

Action plan for the Brown bear in Bulgaria:
A description of the start of the research



Traineeship report
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1. Introduction

In January 2005 Bulgaria began preparations for a national management plan for the brown bear. Alertis Fund for Bear and Nature Conservation and the Balkani Wildlife Society have started a project which will coordinate the activities necessary to develop such a plan. The reason for this is that the future of the Bulgarian bear population, like so many other bear populations in Europe, is worrisome. Alertis has the final coordination of the project. Balkani Wildlife Society in Bulgaria is coordinating the project in Bulgaria and carries out the fieldwork and working group meetings in cooperation with the Institute of Zoology from the Bulgarian Academy of Science and the Environmental Education and Research Centre of the Sofia Zoo.

The project's main objectives are:

1: The formation of bear working group which involves all the relevant stakeholders to prepare a national Brown bear management plan for Bulgaria.

2: To collect field data relevant to develop a sound national management plan for the Brown bear, specifically data on distribution of the Brown bear population and human attitude towards bears.

For the preparation of a national management plan data is needed on population size, population trends, distribution, habitat use, mortality causes, damage caused by bears, public attitudes towards bears, human impact on the bear population.

This report is written in the context of a traineeship of the master program Forest and Nature Conservation at Wageningen University. The traineeship was carried out at Alertis in the months April, May and June 2005. I was participating in the fieldwork to collect information about the distribution of Brown bear in Bulgaria and working in the office building up the data base and all other coming up office work as documentation etc.

In this report I will describe the current situation of the brown bear in Bulgaria, the research plan as known till half of June 2005, the practical process and problems of the project in the period of my stay. In the appendix I included all the field expeditions I made to give insight in my working activities.

2. Brown bear in Bulgaria

2.1 History & status

Europe once offered a wide range of natural habitats for its large carnivore species. During the 18th and 19th century the large carnivores vanished from all regions of high human activity in Europe because of direct persecution and environmental changes (Breitenmoser, 1998). Today, relict brown bear (*Ursus arctos*) populations are dangerously small and highly fragmented in Southern, Central and Western Europe, more specifically in Bulgaria. To protect the species the Bulgarian government has adopted international conventions and agreements such as CITES, the Bern Convention, and the EU habitat directive 92/43 EEC which, among others protect the Brown Bear and its habitat. In the course of the Pan-European Biological and Landscape Diversity Strategy (PEBLDS), the Council of Europe has adopted the Action plan for the conservation of the Brown Bear (*Ursus arctos*) in Europe. From 1992 the bear was a protected species and only hunting permits were issued to hunt on so called 'blood thirsty' animals. The brown bear in Bulgaria is a totally protected species from 2002 and was removed from the game species list by the Hunting and Game Protection Act. Although on paper the legal status of the bear is well defined in practice law enforcement is still a problem which leads to illegal hunting practices (Voeten, 2005).

2.2 Current populations

There are two populations in Bulgaria (see figure 1), one in the Rila Rhodope Mountains and one in the Starra Planina Mountains.

The Rila-Rhodope Mountain population is located in south-western Bulgaria and north-eastern Greece and consists of 520 bears (Swenson, 2000). It includes the three local, but connected populations in the Bulgarian Rila Mountains and Pirin Mountains and the population in the western Rhodope Mountains on both sides of the national border. In the Vitosha Mountains a small sub-population of approximately 6 dispersing animals from the Rila Mountains (personal comment) can be found. Of the total population of about 520 bears, only 15-25 are found in Greece. The connection between the bears in Greece and Bulgaria is likely to consist of dispersing males from Bulgaria. This population probably consists of two to four subpopulations.

In the central part of Bulgaria a population of about 200 bears is located along a 120 km area from Zlatitsa-Teteven in the east to the Tryavna Mountains in the west-central Bulgaria. It became isolated from the populations to the south and west early in this century, after an effort to exterminate the species. However, there may be some genetic interchange, between the Stara Planina population and the Rila-Rhodope population mediated through dispersing males, every ten years (Swenson, 2000, Spassov *et al.*, 1999.)

