VI. REPORTS ON INDIVIDUAL MONITORING SITES 1999–2000

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 three 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 for 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 1999-2000
Coordinator - G. P. Salkina

1. Name of monitoring unit: Lazovsky zapovednik
2. Coordinator: G. P. Salkina
3. Time of simultaneous counts: the first count - December 27 - January 10. Count on 10 routes was conducted from December 27 to December 30 (i.e. during 4 days). The count on route # 11 was conducted on January 10 because there was no snow earlier. The second count was conducted from February 23 to March 3. Ten routes were traveled during four days (February 23-26), and one route was traveled on 3rd of March.
4. Routes ##: 1-12
5. Total length of routes: 117 km and all routes were traveled on foot.
6. Conditions:
   First count. The first snow did not fall on the coast, and the second snowfall was on 24th of December. On the 4th day after snowfall 10 routes out of 12 were traveled. Route # 10 (on the coast) was traveled on the third day after snowfall because snow was melting fast. After the first count, which was conducted on 24th of December, there was no snow on the route # 11. During the first week of January, snow fell almost nonstop and we were able to conduct the count only on 19th of January. In inland part of the reserve snow depth was: in valleys - 7-22 cm, on northern slopes - 8-20 cm, on southern slopes - 5-10 cm, on passes - 14.5-17.5 cm. On the coast snow was 2-3 cm deep in valleys, 4 cm - on northern slope, and 2-2.5 cm - on ridges. After second snowfall snow depth on 11th routes was: in valleys - 11-20 cm, on northern slope - 20.5-27 cm and 4.5 cm - on ridge.
   Second count. In inland part of the reserve snow depth was: in valleys - from 9 up to 57.5 cm, on northern slopes - 44.5-65 cm, on southern slopes - from 14 to 57.5 cm, on ridges - 32.5-65 cm. On the coast snow was 3-25 cm deep in valleys, 20.5 cm - on northern slope, 13-19.5 cm on southern slopes and 6-23 cm - on passes. There were no snowfalls after 6th of January and the count was conducted on routes with numerous tracks (mnogosleditsa) except route # 5 that was traveled on the fourth day after snowfall. It was more difficult to conduct the second count than the first one because of deep snow. It was impossible to walk along the routes located inland without skies.

7. Assessment of efficiency: In December, there was no snow on the coast. One route was traveled 11 days later than others in the reserve. But most likely, it did not influence the results because indirect data suggest that tigers visit Preobrazhenski forest district very rarely, as was confirmed during the count.
   During the second count, snow was everywhere. Routes situated inland were impassable without skies. Two fieldworkers tried to do this but they had to spend a night in a forest. Due to this fact, the route # 5 was not traveled in time. Then snow fell and the route was traveled 5 days later than all other routes. The count was conducted in the end of February because many people at this time had influenza.
   In sika deer habitat it was difficult to count individual tracks because of grouping behavior (large aggregations of deer moving together) and territorial conservatism is typical for this species. At a spot it was difficult to determine where "*zhirovka*" begins and ends. That is

why all crossings are counted in zapovednik. In order to include an adjustment coefficient it is necessary to process existing data and to conduct special investigations.

8. Summary of results:
   Living conditions and status of ungulate populations.
   Such prey species of tiger as wild boar, elk, sika deer, roe deer and musk deer inhabit the monitoring unit. An average acorns crop in autumn of 1999 and average winter were favorable for ungulate populations. Based on December and February survey data (mean number is taken) total ungulate density increased by 13% in comparison with winter season 1995-1996. If we compare only counts made in February (in winter 1995-1996 counts were made in February only) then total ungulate density is on the same level. Counts made on "white trail" show different results.
   A high level of illegal hunting on ungulates continues. Iillegal hunting takes place especially in zapovednik buffer zones, where there are convenient access roads. During past years (from March to March) only two cases of illegal hunting on ungulates were reported in the zapovednik. It is absurd (i.e., unrealistic) estimate.
   Living conditions and status of tiger population in comparison with previous information (for example with data of Tiger census 1996).

   Survey results showed that the number of adult tigers remains the same as in winter season 1995-1996. However, numerous tracks ("mnogosleditsa") probably have influenced this survey results. Before the count in February there was no snowfall for about month and a half and this fact could result in overestimation. Old tracks of the same tiger enlarged, and fresh tracks left on a trail have partly printed pad. On the other hand, it was difficult to determine how many times the same tiger came off the trail and returned (for old tracks).

   In the zapovednik tigers has become rare on the coast. No tracks were found on two routes in December and January although they were traveled at 11 days interval. No tiger signs were found on route # 12 although they were common here before. Tigers have changed their travel patterns here.

   No litters were found in zapovednik from March 1999 until March 2000. During this period 3 reports about cubs' tracks on the coast were made by forest guards and local people. We have thoroughly examined this information on the ground but it was not confirmed. In 1996 three litters of 8 cubs were found in zapovednik. The absence of tiger cubs in the zapovednik could be explained by direct persecution of tigers by poachers. It is known that "new" tigers in a "new" place do not immediately begin to reproduce. Indirect evidence of the fact that tigers are "newcomers" lies in the fact that tigers have changed their travel patterns along the coast.

   Therefore, tiger population in Lazovsky Zapovednik is enduring difficult times. For the first time since 1960s no tiger litters were found. But effective reproduction is the evidence of good population status. Therefore, we can conclude that existing tiger protection today is not effective.

   Habitat conditions

   Spring and fall of 1999 were rainy otherwise there will be much more fires in the area.

High level of illegal hunting for ungulates still remains, and the number of discovered illegal kills is low - less than 10%. Moreover, there is no such term in zapovednik as unrevealed law violations. Violations (poaching) are not being registered, except poached ungulates - because this information is necessary for scientific researchers.

Zapovednik's territory (especially the coast) is under intensie recreational pressure. Moreover, there are many people searching for ginseng during visits to the zapovednik in summer.
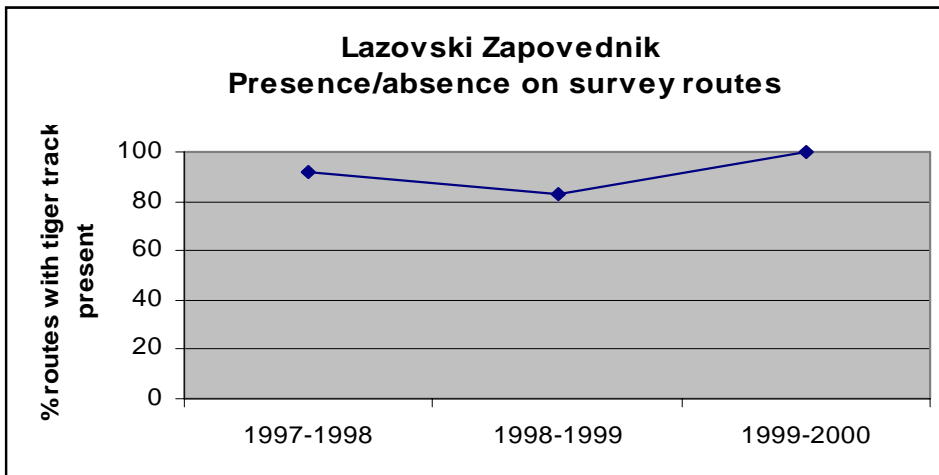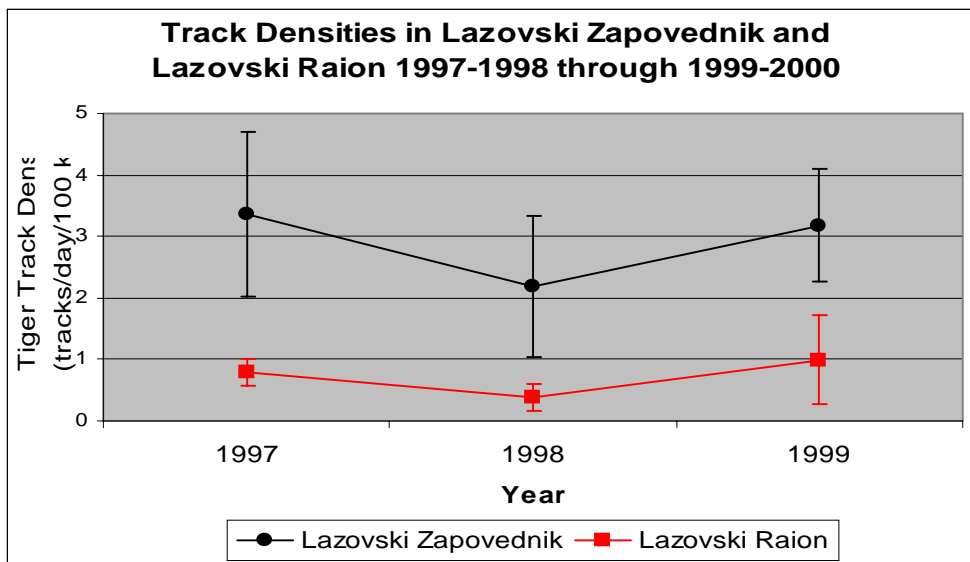
Lazovski Zapovednik 1999-2000
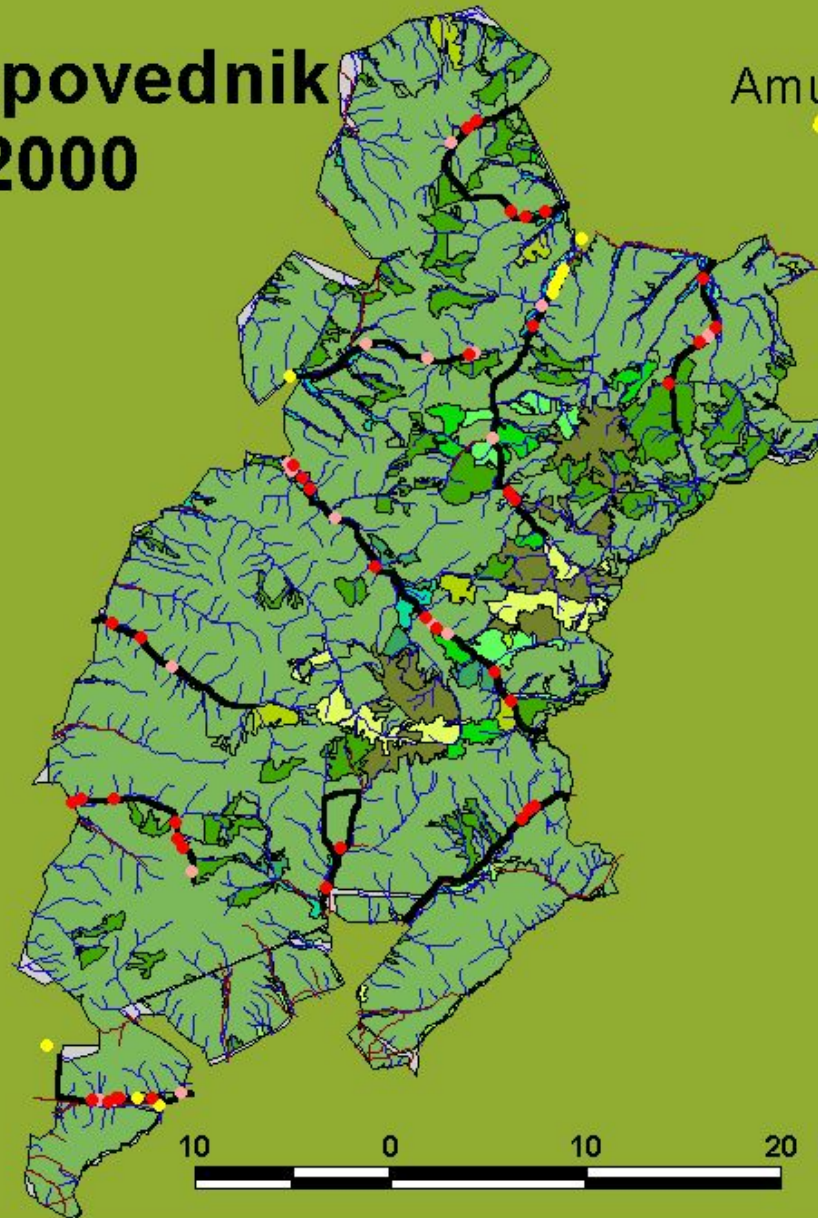
Amur Tiger Monitoring Program 1999-2000 winter
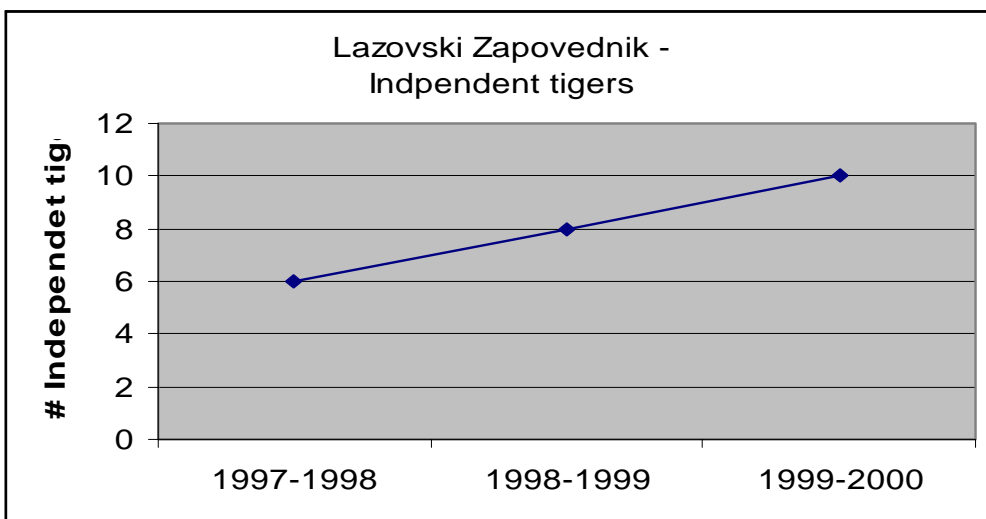
Tracks on routes
- First survey
- Second survey

Tracks off routes
- 1999-2000

Survey routes
Roads
River system

Forest types
- 0
- 4
- 6
- 11
- 12
- 13
- 14
- 15
- 16
- 19
- 20
- 21

10   0   10   20 Kilometers

6

**Lazovski Zapovednik
Presence/absence on survey routes**

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

**Track Densities in Lazovski Zapovednik and
Lazovski Raion 1997-1998 through 1999-2000**

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

Lazovski Zapovednik -
Indpendent tigers

Number of Independent tigers (adults, subadults, unknown) on monitoring sites, 1999-2000
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 3 years.

| # | Monitoring Site | | n | 1997 | | 1998 | | 1999 | | Total |
				mean	std	mean	std	mean	std	mean
1	Lasovski Zapovednik	Red deer	12	1.234	2.392	1.490	2.640	6.945	15.659	3.223
1	Lasovski Zapovednik	Roe deer	12	4.301	9.258	2.401	3.602	3.901	4.891	3.334
1	Lasovski Zapovednik	Sika deer	12	45.178	50.585	43.850	39.937	108.282	158.110	80.174
1	Lasovski Zapovednik	Wild boar	12	1.451	2.163	2.523	2.728	5.242	10.453	3.574
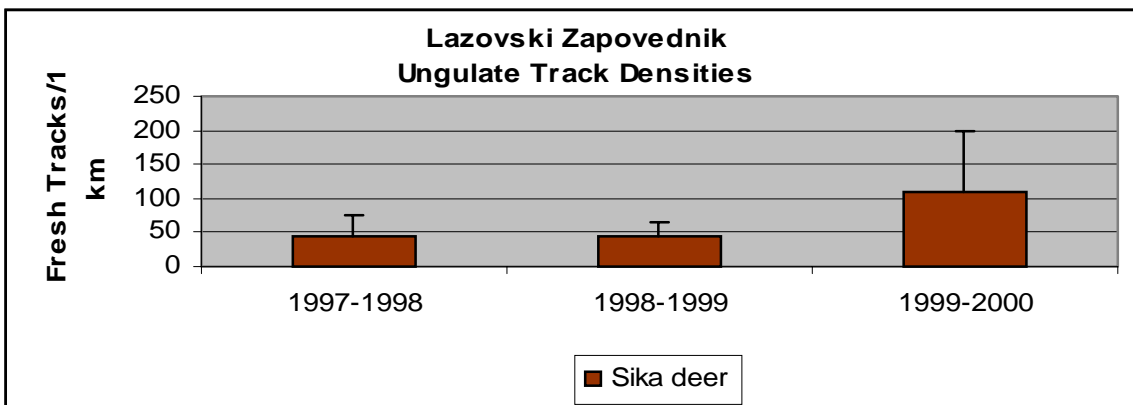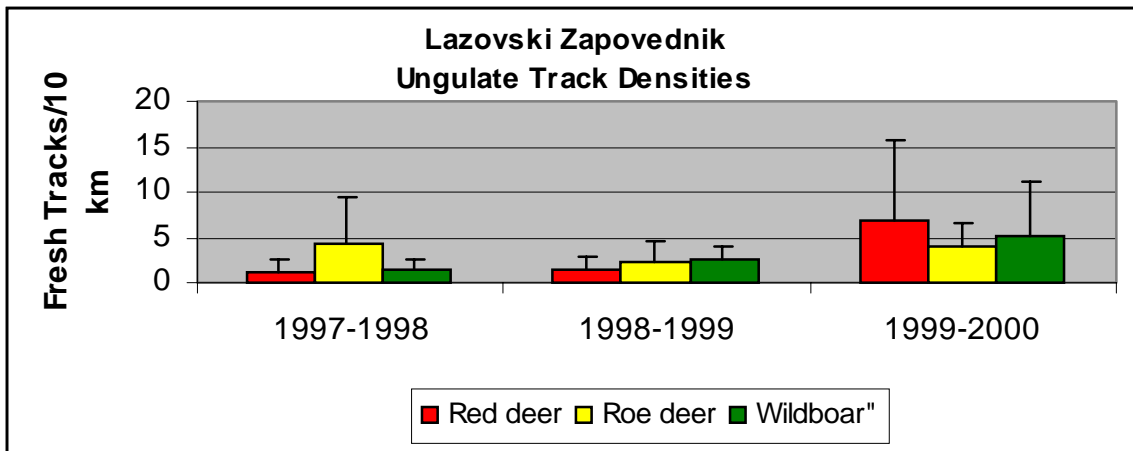
LAZOVSKI RAION
Southeast Primorski Krai

