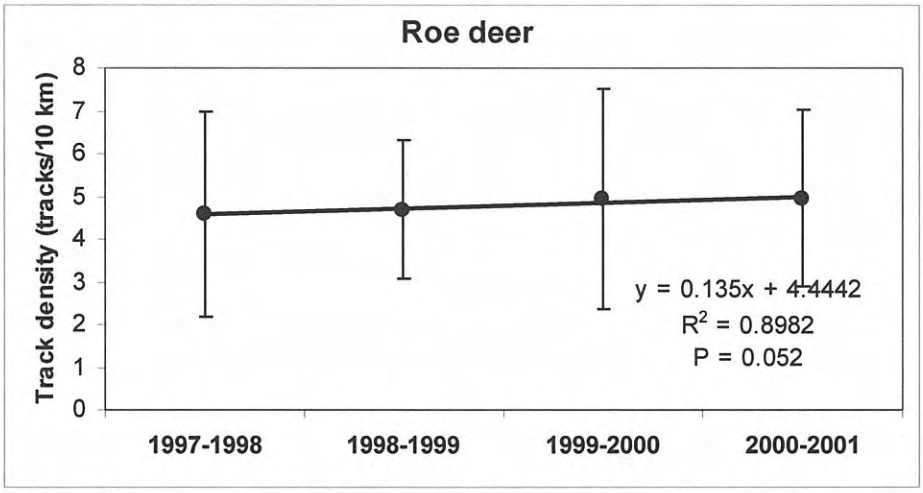


Figure 26. Average roe deer track density for all sites, for each of the first four years of the Amur Tiger Monitoring Program, 1997-1998 though 2000-2001.

Despite the overall positive trend, only two sites, Sandagoy and Botchinski Zapovednik, demonstrated positive trends (with $P \leq 0.2$), but two sites, Lazovski Raion and Ussuriski Zapovednik, also demonstrated negative trends. The majority of sites appear to have stability roe deer populations.

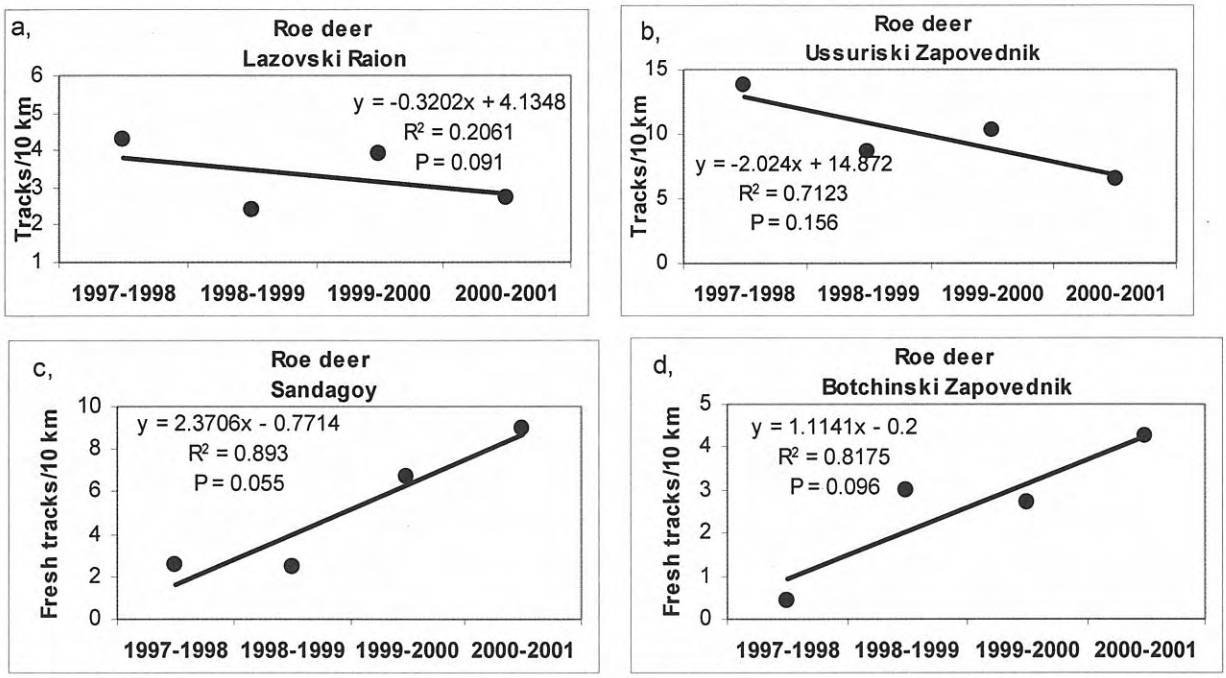


Figure 27a-d. Trends in roe deer densities, 1997-1998 through 2000-2001, as measured by fresh tracks/10 km along routes in 4 monitoring sites (where $P < 0.2$ that the slope of the line does not equal zero) of the Amur Tiger Monitoring Program.

Ungulate and Tiger Densities Inside and Outside Protected Areas.

Numerous analyses conducted above have demonstrated the importance of zapovedniks as reservoirs, or core areas, for tigers and their prey. Perhaps the most convincing evidence, however, comes from comparisons of zapovedniks (strictly protected areas) and the monitoring sites immediately adjacent to zapovedniks. These paired comparisons are particularly valuable because habitat types, climate, and a host of environmental parameters that may affect ungulate

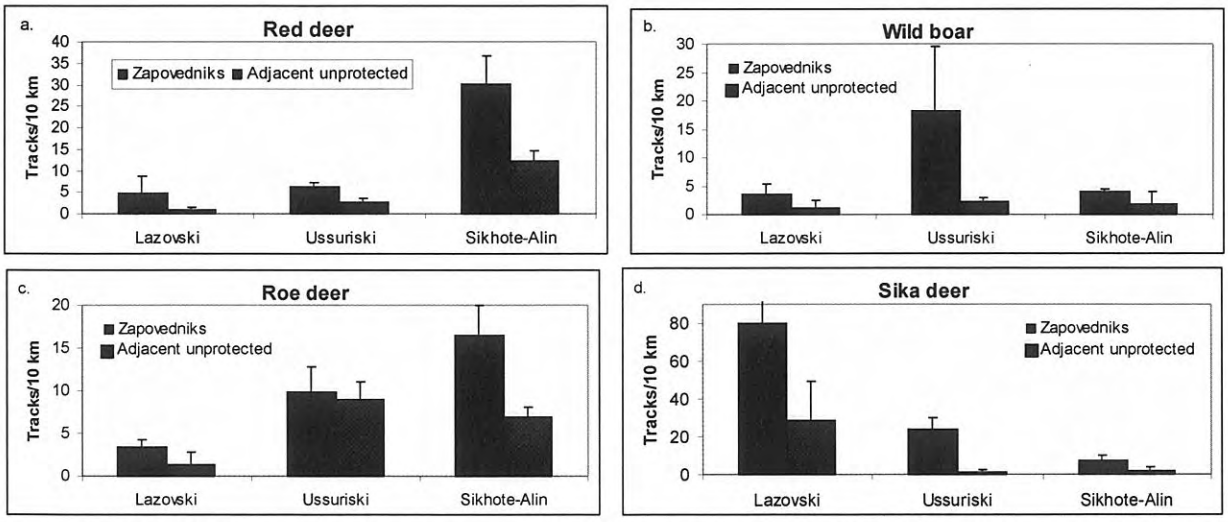


Figure 28a-d. Comparison of ungulate densities, based on fresh tracks/10 km in protected areas (zapovedniks) and adjacent territories included in the Amur Tiger Monitoring Program.

and tiger densities should be constant for each pair, with the primary difference being the influence of anthropogenic impacts. The paired comparisons for all 4 prey species demonstrate a very consistent pattern: track densities are almost without exception at least two times higher in zapovedniks than in adjacent territories (Figures 28a-d). Given this pattern, it would be expected that tiger densities are also higher, and this is indeed the case (Figure 29a-b), whether looking at track density estimators (Figure 29a) or expert assessments of tiger density (Figure 29b), indices of tiger numbers are consistently higher in zapovedniks than adjacent territories. Given that a disproportionate share of cub production also occurs on zapovedniks, these regions must be considered core areas, and security to these areas is key to long-term survival of the Amur tiger population.

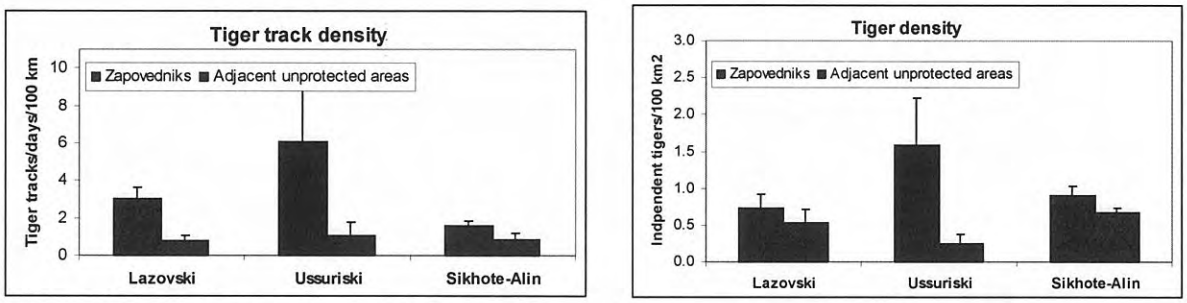


Figure 29a-b. Comparison of indices of tiger abundance in zapovedniks (protected areas) and adjacent monitoring sites, based on a 4-year average for the Amur Tiger Monitoring Program, 1997-1998 through 2000-2001.

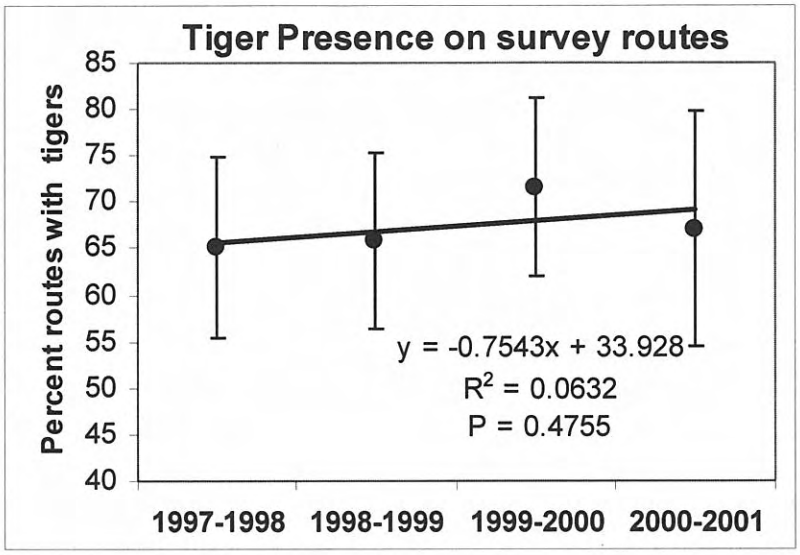
Trends in the Amur Tiger Population and a Scorecard for Monitoring Sites

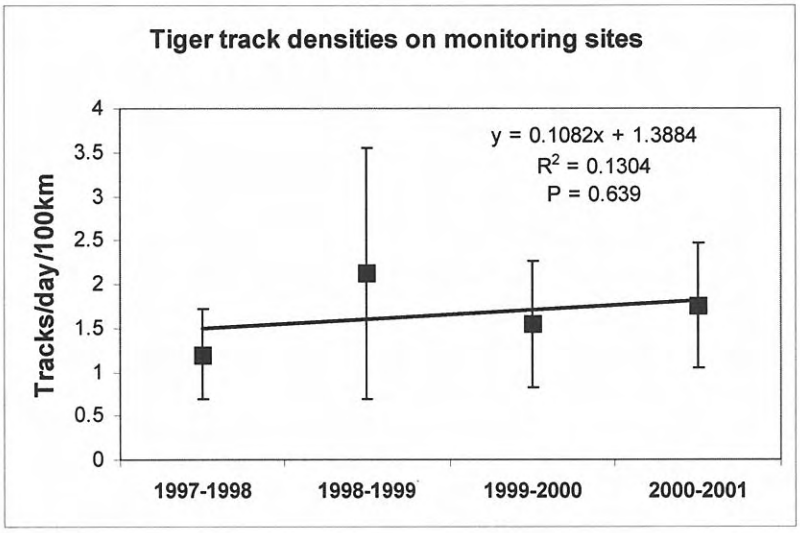
We used a linear regression trend analysis for the three indicators of tiger abundance: % routes with tigers present, mean track density, and an expert assessment of independent tiger density. The intent of these regression analyses is to identify trends in the tiger population across the whole region, and in each of the monitoring sites. We have defined sites as "areas for concern" if the trend analyses demonstrates a negative slope for which the statistical probability was greater than 80% (i.e. $P < 0.2$) that the population was not stable (i.e. that the slope of the line did not equal zero). We have used the same criteria for defining sites as "areas with positive growth indicators" if the slope is positive.

This is a very conservative approach, as most statisticians use a P value of 0.05. By increasing the P value to 0.2, we dramatically increase the probability of defining a site as an "area of concern" or an "area of positive growth indicators" when in fact such may not be the case. Our rationale for taking this approach is that we must have a mechanism for identifying areas early, so that remedial action can take place: a more liberal approach (with a smaller P value) would result in fewer "false alarms" but may not identify all areas in time to respond on an appropriate time scale.

To balance this conservative approach, we have used three indicators of tiger abundance that could signal changes in the population. We consider changes to be important if two of the three indicators indicate a similar pattern.

Overall, the population of Amur tigers, based on average estimates derived from the 16 monitoring sites, appears to be stable (Figures 30a-c). All three of the indicators suggest a stable population (no significant positive or negative slopes), and in fact, all three P values are greater





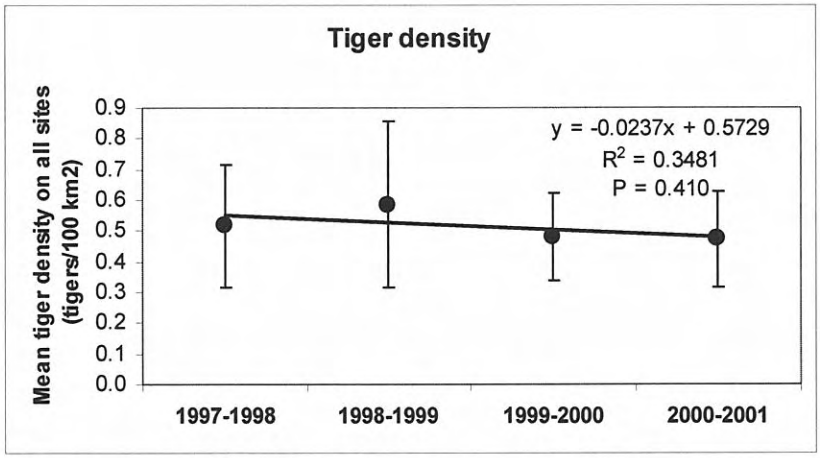


Figure 30a-c. Trend analyses for three indicators of tiger abundance: a. % routes with tiger tracks present; 2) mean track density; 3) density of independent tigers, based on expert assessment. Results are averaged for each year from 16 monitoring sites across tiger range in the Russian Far East.

than 0.4. Thus, if we can assume that the monitoring sites are a good representation of the entire population, Amur tigers appear to be holding steady in the Russian Far East.

Despite this overall stability, there are a number of areas for concern. Only two sites – Lazovski Raion and Bolshe-Khekhtsirski Zapovednik, demonstrated negative trends for at least one of the three indicators, and of those, only Lazovski Raion had negative trends for two of the tiger abundance indicators (% presence on routes, and tiger density). Thus, the results suggest that tiger numbers have decreased in only one of the 16 sites. We label Lazovski Raion as an "area of concern."

On the other hand, seven sites had at least one positive indicator of tiger abundance. Of those, however, only Botchinski Zapovednik had two positive indicators (track and tiger density). Thus, it appears likely that tiger numbers have been increasing in Botchinski Zapovednik over the past 4 years.

Along with measures of tiger abundance, reproduction is a second important indicator of population status. Nine of the 16 monitoring sites reported cubs from the past winter season. If we consider only the past 3 winters (in 1997-1998 we only had 14 sites, making comparisons difficult), there has been a decline in the number of sites producing cubs over each of the past three winters (Figure 31). Although total cub production has remained stable, a smaller percentage of the monitoring sites are responsible for maintaining the current level of productivity. Unfortunately, it appears that zapovedniks are becoming, more and more, islands of high prey density, higher tiger densities, and higher productivity. Thus, zapovedniks play a major role in producing dispersers that move out of the zapovedniks and into adjacent habitat. Since there are now records of tigers dispersing more than 120 km, the few scattered zapovedniks can potentially provide dispersers over a wide area. However, it is unlikely that productivity within zapovedniks is sufficient to retain present numbers of tigers across their entire range. The low densities of prey in unprotected areas (e.g. Figure 28) may explain reduced productivity of tigers in these areas. Increasing prey numbers will be critical to retaining tigers and increasing productivity in these unprotected areas over the long term.

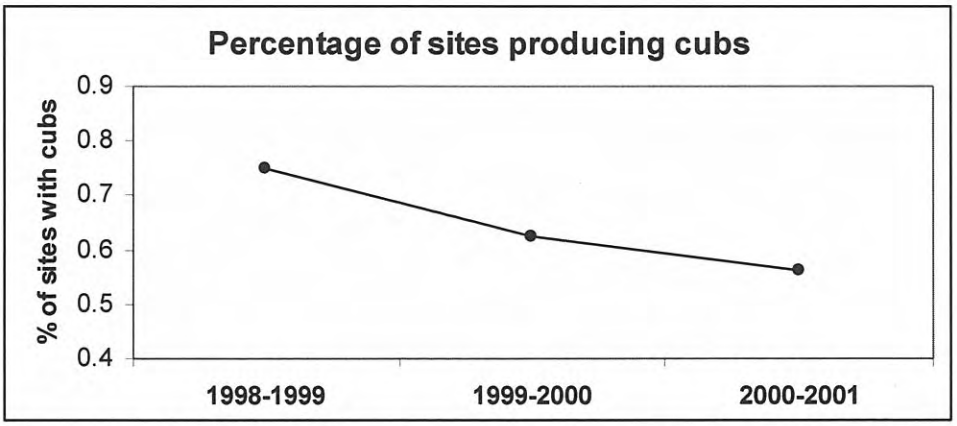


Figure 31. Percentage of monitoring sites that produced cubs in each of the past 3 winter seasons, for all 16 monitoring sites of the Amur Tiger Monitoring Program (1997-1998 not included, when only 14 sites were monitored, confusing comparisons)

A monitoring site scorecard. We are in the process of developing a "scorecard" for each of the monitoring sites, based on tendencies derived from trend analyses (Table 13). By identifying the sum of negative and positive trends simultaneously within any one site, it may be possible to derive an estimate of its status, at least in relation to other monitoring sites. We believe that the key characteristics that should be included in this scorecard are:

- All three indicators of trends in tiger abundance
- Indicators of trends in prey numbers
- Whether recruitment was reported in the previous winter.
- Reports of tiger mortalities (especially human-caused)
- Human impacts .