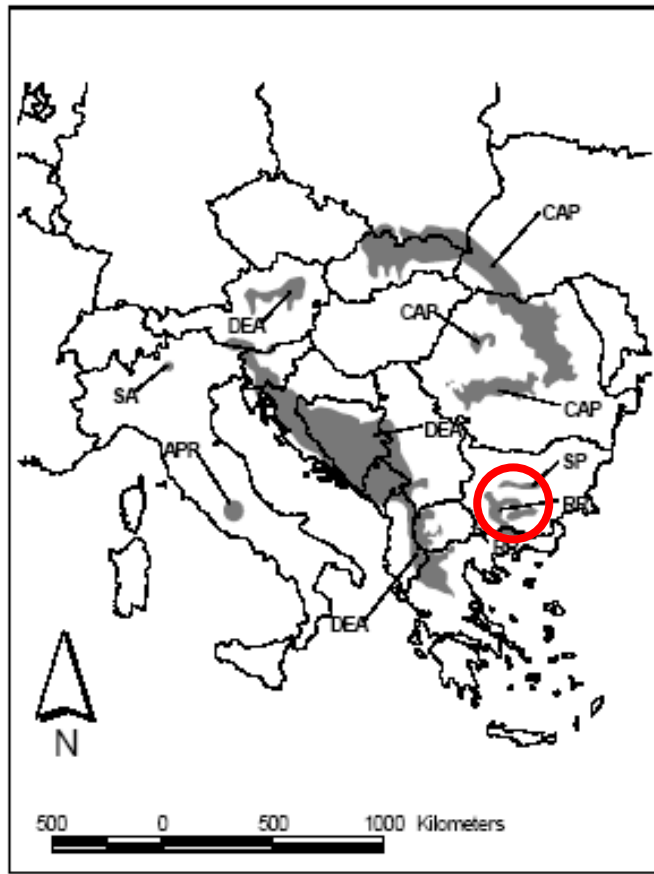


Figure 1. Detailed distribution of brown bears in southeastern Europe c. 1999. CAP = Carpathians, SA = Southern Alps, APP = Appennines, DEA = Dinaric-Eastern-Alps, CAR = Carpathians, RR = Rila-Rhodope Mountains, SP = Stara Planina Mountains. (Linnel et al., 2002)

2.3 Factors influencing the presence of brown bears in Bulgaria

The presence or not presence of bears is influenced by many factors ecological and human and more likely combination of both. Although every country or region has its own specific circumstances in the past habitat models are used to determine habitat quality for brown bear in Europe (Clevenger *et. al*, 1997, Kusak *et. al*, 1998, Kobler *et. al*, 2000, Naves *et al.*, 2003). The food availability is one of the most important factors that influence the bear presence in a certain area recording to the Kusak-Huber model where they describe the habitat quality for the brown bear with as most important component food availability.

In the models developed later in time food availability was replaced by the percentage of forest (positive), proximity to settlements (negative) and elevation above sea level (positive) as key parameters to describe the habitat quality for the brown bear (Kusak *et. al*, 1998, Kobler *et. al*, 2000). In the model of Naves (2003) the assumption was made that the survival of large carnivores is mainly determined by human-induced mortality, whereas nutritional condition determines reproductive rate.

In the following paragraphs an attempt is made to describe the main factors for bear distribution in Bulgaria. Firstly the presence of brown bears related to habitat use will be described and secondly the influence of human dimensions.

2.3.1 Food habits and habitat use

Although the brown bear is categorised in the family of carnivores, it has an omnivore's diet which consists largely of vegetarian foods and invertebrates.

Brown bears pass through three biochemical and physiological stages in their active period from spring to autumn, changing from low food intake (hypophagia) in spring, a stage of normal activity in summer, to a high food intake (hyperphagia) in autumn, even though they might gain weight also during spring (Swenson, 2000). The importance of high energy foods during late summer and autumn must be underscored, as this is the period of accumulation of the adipose tissue that is essential for hibernation. Brown bears have a large worldwide distribution and rely on different foods depending on area, and time of the year. They select the most nutritious food items available at a given time. Thus, the food preference will change seasonally and has a large influence on the density and presence of bears in a habitat and the size of the home ranges.

Unfortunately up till now there is only one publication (Raicev, 1988) about food habits and seasonal food preference of the brown bear in south-west Bulgaria. Conferring to his findings the food habits of the brown bear in Bulgaria consist 25 % remains of live stock and wild animals, 28% fruits, 23% forage (set for feeding game), 5% berries and 6% insects. The percentage of the meat ingredients was the highest in the spring (between March and June)-40%. In most cases these were carcasses or injured and sick animals.