Report on results of Amur tiger monitoring program
in Lazovsky Raion monitoring unit in winter 1999-2000
Coordinator - G. P. Salkina

9. Name of monitoring unit: Lazovsky raion
10. Coordinator: G. P. Salkina
11. Time of simultaneous counts: January 10-16 and February 16-21
12. Routes ##: 1-11
13. Total length of routes: 9 routes (115 km) were traveled on foot, 2 routes were partly (20 km) traveled on foot and partly - by vehicle.
14. Conditions: There were two snowfalls in December but on the coast snow had melted. At the beginning of January, it had been snowing for a week. The survey began on the fourth day after snowfall. In Krivaya basin the snow cover was: in valleys - 14-28.5 cm, on northern slopes - 26-47 cm, on southern slopes - 11-24 cm, and on ridges facing sea - 11.5-24 cm. At this time on the shore snow cover was: in valleys - 6.5-16.5 cm, on southern slopes - 11.5-24 cm. The second count was conducted from 15 to 21 of February. There were no snowfalls for about month and a half. The whole area was covered with snow except southern slopes that had patchy snow cover (were partly covered with snow). In Krivaya river basin the snow cover was 18-39 cm, on northern slopes - 18-31.5 cm, on ridges facing sea - 12-29.5 cm. On the shore snow cover was: in valleys - 10 cm, on ridges - 12-29.5 cm. On southern slopes, on places with snow, it was up to 24.5 cm deep.
15. Assessment of efficiency: During the first count snow was everywhere, people had time to establish roads and to make trails. During the second count, there was no snow cover in some places on the slopes facing sea. But it was possible to count tigers there. The possibility of missing a tiger can be considered low. As for ungulates - they were counted on such parts of routes (see table 3b). The survey was complicated by the absence of snowfall and tiger tracks on the roads were quickly destroyed by vehicles. But there were only three such routes. Numerous crossings ("mnogosleditsa") also made tracks identification difficult.
    In sika deer habitat it was difficult to identify tracks due to multiple crossings of aggregations of deer,. At a spot it was difficult to determine where " zhirovka" begins and ends. That is why all crossings are counted in zapovednik. In order to include an adjustment coefficient it is necessary to process existing data and to conduct special investigations.

16. Summarizing of results:
    Living conditions and status of ungulate populations.
    Prey species of tiger such as wild boar, elk, sika deer, roe deer and musk deer inhabit the monitoring unit. The average acorn crop in autumn of 1999 and average winter were favorable for ungulate populations. Total ungulate density (number of crossing per 10 km of route) in February was reduced twice in comparison with data obtained in December. If to compare data on ungulate density obtained in February 1996 and in February 2000 - this index has slightly decreased. Most likely ungulate density has decreased significantly. First, the last count was conducted by more experienced fieldworkers who registered all crossings. Second, on six routes very few crossings were registered.

A high level of poaching remains. During the survey 30 skins of sika deer were found despite the fact that hunting for sika deer is prohibited in Lazovsky Raion. In state hunting inspection there is no such term as "undisclosed infringement" - illegal kills are not registered.

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

Survey results showed that the number of adult tigers had been reduced to half of what occurred here in the 1995-1996winter season. Numerous tracks ("mnogosleditsa") probably influenced this survey results. Before the survey in February there was no snowfall for about month and a half and this fact could result in overestimation. Old tracks of the same tiger enlarged, and fresh tracks left on a trail have partly printed pad. On the other hand, it was difficult to determine how many times the same tiger came off the trail and returned (for old tracks).

During the first count, tiger tracks were not found on seven routes of 11, in the second count - on five routes, despite the fact that there was no snowfall for about month and a half. No tracks were found on four routes both during the first and the second count. The following tendency is tracked. Last year tigers were rarely found in adjacent areas of Partizansky Raion, which borders monitoring unit. This year tracks were not found in the southeastern part of unit from the direction of Nakhodka and Partizansk towns, which is an area often visited by people.

No tiger litters were found. Hunters say that there were no litters last year. In 1995 until February 1996 four litters including five cubs were registered in this territory. It looks like tigers are hanging around the settlements. During the first count on Sinegornaya river tigers (male and female) left numerous tracks near logger's trail, where they were attracted by dogs. During the second count, the male was also registered here. Both in the first and in the second counts tiger tracks were found near Kievka village. In Komyndov creek area a tiger walked around a cabin, examined a rubbish heap and had been lying for a long time near this place. Above Sinegornaya river there was an accident when tiger demonstrated aggression when a man attempted to confiscate its prey. Tiger was not killed only because the hunter had unsafe rifle and was afraid to shoot.
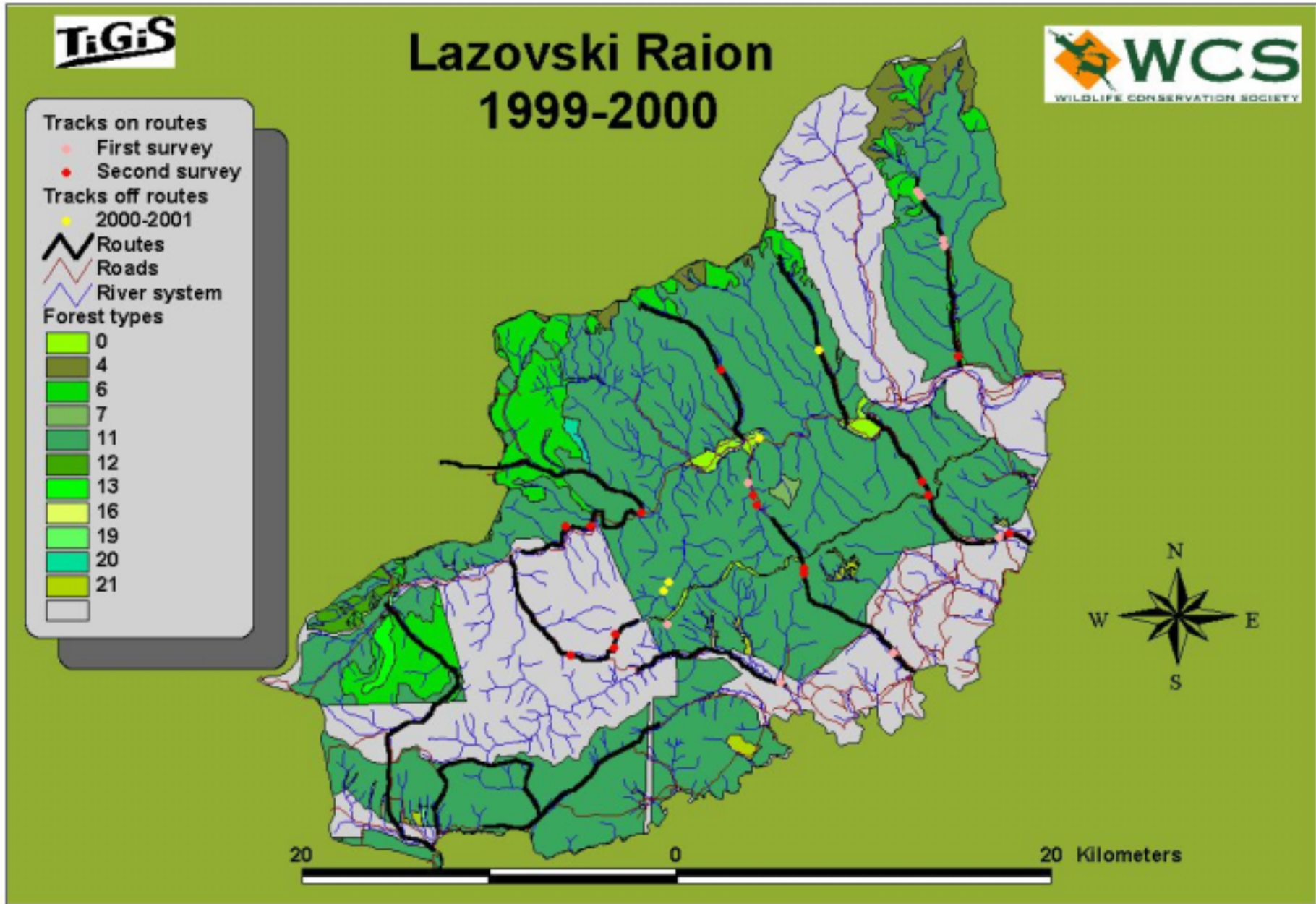
Therefore, the status of tiger population in Lazovsky Raion monitoring unit became worse in comparison with 1995-96 winter season. For the first time for many years, litters were not found. But effective reproduction is the evidence of good population status. Therefore, we can conclude that existing tiger protection today is not effective.
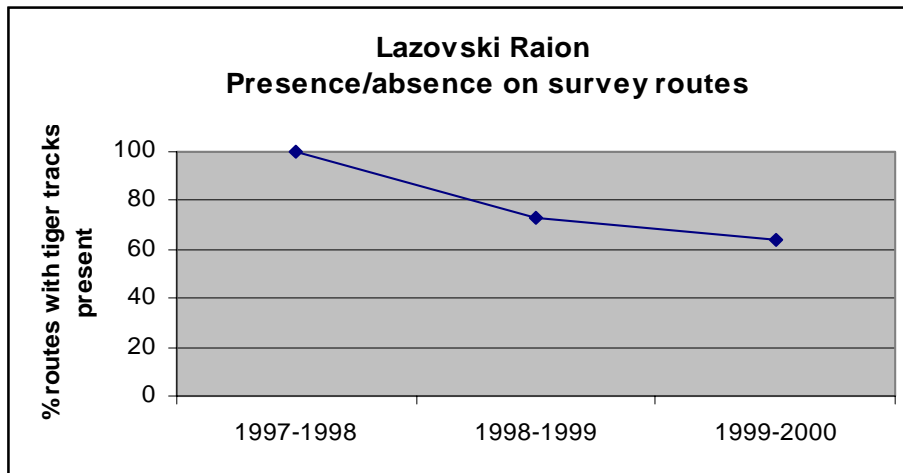
Habitat condition

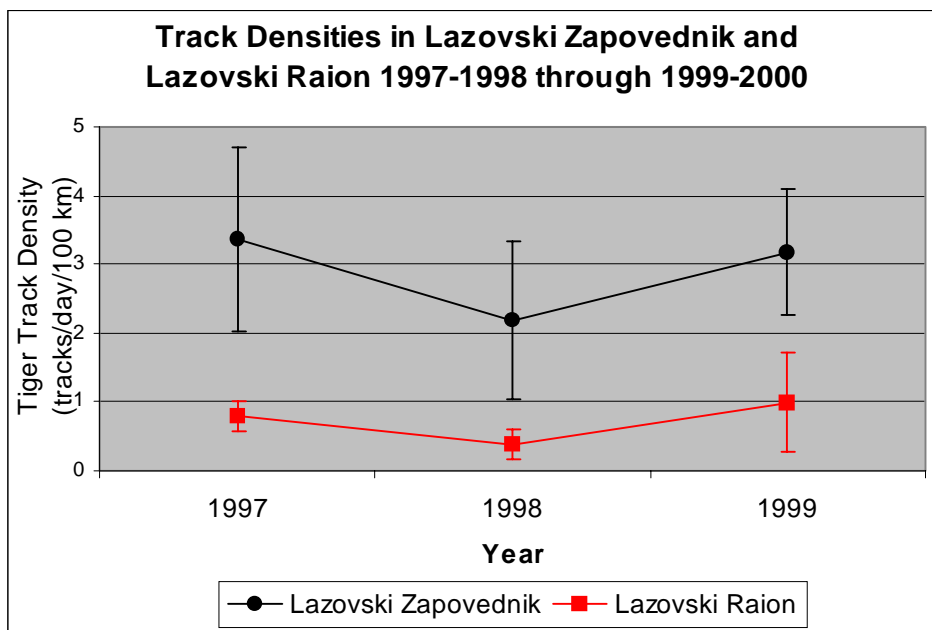Spring and fall of 1999 were rainy otherwise there would be much more fires in the area.
High level of illegal hunting for ungulates still remains, and the number of discovered illegal kills is low - less than 15%. Everyday during the second count (when hunting season had already been closed) fieldworkers heard the shots or saw poachers. Heavy recreational pressure in the territory takes place. Krivaya river valley is being occupied, new khutors are being built (many of which are poachers' bases). Logging has increased.
In Polozov creek valley 3 km of road were destroyed by flood and this fact can be considered as positive event.
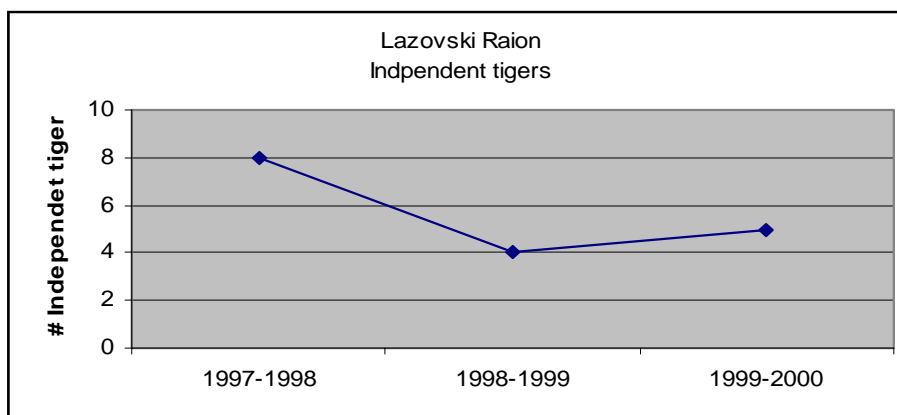
TiGIS

Lazovski Raion
1999-2000

WCS
WILDLIFE CONSERVATION SOCIETY

Tracks on routes
First survey
Second survey
Tracks off routes
2000-2001
Routes
Roads
River system
Forest types
0
4
6
7
11
12
13
16
19
20
21

N
W   E
S

20   0   20 Kilometers

Lazovski Raion
Presence/absence on survey routes

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

Track Densities in Lazovski Zapovednik and
Lazovski Raion 1997-1998 through 1999-2000

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


Lazovski Raion
Indpendent tigers

Number of Independent tigers (adults, subadults, unknown) on monitoring sites, 1999-2000

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 3 years.

#	Monitoring Site		n	1997		1998		1999		Total
				mean	std	mean	std	mean	std	mean
2	Lazovski Raion	Red deer	11	1.414	3.683	0.254	0.564	1.182	3.757	0.758
2	Lazovski Raion	Roe deer	11	3.424	5.466	1.012	0.969	0.667	1.411	1.303
2	Lazovski Raion	Sika deer	11	9.314	6.993	11.435	12.098	41.785	65.131	28.544
2	Lazovski Raion	Wild boar	11	3.283	2.027	0.299	0.606	0.298	0.493	1.037
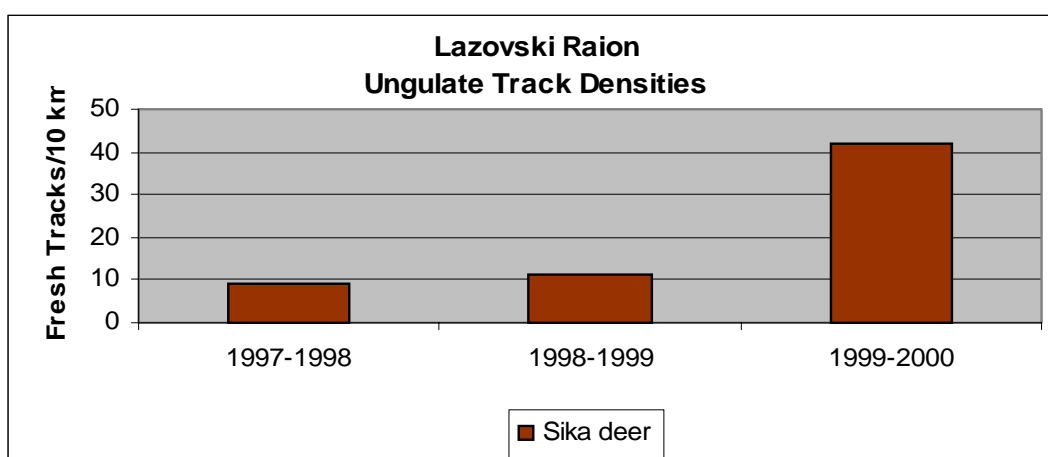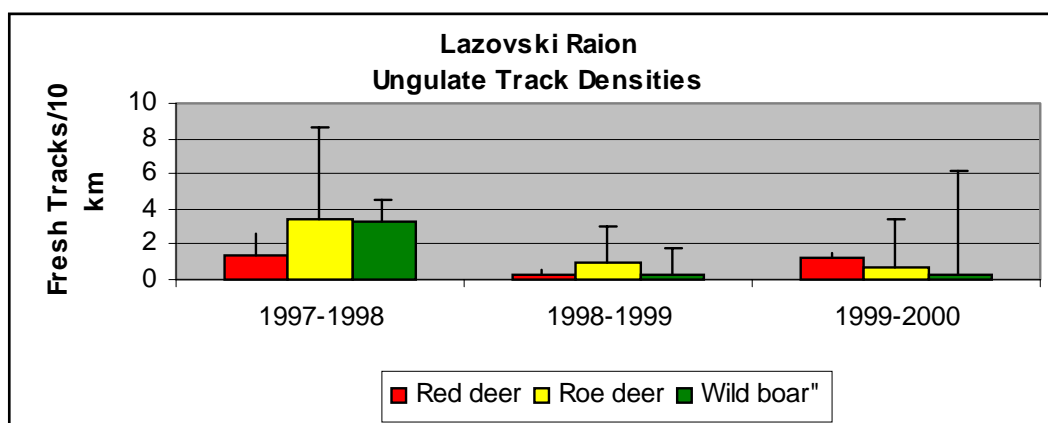
USSURISKI ZAPOVEDNIK AND USSURSIKI RAION
Southcentral Primorski Krai
1999-2000

Report on results of Amur tiger monitoring program
in Ussuriisky Zapovednik and Ussuriiski Raion monitoring units in winter 1999-2000
Coordinator - V.K. Abramov

Tiger and ungulate survey was conducted in December 21-23, 1999 and in February 18-19, 2000. The territory as in previous winter season was divided into two units: zapovednik and raion.