Presently, we have only included the first three indicators in this scorecard system (Table 13). Mortality data is not consistently reported across all sites, and in fact tends to be recorded only in those sites where a coordinator is permanently stationed (e.g. zapovedniks). Therefore, evidence of mortality is more closely related to knowledge of the area than real mortality trends across the region, at this point. Similarly, we have not yet derived indicators of human impacts, but we are working on these.

Table 13. A "scorecard" for monitoring sites: a summary of trend analyses and population status of tigers and their prey on the 16 monitoring site of the Amur Tiger Monitoring Program for the 2000-2001 season.

		Trend analyses										
		Tiger abundance			Ungulate abundance				Reproduction	Mortality	Human impacts	
#	Name	% tiger presence on rtes	Tiger track density	Tiger density	Red deer track density	Wild boar track density	Sika deer track density	Roe deer track density	Reproduction this year	Mortalities reported	Human impacts	Total
1	Lazovski Zapovednik			+	+	+	+		+	-2		5
9	Botchinski Zapovednik		+	+				+	+	0		4
7	Sandagoy (Olginski Raion)				+		+	+	0	0		3
8	Khor		+						+	-2		2
11	Tigrini Dom	+							+	0		2
5	Bikin River	+							0	-1		1
12	Matai River Basin (Zakaznik)					+			0	-1		1
15	Sineya (Chuguevski Raion)		+			-	-		+	0		1
3	Ussuriski Zapovednik							-	+	-1		0
4	Vaksee (Iman)					-			+	-1		0
10	Bolshe Khekhtsirski Zapovednik		-		+				0	-1		0
14	Sikhote-Alin Zapovednik					-			+	-2		0
2	Lazovski Raion	-		-			+	-	+	-2		-1
6	Borisovkoe Plateau						-		0	-1		-1
13	Ussuriski Raion		+	-		-			0	-1		-1
16	Terney Hunting lease					-	-		0	0		-2

By simply summing the pluses and minuses derived from trend analyses of tiger and ungulate populations, along with tiger recruitment, we have a mechanism for comparing relative status of the 16 monitoring sites. Based on these parameters, Lazovski and Botchinski Zapovedniks appear to have the most positive signs, in terms of increasing trends in either tigers or prey, and good recruitment. Five of the 16 sites are considered to be stable (i.e. sum=0), and only three have a total negative sum: Lazovski Raion, Borisovkoe Plateau, and Terney Hunting Lease. These regions represent areas of concern, where conservation efforts may need to be focused.

V. LITERATURE CITED

Conover, W. J. 1980. Practical nonparmetric statistics, 2nd Edition. John Wiley & Sons.

Hayward, G. D., D. G. Miquelle, E. N. Smirnov, and C. Nations. In press. Monitoring Amur tiger populations: characteristics of track surveys in snow. J. Wildl. Manage.

Thompson, W. L., G. C. White, C. Gowan. 1998. Monitoring vertebrate populations. Academic Press.

SAS 1998. SAS Release 6.12 TS Level 025. SAS Institute Inc. Cary, N.C.

VI. REPORTS ON INDIVIDUAL MONITORING SITES 2000-2001

Introduction

Following are brief summaries of each monitoring site. For each site, a summary of the highlights and results of the year are provided by the coordinator for that site. Additionally, a map of the area, including location of survey routes, location of tiger tracks reported on survey routes during both surveys (early and late winter) and location of tiger tracks reported off survey routes (or reported at another time than the actually survey) is also provided. These track data provide the basis for the three estimators of tiger abundance (presence/absence, track density, and number of independent tigers) (see Section I), each of which is summarized in a graph for the first four years of the monitoring program for each site. A summary table of the sex-age distribution of tigers in each site, based on expert assessments is also provided, which includes information on reproduction. Ungulate track density estimators are summarized in a table, and for comparative purposes, in a bar graph as well.

Some sites, such as Ussuriski Zapovednik and Ussuriski Raion, or Sikhote-Alin Zapovednik and Terney Hunting Society, are reported on together by the single coordinator responsible for them. All 5 sites in Khabarovsk are reported on together by Yu. M. Dunishenko, who provides an excellent assessment of conditions there.

In summary, results of this year's monitoring program at each of these sites represent a "snap-shot" of conditions existing across tiger range in the Russian Far East. By reviewing the sum of these data it is possible to derive a better understanding of the variation in conditions across this vast area inhabited by tigers, and to better appreciate local variations, trends, and conditions for tigers and their prey base.

LAZOVSKI ZAPOVEDNIK

Southeast Primorski Krai

Report on results of Amur tiger monitoring program in Lazovsky Zapovednik monitoring unit in winter 2000-2001
Coordinator - G. P. Salkina

1. Name of monitoring unit: Lazovsky Zapovednik
2. Coordinator: G. P. Salkina
3. Time of simultaneous counts: the first count was conducted on December 14-27. The count on 10 routes out of 12 was conducted on 14-15th of December. Seven routes were traveled on the 14th of December, three routes were traveled on the 15th of December, and the remaining two routes were traveled on 17th and 27th of December. The second count was conducted on 10 routes out of 12 on 10-11th of February and two routes were traveled on 12th and 25-26th of February.
4. Routes ##: 1-12
5. Total length of routes: all routes (total length is about 130 km) were traveled on foot.

6. Conditions: the first snow fell early this winter - on 20th of November. The last snow before counts fell on the 9th of December, but then there was a strong wind that could destroy some tracks. The count on 10 routes out of 12 was conducted in 5-6 days after snowfall. During the count snow depth varied from 13 cm on the coast to 50 cm inland (count on 27th of December). During the main survey (December 14-17) maximum snow depth inland was up to 38 cm in the upper reaches and on passes. On northeastern slopes along the coast snow depth was as much as 34 cm.

Before the count in February the last snowfall took place on the 1st of February. Routes were traveled 9-10 days after last snowfall (10 routes out of 12), one route 11 days after snow, and the last route 24-25 days after snow. In February snow depth varied from 0 cm in some places on passes to 80 cm in creek heads. At this time snow depth on the coast was 17 cm in coniferous forests, up to 50 cm on passes, up to 54 cm in glades and up to 74 cm in fir forests. The weather was rather cold on the 10th and 11th of February. During this count snow was crumbly, icy crust over snow occurred only in a scattering of areas. On 25th and 26th of February count was conducted on route # 4 because this route was not traveled earlier (see below). At this time snow was crumbly and was melting extensively, making it difficult to walk (that is why the route was traveled during two days) and to identify age of tracks.

7. Assessment of efficiency: In December snow depth did not obstruct our survey work along the routes. However rivers were not frozen completely and it was difficult to travel, especially on skies. In February snow was much more abundant and it was impossible to walk along the routes without wide skies in inland regions. Fieldworkers had to use only their own skies and not all people have them. Route # 4 had to be traveled on 10th and 11th of February, when the survey was being conducted. A fieldworker was brought to the route in morning on 10th of February, and he later gave the information about tiger tracks, ungulate tracks and snow depth to coordinator, who recorded all data in a Field diary. But later we received information that the route had not been traveled. A check on the work confirmed this information. There were no human tracks neither in creek valleys nor on trails where the route is situated. Therefore this route was surveyed on 25th and 26th of February, i.e. 16 days

after the beginning of the survey in the zapovednik. Our visit to the cabin in Shirokiy Log creek confirmed that this fieldworker was here during survey in December, i.e. he traveled only one-third of the route. The rest of the survey route probably was not traveled.

During the count in February an incident occurred. Because of deep snow a fieldworker who was travelling along route # 5 reached the pass (that is situated in the middle of the route) only in the evening despite the fact that he drove out of Lazo at 8 a.m. He had skies 15 cm wide. On the pass he was not able to take off his boots to dry his feet. Here the fieldworker had to wait until the moon rose (about 10:30 p.m.) and then went down to the cabin, which he reached only in the evening of the next day. As a result he incurred severe frostbite on his feet. Search for fieldworker began immediately and he was immediately provided with medical care. This person was a highly experienced and conscientious fieldworker and he gathered all the necessary data. According to zapovednik's safety code routes should be traveled by two people. To minimize such incidents coordinators of monitoring program should develop a safety code and insert it into Field diary. It is necessary to buy 24 (12?) pairs of skies of adequate width.

It is difficult to write the data on snow depth in the Table # 8. The following points are placed in the table - snow depth at the starting point of route, in the middle and at the end of the route. Instruction for coordinators says that snow depth should be measured in valley, on slopes and on the pass. Many routes pass river valleys through slopes of different aspects. Here is the question - what measurements should be done in this case? For example - if route passes through river valley, through divide, southern and northern slopes - it is clear that it is necessary to measure snow depth in valley, on different slopes and on pass in order to obtain adequate information about snow conditions of this winter. Table columns concerning snow depth should have subsections: snow depth in valley, on slopes (separately southern slopes, including southeastern and southwestern parts, and northern slopes, including northeastern and northwestern parts), on divides. Field diary should contain instructions how and where to measure snow depth, how many measurements should be done at one place or to give mean value. There is also a question - what to do with snow-wreaths and places without snow - to measure them separately or to give mean value?

8. Summarizing of results:

Living conditions and status of ungulate populations.

Tiger prey species that occur in this unit include wild boar, elk, sika deer, roe deer, musk deer and ghoral. Zapovednik should provide optimal conditions for these species, and there are all types of habitat here - from oak forests to coniferous taiga. This fall there was an abundant crop of pine cones. The 2000-2001 winter was difficult for ungulates. Snow cover formed early with the first snowfall on 20th of November, which did not melt (except on southern slopes). The border of the Zapovednik is indented; valleys jut out deep into its territory. Ungulates came down to valleys beyond borders of the zapovednik, to fields and roads where they were poached. In January snow cover increased (see above), and the winter was quite cold. The weather station in Preobrazhenie registered - 22° C for only the second time in the past 15 years. Snow insolation (?) was inadequate and winter conditions ungulates were difficult, especially for sika deer, which have a hard time with snow depths greater than 50-60 cm for 2-3 months. A great number of sika deer were poached on the road between Benevskoe and Kievka village. From November to March 219 poached ungulates were registered by Zapovednik employees (most of them sika deer). Part of the population died from starvation, caused by deep snow (20 sika deer were found). The situation was aggravated by a 40-50 cm snowfall that took place between 3rd and 4th of March, followed by

sleet on the coast, resulting in an icy crust. Dead deer (which were dissected) had full stomach but filled with low-calorie food.

Average number of sika deer in a herd was six individuals. It was taking into consideration during tracks counting on "zhirovka". To count tracks of other ungulates was not difficult for fieldworkers.

In comparison with the past year total ungulate density increased by 8% (approximately, if to take average values for December and February). The elk and wild boar populations remain more stable than sika deer, but it is likely that ungulate populations (especially sika deer) will decline further before green-up begins.

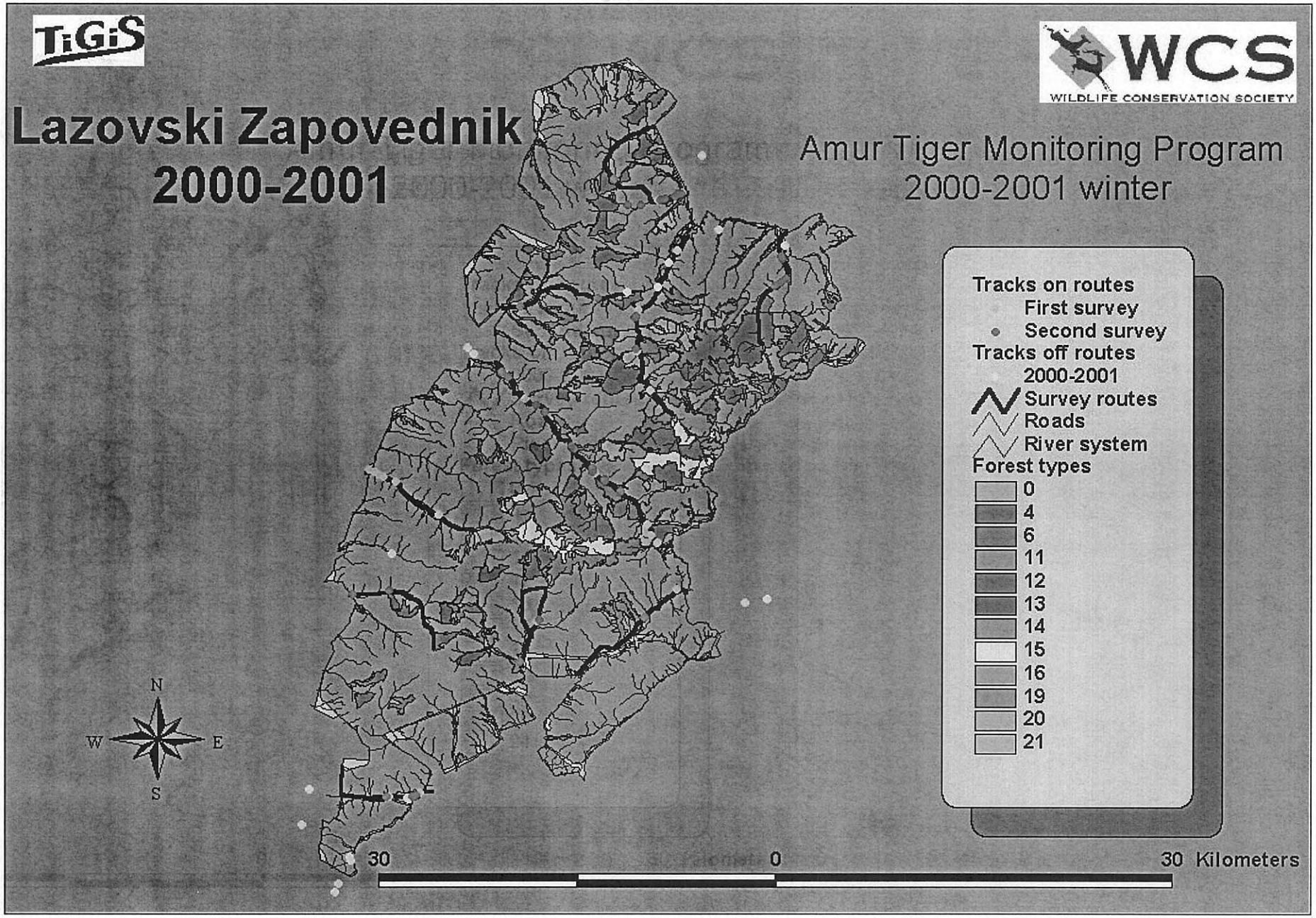
Living conditions and status of tiger population in comparison with previous information (with data of Tiger census 1996).

In comparison with data obtained last year and during the 1996 tiger census the number of tigers has increased by one individual. Two litters consisting of five cubs appeared. Information about litters appears valid because in one case it was checked by coordinator, in another case the cub tracks were photographed. Tiger numbers can be overestimated due to inaccurate measurements of pad width and errors in identifying age of tracks. But there is no doubt that six tigers were present in the reserve during the survey. But following facts raise some doubts. During the past years visible tiger signs have become rare in the zapovednik, including the number of communicative signs (scratches, urine marks, etc.). On some routes no tigers have been found for a long time: during one survey tigers left numerous tracks, during another survey there were neither fresh nor old tiger tracks. It is indicative that only three tigers were found during the count "on white trails" (three tracks during the first day and one track - during the second day), although in past years at least six tigers were identified during such survey. That is why the number of tiger tracks per route unit does not directly reflect tiger numbers and density.

Appearance of cubs indicates that population status is improving to some extent in comparison with past two years. However, illegal hunting for deer and their death from starvation probably will destabilize the current situation.

Habitat conditions

In past fire season (spring and fall 2000) there was one forest fire in the territory of the reserve, where 2.5 ha were burnt. One road (about 6-7 km long) was being reconstructed in northeastern part of coast. High recreational pressure still remains on southeastern coastal part of the reserve. In the warm season many people cross the reserve territory in order to get to the bay that is situated in an adjacent area. As far back as in 1998 the drying of Jeddo spruce in the area of 100 ha was registered. Probably this process began in 1992. The number of ungulates in the reserve is influenced by poaching that takes place near the reserve's borders and in its buffer zone, which are visited by ungulates from time to time.