In the following paragraphs a description is made of the bear diet seasonally using literature from comparable European countries.

Spring

Green vegetation, such as graminoids and forbs, are eaten mostly in their most nutritious pre-flowering stages in spring and early summer. Bears also visited meadows where consumed grasses (Gramineae spp.), clovers (Trifolium spp.), and plants of Polygonaceae family (Rumex spp.). In spring time bears in Slovenia were depending on there food intake on green food and ants. (Große, 2003)

Insects, especially the order Hymenoptera (ants, bees and wasps) may be seasonally important foods. Especially in spring, when snow covers the ground in northern areas and very limited food sources are available, bears dig out *Formica* anthills and break open down logs to obtain *Camponotus* ants. High in protein, insects may serve as one of a few sources of proteins in the spring and may provide essential amino acids. Tracking studies in Sweden have documented that female bears utilize ants more than males during spring, the season when ants are most often eaten.

Summer

In Croatia the bear main plant food source during summer were plants of Umbelliferae (Apiaceae) family like wild angelica (Angelica silvestris) and family Compositae (Asteraceae) with stinking aposeris (Aposeris foetida). In this season bears switch to berries and fruits when they ripen. By late summer, fruits ripen at meadows, abandoned orchards, along fields and roads, and in the forest. The most important as bear foods were raspberry (Rubus idaeus), bramble (Rubus fruticosus), common buckthorn (Rhamnus cathartica), and blueberry (Vaccinium myrtillus).

Autumn

In Slovenia at fall season, bears spent most of time in forests where beech nuts were abundant. Similar pattern of bear movements and habitat use was found in Cantabrian mountains, Spain. Later in autumn, and also during winter and spring, bears may consume large amounts of hard masts like acorns (*Quercus*), beechnuts, (*Fagus silvatica*), chestnuts (*Castanea*), and hazelnuts (*Corylus avellana*) where they are available.

Winter

Bears in south Europe make extensive use of hard masts, as well as berries and large soft masts. Due to its high digestibility and high nutritional value, meat, obtained either as prey, as carcasses or as baits seems to be selected when available.

In the winter when the bears prepare for hibernation they will be on a high altitude above snow level (1500 meters). In this period they will prepare several dens and will choose the most suitable one when needed. The den is mostly in a rocky area, where they can make a place between and under rocks. A second possibility is that they use a big trunk as a den. The snow will cover the entrance of the den and will keep them warm and dry. The home range of the bears varies seasonally; in the winter when they are in hibernation they have a small territory.

Most studies of brown bear food habits are based on fecal analysis, and have underestimated the importance of animal matter, especially large mammals, in the diet. Bears are not effective hunters of adult wild ungulates, unless they are favoured by hard snow crust during spring. Predation rate on moose calves in an area in central Sweden with a high bear density (20-25 bears/1,000km²) is about 25%. Domestic animals, which for generations have been bred for characteristics favoured by humans, have become quite defenceless against large carnivores. This has made domestic animals, especially sheep, an easy prey for brown bears in parts of Europe where effective guarding techniques have been abandoned. However, on a European level domestic animals are not important food for brown bears (Swenson et al.2000)

Altitude and forest cover

The bears preferred altitude varies also through the year depending on the place of the preferred food which changes seasonally. In general the altitude has a positive influence on the quality of the habitat for brown bear. (Kobler, 2000). In Spain the preferred altitude was stated between 1100 and 1400 meters above sea level (Clevenger 1997). Comparing this to the Bulgarian situation

Forest cover has a positive influence on the presence of brown bear. A high influence of large forest patches on bear movements was stressed. In the model of Kobler taken in account the proximity to settlements, it neglects food availability. This agrees with Swenson et al. (1998), who maintain that the brown bears are found in forested areas with low human density, but the population survival is determined more by the presence of a protective forest cover than by the availability of food (Kobler *et. al*, 2000). This insists that the focus to preserve the species in Bulgaria have to be on large dense forested areas.

2.3.2 Human dimensions

Wherever bears occur in Europe they come into conflict with human land uses and activities. In Bulgaria most often bears cause damages to livestock and bee-hives. From the domestic animals, sheep are the most often victim. Usually the attacks are

during the summer period and secondly during the spring time when the animals damage the fruit-trees. Although in general humans have a positive attitude towards bears, when a 'blood thirsty' animal is known their attitude switches directly to negative (Dutsov, 2005).