Routes ## 1, 5, 6, 7, 8, 12, 14, 15, 17, 22, 23, 23 are located in Zapovednik monitoring unit and routes ## 4, 9, 10, 11, 13, 16, 18, 19, 20, 21, 24 are located in Raion monitoring unit. Total length of survey routes is 302.4 km including routes traveled on foot -209.9 km and by vehicle - 92.5 km. In zapovednik steady snow cover formed after snowfall that took place on December 20, 1999. During the first phase of survey, snow cover height varied (depending on relief and vegetation) from 5 to 16 cm. Before the beginning of the second phase of survey snowfall took place on February 15 and during the field work snow cover height varied (depending on relief and vegetation) from 4 to 40 cm, and on most routes snow cover was 22-23 cm.
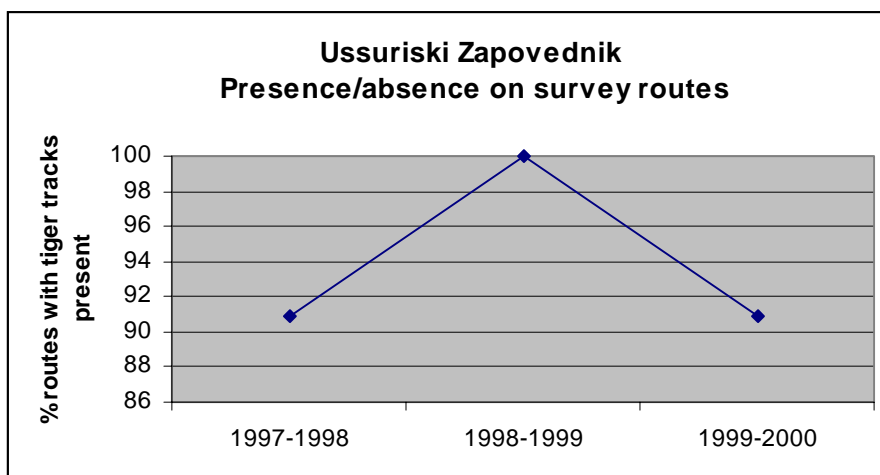
In December one male and one individual of unknown sex and age (probably subadult, independent tiger) were not registered during the survey. In February, tracks of cubs and one individual of unknown sex and age were not found. But these gaps in December and February counts were supplemented with information obtained between and after these counts. Based on monitoring data we can estimate the total number of tigers in the monitoring units as: two males, two females, and one female with cub, three cubs and one individual of unknown sex and age.

During the last year, the number of tigers in monitoring unit has decreased. First of all, it concerns two litters. The litter, which lived in Perevoznaya and Kamenushka river valleys (route # 3), disappeared entirely - female and two cubs. Most likely, they were poached in summer or autumn 1999. The second litter that lived in Levaya Komarovka river valley in Zapovednik (route # 7) also disappeared. It is suggested that female died or was killed, but one cub survived. Probably tracks # 20, 21, 73, 74 in zapovednik and track # 6 in the Raion belong to him.
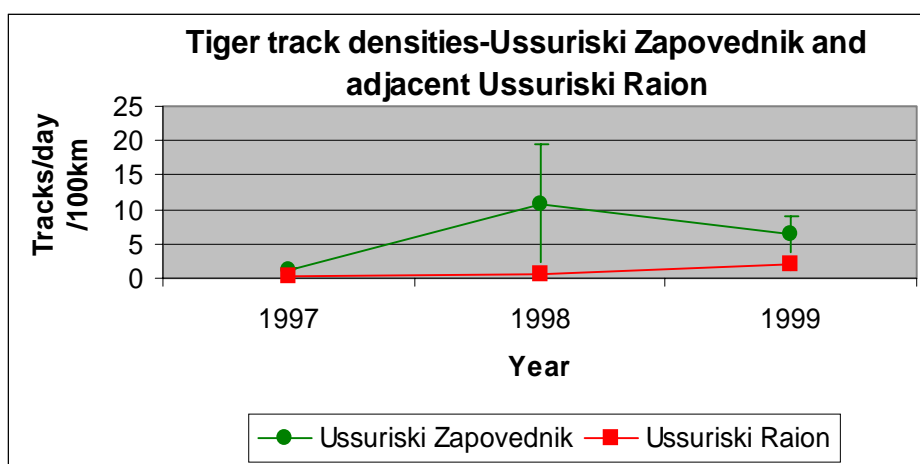
The status of ungulate populations (elk, wild boar, roe deer and musk deer) became worse. The number of ungulates is decreasing both in the zapovednik territory and adjacent areas. Sika deer numbers in the zapovednik are stable or even potentially increasing s their range extends.

In comparison with past winter season human disturbance has decreased - people visited the forest seldom because of bad pine nuts crops.

Ussuriski Zapovednik 1999-2000

Amur Tiger Monitoring Program 1999-2000 winter

Tracks on routes
First survey
Second survey
Tracks off routes
1999-2000
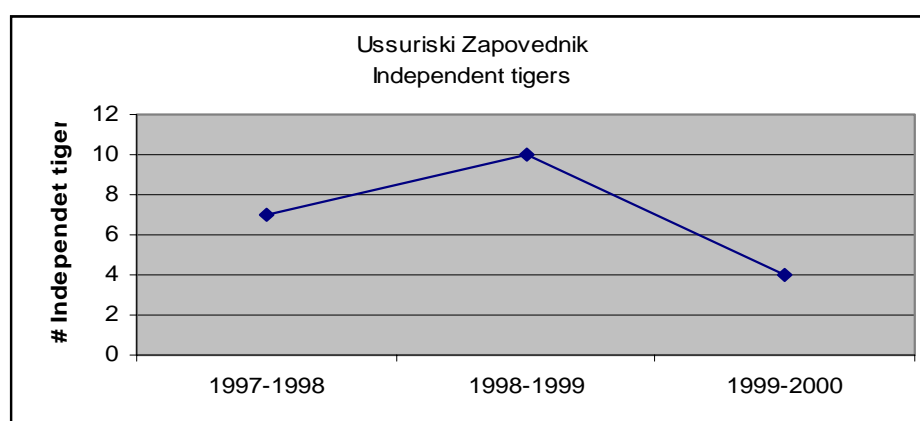Survey routes
Roads
River system

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

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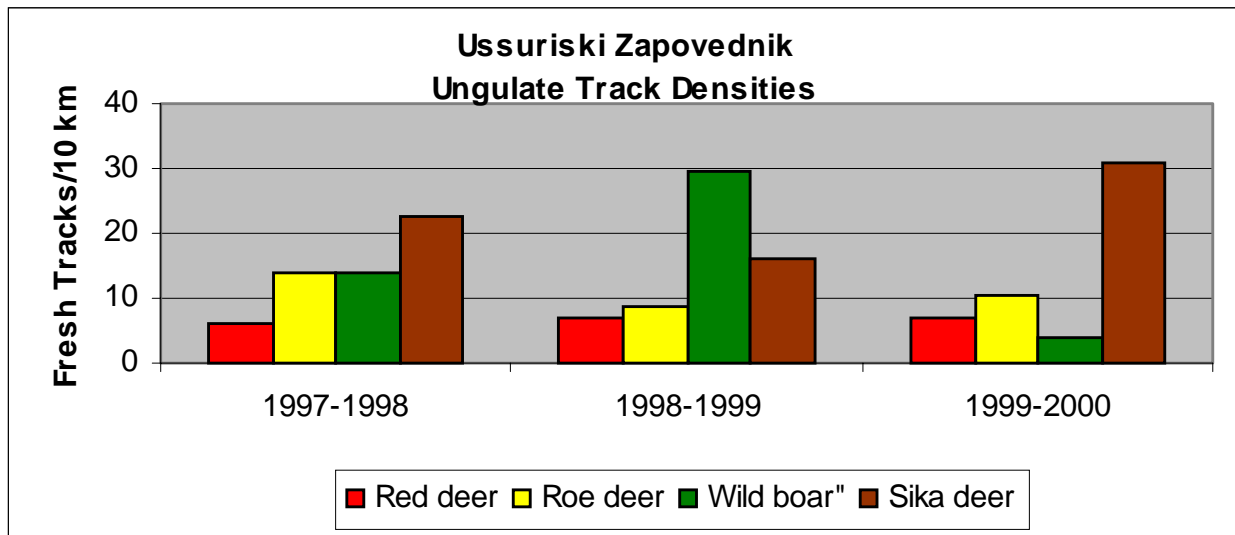

Number of Independent tigers (adults, subadults, unknown) on monitoring sites, 1999-2000
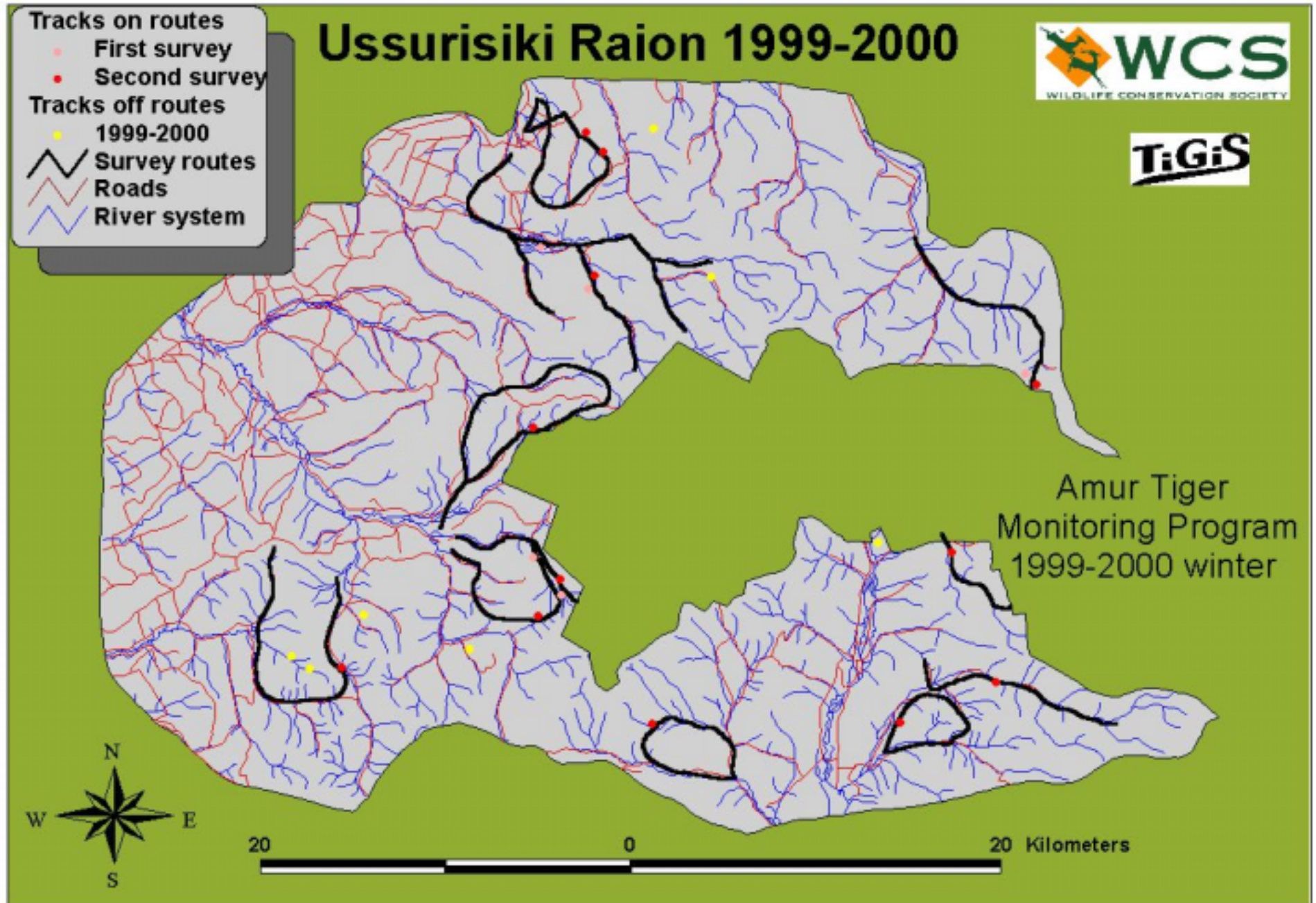
Number of tigers, by age class, and sex (for adults only) on Amur tiger monitoring sites in winter
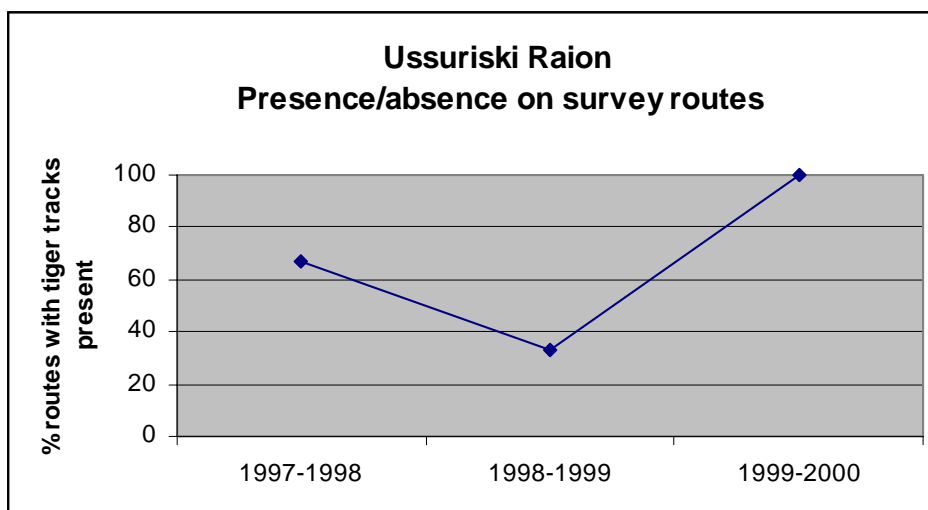
			Age						Totals	
			Adults							
#	Site	Year	Males	Females	Un-known	Sub-adults	Cubs	Age unknown	Total adults	Total independents*	Total (all tigers)
3	Ussuriski Zapovednik	1997-1998	0	0	0	1	0	6	0	7	7
3	Ussuriski Zapovednik	1998-1999	0	1	0	2	0	7	1	10	10
3	Ussuriski Zapovednik	1999-2000	1	2	0	0	3	1	3	4	7
3	Ussuriski Zapovednik	2000-2001	2	2	1	0	2	0	5	5	7

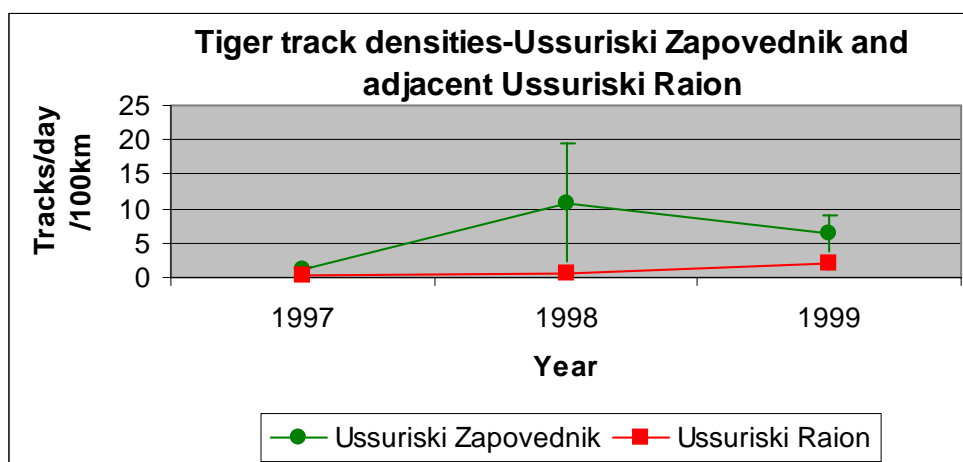Mean track density (tracks less than 24 hours) of ungulates in Amur tiger monitoring sites for first 3 years.