TiGiS
WCS
WILDLIFE CONSERVATION SOCIETY
Lazovski Zapovednik
2000-2001
Amur Tiger Monitoring Program
2000-2001 winter
Tracks on routes
First survey
Second survey
Tracks off routes
2000-2001
Survey routes
Roads
River system
Forest types
0
4
6
11
12
13
14
15
16
19
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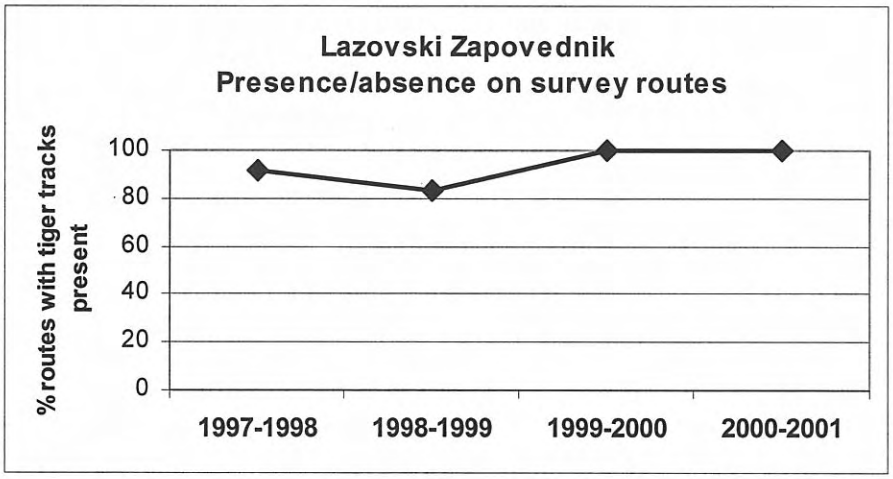
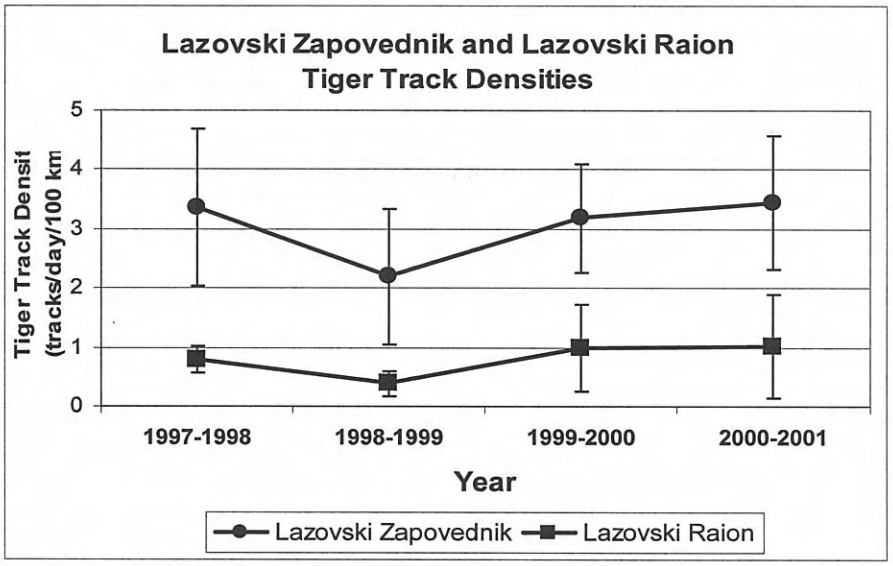


Percentage of routes with tiger tracks reported (both surveys combined).



Comparison of track densities in Lazovski Zapovednik and adjacent Lazovski Raion

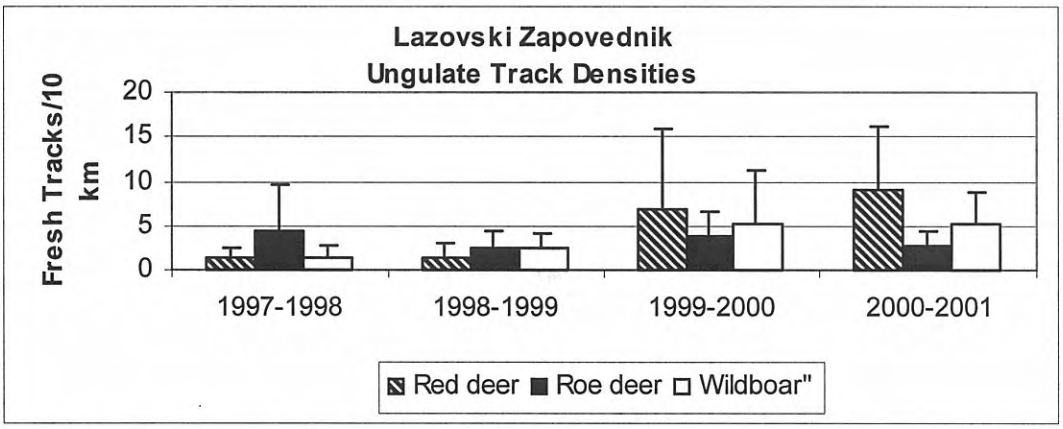
Number of Independent tigers (adults, subadults, unknown) on monitoring site

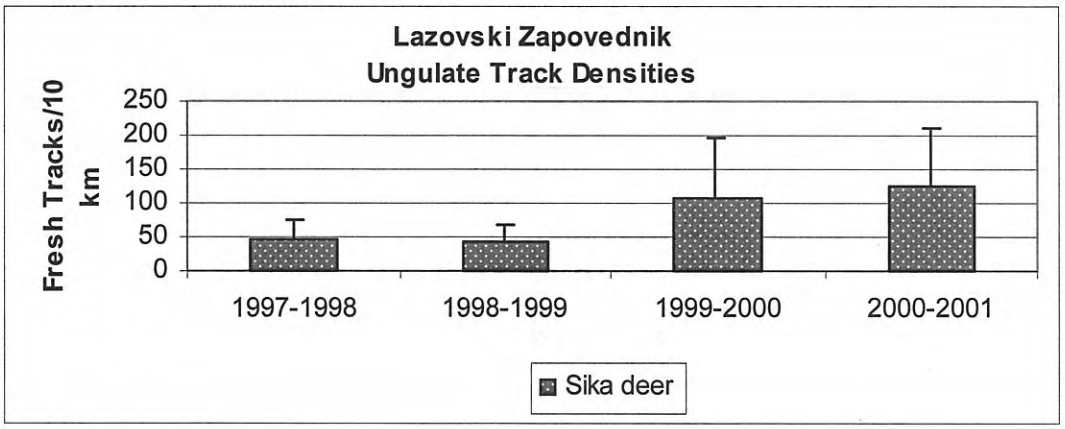
Number of tigers, by age class, and sex (for adults only) on Amur tiger monitoring sites in winter

			Age						Totals		
			Adults								
#	Site	Year	Males	Females	Un-known	Sub-adults	Cubs	Age unknown	Total adults	Total independents*	Total (all tigers)
1	Lasovski Zapovednik	1997-1998	0	0	0	0	0	6	0	6	6
1	Lasovski Zapovednik	1998-1999	0	1	0	0	2	7	1	8	10
1	Lasovski Zapovednik	1999-2000	3	4	0	0	0	3	7	10	10
1	Lasovski Zapovednik	2000-2001	1	2	0	0	5	8	3	11	16

Mean track density (tracks less than 24 hours) of ungulates in Amur tiger monitoring sites for first 4 years.

		Prey		1997		1998		1999		2000		Grand Total	
#	Monitoring Site	species	n	mean	std	mean	std	mean	std	mean	std	mean	std
1	Lasovski Zapovednik	Red deer	12	1.23	2.39	1.49	2.64	6.94	15.66	9.16	12.57	4.71	10.46
1	Lasovski Zapovednik	Roe deer	12	4.30	9.26	2.40	3.60	3.90	4.89	2.73	3.05	3.33	5.61
1	Lasovski Zapovednik	Sika deer	12	45.18	50.58	43.85	39.94	108.28	158.11	123.38	155.86	80.17	117.63
1	Lasovski Zapovednik	Wild boar	12	1.45	2.16	2.52	2.73	5.24	10.45	5.08	6.45	3.57	6.39





LAZOVSKI RAION
Southeast Primorski Krai

Report on results of Amur tiger monitoring program in Lazovsky Raion model unit in winter 2000-2001
Coordinator - G. P. Salkina

1. Name of model unit: Lazovsky raion - Krivaya river basin and coast
2. Coordinator: G. P. Salkina
3. Time of simultaneous counts: December 27-30 and February 16-22 (survey on 10.5 routes out of 11 was conducted on February 16-21, 2001)
4. Routes ##: 1-11
5. Total length of routes: nine routes were traveled on foot, two routes were partly traveled on foot and partly by vehicle. Total length of routes is about 145 km.
6. Conditions: the first snow fell early this winter - on 20th of November. The last snow before counts fell on 23rd of December; then there was a strong wind that could eliminate some tracks. The count was conducted 4-7 days after snowfall. During the count snow depth varied from 10 cm on the coast to 100 cm on the divide in the upper reaches of Krivaya river. In Krivaya valley snow depth was 29-48 cm. Snow depth on northern slopes was up to 45 cm, on southern slopes - up to 37 cm, on passes - 40-100 cm.

Before the count in February the last snowfall took place on the 1st of February. Routes were traveled 15-20 days after the last snowfall (10 routes out of 11), the second part of the last route was traveled on the 21st day after snowfall. During the count snowmelt was extensive, and the temperature was above zero. It was difficult to travel along routes because snow stuck to skies, and one route was traveled during two days, including a night spent in the forest. In February snow depth varied from 37 cm in valley bottoms to 68 cm on northern slopes in Krivaya river basin. Snow depth in this river valley was 48-57 cm. At this time snow depth on the coast was 0-70 cm. Here on northern slopes snow was 67-70 cm deep, on southern slopes - 0-70 cm deep and in river and creek valleys - 0-70 cm deep.

7. Assessment of efficiency: Two routes were partly traveled on foot and partly by vehicle because it was necessary to travel routes ## 4 and 5 completely in one day because there were no cabins to stay overnight (cabins were burnt). That is why we tried to drive fieldworker as far as possible along the road and then finish the route on foot. Route # 6 was also traveled by a combination of vehicle and on foot. This route is situated in river valley where there are many crossings, i.e. this area was difficult to travel by vehicle. That is why we should not leave the driver (who brought fieldworkers to the place) alone. It was impossible to use more fieldworkers or assistants because the vehicle was small.
In February the count was delayed due to incident which occurred during the survey in the Zapovednik (see report on Lazovsky Zapovednik).
On the whole surveys were conducted by experienced people in an appropriate timeframe.

8. Summarizing of results:
Living conditions and status of ungulate populations.
Tiger prey species that inhabit the monitoring unit include wild boar, elk, sika deer and roe deer. Abundant pine nut crop was available in fall of 2000, but much of it was gathered by people. The 2000-2001 winter was difficult for ungulates. First snow fell on 20th of

November and it did not melt (except on southern slopes). Ungulates came down to the valleys, fields and roads where they were easily poached. In January snow depth increased substantially, and the winter was quite cold. The weather station in Preobrazhenie registered 22° C, only the second such record in the past 15 years. Snow insolation was inadequate and winter conditions were difficult for ungulates. The sika deer population especially was hard hit. It is generally accepted that this species copes poorly with snow depths greater than 50-60 cm for 2-3 months. At the beginning of March, because of greater snow depths (about 60 cm more), the conditions for ungulates in this model unit were more difficult than in Lazovsky Zapovednik. By the 8-12th of March snow cover was up to 1 m, and an icy crust formed, strong enough to support a man, and leave no human tracks. During the count 28 poached deer were found, and 13 deer died from starvation (including the beginning of March).

The number of ungulate tracks found this year was on average less than past year. The number of elk tracks decreased by 5-6 times; the number of wild boar tracks remains at the same low level.

Living conditions and status of tiger population in comparison with previous information (for example with data of Tiger census 1996).

In this model unit the tiger population density (adult tigers) has reduced (even taking into consideration a possible underestimation) twice in comparison with the winter season 1995-1996. This winter one litter which consisted of three cubs was registered. In 1995-1996 (up to February 1996) four litters totalling five cubs were present in this territory. Therefore, the number of tiger cubs has been reduced in half. Tigers were not found in the southwestern part of the unit, where no tracks were observed on five routes during the count. No tiger tracks were also found on one route situated in the northeastern part. Last year there were no tiger tracks here as well, but a tiger walked within the valley where the route is situated. Last year tiger signs (marked trees) were found on two routes. This year no tiger tracks or signs were found on another route (neither during the counts nor during the whole season). Tiger habitat is being eliminated by the densely populated valley of adjacent Partizansk Raion. Tigers can be still found in remote areas, which are difficult for hunters to access or to develop.

Illegal hunting for ungulates and death due to starvation will probably have a negative impact on this tiger subpopulation in the future.

Habitat conditions

During this year, no considerable movements of human population occurred in this model unit. In Krakovka Bay the owner of one of recreation departments is constructing a smoking-shed. We suppose it will be used for smoking of meat of wild ungulates, sika deer in particular, which are widely distributed here, even though this population of sika deer in Lazovsky Raion is listed in the Red Book of the Russian Federation.

Industrial development did not increase. According to the information of Lazo Forestry District, the area of logging activity in this model unit was less than past years. Data obtained from Tikhookeanski Forestry (military forestry that includes Medonos creek basin)

indicated that there was no logging here. But information we have does not confirm this statement. Logging took place both in this and past years.

According to the information obtained from local forestries and local people, no fires happened burned last year in this model unit.

Recreational pressure from citizens of epy adjacent densely populated Partizanski raion remains high. In summer many people are looking for ginseng here. In the upper reaches of Krivaya river in Maly Port hunting lease there is a reproduction area, where hunting is limited. But ungulate density remains very low there. It is especially evident in Medonos creek area, where route # 4 is situated. No fresh tracks of ungulates were found there and old tracks are also very rare. Mamy more ungulate tracks were found on the next route that is situated on the other side of divide along the river valley, which flows into the sea. Probably deep snow made access to this area very difficult.

Hunting pressure on ungulate populations increased in comparison with the past year. The number of licenses distributed for hunting elk and wild boar is more than ungulate populations' density can bear. Hunters with license have a right to stay in the territory, but they kill sika deer instead of elk, wild boar or roe deer.

On the whole, it is our opinion that tiger habitat and living conditions in this model unit continue to deteriorate.


TiGiS
Lazovski Raion
2000-2001
WCS
WILDLIFE CONSERVATION SOCIETY
Tracks on routes
First survey
Second survey
Tracks off routes
2000-2001
Routes
Roads
River system
Forest types
0
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12
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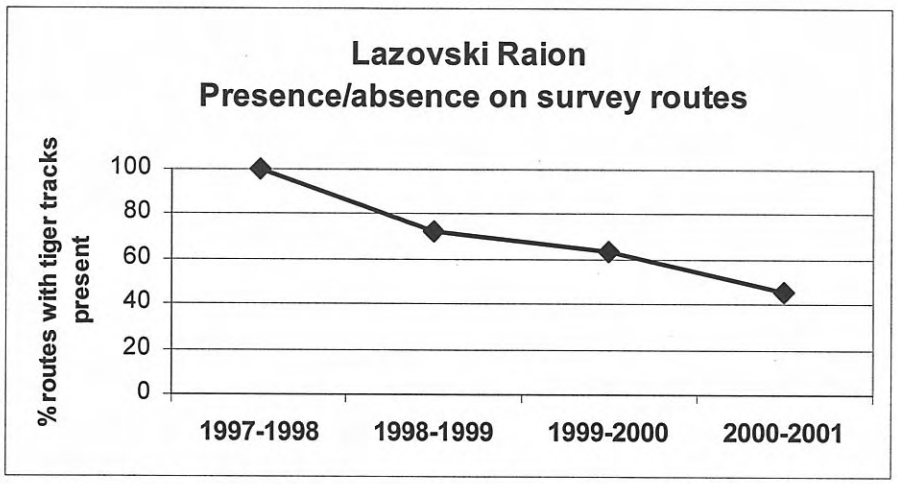
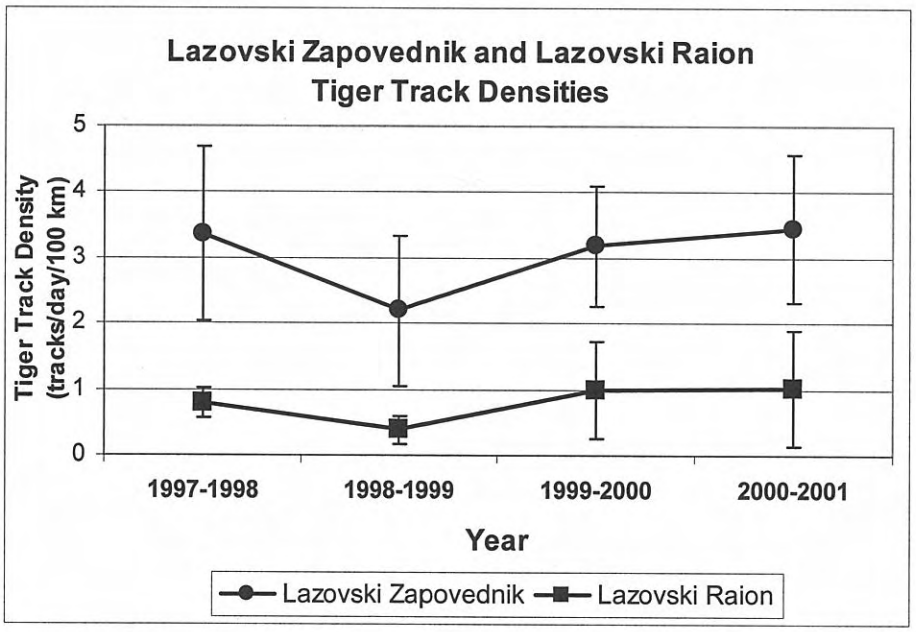
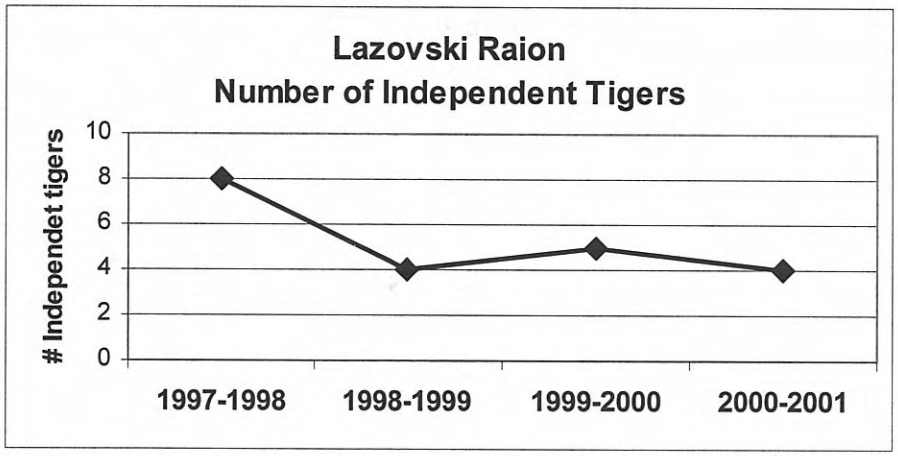


Percentage of routes with tiger tracks reported (both surveys combined).