#	Monitoring Site		n	1997		1998		1999		Total
				mean	std	mean	std	mean	std	mean
3	Ussuriski. Zapovednik	Red deer	11	6.059	6.250	7.026	5.713	6.975	6.984	6.274
3	Ussuriski. Zapovednik	Roe deer	11	13.815	16.105	8.608	10.446	10.333	10.651	9.812
3	Ussuriski. Zapovednik	Sika deer	11	22.555	25.163	16.115	17.815	30.715	45.737	24.010
3	Ussuriski. Zapovednik	Wild boar	11	14.092	17.653	29.555	32.903	4.129	3.308	18.247

Ussurisiki Raion 1999-2000

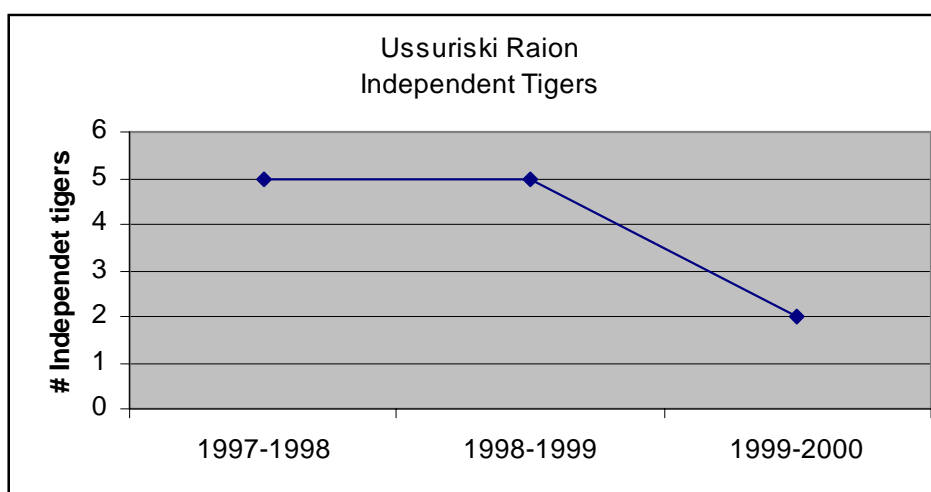Amur Tiger
Monitoring Program
1999-2000 winter

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 sites, 1999-2000

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 3 years.

#	Monitoring Site		n	1997		1998		1999		Total
				mean	std	mean	std	mean	std	mean
13	Ussuriski Raion	Red deer	12	2.162	2.960	2.017	2.044	4.276	3.669	2.562
13	Ussuriski Raion	Roe deer	12	7.935	9.007	7.921	8.239	12.052	7.696	8.941
13	Ussuriski Raion	Sika deer	12	0.587	1.275	0.342	0.743	2.694	3.557	1.401
13	Ussuriski Raion	Wild boar	12	3.242	3.978	2.189	3.034	2.072	2.676	2.303
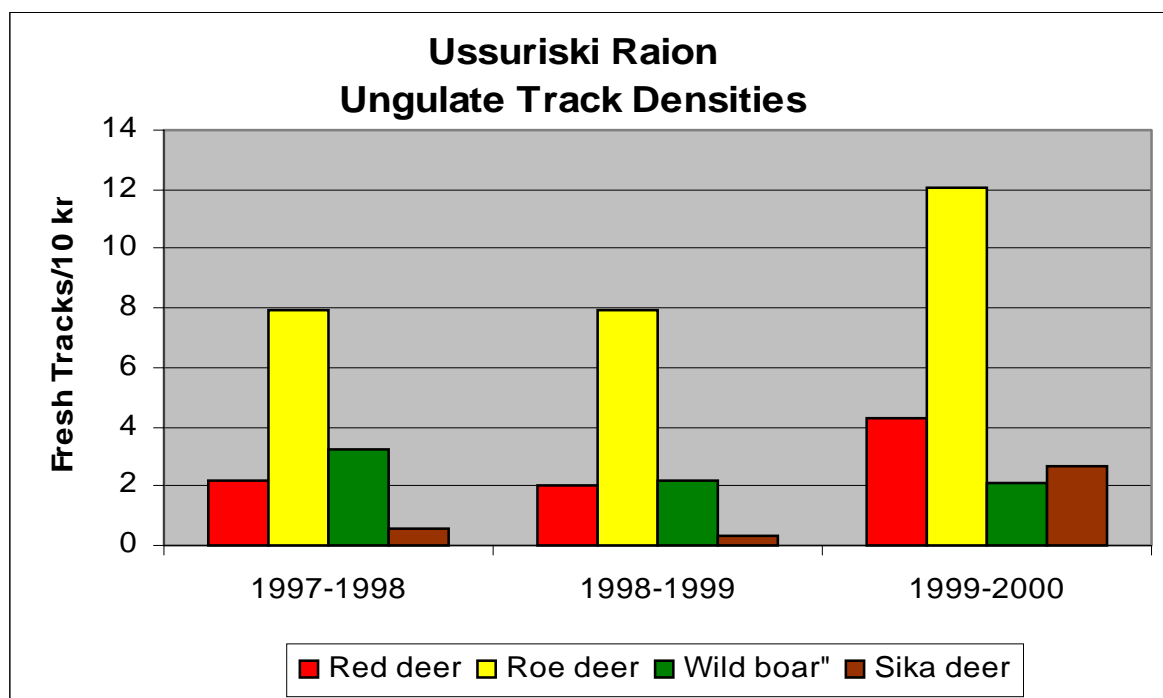
BORISOVKOE PLATEAU
Southwest Primorski Krai
1999-2000

**Report on results of Amur tiger monitoring program
in Borisovskoe Plateau monitoring unit in winter 1999-2000
Coordinator - D.G. Pikunov**

Borisovskoe Plateau monitoring unit is situated in southwestern part of Primorski Krai. After a "complete count" survey of Amur tigers was conducted in winter 1995-1996, the monitoring program of tiger and ungulate populations was implemented here three years ago.

Time of surveys. The first count was divided into two phases: from 23 to 29 of December 1999 - all routes except 3 were traveled (we could not investigate these 3 routes because snow cover was less than 5 cm), and on January 11-12, 2000 routes ## 1, 2, 3 were traveled soon after heavy snowfalls. The second count was conducted from 12 to 21 of February, 2000.

Monitoring unit was covered with 14 routes evenly located over the whole territory. Most routes were set along beds of medium and large rivers, where (based on our long-term field studies) the typical tiger and ungulate habitat is situated. Most survey routes run along valleys, cross or go into divides and plateaus (routes ## 1, 2, 3, 9, 10, 13, 14). Routes set up in valleys and especially in lower reaches were not chosen at random. Southwest Primorye is the least snowy area in the region. Minimum snow usually falls in lower river basins and therefore snow cover in valleys is more or less stable. Snow is small or absent on slopes and "warm" expositions even in average winters. Tigers residing at divides and plateaus necessarily cross or come down to valley with time. About 50% of monitoring unit area is covered with hunting grounds, other territory is free of hunting (hunting is prohibited). 14 routes include six routes traveled on foot (total length is 96-98 km), 6 - traveled by vehicle (total length - 100-102 km), 2 - traveled both by vehicle (20 km) and on foot (15 km). The total length of all survey routes is 230-240 km.

It was somewhat difficult to organize the first count in December because of low snow cover. Virtually there were no tigers there because of maximum human disturbance, associated with intensive hunting on ungulates. In February the field work was done on a deep snow cover (30-40 cm) therefore, survey results are beyond any doubt.

Organizational problems are associated with intensive movements of ungulates and predators: brief and heavy snowfalls forced ungulates down to lower reaches, where snow cover is low and there is an abundant harvest of acorns - the favorite food of all wild ungulates.

It was very difficult to count numerous crossings of wild ungulates especially sika deer. In some places it is impossible to count tracks even approximately. Therefore the number of crossings (of sika deer in particular) on some routes is not precise. On the whole, the information got during the winter survey 1999-2000 raises no doubts. The number of wild boars is increasing gradually in Borisovskoe plateau area: herds consisted of 10 and more individuals are not so rare there. It is unclear whether the local population of wild boars is growing or this increase represents a migration of wild boars from northern areas, or even from Sikhote-Alin Range. From this point of view tiger habitat is improving. But this territory began to be used for logging. Logging rates in the area continue to increase. The road along Ananievka river was prepared for driving by any trucks and passenger cars in winter season. Borisovskoe plateau territory is easy to access and many people visit the area intensively. This leads to poaching and total absence of tigers and wild

ungulates in vast areas. Logging of oak continues. Therefore in future there will be a significant deterioration of forage resources of wild ungulates. Today logging and both legal and illegal hunting become more and more intensive every year not only in the territory between Chinese and Russian border (behind KSP) but almost on the whole territory of Borisovskoe Plateau.

The situation with habitat conditions of ungulates and predators becomes more and more difficult every year. This winter all identified tigers were found within the region, which is very difficult to access, where hunting is banned. Probably because of this tigers visit the eastern part of monitoring unit (where biggest sports hunting leases are situated) more and more rarely. Intensive hunting for ungulates and the low density of ungulates are probably the main reasons why tigers left this territory. The only tiger found in the eastern part of Borisovskoe Plateau (Penyazhinskiy route) was probably poached. During previous surveys, tigers and leopards were always found here.
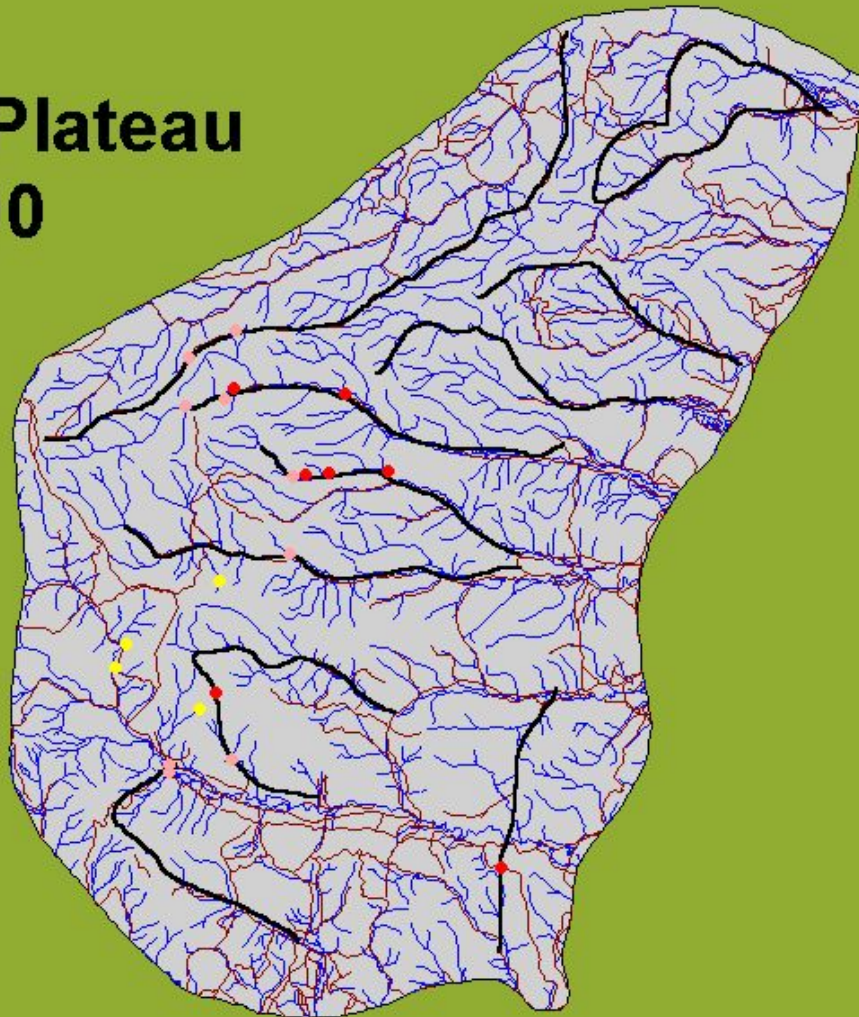
It is urgent to establish special protected area in the territory of Borisovskoe Plateau monitoring unit.

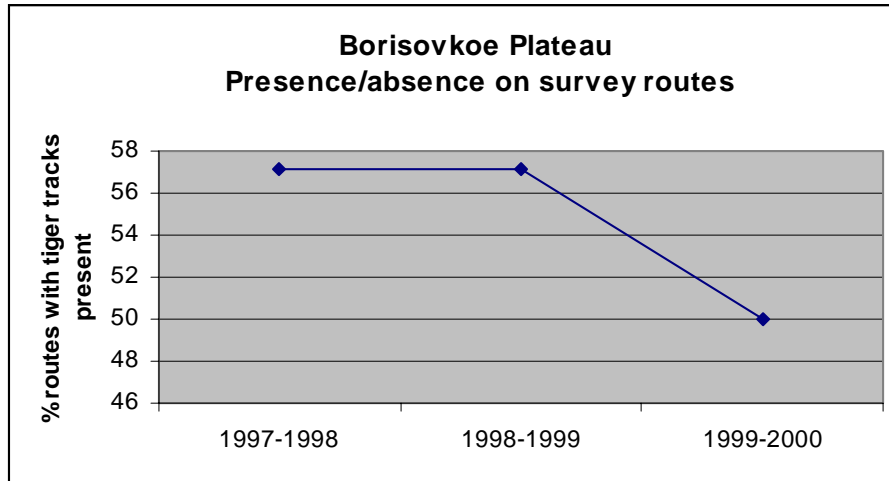Percentage of routes with tiger tracks reported (both surveys combined).

Comparison of track densities in monitoring site across years

Number of Independent tigers (adults, subadults, unknown) on monitoring sites, 1999-2000

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 3 years.

#	Monitoring Site		n	1997		1998		1999		Total
				mean	std	mean	std	mean	std	mean
6	Borisovkoe Plateau	Red deer	14	0.019	0.069	0.000	0.000	0.000	0.000	0.005
6	Borisovkoe Plateau	Roe deer	14	3.376	5.286	8.479	15.224	4.583	6.456	5.664
6	Borisovkoe Plateau	Sika deer	14	116.288	183.222	42.867	56.987	65.738	87.396	61.425
6	Borisovkoe Plateau	Wild boar	14	91.094	122.255	0.261	0.842	5.526	5.947	26.087

Borisovkoe Plateau Ungulate Track Densities
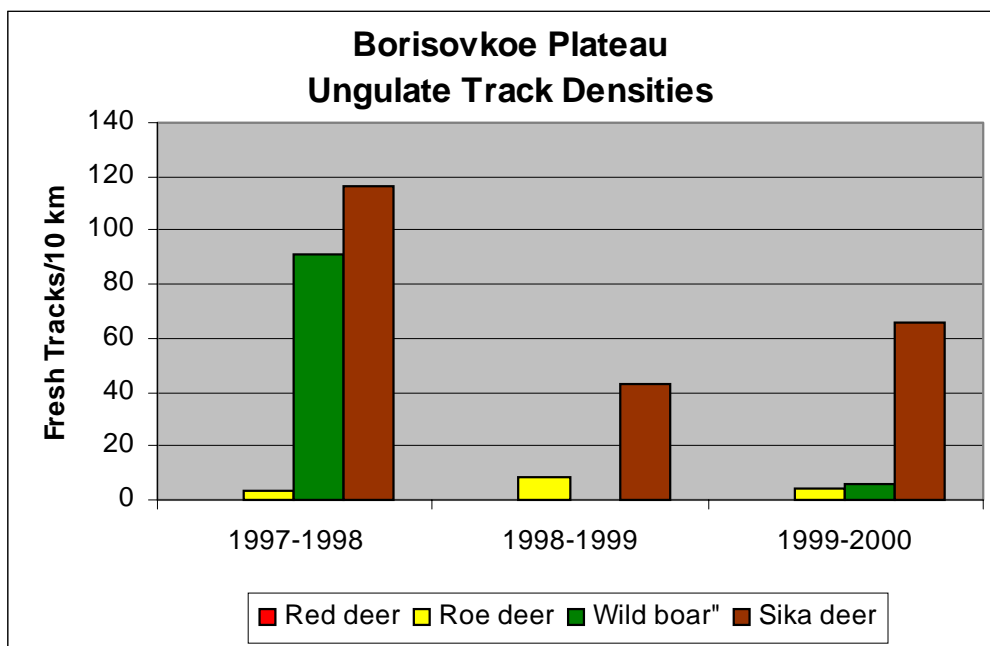
SANDAGOY
Olginski Raion
Southeast Primorski Krai

Report on results of Amur tiger monitoring program
in Sandagou monitoring unit in winter 1999-2000
Coordinator - V. V. Aramilev

Weather conditions: in contrast to past years this winter was characterized by deep snow cover. In November snow lay for 1-2 days and then melted quickly on southern slopes. By the middle of December snow cover of about 10 cm deep with crust of ice had formed. On most of the monitoring unit it was impossible to find ungulate tracks and sometimes tiger tracks on snow cover. Therefore, we had to postpone the first count to January. As it was 16 years ago (in 1984-1985) heavy snowfalls happened on New Year holidays: 80 cm of snow fell during 24 hours. As a result by the 10th of January snow cover in the southern part of monitoring unit (in valley) had reached 70-80 cm, on ridges and northern slopes - up to 1 m. Less snow was in the central part of monitoring unit: 35-40 cm in valley, up to 50-60 cm - on slopes and ridges. In northern part of monitoring unit snow cover increased with elevation. Mean temperatures of December, January and February did not differ significantly from ones in previous counts. Snow has settled and covered with icy crust.

Organization details: because of deep snow cover local people refused to take part in the survey, so the field work was done only by employees of Institute of Sustainable Nature Use. All routes could be traveled only on skies - therefore the time of travel increased, as did the required level of exertion. A spacious winter cabin built in October 1999 helped a lot in field work and saving of funds.