Comparison of track densities in Lazovski Zapovednik and adjacent unprotected site in Lazovski Raion



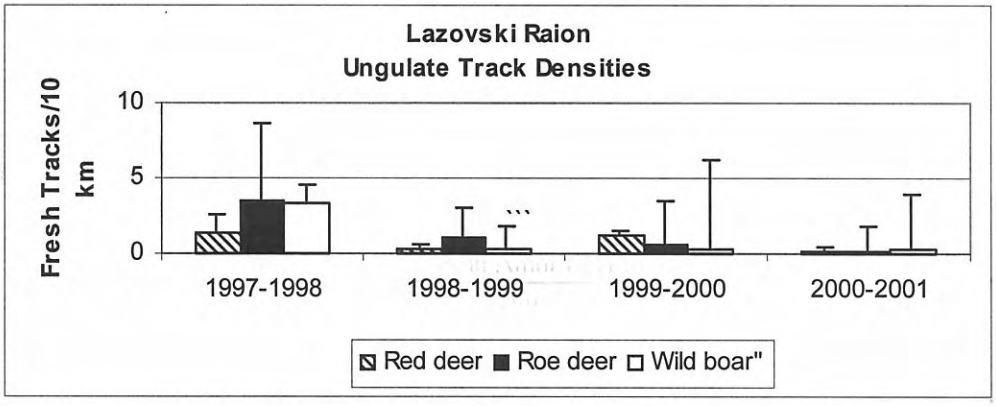
Number of Independent tigers (adults, subadults, unknown) on monitoring site

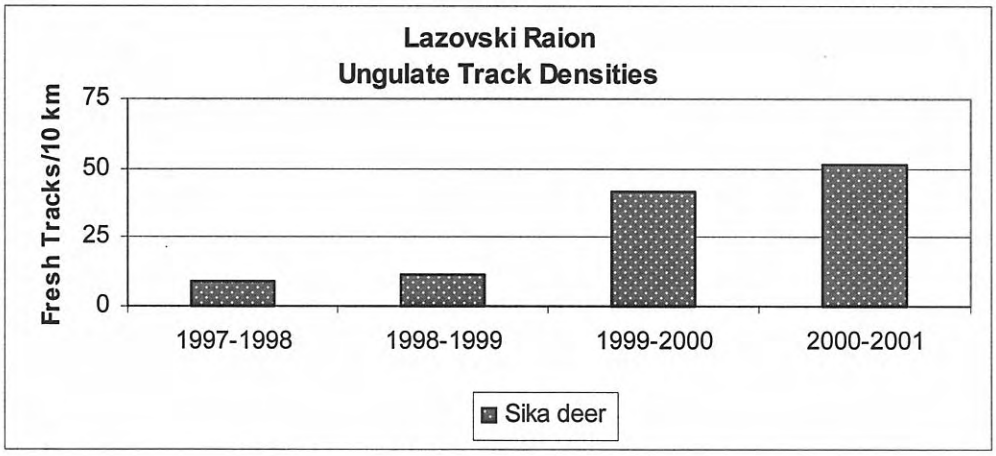
Number of tigers, by age class, and sex (for adults only) on Amur tiger monitoring sites in winter

			Age						Totals		
			Adults								
#	Site	Year	Males	Females	Un-known	Sub-adults	Cubs	Age unknown	Total adults	Total independents*	Total (all tigers)
2	Lazovski Raion	1997-1998	0	2	0	0	0	6	2	8	8
2	Lazovski Raion	1998-1999	0	1	0	0	2	3	1	4	6
2	Lazovski Raion	1999-2000	3	1	0	0	0	1	4	5	5
2	Lazovski Raion	2000-2001	0	2	0	0	3	2	2	4	7

Mean track density (tracks less than 24 hours) of ungulates in Amur tiger monitoring sites for first 4 years.

		Prey		1997		1998		1999		2000		Grand Total	
#	Monitoring Site	species	n	mean	std	mean	std	mean	std	mean	std	mean	std
2	Lazovski Raion	Red deer	11	1.41	3.68	0.25	0.56	1.18	3.76	0.18	0.46	0.76	2.62
2	Lazovski Raion	Roe deer	11	3.42	5.47	1.01	0.97	0.67	1.41	0.11	0.36	1.30	3.05
2	Lazovski Raion	Sika deer	11	9.31	6.99	11.43	12.10	41.79	65.13	51.64	105.40	28.54	62.98
2	Lazovski Raion	Wild boar	11	3.28	2.03	0.30	0.61	0.30	0.49	0.27	0.59	1.04	1.70





USSURISKI ZAPOVEDNIK AND USSURSIKI RAION
Southcentral Primorski Krai

Report on results of Amur tiger monitoring program in Ussuriisky Zapovednik and Ussuriiski Raion model units in winter 2000-2001
Coordinator - V.K. Abramov

Organizer: Abramov V. K.
Coordinators: Kovalev V.A. – Ussuriiski, Nadezhdinski, Mikhailovsky raions
Kosach S. P. – Shkotovsky, Mikhailovsky raions

The territory consists of two parts: central (the territory of Zapovednik – 40,432 ha) and outlying (areas adjacent to zapovednik – 141,926 ha).

Central part (Ussuriiski Zapovednik)
Number of routes – 11 (## 1, 5-8, 12, 14, 15, 17, 22, 23), total length of routes – 100.8 km, including 1 route traveled by vehicle (16.6 km) and 10 routes traveled on foot (84.2 km). The survey was conducted on 22-24 of December and on 15-17 of February.

Outlying part (Ussuriiski Raion)
Number of routes – 13 (## 2-4, 9-11, 13, 16, 18-21, 24), total length of routes – 198.1 km, including 75.9 km traveled by vehicle and 122.2 km traveled on foot. The survey was conducted on 21-23 of December and on 15-18 of February.

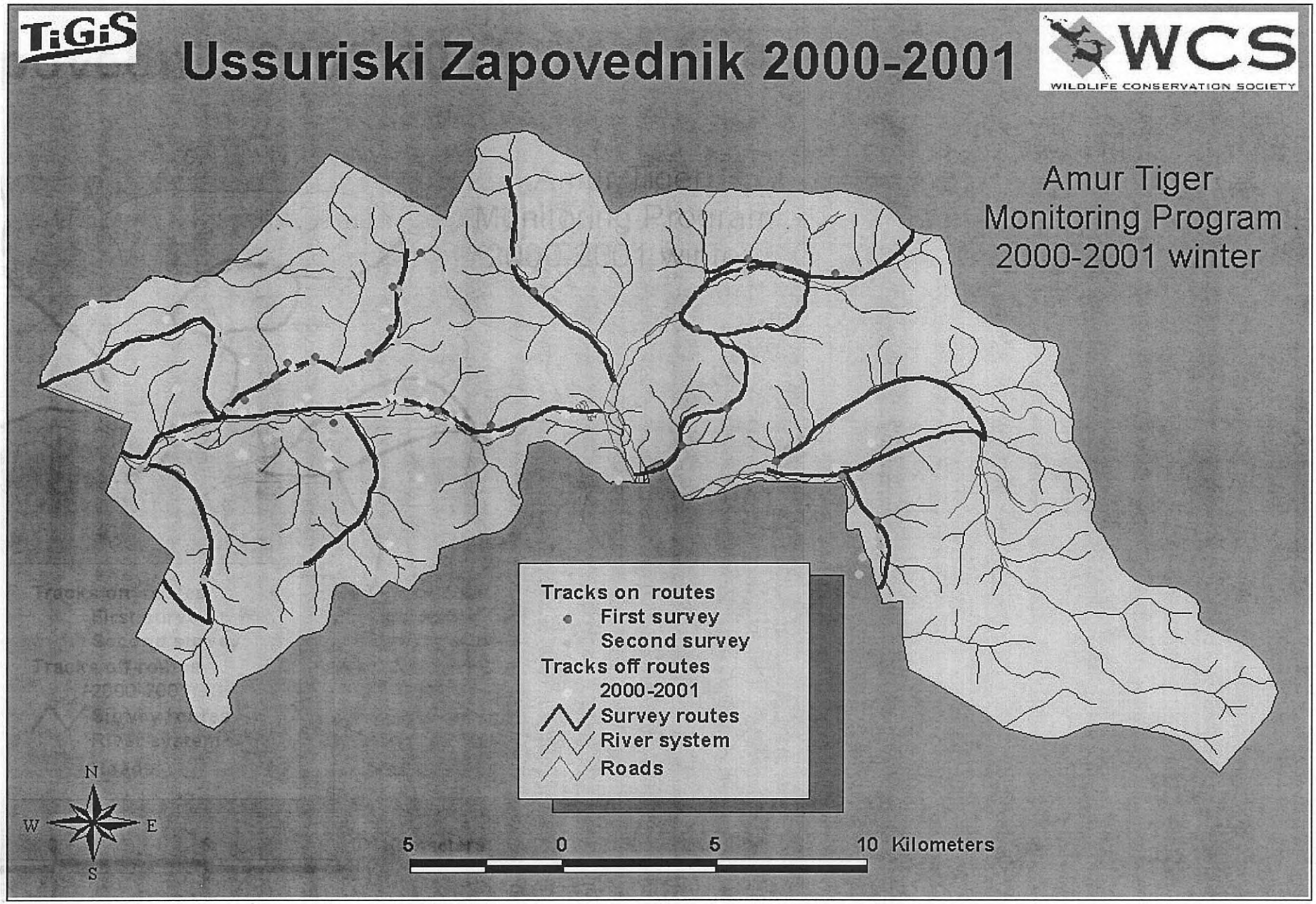
Survey conditions. In December 2000 snow depth depended on route location. Snow was 2-3 cm deep along the roads, where tracks were measured, and in the forest snow was 20-29 cm (up to 35 and 42 cm) deep. In February snow depth had not changed significantly despite previous snowfalls, but snow condition had changed greatly. Snow became dense and in some places it was covered with a thin crust of ice. Along roads snow was 2-7 cm deep, and 20-30 cm deep (in some places up to 35-48 cm) under forest canopy.

Survey efficiency – encounters of ungulate and tiger tracks encounter was low. The main reason for this was the absence of animals. The absence of animals is caused firstly by a decrease in ungulate numbers and secondly by a high level of human disturbance (every day people visited the forest to gather pine cones).

Sometimes it was very difficult to travel along the route by vehicle because the roads were not passable. As those road sections are situated in lowlands, they were not frozen and it was necessary to rent a bulldozer or tractor to travel along such routes. It is necessary to provide additional funds for tractor rental and fuel to conduct the survey in the future.

Habitat conditions for tigers and ungulates became significantly worse in Ussuriisky Raion due to the increase in human disturbance, a worsening management regime, and an increase in poaching, resulting in a decrease in ungulate numbers. During the past year the number of ungulates (roe deer, elk, and wild boar) was reduced by half in the outlying part (Ussuriisky Raion). The number of tigers was reduced by six individuals from last year (in 2000 – 12 individuals, 2001- 7 individuals). It is likely that most of them were poached in summer in Ussuriisky Raion. A litter disappeared (a female with two cubs) in the hunting lease along Kamenushka and Perevoznaya rivers (Aramilev's hunting lease).

Eight tigers were wintering in monitoring unit in the 2000-2001 winter season: one female with two cubs, one female without cubs, two males and two individuals of unknown sex and age.


TiGiS
Ussuriski Zapovednik 2000-2001
WCS
WILDLIFE CONSERVATION SOCIETY
Amur Tiger
Monitoring Program
2000-2001 winter
Tracks on routes
First survey
Second survey
Tracks off routes
2000-2001
Survey routes
River system
Roads
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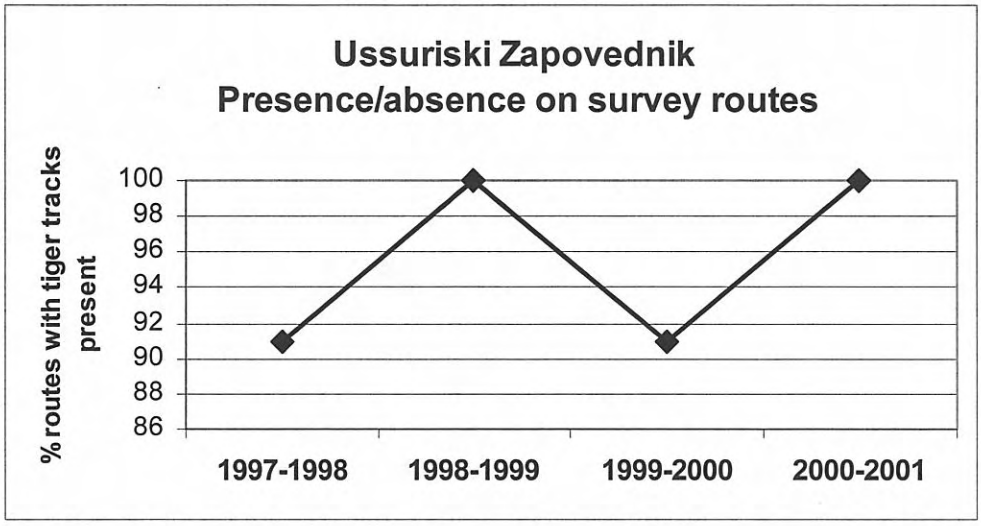
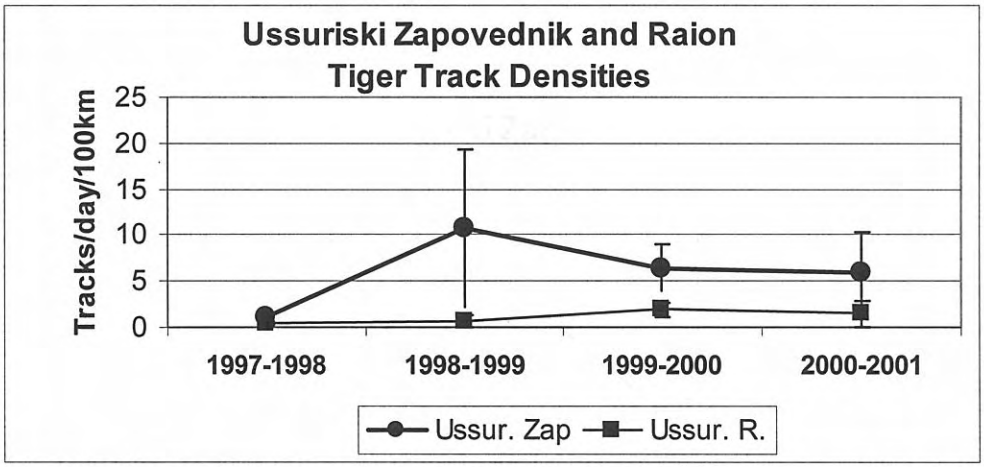
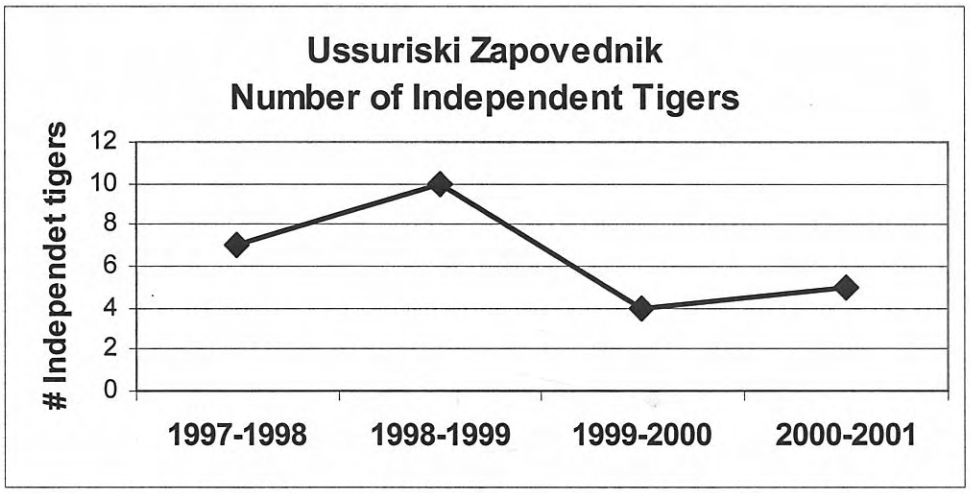


Percentage of routes with tiger tracks reported (both surveys combined).