Ungulates and predators allocation: allocation of ungulates and predators was influenced by two factors: height and distribution of snow cover and local acorn crop (having a bad harvest of pine nuts). During 2-3 weeks ungulates (elks, roe deer, wild boars and sika deer) moved to the central part of the monitoring unit due to the low snow cover there. Some roe deer were not able or had no time to move to the sites with low snow cover, and consequently three dead roe deer (young individuals) were registered in the southern part of monitoring unit. Probably more dead animals will be registered in the spring. Some elk and sika deer did not move to the sites with low snow cover. Based on March observations in monitoring unit, it appears that the elk population survived the winter without losses. A sika deer, which had apparently died from starvation, was found. This year a characteristic feature of ungulate movements was their propensity to avoid deep snow, not by going into river valleys and then downstream but by moving to ridges to the north and then to sites with low snow cover. During bear surveys the ungulate density in southern part of monitoring unit was (individuals/1,000 ha): roe deer - 0, elk - 1-2, sika deer - 0, wild boar - 0.5-1.

Local acorn crops were registered in the eastern part of monitoring unit. Wild boars moved there and stayed for the whole winter. Rare herds left the territory and then returned in a short time.

Ungulates allocation and snow cover influenced the tiger distribution. In January tigers were not found in the southern part of the monitoring unit, in February tiger tracks were found on crumbly snow on the border of southern part on Mineralnaya river. Crumbly deep snow complicated tracks measurement, because print (track) crumbled and even after tracking it was difficult to find good track to measure. Due to deep snow tigers' movements were limited, they stayed on local sites with high ungulate density and did not move for

long distances and did not leave tracks on routes. On the whole, it is difficult to say if all tigers still remain in the territory or not in comparison with past years.

To get reliable information in an anomalous and critical year for ungulates and tigers it is necessary to increase the volume of work and it requires additional funds. On the other hand, it is necessary to study such aspects thoroughly because such anomalies are "the bottle neck" of ungulate and tiger population. Based on my observations this situation with deep snow cover in Sandagou has twice in the past 16 years. Two times in this period snow cover was also high but not so high as in 2000. One more characteristic feature - deep snow cover was along the whole length of Japan Sea shore - from Olginsky Raion to Terney. Usually this region is characterized by small snow cover, ungulates use this territory for wintering, and this is the reason of high tiger density there.

The region where survey was conducted is characterized by absence of intensive human impact. Insignificant logging took place on local sites in northern part of monitoring unit. There is no agricultural and other industrial development
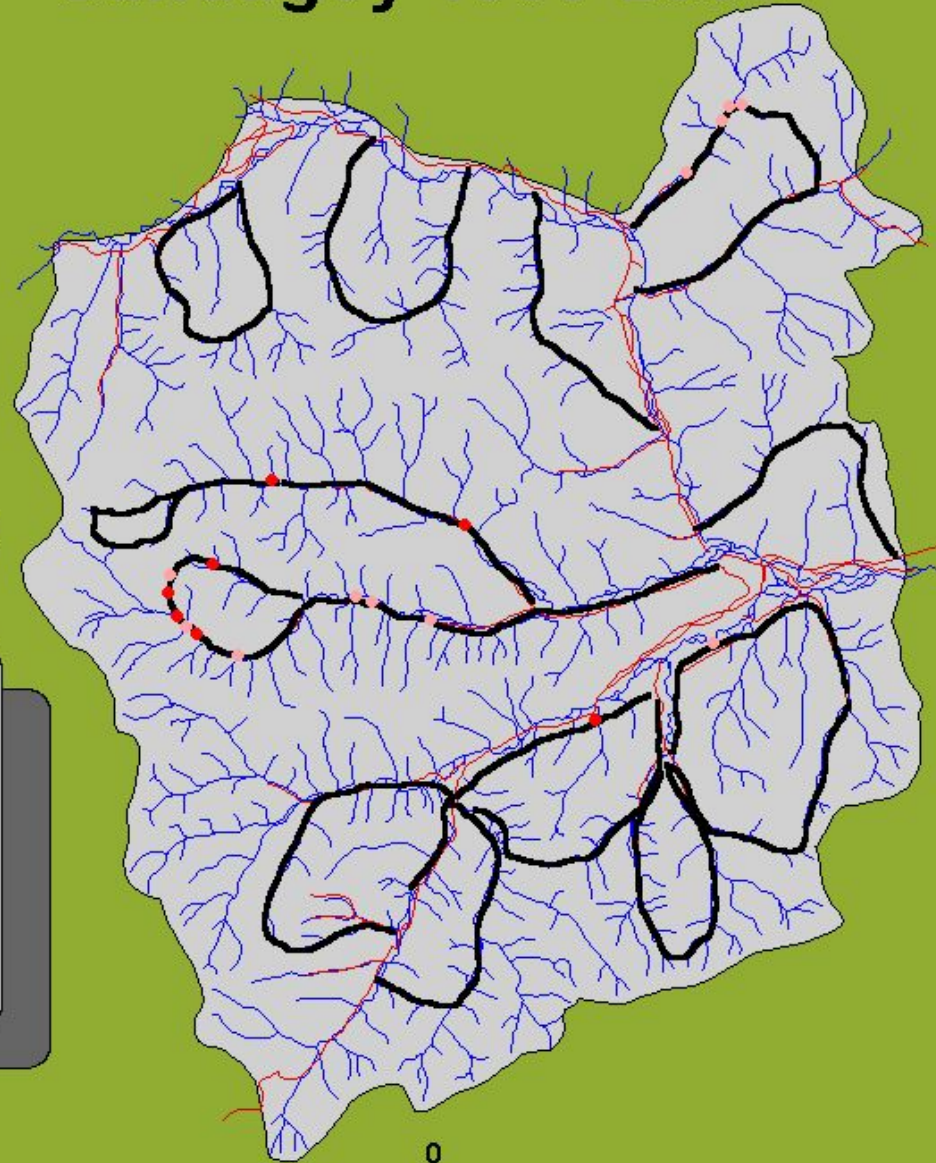
Sandagoy 1999-2000

TiGiS

WCS
WILDLIFE CONSERVATION SOCIETY

Amur Tiger
Monitoring Program
1999-2000 winter

Tracks on routes
- First survey
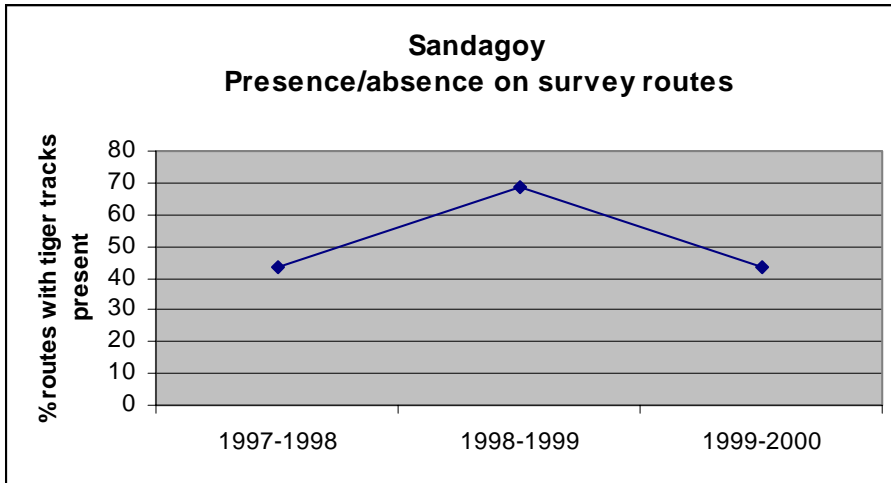- Second survey

Tracks off routes
- 1999-2000
- Survey routes
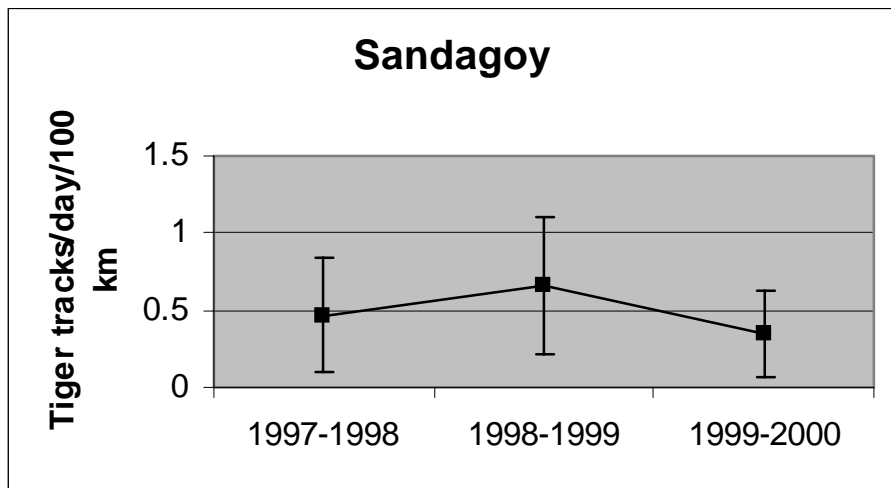- Roads
- River system
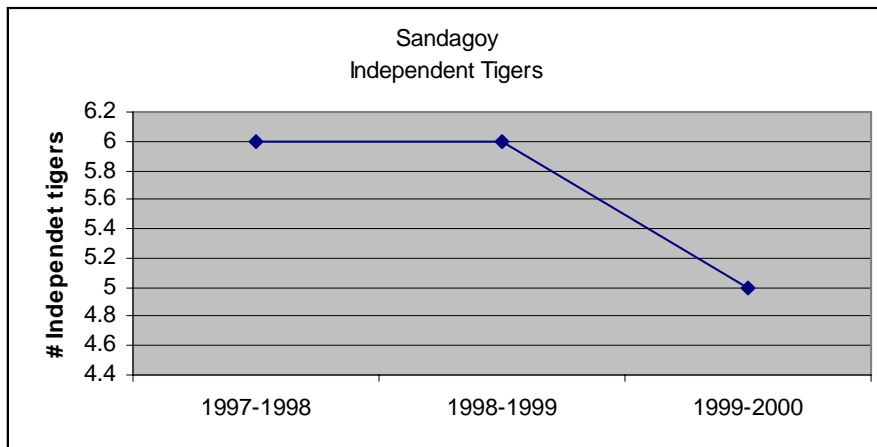
20   0   20 Kilometers

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 sites, 1999-2000

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	Sandago	1997-1998	1	1	3	0	1	1	5	6	7
7	Sandago	1998-1999	0	1	0	0	0	5	1	6	6
7	Sandago	1999-2000	1	1	0	0	0	3	2	5	5
7	Sandago	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 3 years.

#	Monitoring Site		n	1997		1998		1999		Total
				mean	std	mean	std	mean	std	mean
7	Sandagoy	Red deer	16	1.870	2.779	3.841	3.757	9.898	10.784	5.756
7	Sandagoy	Roe deer	16	2.502	2.666	2.437	2.248	6.698	5.692	5.155
7	Sandagoy	Sika deer	16	0.913	1.682	2.461	3.547	4.055	3.976	3.834
7	Sandagoy	Wild boar	16	0.417	0.678	2.763	4.070	2.683	4.036	1.600

Sandagoy Ungulate Track Densities
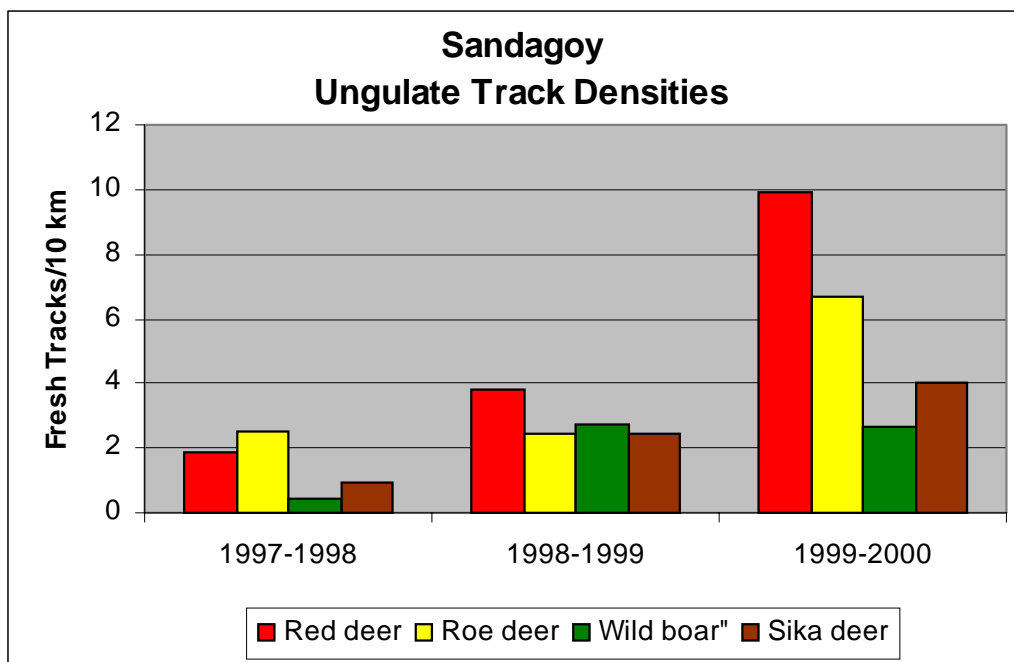
SINEYA
Chugevski Raion
Central Primorski Krai

**Report on results of Amur tiger monitoring program
in Sinyaya monitoring unit in winter 1999-2000
Coordinator - P. V. Fomenko**

Sinyaya monitoring unit is located in the central part of Chuguvski Raion, Primorski Krai. Organizer of field work in the unit is P.V. Fomenko - WWF RFE Program Coordinator.

Field work on the routes was conducted in December 27-30, and in March 2-5 (due to the illness of field co-coordinator).

Same as last winter season 15 routes were traveled. Total length and location of routes were the same. During the second phase of field survey, routes were mostly traveled by snowmobile because of deep snow cover.
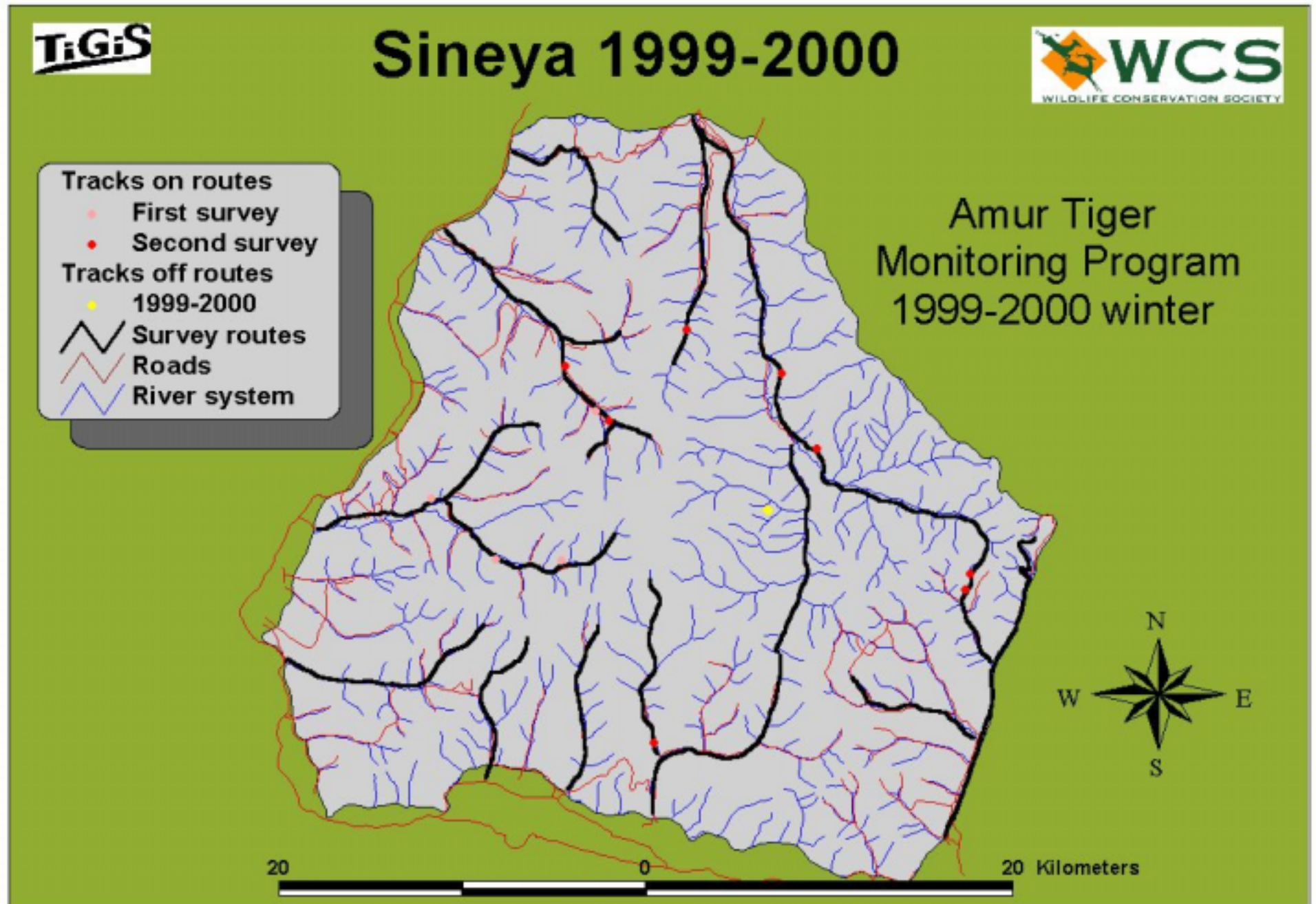
Snow cover height varies from 15 to 35 cm in December and from 20 to 60 cm in March. Time of latest snowfall in the first phase of survey just as in the second one was favorable for efficient track measurements.
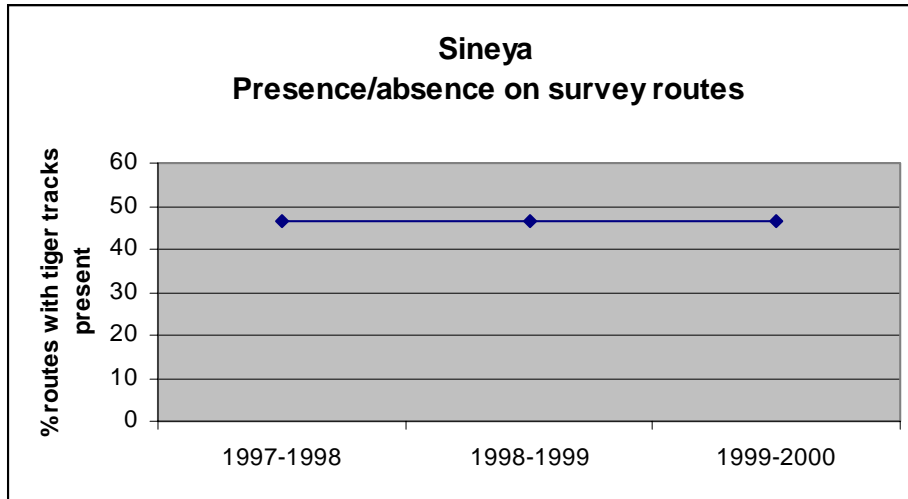
Because field work in Sinyaya monitoring unit was conducted by the same specialists as last winter season there were no problems associated with survey.

Habitat conditions are virtually unchanged but roe deer and wild boar numbers have distinctly decreased. The changes are probably associated with absence of main ungulate forage - acorns and pine nuts. The number of elk in the monitoring unit is stable. On the whole, a decrease in ungulate numbers is probably associated with the significant impact of poaching.
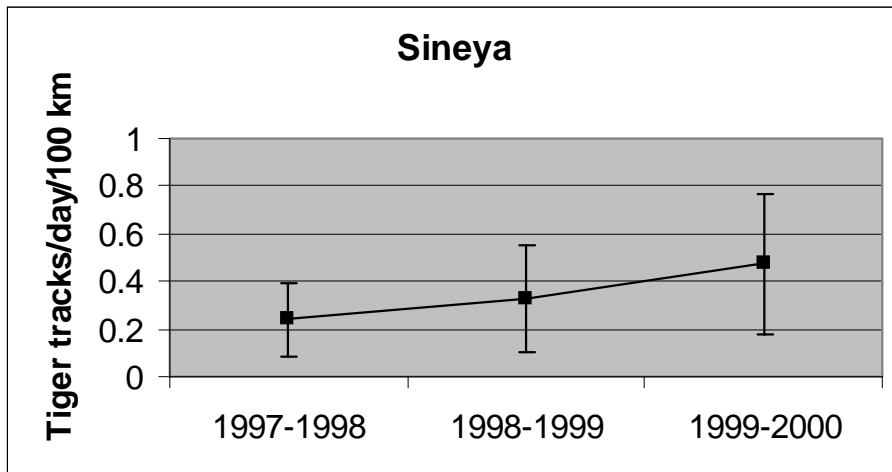
During the past three monitoring seasons tiger numbers in the monitoring unit have remained stable. Based on interviews of professional trade hunters all tigers in 1999-2000 winter season were identified. One female with a cub was registered off the survey routes. Few tiger tracks were recorded during the first phase of the survey probably due to the fact that tigers followed wild boars who had migrated in search of forage. In the second phase of survey when wild boars were feeding on horse-tail, tigers were more readily located.

On the whole habitat conditions in Sinyaya monitoring unit have undergone virtually no changes. Small sanitary logging has caused no significant damage to the habitat. There were no forest fires in the region this season. However, we are anxious about planned timber sale in a large area of Sinyaya Pavlovskaya river valley.
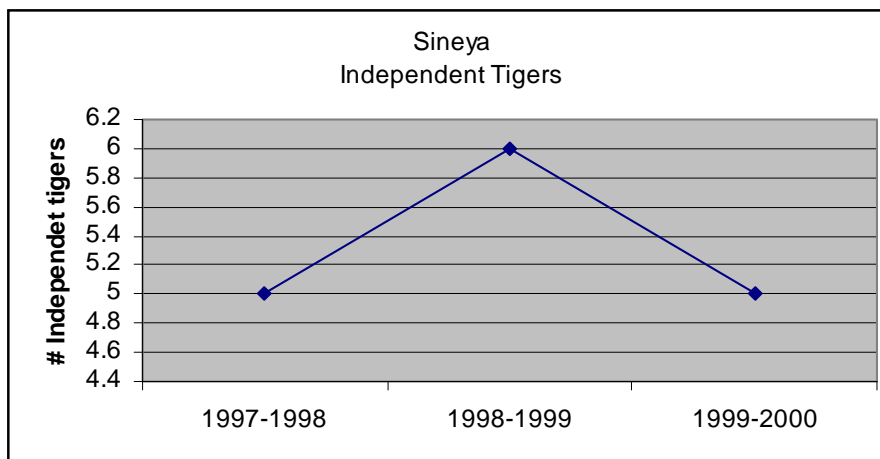
Percentage of routes with tiger tracks reported (both surveys combined).

Comparison of track densities in monitoring site across years

Number of Independent tigers (adults, subadults, unknown) on monitoring sites, 1999-2000

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 3 years.

#	Monitoring Site		n	1997		1998		1999		Total
				mean	std	mean	std	mean	std	mean
15	Sineya	Red deer	15	1.677	1.600	3.999	2.602	2.765	3.744	2.947
15	Sineya	Roe deer	15	2.480	2.239	2.594	2.077	2.373	1.834	2.851
15	Sineya	Sika deer	15	0.266	0.780	0.075	0.213	0.000	0.000	0.085
15	Sineya	Wild boar	15	1.555	2.894	1.232	1.820	0.613	1.074	1.000

Seneya
Ungulate Track Densities
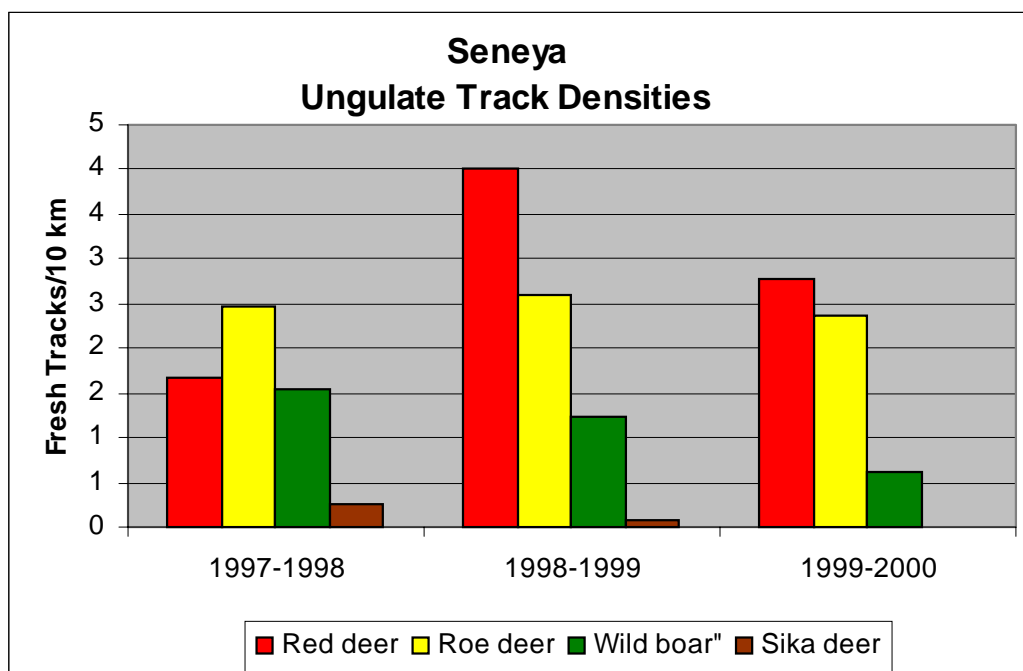
IMAN
Central Primorski Krai
1999-2000

**Report on results of Amur tiger monitoring program
in Iman monitoring unit in 1999-2000 winter
Coordinator - I.G. Nikolaev**

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

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

Field work on the routes was conducted in December 19-21 and 26, in February 2-24 and in March 2-5. It was impossible to complete all the work in February due to the snowfall that started in the morning of February 27 and lasted more than 24 hours.

In December total length of routes traveled by vehicle is 132 km, on foot - 38, by snowmobile - 16 km. In March total length of routes traveled by vehicle is103 km, on foot - 66 km, by snowmobile - 16 km. Discrepancy between types of travel in December and February was caused (as in past years) by increased snow cover height during the second part of field survey: in December minimum and maximum snow cover heights in open site were 24 cm and 32 cm correspondingly; in February and first days of March these figures were 33 cm and 58 cm correspondingly. Due to this fact in February and March several routes, which were not passable for vehicle, were traveled on skies.
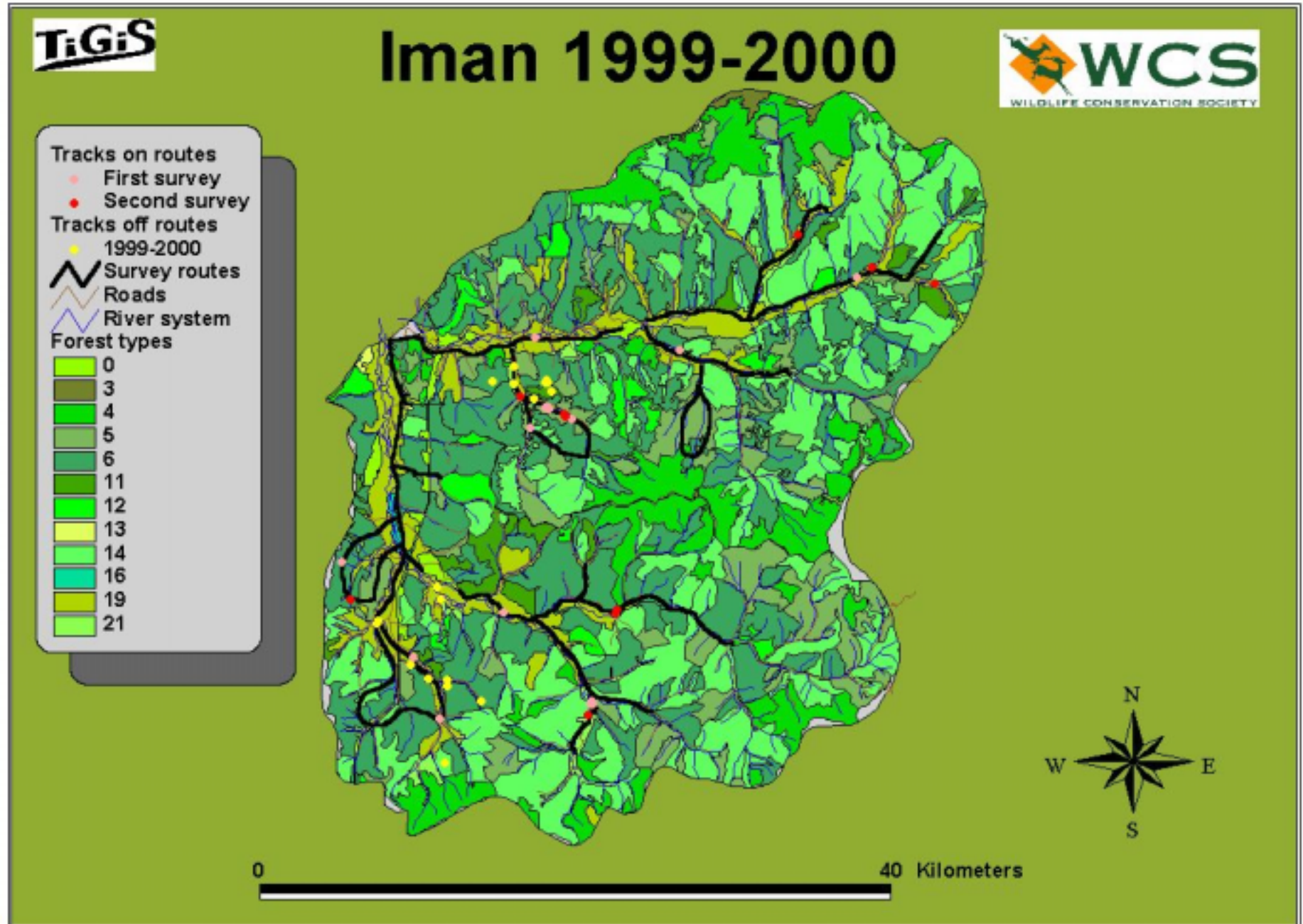
This season, in comparison with previous one, was characterized by more unfavorable conditions for the local tiger subpopulation. First, the number of wild boar (the main prey species for tiger in this territory) decreased dramatically in the beginning of December. Based on interviews with local people and my observations wild boar moved to oak forests and concentrated in areas 50 km northwest of the monitoring unit. Another indication of worsening conditions is the extensive movements of a female with 6 months cubs across the unit.
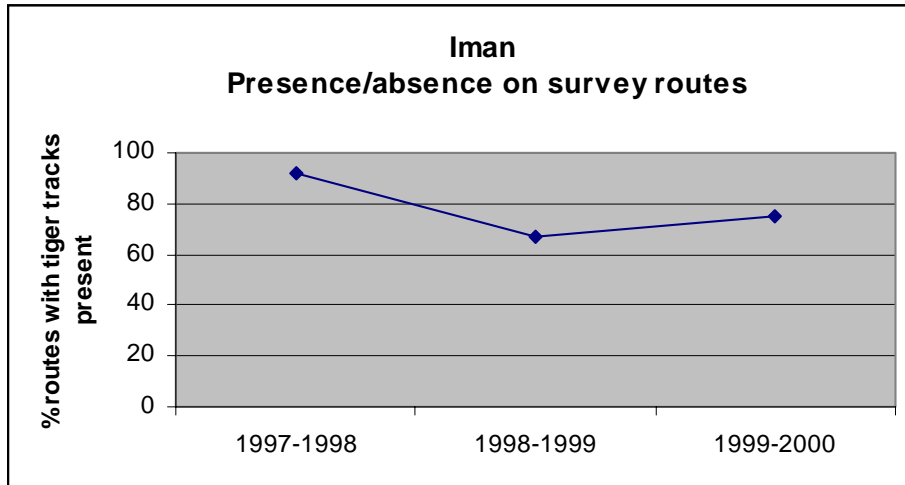
The status of the elk population is a little better (in comparison with wild boar), but nevertheless elk numbers are low. The status of the roe deer population is estimated as normal (satisfactory).

The second important negative factor is human disturbance. The role of this factor has increased due to the more intensive logging. The size of logging areas has risen mostly due to the activity of different industrialists and illegal logging. This factor affects females with cubs most of all. They usually leave a region where logging begins.
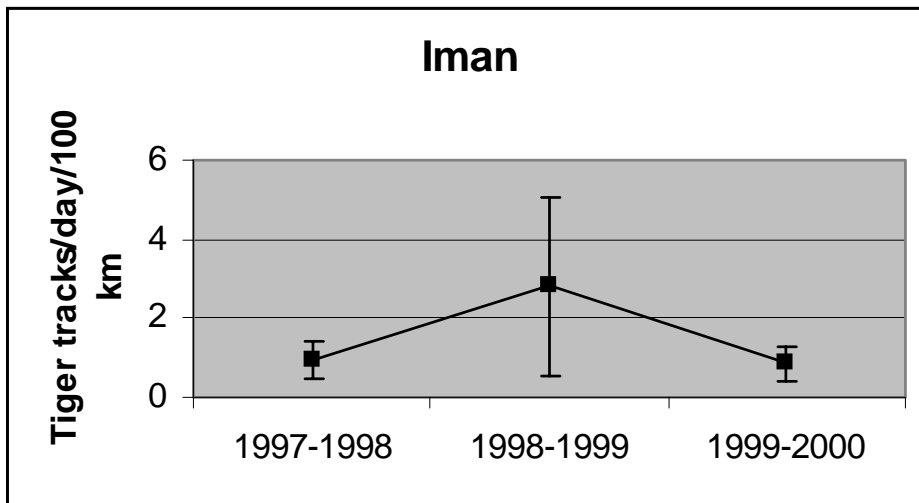
Although habitat conditions for tigers this winter season were considered unfavorable, nevertheless no significant changes except death of a tiger cub death have occurred in this tiger subpopulation. At the time of field work the status of this tiger subpopulation was estimated as normal.