Comparison of track densities in Ussuriski Zapovednik and adjacent unprotected site in Ussuriski Raion



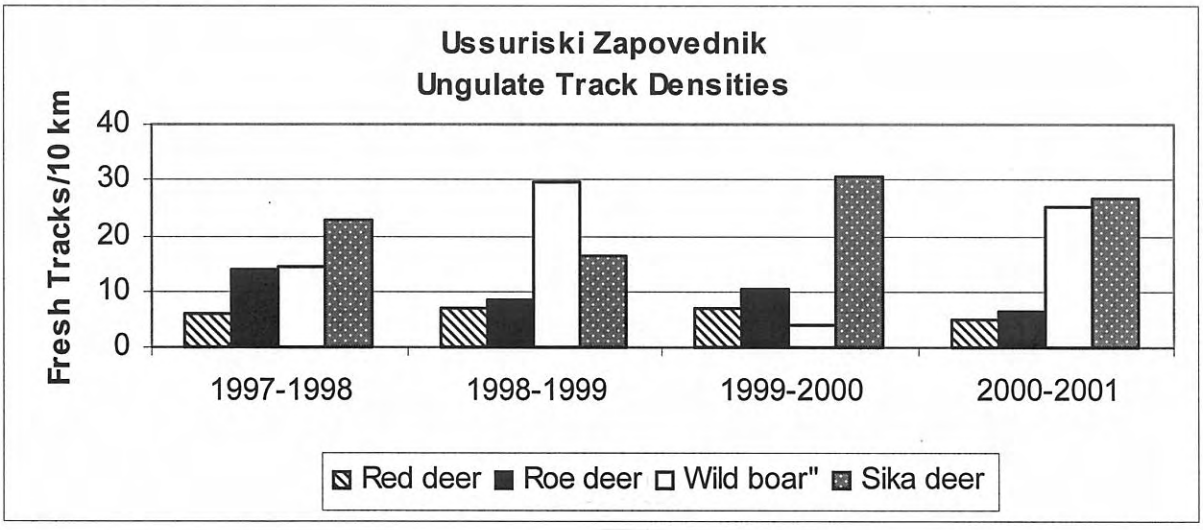
Number of Independent tigers (adults, subadults, unknown) on monitoring site

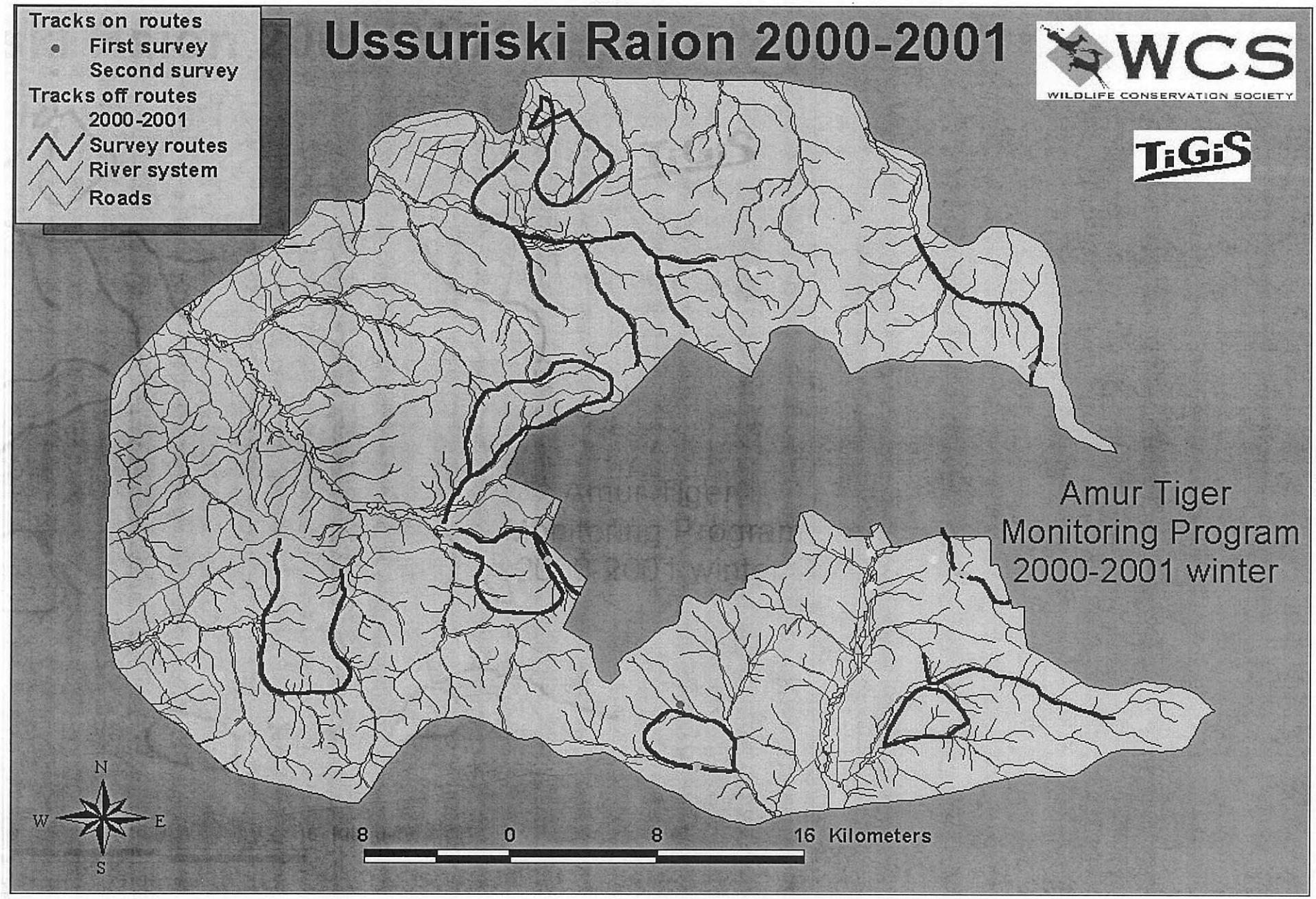
Number of tigers, by age class, and sex (for adults only) on Amur tiger monitoring sites in winter

			Age						Totals		
			Adults								
#	Site	Year	Males	Females	Un-known	Sub-adults	Cubs	Age unknown	Total adults	Total independents*	Total (all tigers)
3	Ussuriski Zapovednik	1997-1998	0	0	0	1	0	6	0	7	7
3	Ussuriski Zapovednik	1998-1999	0	1	0	2	0	7	1	10	10
3	Ussuriski Zapovednik	1999-2000	1	2	0	0	3	1	3	4	7
3	Ussuriski Zapovednik	2000-2001	2	2	1	0	2	0	5	5	7

Mean track density (tracks less than 24 hours) of ungulates in Amur tiger monitoring sites for first 4 years.

		Prey		1997		1998		1999		2000		Grand Total	
#	Monitoring Site	species	n	mean	std	mean	std	mean	std	mean	std	mean	std
3	Ussuriski. Zap.	Red deer	11	6.06	6.25	7.03	5.71	6.98	6.98	5.03	4.78	6.27	5.83
3	Ussuriski. Zap.	Roe deer	11	13.81	16.11	8.61	10.45	10.33	10.65	6.49	4.81	9.81	11.17
3	Ussuriski. Zap.	Sika deer	11	22.56	25.16	16.12	17.82	30.72	45.74	26.65	30.41	24.01	30.86
3	Ussuriski. Zap.	Wild boar	11	14.09	17.65	29.56	32.90	4.13	3.31	25.21	27.41	18.25	24.54




Tracks on routes
First survey
Second survey
Tracks off routes
2000-2001
Survey routes
River system
Roads
Ussuriski Raion 2000-2001
WCS
WILDLIFE CONSERVATION SOCIETY
TiGiS
Amur Tiger
Monitoring Program
2000-2001 winter
N
W
E
S
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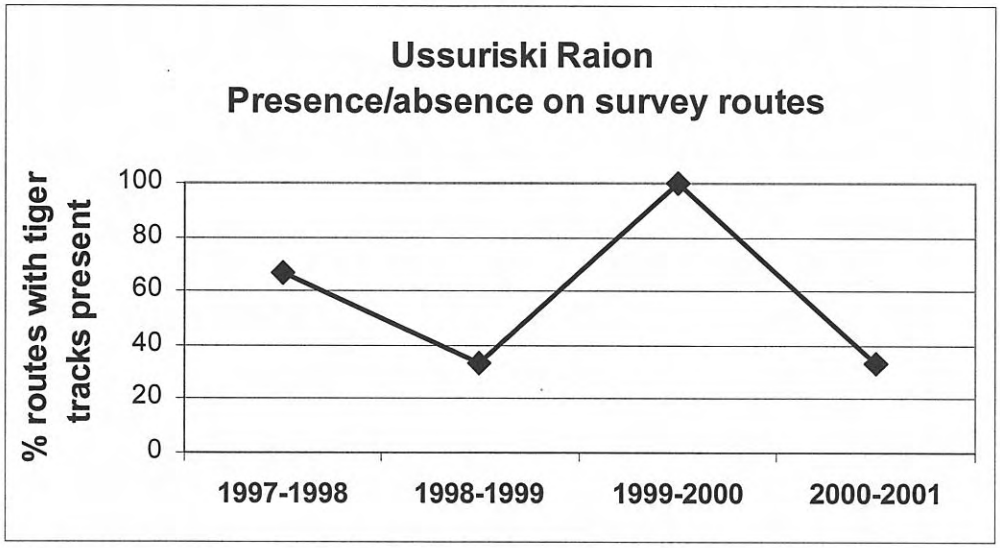
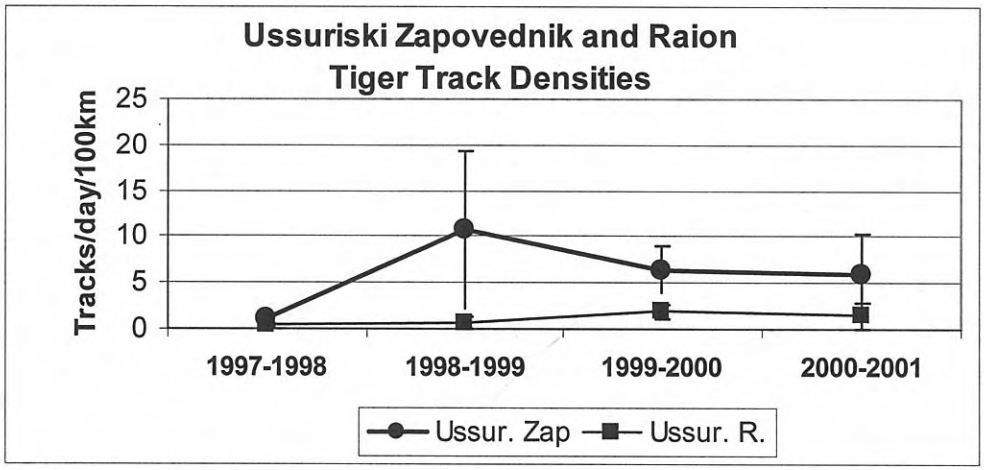
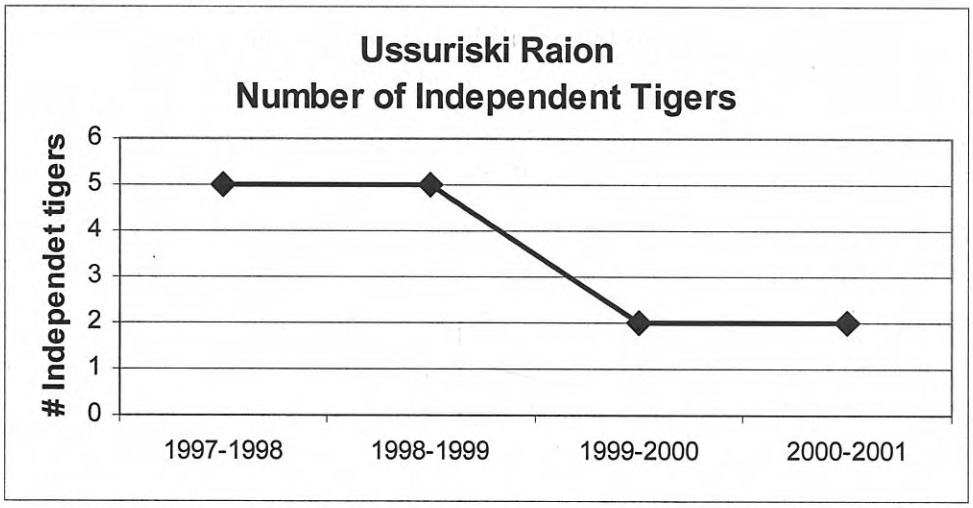
16 Kilometers



Percentage of routes with tiger tracks reported (both surveys combined).



Comparison of track densities in Ussuriski Zapovednik and adjacent unprotected site in Ussuriski Raion



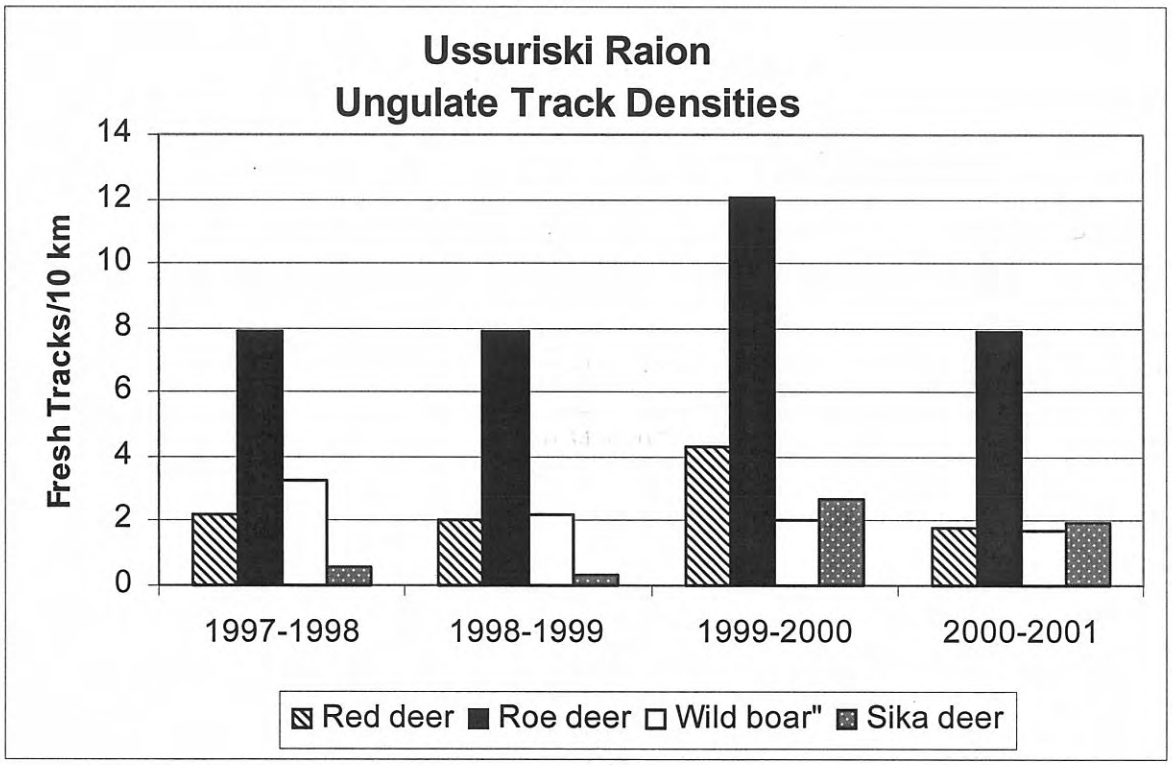
Number of Independent tigers (adults, subadults, unknown) on monitoring site

Number of tigers, by age class, and sex (for adults only) on Amur tiger monitoring sites in winter

			Age						Totals		
			Adults								
#	Site	Year	Males	Females	Un-known	Sub-adults	Cubs	Age unknown	Total adults	Total independents*	Total (all tigers)
13	Ussuriski Raion	1997-1998	0	0	0	3	0	2	0	5	5
13	Ussuriski Raion	1998-1999	0	2	0	0	2	3	2	5	7
13	Ussuriski Raion	1999-2000	1	1	0	0	0	0	2	2	2
13	Ussuriski Raion	2000-2001	1	1	0	0	0	0	2	2	2

Mean track density (tracks less than 24 hours) of ungulates in Amur tiger monitoring sites for first 4 years.

		Prey		1997		1998		1999		2000		Grand Total	
#	Monitoring Site	species	n	mean	std	mean	std	mean	std	mean	std	mean	std
13	Ussuriski Raion	Red deer	12	2.16	2.96	2.02	2.04	4.28	3.67	1.79	2.02	2.56	2.86
13	Ussuriski Raion	Roe deer	12	7.93	9.01	7.92	8.24	12.05	7.70	7.86	5.19	8.94	7.64
13	Ussuriski Raion	Sika deer	12	0.59	1.27	0.34	0.74	2.69	3.56	1.98	3.33	1.40	2.65
13	Ussuriski Raion	Wild boar	12	3.24	3.98	2.19	3.03	2.07	2.68	1.71	3.63	2.30	3.31



BORISOVKOE PLATEAU
Southwest Primorski Krai

Report on results of Amur tiger monitoring program in Borisovskoe Plateau monitoring unit in winter 2000-2001

Coordinator - D.G. Pikunov, Pacific Institute of Geography

Counts were conducted on December 1-9, 2000 and on February 27 - March 11, 2001.

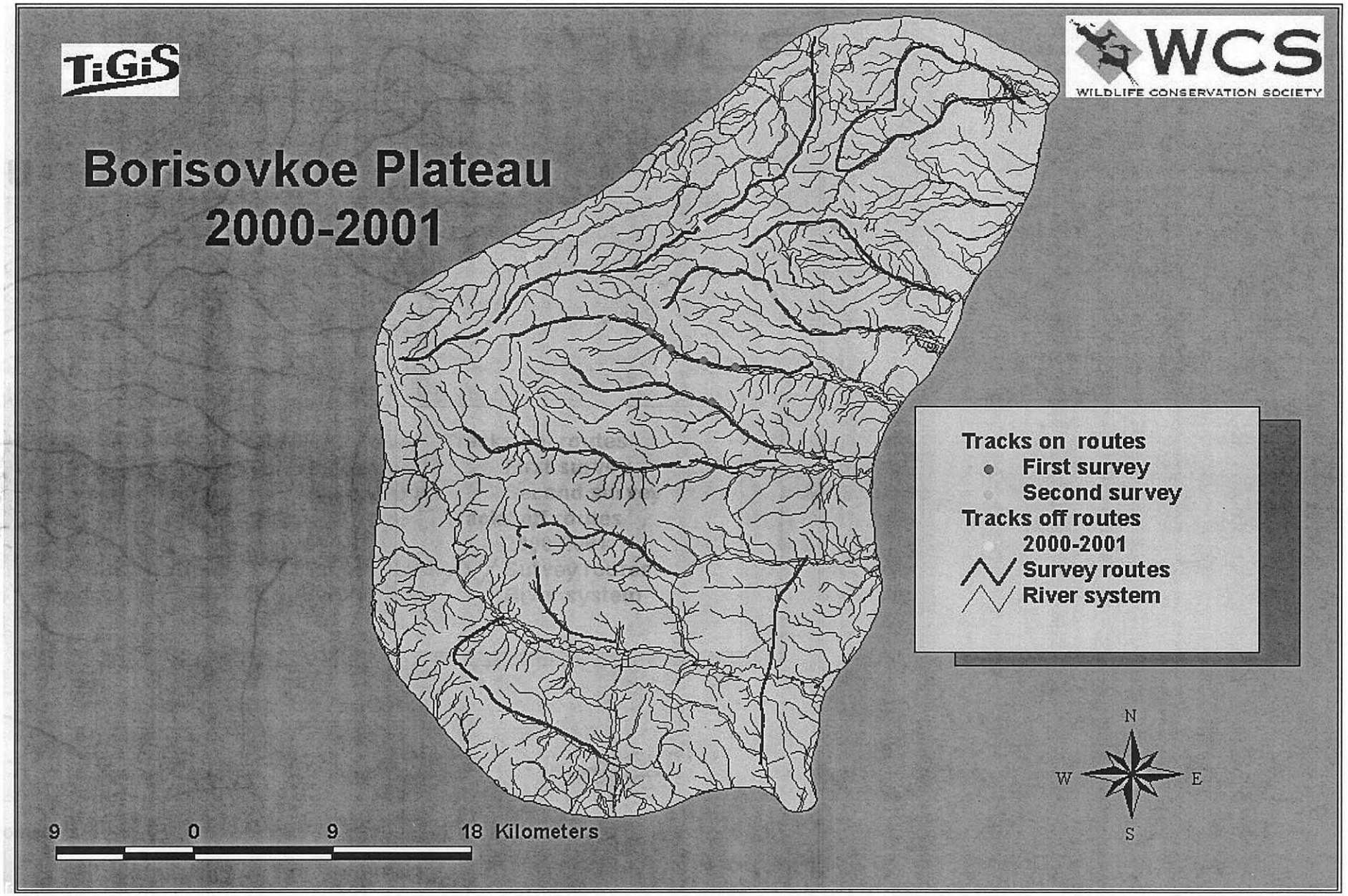
As in past years 14 routes that evenly covered the whole territory of the monitoring unit were traveled. The total length of routes was 217 km.

Routes # 1, 2, 3, 5 and 8 were traveled on foot (total length is 73 km). Routes # 4, 7, 11, 12, 13 and 14 were traveled by vehicle (total length is 94 km). Routes # 6, 9, 10 were traveled both by vehicle and on foot (total length - 50 km). Route # 10 was traveled only during the first count, during the second count the route was not traveled due to technical reasons. Heavy atypical snowfall took place in southwest Primorye on 27th of November. Most of routes were traveled 4-7 days after heavy snowfalls, when average snow depth was 15-25 cm. So the snow conditions were favorable for efficient count of tigers and ungulates. Snow conditions were also favorable for tracking individuals, as necessary, to measure their tracks accurately.

A more difficult situation existed in the second count, in association with snow depth and distribution of tigers and ungulates. Snow depths occurred up to 50-60 cm, and periodical thaws created a thin crust of ice on top of the snow that made travel difficulty for all large animals. Ungulates and predators had to gather on southern slopes, where snow was melting after thaws. There was a lack of food for ungulates on the slopes in comparison with valley bottoms, where there exist a variety of shrubs - important food for deer. Ungulates very rarely came down to valley bottoms, even if in the absence of a navigable road along the valley. Such ungulate behavior is not typical and it is associated with uncharacteristic snow conditions. Usually when ungulate hunting for ungulates is closed in the second part of winter, most ungulates stay in valley bottoms, where monitoring routes were set up. The same situation occurred on mountain plateaus. Even on the most remote plateaus (e.g., plateau between Borisovka river and Nezhinka river, where maximum ungulate densities were observed during the first count) ungulates left the territory after development of an icy crust had formed. Ungulates gathered on southern slopes. Animals had to leave the territory, even wild boars, despite the abundance of pine nuts - their favorite food. Permanent survey routes and atypical snow conditions were the reason why the second count gave slightly distorted information about ungulates and large predators distribution. Nevertheless, integrated results of both counts reflected the whole situation correctly enough. It has become more evidently that definition of the time frame for both counts should be more flexible and dependent on heavy snowfalls.

The first survey on Borisovskoe Plateau coincides with the height of hunting season for ungulates and results in a great deal of disturbance, which influences the distribution of both ungulates and predators. During the first count on part of monitoring unit, where hunting grounds of Nezhinskoe Hunting Lease are situated, the number of ungulates and tigers was minimal. It is possible that existing hunting methods including battue with unlimited number of participants make it possible that not only ungulates but also tigers can be shot. In the 2000-2001 winter season a female with one cub (T-7 and T-8), which were registered in upper basin of Vtoraya Rechka in December 2000, disappeared without leaving a trace. In addition, an adult female disappeared from southern part of monitoring unit, where her tracks (#1, 2, 3, 4, and 5) were registered on the 1st and 2nd routes. This was confirmed by the absence of her tracks on Penyazhinskiy (# 3) route, which was a part of her home range in past years.

Mass battues (legal and illegal), industrial logging (including mature oak forests) and a decreasing number of ungulates are undoubtedly the reasons of tiger habitat deterioration. The monitoring survey results indicate that in the 2000-2001 winter season in Borisovskoe Plateau monitoring unit only two tigers were present – a resident male and adult female. Only the total prohibition of hunting and industrial logging in the whole territory of Borisovskoe Plateau, Barsovy Zakaznik and Khasan Raion up to Kraskino settlement (to the west from highway between Ussuriisk and Kraskino) will help to protect small populations of ungulates and large predators. Otherwise, there will be no chance for natural dispersal of ungulates and predators into northern provinces of China and North Korea from Russia.


TiGiS
WCS
WILDLIFE CONSERVATION SOCIETY
Borisovkoe Plateau
2000-2001
Tracks on routes
First survey
Second survey
Tracks off routes
2000-2001
Survey routes
River system
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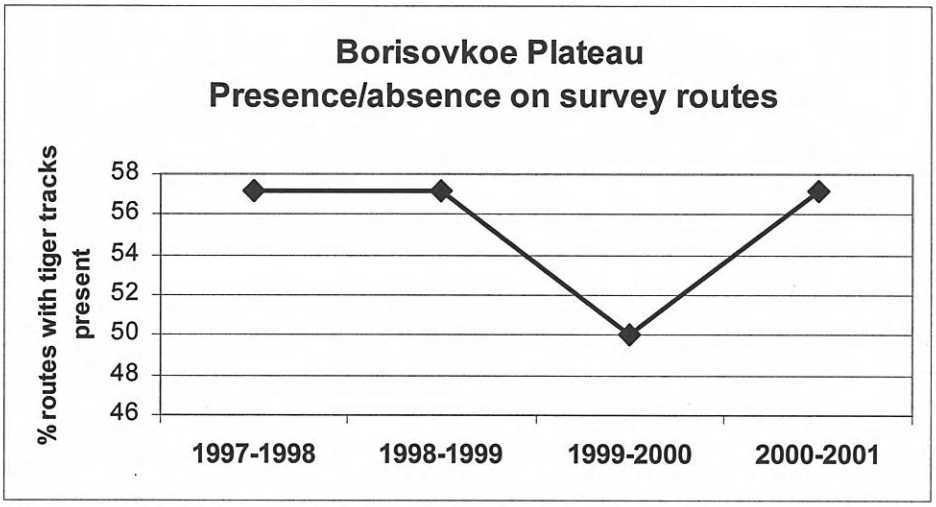
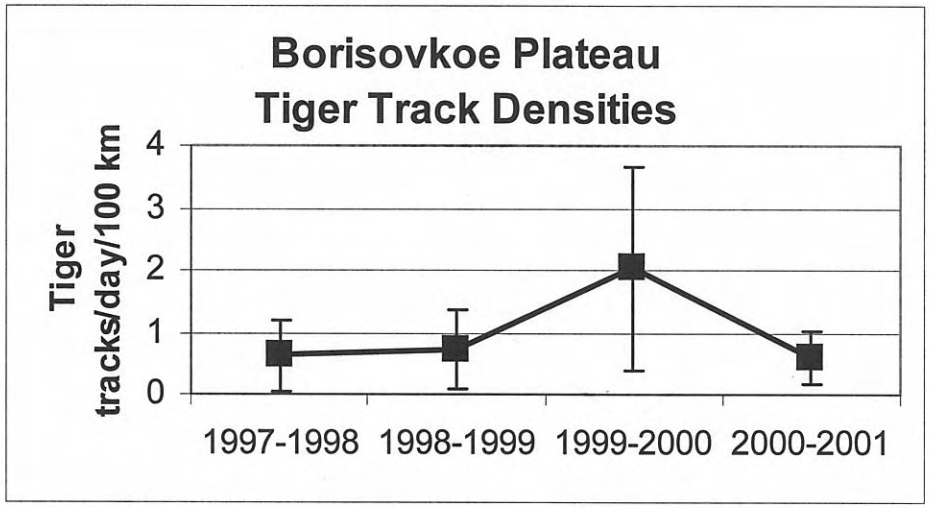
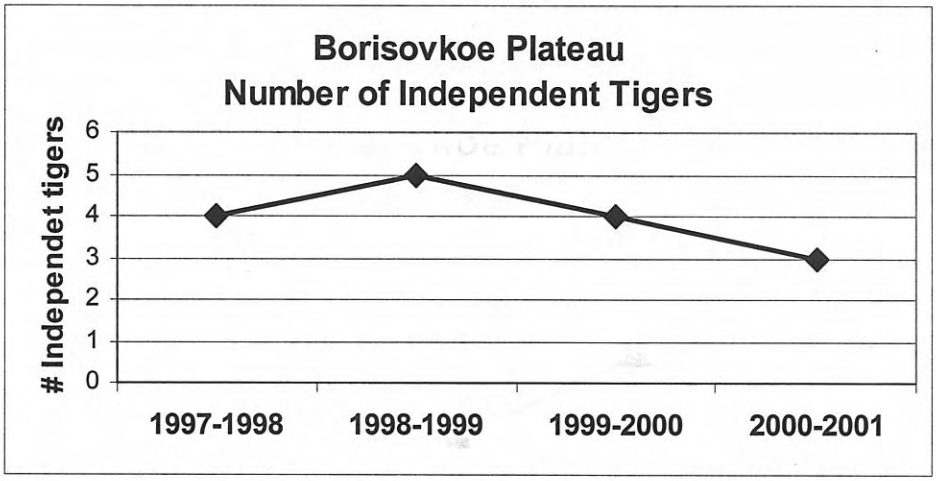


Percentage of routes with tiger tracks reported (both surveys combined).



Comparison of track densities in monitoring site across years



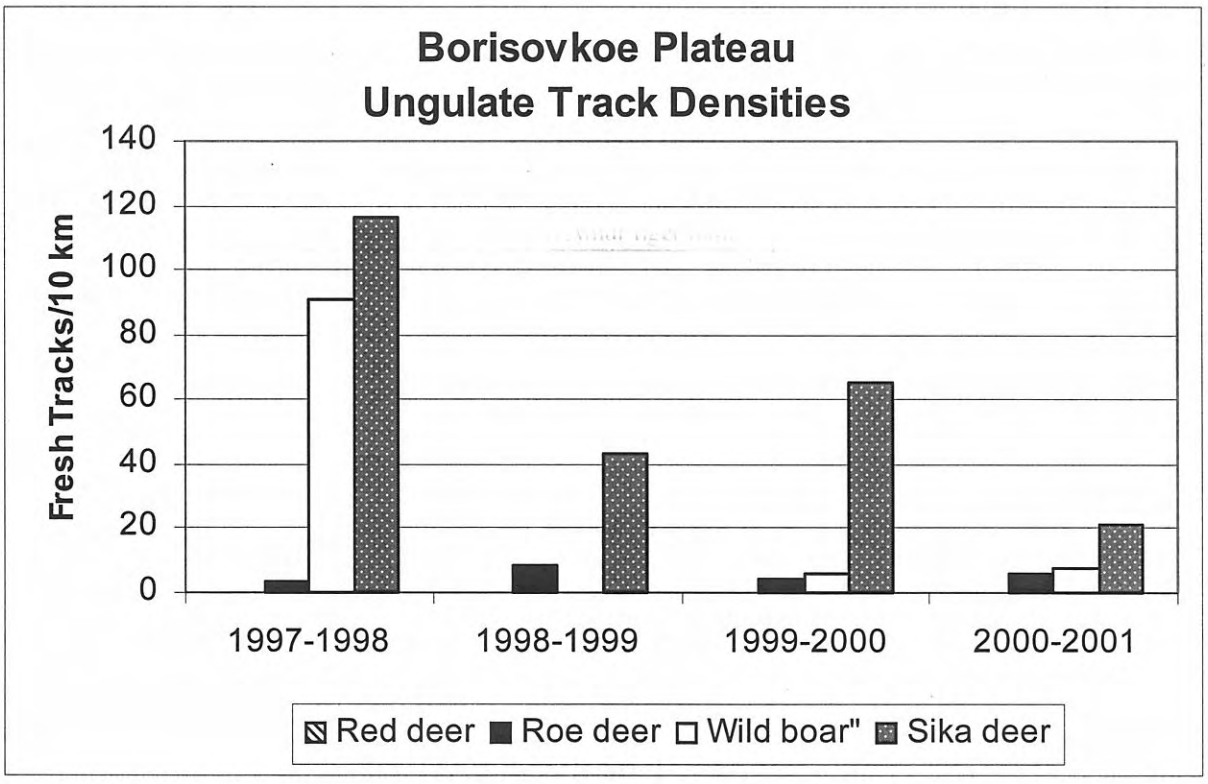
Number of Independent tigers (adults, subadults, unknown) on monitoring site

Number of tigers, by age class, and sex (for adults only) on Amur tiger monitoring sites in winter

			Age						Totals		
			Adults								
#	Site	Year	Males	Females	Un-known	Sub-adults	Cubs	Age unknown	Total adults	Total independents*	Total (all tigers)
6	Borisovkoe Plateau	1997-1998	1	2	0	1	1	0	3	4	5
6	Borisovkoe Plateau	1998-1999	1	1	0	2	1	1	2	5	6
6	Borisovkoe Plateau	1999-2000	1	2	1	0	1	0	4	4	5
6	Borisovkoe Plateau	2000-2001	1	2	0	0	1	0	3	3	4

Mean track density (tracks less than 24 hours) of ungulates in Amur tiger monitoring sites for first 4 years.

		Prey		1997		1998		1999		2000		Grand Total	
#	Monitoring Site	species	n	mean	std	mean	std	mean	std	mean	std	mean	std
6	Borisovkoe Plateau	Red deer	14	0.02	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
6	Borisovkoe Plateau	Roe deer	14	3.38	5.29	8.48	15.22	4.58	6.46	6.22	5.57	5.66	9.07
6	Borisovkoe Plateau	Sika deer	14	116.29	183.22	42.87	56.99	65.74	87.40	20.81	16.99	61.43	108.88
6	Borisovkoe Plateau	Wild boar	14	91.09	122.25	0.26	0.84	5.53	5.95	7.47	12.02	26.09	70.83



SANDAGOY
Olginski Raion
Southeast Primorski Krai

Report on results of Amur tiger monitoring program in Sandagou monitoring unit in winter 2000-2001
Coordinator - V.V. Aramilev, Institute for Sustainable Use of Natural Resources

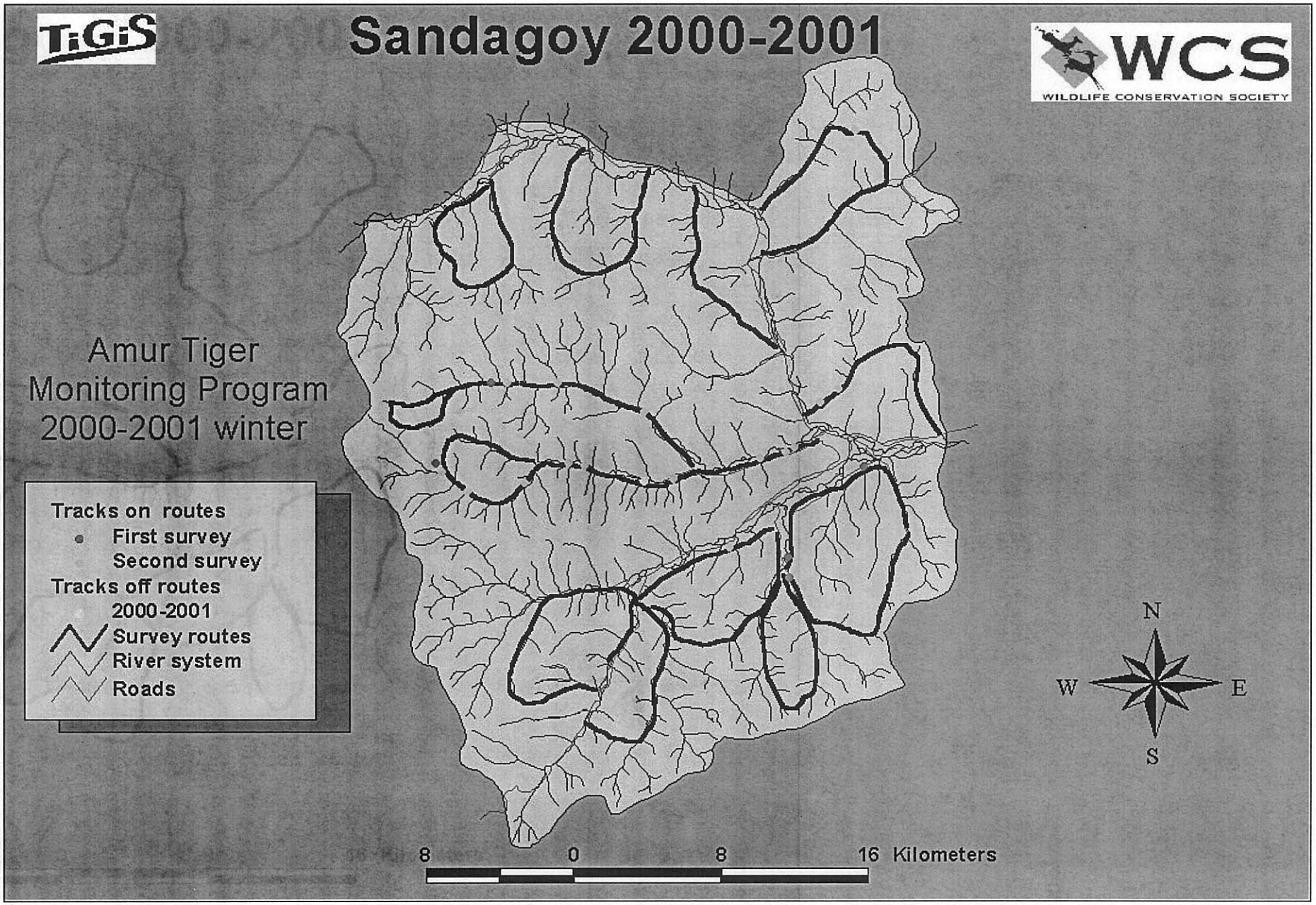
This winter survey in the monitoring unit was conducted on December 17-18, 2000 and on February 10-11, 2001. By the beginning of December stable snow cover had formed in the monitoring unit and we were able to conduct the first count in December. In the second part of winter snow cover increased but all routes were passable on skies and the second count was conducted according to the schedule. All 16 routes were traveled twice during this winter survey. All routes in our monitoring unit are traveled on foot. When snow is deep fieldworkers use skies. Routes are traveled according to existing scheme and has not varied between years. The actual number of kilometers traveled on routes can be accurately determined with the help of GPS and route length marked on the map can be determined more accurately with the help of computer program.