Habitat conditions in monitoring unit still remain at the level suitable for tiger survival in the near future.
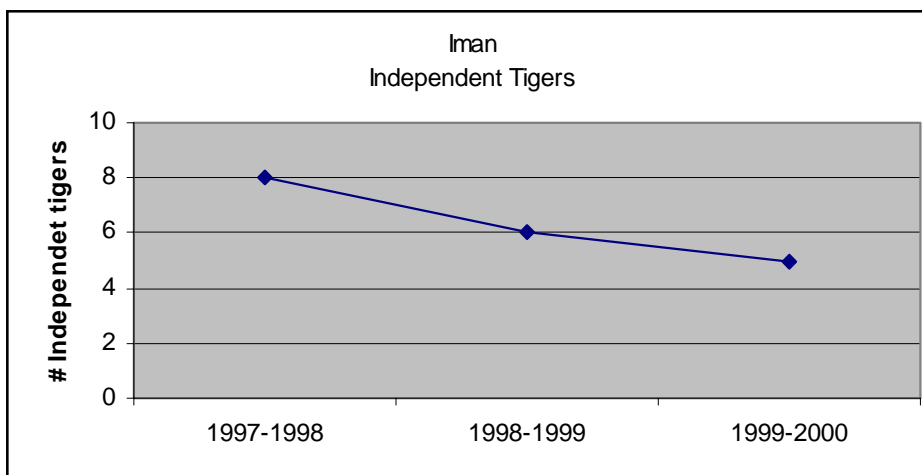
Iman 1999-2000

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 sites, 1999-2000

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)
4	Iman	1997-1998	3	1	0	2	0	2	4	8	8
4	Iman	1998-1999	3	2	0	1	2	0	5	6	8
4	Iman	1999-2000	2	1	0	1	2	1	3	5	7
4	Iman	2000-2001	2	3	0	1	2	0	5	6	8

Mean track density (tracks less than 24 hours) of ungulates in Amur tiger monitoring sites for first 3 years.

#	Monitoring Site		n	1997		1998		1999		Total
				mean	std	mean	std	mean	std	mean
4	Iman	Red deer	12	1.793	2.881	6.331	5.273	5.343	7.232	4.758
4	Iman	Roe deer	12	3.383	5.326	2.681	2.278	2.982	3.944	3.373
4	Iman	Wild boar	12	3.632	5.070	1.546	2.368	0.193	0.401	1.508
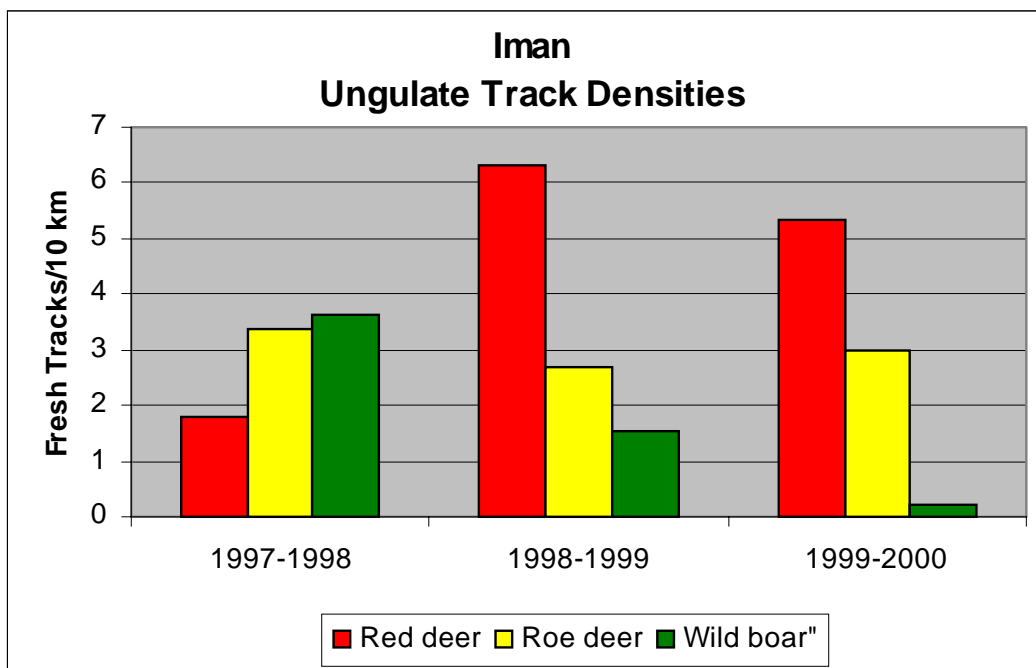
BIKIN RIVER TIGER MONITORING SITE
Central Sikhote-Alin, Northern Primorski Krai

**Report on results of Amur tiger monitoring program
in Bikin monitoring unit in 1999-2000 winter
Coordinator - D.G. Pikunov**

The first count (survey) was organized and conducted from 8 to 20 of January, 2000
The second count was organized and conducted from February 26 to March 4, 2000

During the survey 16 routes were established and traveled as in the two past years. Total length of routes is 210 km, including 150 km traveled on skies and 60 km traveled by snowmobile. A minimum of two snowmobiles "Buran" are necessary to bring fieldworkers and equipment to monitoring unit because roads are absent here.

The first count in the monitoring unit was conducted by four fieldworkers, the second count - by six fieldworkers. Optimum number of fieldworkers is six specialists, including 2-3 local hunters (aboriginal), which have a good knowledge of territory and conditions of work. The count should be conducted by two teams, and each of them should have a snowmobile and other necessary equipment to work independently.

First visit to monitoring unit should be done immediately after New Year holidays, when firm ice cover has formed and it is safe to transport people and equipment on snowmobile along Bikin riverbed. The second count should be completed by the beginning of March before thaw and ice flow appear and it becomes difficult and dangerous to travel along the river.

This winter snow depth was high in comparison with the three past winters. This fact resulted in several peculiarities in animal behavior and therefore in summarizing of survey results. Particularly it looked like daily movements of tigers (even adult males) were reduced, the same can be said about size of home ranges. Tigers preferred to move along their old trails, ungulate trails, ice flows, snowmobile tracks and ski-tracks. It was difficult to measure tiger tracks on deep crumbly snow. It generally required more time to obtain measurements of most tiger tracks, and tracks varied in size even for the same individuals. Sometimes tigers remained in confined areas for extended periods because ungulates concentrated there. Under these conditions it was less likely to locate tracks of all tigers. All these facts resulted in some difficulties during final processing of the survey data. On the whole, a dramatic decline in ungulate numbers (especially wild boar) occurred in the monitoring unit. Tracks of wild boar were found only on one route. In this situation tiger litters were found in very poor conditions and it is possible that cubs will die or move to settlements. Habitat deterioration and most importantly, decrease in prey species, has become more evident every year. Today it is urgent to restrict hunting on ungulates immediately or to ban hunting on wild ungulates temporarily.
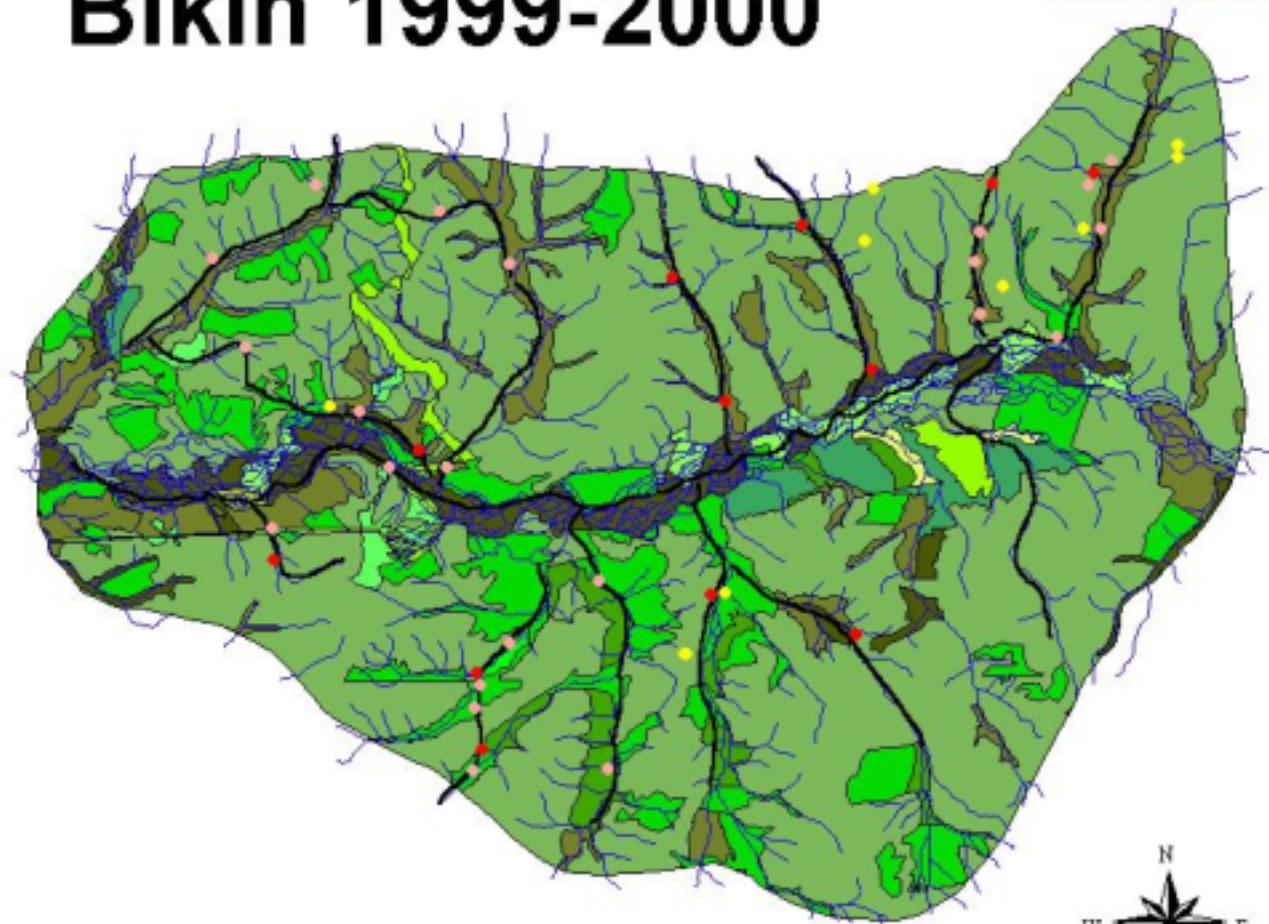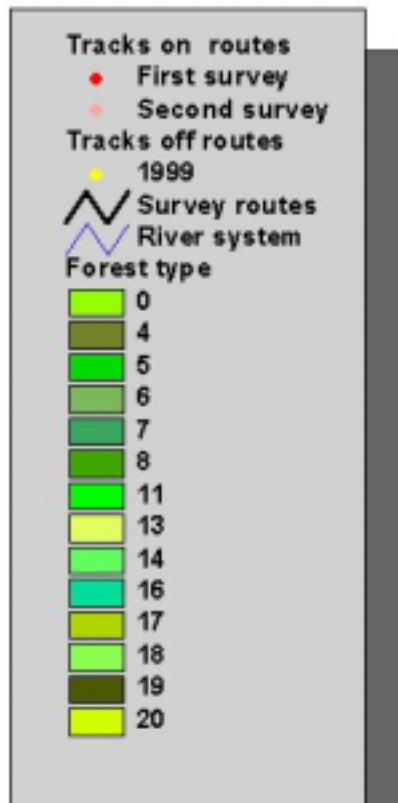
It is also very important to reduce uncontrolled access of fishermen, hunters and tourists to the Bikin river basin, which is a key tiger are for tiger conservation. Additionally, this is a territory of traditional use by indigenous people.

At present tiger habitat in Bikin river basin is deteriorating due to sharp decline in ungulate numbers, poorly regulated hunting, and increasing human disturbance.
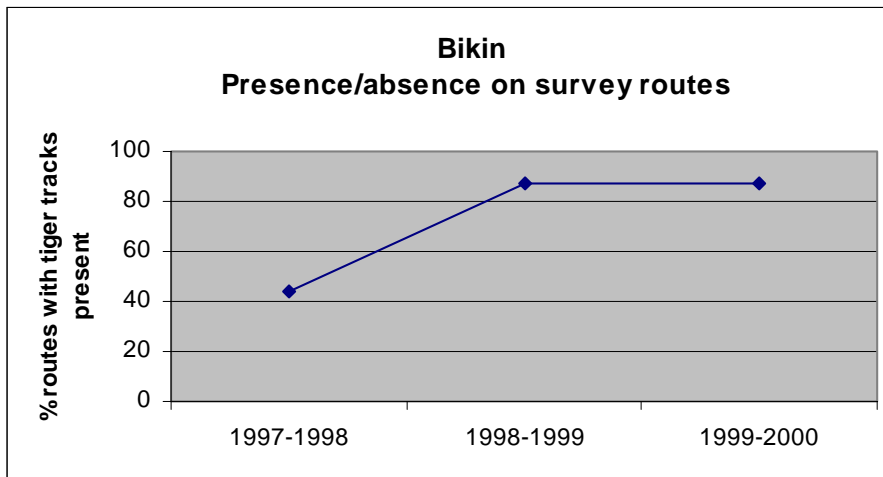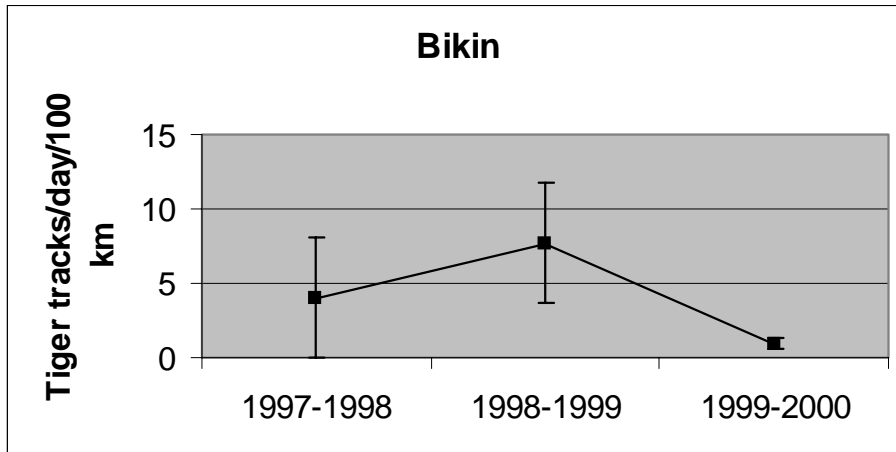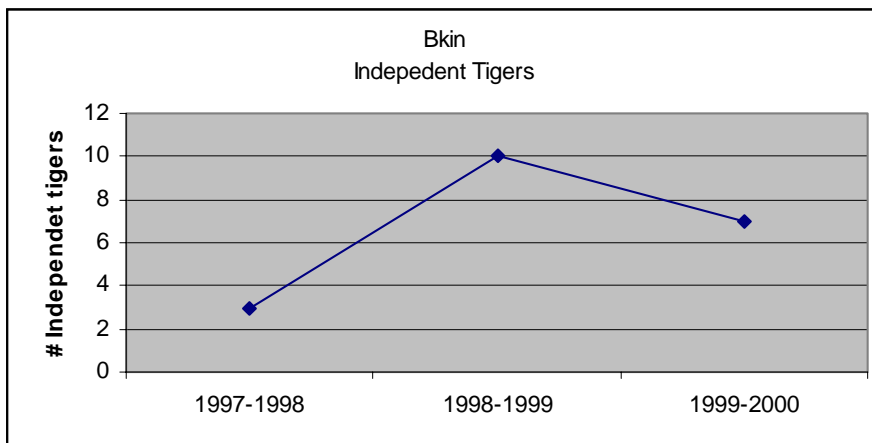
Percentage of routes with tiger tracks reported (both surveys combined).