During the first count, average snow depth was 15-30 cm depending on height above the sea level and snow was evenly spread across the territory. Three weeks passed since the last snowfall and convenient conditions had formed for counting tiger tracks. In February snow cover increased up to 40-50 cm and routes could be traveled only on skies. Only ten days passed after the last snowfall and that is why fewer tiger tracks were registered. Cold weather had an influence on activity of tigers, at nights temperature went down to 30-35° C below zero and in daytime it did not exceed 15-18 ° C below zero. Usually in daytime wind rose up to 10-15 m/sec. Tiger distribution and their track activity (movements) were determined by the distribution of ungulates and their physiological condition. After deep snow cover had formed in December some ungulates went along creeks down to river valleys. After sunny weather had set in and snow depth on steep slopes decreased ungulates went up from river valleys to slopes again. But because of deep snow and low temperatures ungulates did not move widely and stayed on local sites: wild boars - in areas with good harvest of pine cones, deer - on steep slopes with herbaceous food, elks and roe deer - in areas with adequate food and minimally acceptable snow cover. Tigers correspondingly stayed not far from areas where ungulates concentrated and went out to roads, trails and river valleys more rarely.

In comparison with the past year ungulate numbers increased despite a difficult 1999-2000 winter season with deep snow. As in the past minimum ungulate densities were observed in areas adjacent to Mikhailovka and Furmanovka villages. But this year "Chin San" hunting lease was established here with our assistance, and local hunters obtained rights for long-term use. Now they are owners of the territory, and should organize the hunting season and protection of hunting resources.

The number of tigers in the monitoring unit has been stable for the two past years. The xex-age composition of tigers in the monitoring unit seems appropriate and does not provide any indicators that would cause anxiety. The particular feature of this year is the absence of litters. A young tiger with a pad width of 7.5 cm should walk with his mother but this one individual did not. It is worth mentioning that last year an animal with the same pad width was also registered in this monitoring unit.

Logging in monitoring unit territory takes place within confined areas. Hardwooded, broadleaved species are mainly logged, but coniferous trees are also logged near Furmanovka village. Logging here is not large-scale and comprises only about 150 ha for the past year. There were no crown fires in monitoring unit, but ground fires were found in localized parts of the northeastern section of the unit.


TiGiS
Sandagoy 2000-2001
WCS
WILDLIFE CONSERVATION SOCIETY
Amur Tiger
Monitoring Program
2000-2001 winter
Tracks on routes
First survey
Second survey
Tracks off routes
2000-2001
Survey routes
River system
Roads
N
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8
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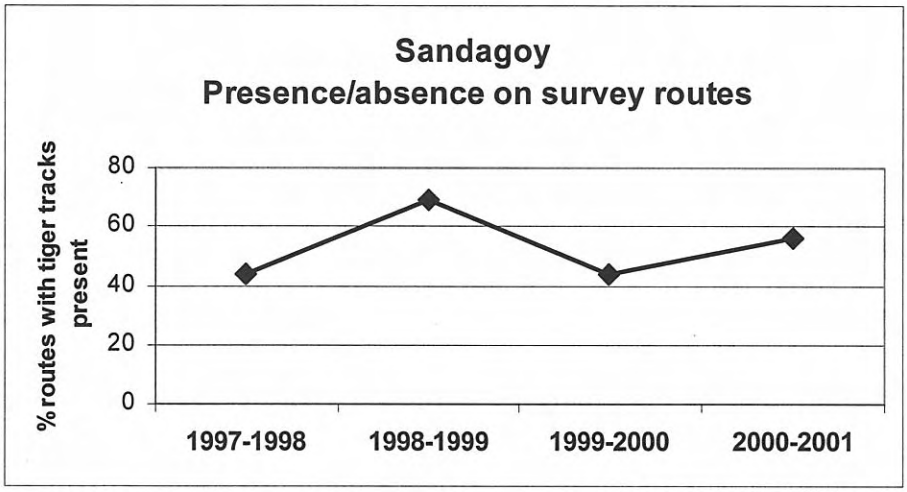
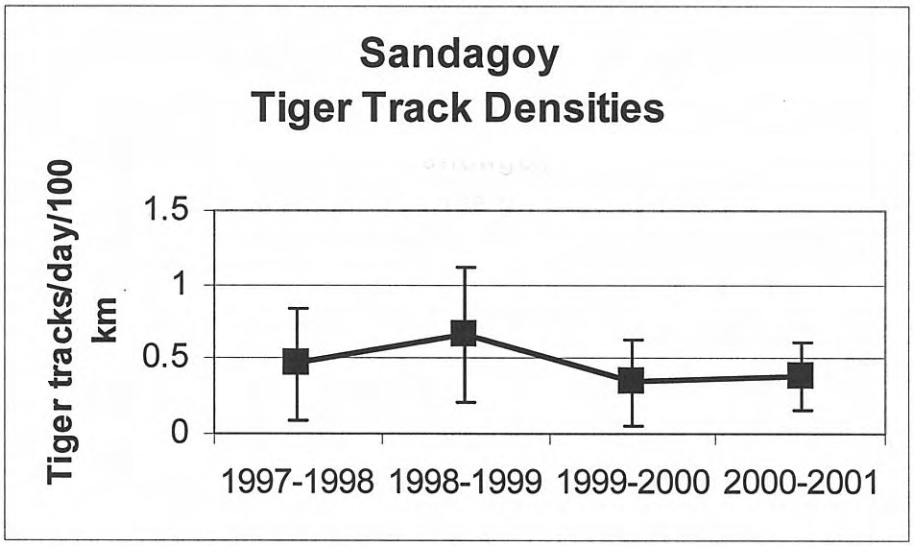
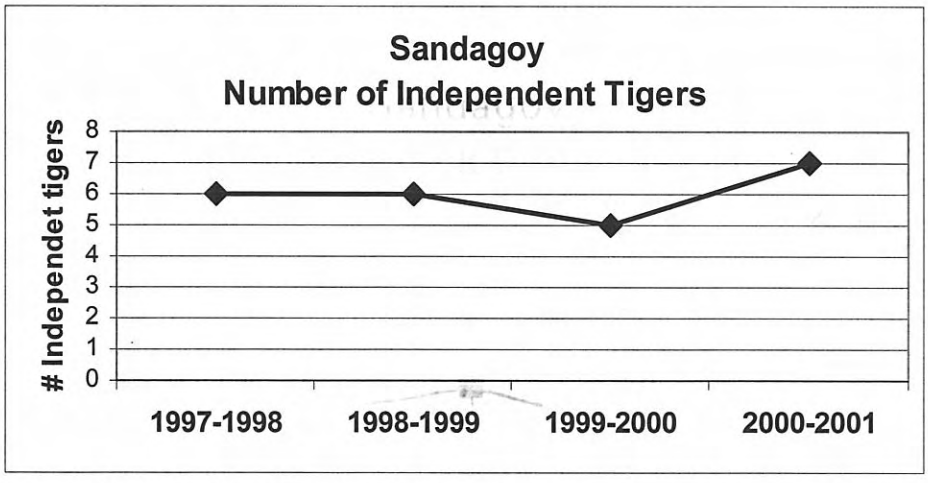
8
16 Kilometers



Percentage of routes with tiger tracks reported (both surveys combined).



Comparison of track densities in monitoring site across years



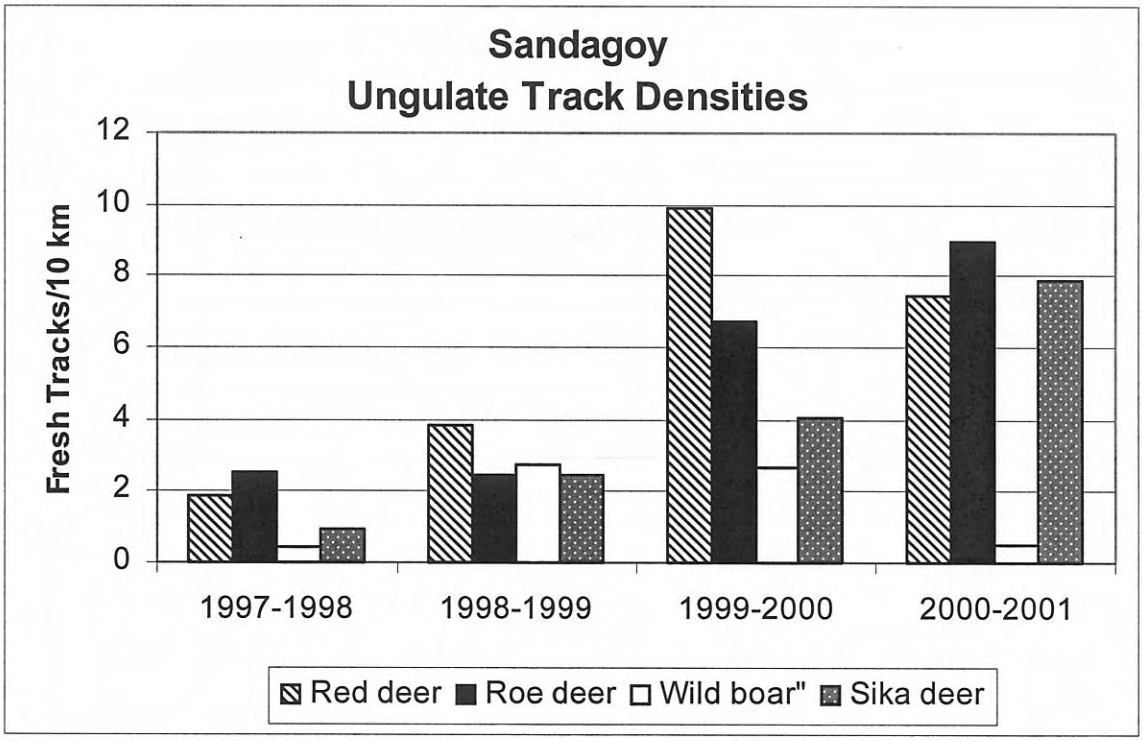
Number of Independent tigers (adults, subadults, unknown) on monitoring site

Number of tigers, by age class, and sex (for adults only) on Amur tiger monitoring sites in winter

			Age						Totals		
			Adults								
#	Site	Year	Males	Females	Un-known	Sub-adults	Cubs	Age unknown	Total adults	Total independents*	Total (all tigers)
7	Sandagoy	1997-1998	1	1	3	0	1	1	5	6	7
7	Sandagoy	1998-1999	0	1	0	0	0	5	1	6	6
7	Sandagoy	1999-2000	1	1	0	0	0	3	2	5	5
7	Sandagoy	2000-2001	2	1	0	1	0	3	3	7	7

Mean track density (tracks less than 24 hours) of ungulates in Amur tiger monitoring sites for first 4 years.

		Prey		1997		1998		1999		2000		Grand Total	
#	Monitoring Site	species	n	mean	std	mean	std	mean	std	mean	std	mean	std
7	Sandagoy	Red deer	16	1.87	2.78	3.84	3.76	9.90	10.78	7.41	8.55	5.76	7.75
7	Sandagoy	Roe deer	16	2.50	2.67	2.44	2.25	6.70	5.69	8.98	8.57	5.16	6.01
7	Sandagoy	Sika deer	16	0.91	1.68	2.46	3.55	4.06	3.98	7.91	13.77	3.83	7.71
7	Sandagoy	Wild boar	16	0.42	0.68	2.76	4.07	2.68	4.04	0.54	0.99	1.60	3.07



SINEYA
Chugevski Raion
Central Primorski Krai

Results of monitoring program in Sinyaya monitoring unit in winter 2000-2001
Pavel Fomenko, WWF-RFE Program Coordinator

Sinyaya monitoring unit is situated in the central part of Chuguevsky Raion (Primorski Krai). Coordinator of survey is P. V. Fomenko – WWF RFE Program Coordinator.

Both counts were conducted in accordance with the schedule.

15 routes were traveled. Total length of the routes and their location were the same as last winter. Deep snow cover made it necessary to use snowmobiles during both counts.

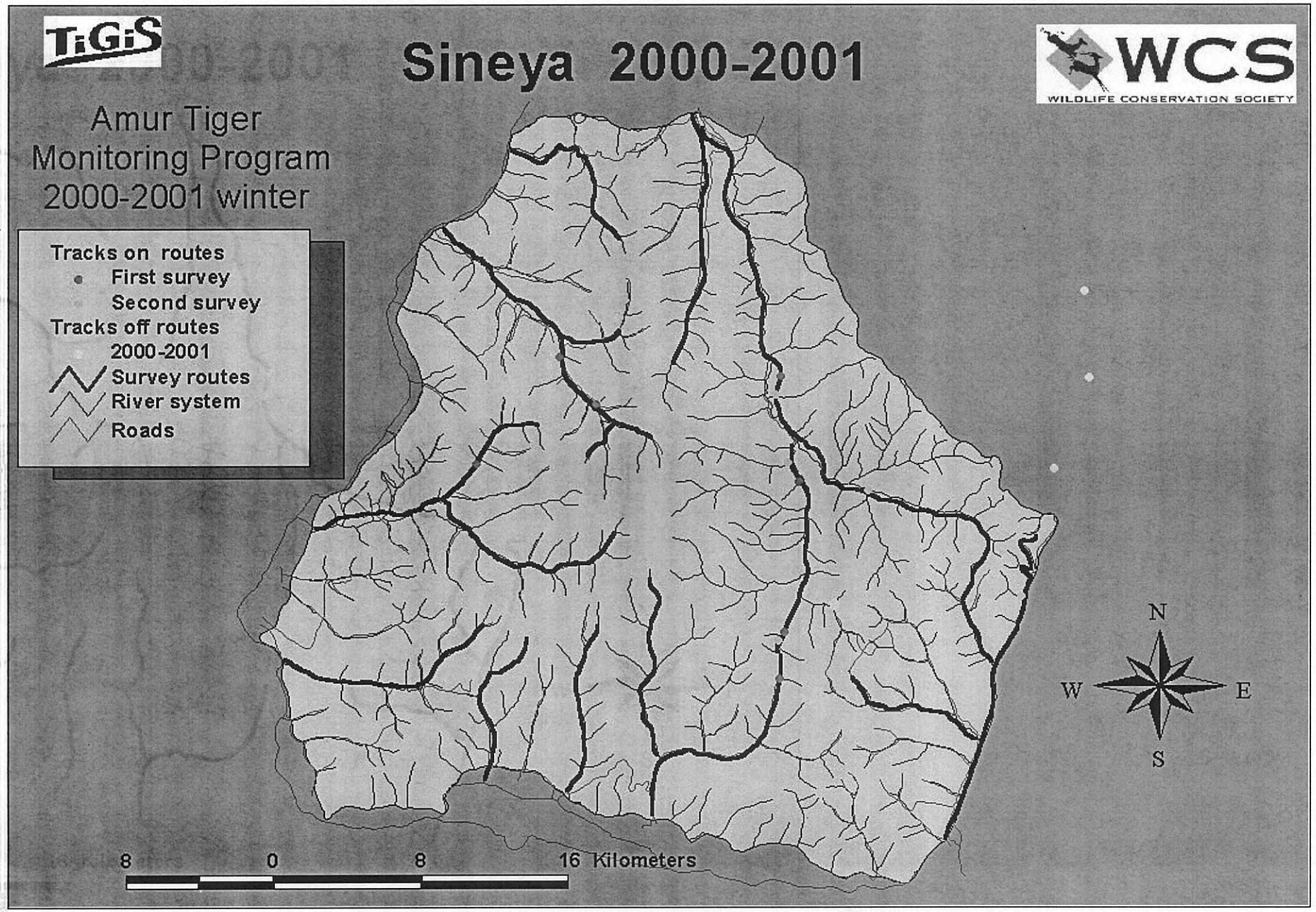
Weather conditions were extreme, both in relation to snow depth and average winter temperatures. Snow depth was 15-20 cm more than last year.

There were no any organizational problems because the survey was conducted by the same fieldworkers as the last year. Weather conditions also did not influence the work efficiency.

Despite the very difficult conditions for wintering ungulates, there were not reports of mortality (winter kill). In comparison with past years, the numbers of roe deer and wild boar (insignificantly) have increased. The elk population in study area is stable.

The number of tigers in the monitoring unit is stable. Almost all animals are identified excluding one big male tiger. In addition two females with cubs were found (one of them was registered outside of the monitoring unit). The death on one cub was reported (probably he was killed by a male). There was no information about poached tigers.

Habitat conditions have not changed significantly. Small ground fires in spring and fall did not impact the habitat significantly. There were no crown fires. Selective logging did not damage the habitat. As usual hunting pressure on ungulates is considerable but it is compensated for by recruitment.


TiGiS
Sineya 2000-2001
WCS
WILDLIFE CONSERVATION SOCIETY
Amur Tiger
Monitoring Program
2000-2001 winter
Tracks on routes
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Second survey
Tracks off routes
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Survey routes
River system
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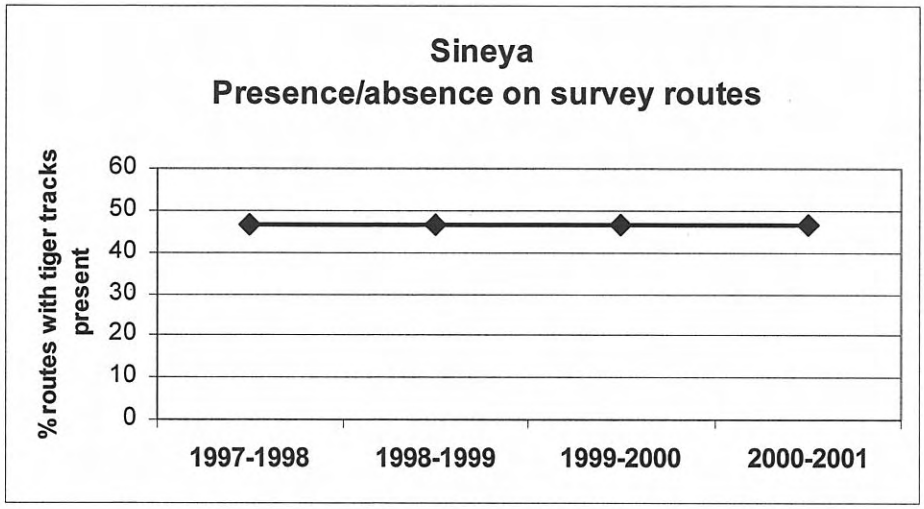
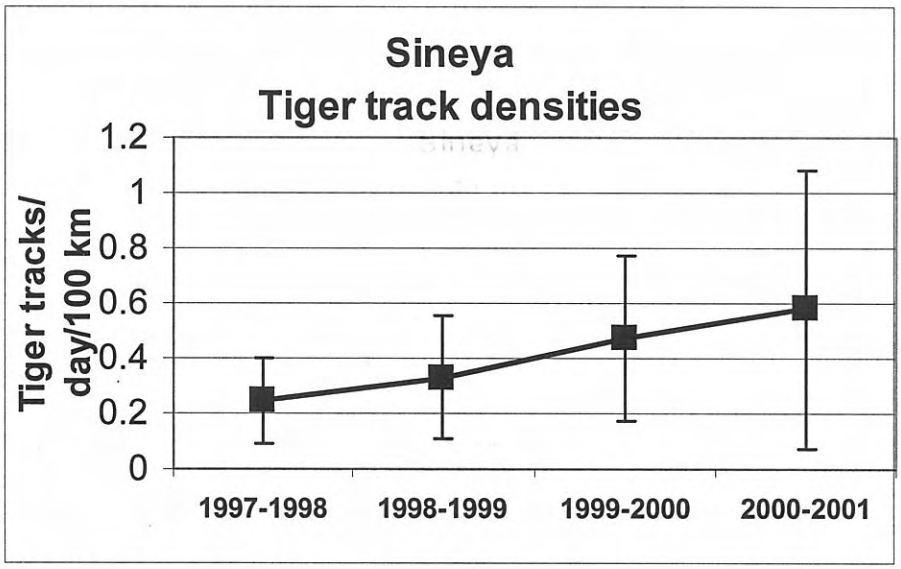
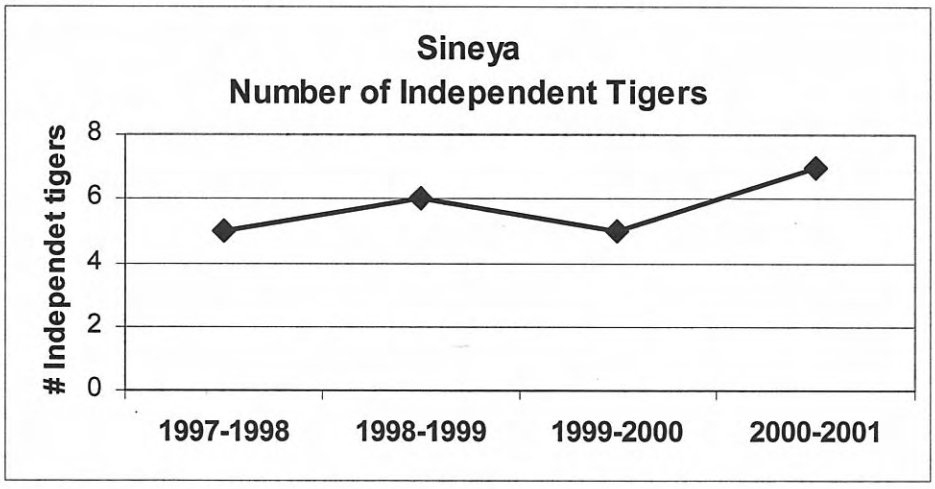


Percentage of routes with tiger tracks reported (both surveys combined).



Comparison of track densities in monitoring site across years



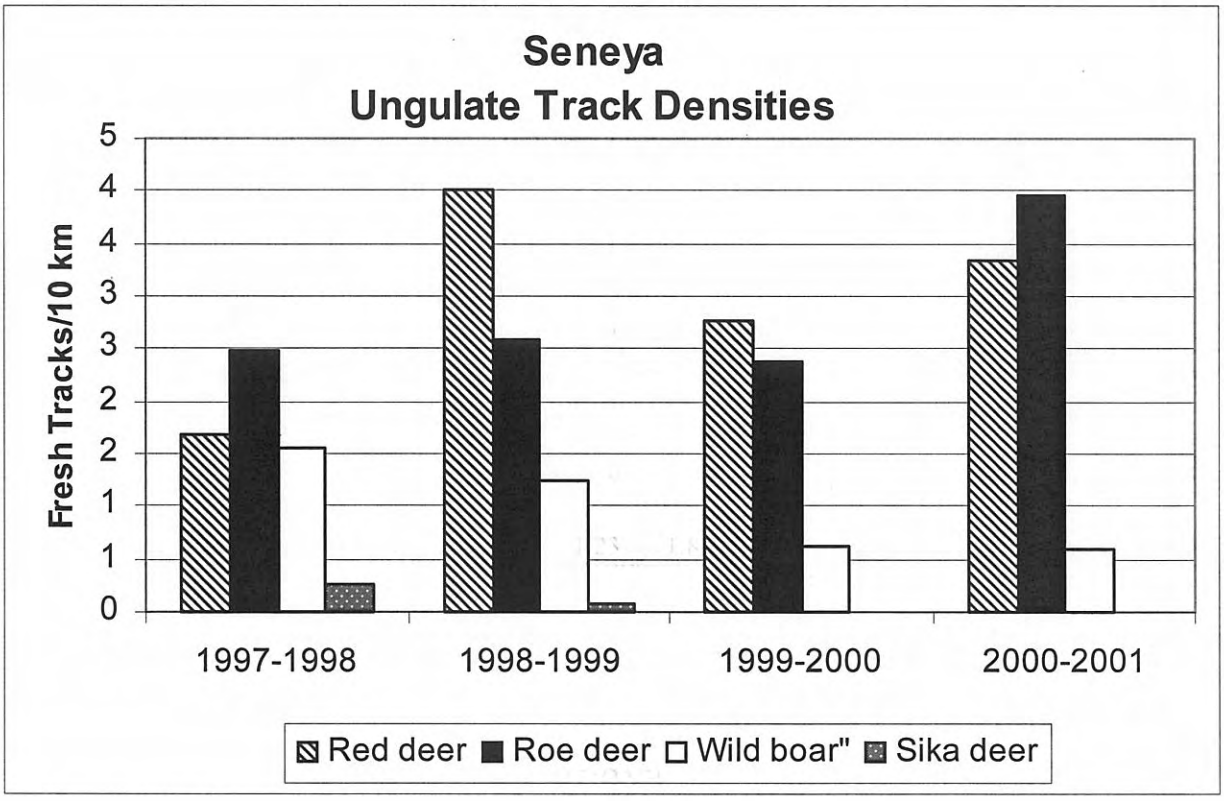
Number of Independent tigers (adults, subadults, unknown) on monitoring site

Number of tigers, by age class, and sex (for adults only) on Amur tiger monitoring sites in winter

			Age						Totals		
			Adults								
#	Site	Year	Males	Females	Un-known	Sub-adults	Cubs	Age unknown	Total adults	Total independents*	Total (all tigers)
15	Sineya	1997-1998	1	0	0	1	1	3	1	5	6
15	Sineya	1998-1999	1	2	0	0	0	3	3	6	6
15	Sineya	1999-2000	2	2	0	1	1	0	4	5	6
15	Sineya	2000-2001	2	3	0	1	3	1	5	7	10

Mean track density (tracks less than 24 hours) of ungulates in Amur tiger monitoring sites for first 4 years.

		Prey		1997		1998		1999		2000		Grand Total	
#	Monitoring Site	species	n	mean	std	mean	std	mean	std	mean	std	mean	std
15	Sineya	Red deer	15	1.68	1.60	4.00	2.60	2.77	3.74	3.35	2.27	2.95	2.74
15	Sineya	Roe deer	15	2.48	2.24	2.59	2.08	2.37	1.83	3.96	2.49	2.85	2.21
15	Sineya	Sika deer	15	0.27	0.78	0.08	0.21	0.00	0.00	0.00	0.00	0.09	0.41
15	Sineya	Wild boar	15	1.56	2.89	1.23	1.82	0.61	1.07	0.60	1.23	1.00	1.89



IMAN
Central Primorski Krai
1999-2000

Report on results of Amur tiger monitoring program in Iman monitoring unit in 2000-2001 winter Coordinator

I.G. Nikolaev
Institute of Biology and Soils, Far Eastern Branch Russian Academy of Sciences

The Iman monitoring unit is located in the Malinovka river basin (Dalnerechensky Raion, Primorski Krai). The territory of the monitoring unit (140,000 ha) includes the upper basin of Orekhovka river and its tributary - Gornaya river. The border of the monitoring unit lies mostly along the divides of these river basins and only in the west it runs through valleys of Orekhovka and Gornaya rivers, crossing them near cross-road that leads to Polyana and Martynova Polyana villages.

The number of routes on monitoring unit, their numeration and location are the same as in past years.

Field work on the routes was conducted in December 6-8 and in February 19-22.

In December the total length of routes traveled by vehicle was 131 km, on foot – 68 km. In February the total length of routes traveled by vehicle was120 km, on foot - 78 km. Routes were not traveled by snowmobile, which was used only to bring fieldworkers to the routes. A discrepancy in modes of travel during the first and the second counts was caused (as in past years) by a big difference in snow depth in December and February. In December the minimum and maximum snow depth in open sites were 19 cm and 35 cm respectively; in February these figures were 41 cm and 60 cm. Due to snow depth in the second half of the winter several routes which were not passable by vehicle were traveled on skies.

The date of last snow (for the count in December) was November 26 and the February count - January 31. Therefore, before first count there had been an interval of 10 days since the last snow, and before the second count,19 days.

This season as well as the past winter were both unfavorable for local tigers. This situation has developed due to an imbalance in predator-prey numbers. Among tiger prey species, or primary concern is the wild boar population, whose density has remained at very low levels for the past six years. In February no fresh tracks of wild boars were found on routes.

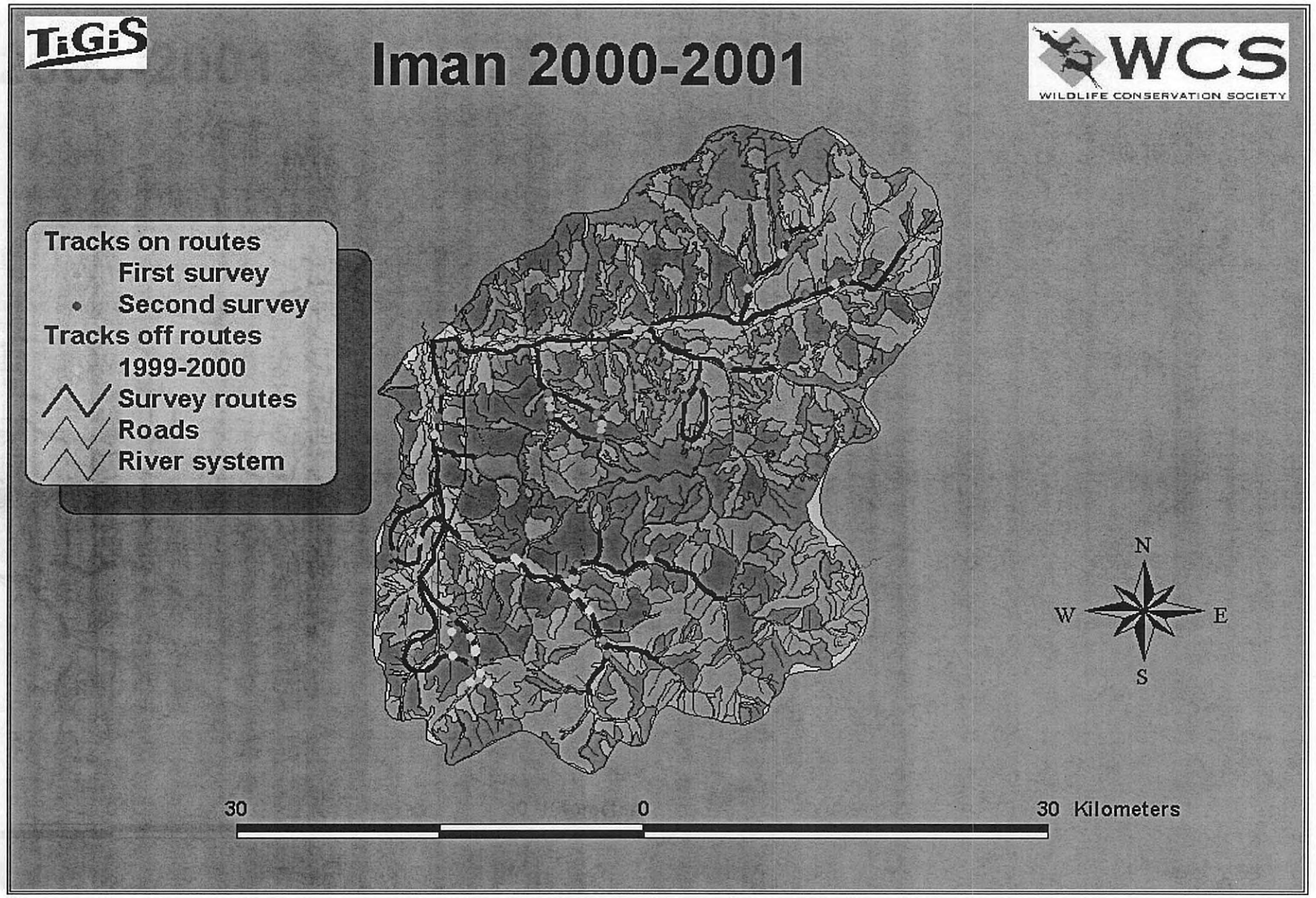
Elk and roe deer populations appear to be in satisfactory condition. There were considerable differences in the number of elk tracks reported in February in comparison with December (81 tracks in December versus 126 in February), which can probably be explained by the difference of snow depth in the first and second surveys. Deep snow (which accumulated in the second part of winter) forced elk to go downslope into river valleys and to concentrate in their middle and lower reaches of river basins as snow depth increased.

The second important negative factor is human disturbance. The importance of this factor has increased due to more intensive logging. The area being logged has risen mostly due to the activity of a variety of

commercial and illegal logging groups. This factor affects females with cubs most of all. They usually leave areas where logging activity is occurring.

Although the condition of tiger habitat for this winter season was considered not particularly favorable, nevertheless population density here remains at the same high level as before.

Habitat conditions on the monitoring unit still remain at a level suitable for tiger survival in the near future.


TiGiS
Iman 2000-2001
WCS
WILDLIFE CONSERVATION SOCIETY
Tracks on routes
First survey
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Tracks off routes
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Survey routes
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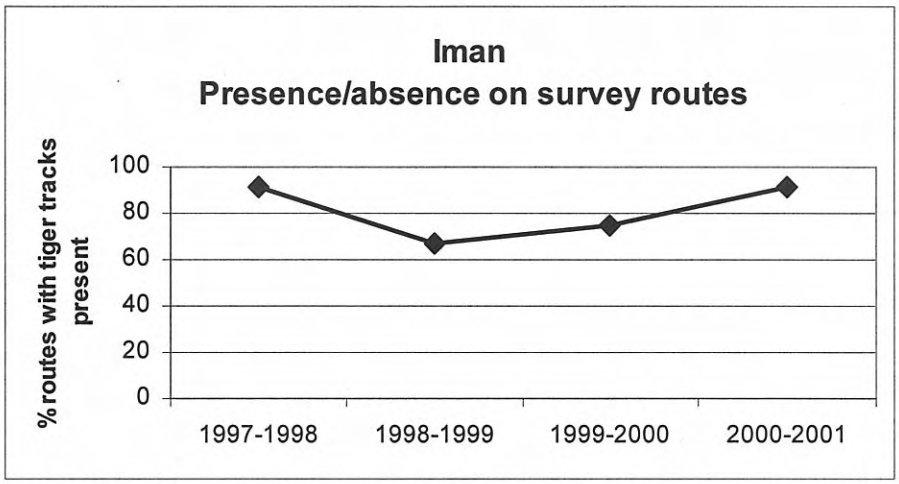
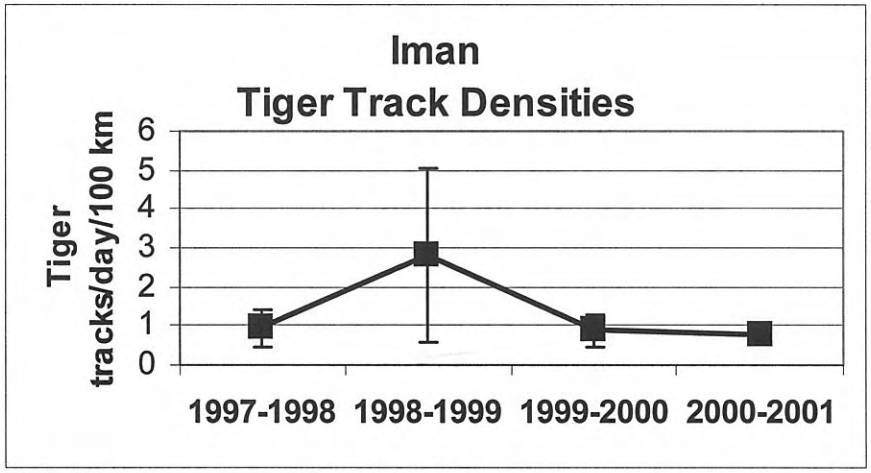
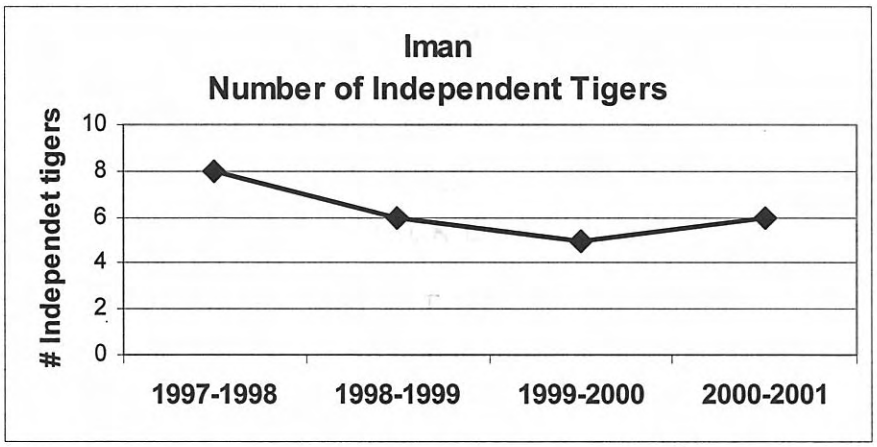


Percentage of routes with tiger tracks reported (both surveys combined).



Comparison of track densities in monitoring site across years



Number of Independent tigers (adults, subadults, unknown) on monitoring site