Comparison of track densities in monitoring site across years

Number of Independent tigers (adults, subadults, unknown) on monitoring sites, 1999-2000

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)
5	Bikin	1997-1998	0	3	0	0	3	0	3	3	6
5	Bikin	1998-1999	2	2	1	3	0	2	5	10	10
5	Bikin	1999-2000	2	2	1	1	1	1	5	7	8
5	Bikin	2000-2001	2	4	0	0	0	0	6	6	6

Mean track density (tracks less than 24 hours) of ungulates in Amur tiger monitoring sites for first 3 years.

| # | Monitoring Site | | n | 1997 | | 1998 | | 1999 | | Total |
				mean	std	mean	std	mean	std	mean
5	Bikin	Red deer	16	1.373	1.511	10.783	9.973	8.012	6.618	7.424
5	Bikin	Roe deer	16	1.490	1.912	5.303	3.030	1.735	2.847	2.852
5	Bikin	Sika deer	16	0.308	1.053	3.660	8.692	0.000	0.000	0.992
5	Bikin	Wild boar	16	16.324	61.206	3.795	4.556	0.299	0.654	6.096
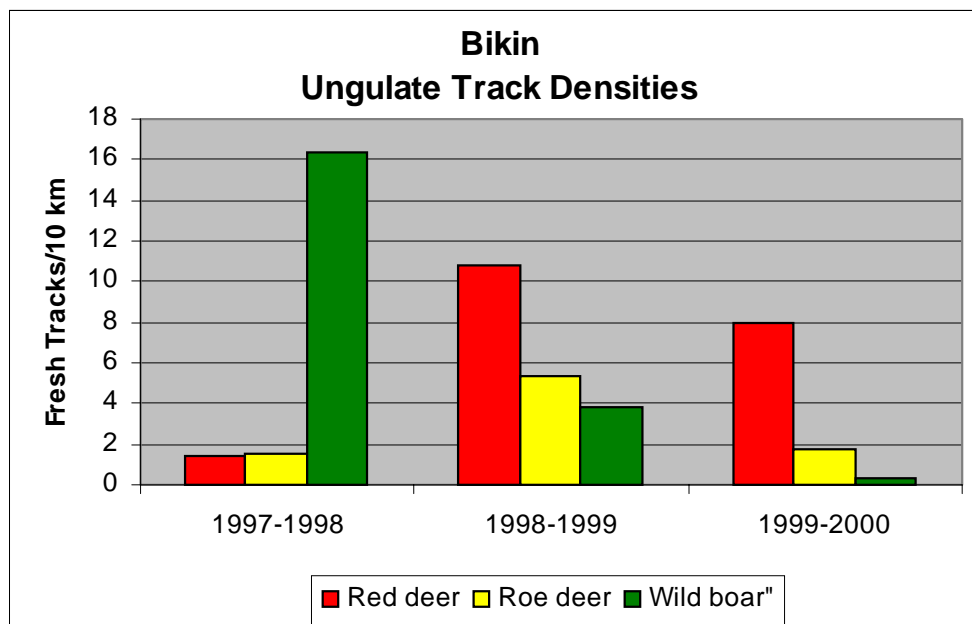
**SIKHOTE-ALIN STATE BIOSPHERE ZAPOVEDNIK AND
TERNEY HUNTING SOCIETY
(Coastal, or "eastern macroslope" portion of zapovednik)
Terneiski Raion
Northeast Primorski Krai**

**Report on results of Amur tiger monitoring program
in SABZ and Terney Hunting Lease monitoring units in winter 1999-2000
Coordinator - E. N. Smirnov**

1. Monitoring units:Sikhote-Alin State Biosphere Reserve (SABZ)
Terney Hunting Lease

2. Coordinator:Smirnov E. N.

3. Time of counts:January 10-17, 2000
February 14-21, 2000

4. Numbers of routes:1-52

5. Total length of routes:

Monitoring unit	Date	Length of routes, km		Total, km
		On foot	By vehicle	
SABZ	January 10-17, 2000	311.8	0	311.8
Terney Hunting Lease		83.5	116.9	200.4
				512.2
SABZ	February 14-21, 2000	296	0	296
Terney Hunting Lease		120	163.5	283.5
				579.5

6. Conditions: In December the count was not conducted because of absence of coordinator and funds. On 6th and 7th of January abundant snow fell down, in some places snow cover was up to 20-30 cm. Skies were necessary. In some places soggy snow made passability very difficult, snow stuck to skies and speed of travel did not exceed 1 km per hour. As we went to routes on fourth day after snowfall, we could not count many tigers.

We could not travel along several routes because of deep snow: 1.5 routes on foot and 4.5 routes by vehicle. On the whole, I think the survey went off satisfactorily.

There were no heavy snowfalls after January 7, 2000. The last newly-fallen snow (1-2 cm) before the survey fell on January 30-31. Everywhere snow settled, and melted, and during the survey snow cover did not exceed 30-40 cm. It was much easier to use skies than in January. Crust of ice was a hindrance but prevented only from counting little animals. On the whole, the conditions were favorable for survey. Only three routes were not traveled along Evlantievski Creek because they were not passable by vehicle.

7. Assessment of efficiency: I think that as the methodology itself has so many errors it is impossible to make absolute count and even close to it (identification of animals based on pad size, different fieldworkers, count by vehicle and count on foot, uncertainty in track age identification, insufficient territory, time after last snow, etc.).

But monitoring program has many advantages and we cannot argue about this fact. Such program is absolutely necessary for monitoring of significant changes in dynamics of ungulate and tiger numbers and for taking adequate measures. I think that the program was initiated opportunely and will give positive results.

As for results of monitoring in model units in 2000, we can say that conditions were favorable and data reflect the situation well enough.
What can be suggested to make gathered information more effective?

1. To introduce into practice "passport system" (sex, age, home range, individual characteristics, individual number) for all counted tigers in order to ensure that every survey is a continuation of the previous one. Sikhote-Alin Reserve has such experience.
2. It is necessary to make a computer program that allows for ranges of estimates, and not just absolute counts. We do not always know if there are 5, 6 or 7 males. There should be a mechanism for providing a range of values.
3. When summarizing monitoring results, both data on conflict tigers from Committee of Environmental protection and data on ungulate surveys from Hunting Department may be helpful.
4. Final results of surveys should be officially approved by all coordinators and should be sent to regional and federal authorities together with adequate recommendations.

8. Conclusions:

   1) Highways are the major contributor to intentional tiger and ungulate poaching. Many kilometers of roads can be closed without any damage to economy. This measure will save many animals and will not require great expenses.
   2) Game inspectors, zoologists and specialists should educate trade hunters, including enlightenment through mass media. Seminars, trainings, meetings with hunters are not the attributes of stagnation but the continual forms of education. I propose to present books ("Amur tiger" by Dunishenko and Kulikov, "Encounters with tiger" by Smirnov and "Rules of people's behavior and cattle keeping in tiger habitat") to every hunter. "Rules.." also should be presented to farmers of southern part of Far East. Funds are necessary for all these activities.
   3) The most difficult situation is with tigers near settlements. It is necessary to organize the team of specialists who are able to frighten, catch or kill such a tiger. Tragic encounters between tigers and people are registered mostly in such situations.

Further, it is necessary to read my previous report (1999). Nothing can be added to it, relative stability of situation remains.

It is important to mention all cases when tigers were saved from unnecessary killing. This experience differs fundamentally from previous practice.
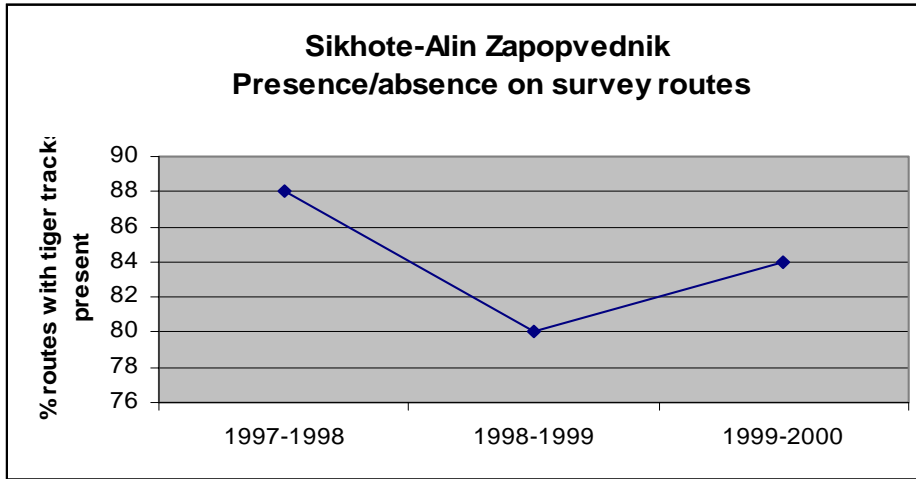
**Sikhote-Alin Zapopvednik
Presence/absence on survey routes**
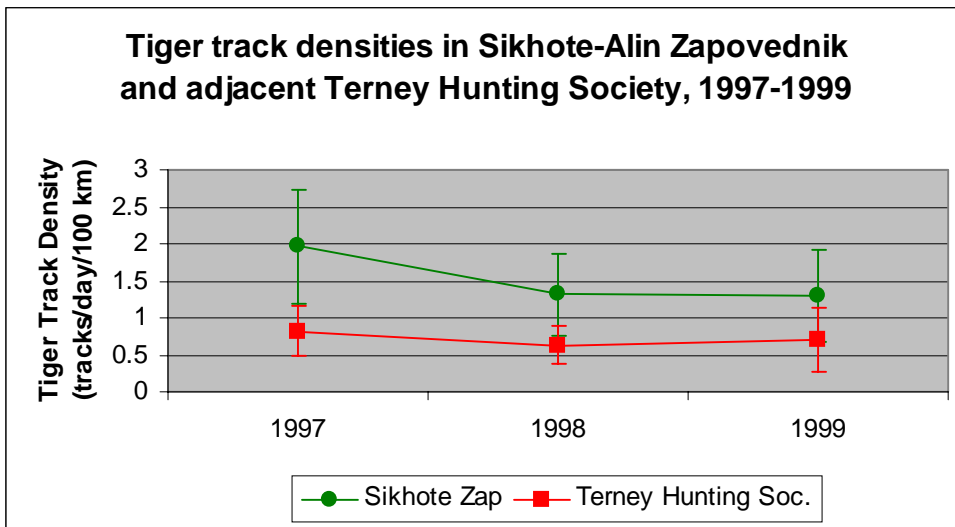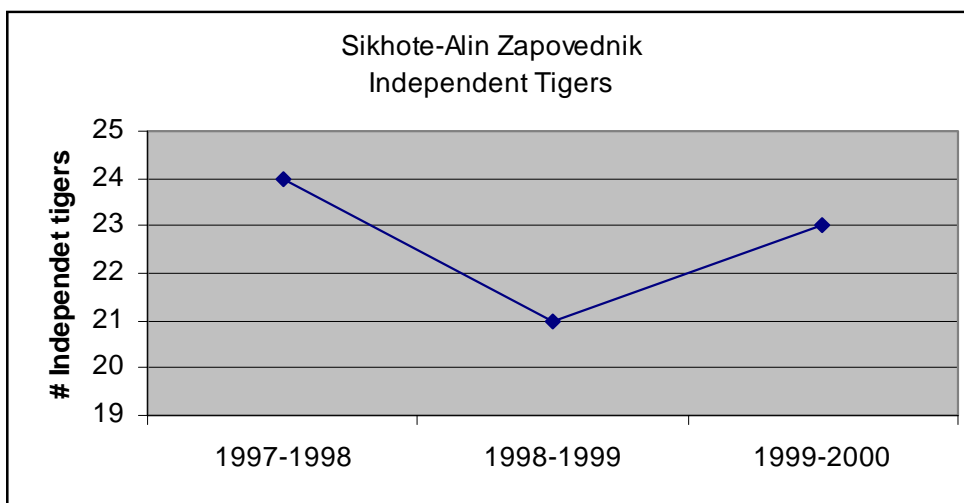
Percentage of routes with tiger tracks reported (both surveys combined).

**Tiger track densities in Sikhote-Alin Zapovednik
and adjacent Terney Hunting Society, 1997-1999**

Comparison of track densities in Sikhote-Alin Zapovednik and adjacent unprotected site in Terney Hunting Society, Terneiski Raion

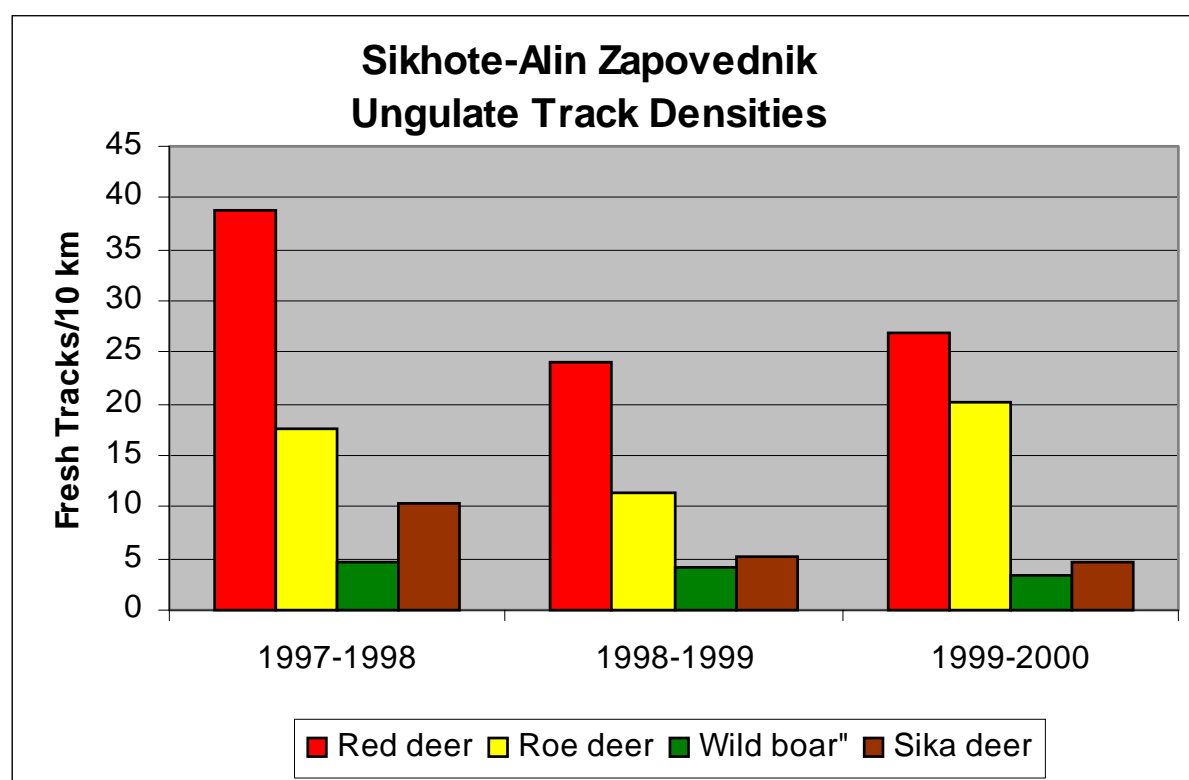Sikhote-Alin Zapovednik
Independent Tigers

Number of Independent tigers (adults, subadults, unknown) on monitoring sites, 1999-2000

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)
14	Sikhote-Alin Zap.	1997-1998	10	10	0	0	8	4	20	24	32
14	Sikhote-Alin Zap.	1998-1999	7	5	0	1	0	8	12	21	21
14	Sikhote-Alin Zap.	1999-2000	7	7	0	4	1	5	14	23	24
14	Sikhote-Alin Zap.	2000-2001	3	7	0	2	4	5	10	17	21

Mean track density (tracks less than 24 hours) of ungulates in Amur tiger monitoring sites for first 3 years.

#	Monitoring Site		n	1997		1998		1999		Total
				mean	std	mean	std	mean	std	mean
14	Sikhote Alin Zapovednik	Red deer	25	38.858	56.834	23.975	16.711	27.019	22.644	30.283
14	Sikhote Alin Zapovednik	Roe deer	25	17.595	39.802	11.501	17.618	20.050	21.050	16.480
14	Sikhote Alin Zapovednik	Sika deer	25	10.242	29.293	5.185	12.446	4.682	12.585	7.206
14	Sikhote Alin Zapovednik	Wild boar	25	4.595	4.910	4.207	4.780	3.249	5.086	3.905

Terney Hunting Society
Presence/absence on survey routes
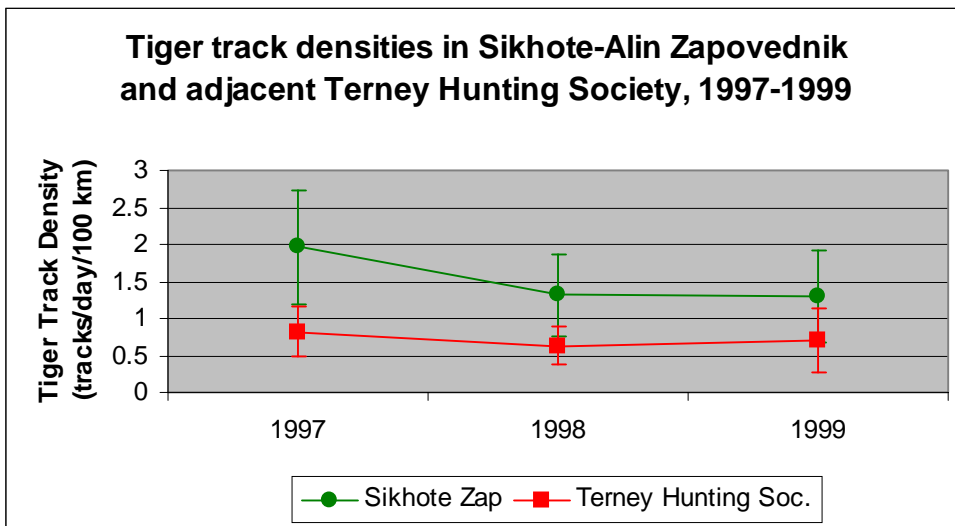

Percentage of routes with tiger tracks reported (both surveys combined).

Tiger track densities in Sikhote-Alin Zapovednik
and adjacent Terney Hunting Society, 1997-1999

Comparison of track densities in Sikhote-Alin Zapovednik and adjacent unprotected site in Terney Hunting Society, Terneiski Raion

Terney Hunting Society
Independent Tigers

Number of Independent tigers (adults, subadults, unknown) on monitoring sites, 1999-2000

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)
16	Terney Hunting Soc.	1997-1998	3	4	0	0	6	4	7	11	17
16	Terney Hunting Soc.	1998-1999	2	3	0	1	0	5	5	11	11
16	Terney Hunting Soc.	1999-2000	5	5	0	0	1	3	10	13	14
16	Terney Hunting Soc.	2000-2001	3	3	0	0	1	5	6	11	12

Mean track density (tracks less than 24 hours) of ungulates in Amur tiger monitoring sites for first 3 years.

#	Monitoring Site		n	1997		1998		1999		Total
				mean	std	mean	std	mean	std	mean
16	Terney Hunting Society	Red deer	24	14.398	14.073	10.133	10.729	10.749	11.624	12.353
16	Terney Hunting Society	Roe deer	24	7.321	9.289	6.383	9.683	5.522	8.186	6.867
16	Terney Hunting Society	Sika deer	24	5.196	17.740	1.801	5.452	1.726	5.290	2.299
16	Terney Hunting Society	Wild boar	24	4.975	16.206	0.973	1.936	1.329	2.021	1.857

Terney Hunting Society Ungulate Track Densities