The main traits for the bear population in Bulgaria are (Voeten, 2005):

1. Habitat degradation due to timber industries and firewood collection
2. Loss and fragmentation of habitat because of developing infrastructural works.
3. Killing of bears by local people because of damage done to apiaries, orchards, field crops and livestock. In addition, people gathering mushrooms, berries etc. in the forests have a negative attitude towards bears because of fear for attacks.
4. Illegal hunting for trophies and meat.
5. Since the removal of the bear from the game species list some regional forestry units lost a significant source of income and contrary to the intentions of the law, are losing interest and motivation to protect the bear.
6. Some years ago, Carpathian bears were introduced into captive breeding populations, which were released for hunting. This can seriously threaten the genetic purity of some subpopulations

Recommendations as followed formulated by Dutsov, *et. al* (2002) to solve the human animal conflict:

- Since the main reason for the negative attitude towards the large carnivores species is the damages they cause to the agriculture economy, more should be done for developing and applying proper methods for damage prevention. A traditional method with livestock guarding dogs is working quite well, where it exists.
- Developing of a compensation system could help a lot, but the economical stability in the country is something necessary for the proper application of the above mentioned system.
- Wide-spread education and public awareness campaign is needed to popularise the natural role of the large carnivores and to decrease the negative attitude.

Breeding stations

In south-eastern Europe, feeding stations and hunting baits, serving as an artificial food source for brown bears, seem to be common. Breeding stations provide food for game species e.g. wild boar who also attract bear. Due to feeding holes year round, high concentrations of bears around breeding centres are found. For instance in the western Balkans a breeding station where approximately 40 bears visit the feeding spots.

2.3.3 Conclusion

Firstly the presence of brown bears is related to habitat quality which varies seasonally related to food availability and food preference per season. Percentage of forest cover and elevation have a positive influence on the bear habitat quality.

Secondly the presence of brown bears is related to human dimensions which can be divided in; presence of human interference and breeding stations. Human presence- occurring by villages, roads and agriculture- has a negative influence on the presence of bear. Although, human presence is considered as a negative influence on the presence of bears, breeding stations can cause high concentration of bear numbers due to feeding spots where food is available year round.

So perfect bear habitat will be areas on a high altitude with a high forest cover and seasonally preferred food available with no human interference so ever. Unfortunately, in reality this is not present and bear and human have to find their way to live next to each other.

3 Research plan

3.1 Objective and questions

Main objective for the ecological research is to collect field data relevant to develop a sound national management plan for the Brown bear, specifically data on distribution of the Brown bear population.

For the preparation of a national management plan data is needed on population size, population trends, distribution, habitat use, mortality causes, damage caused by bears, public attitudes towards bears, human impact on the bear population.

The main questions are:

1. How is the brown bear distributed in Bulgaria?
Where do the bears occur?
Where are the core areas?
How big is their territory?
What do they eat?
In what kind of habitat do they occur?
Do the animals cross between core areas and where?
2. What is the population size and composition?

3.2 Methods

Mammals are exclusively elusive creatures with hidden life. They are mainly nocturnal with well-developed senses. Because of the above mentioned reasons their direct observation and describing of their biology is hard or practically impossible. That is why numerous non-invasive and indirect methods for their study are developed.

In this study, the data on the distribution and population size of the species will be collected using, firstly transects: for presence, diet, habitat description. Secondly hair traps will be set to collect hairs and other traces for population size and population composition. In the corridor areas the roads -which are considered as major barrier- will be measured on their quality of possible crossing point.

There are four methods used for collecting data:

1. Existing data: general first idea of bear distribution
2. Transects: presence, diet and habitat
3. Hair traps: population size and composition
4. Quality crossing assessment of roads in the corridor areas

Every bear track will be collected when possible during tracking independent of the method that is used on that moment.

Besides the methods of transects and hair-traps to collect bear presence information, there are plans to radio collar a few animals in core areas of their habitat for detailed information on movement patterns, activity ratio and home range size. This, however, depends on sufficient funding in the future.

Before the fieldwork starts existing data is collected at forestry departments and national parks. This data is used to get a general idea where the bears live and there

numbers and local problems caused by occurrence of bears. The gathered information is used to choose the territories for setting transects and hair-traps.

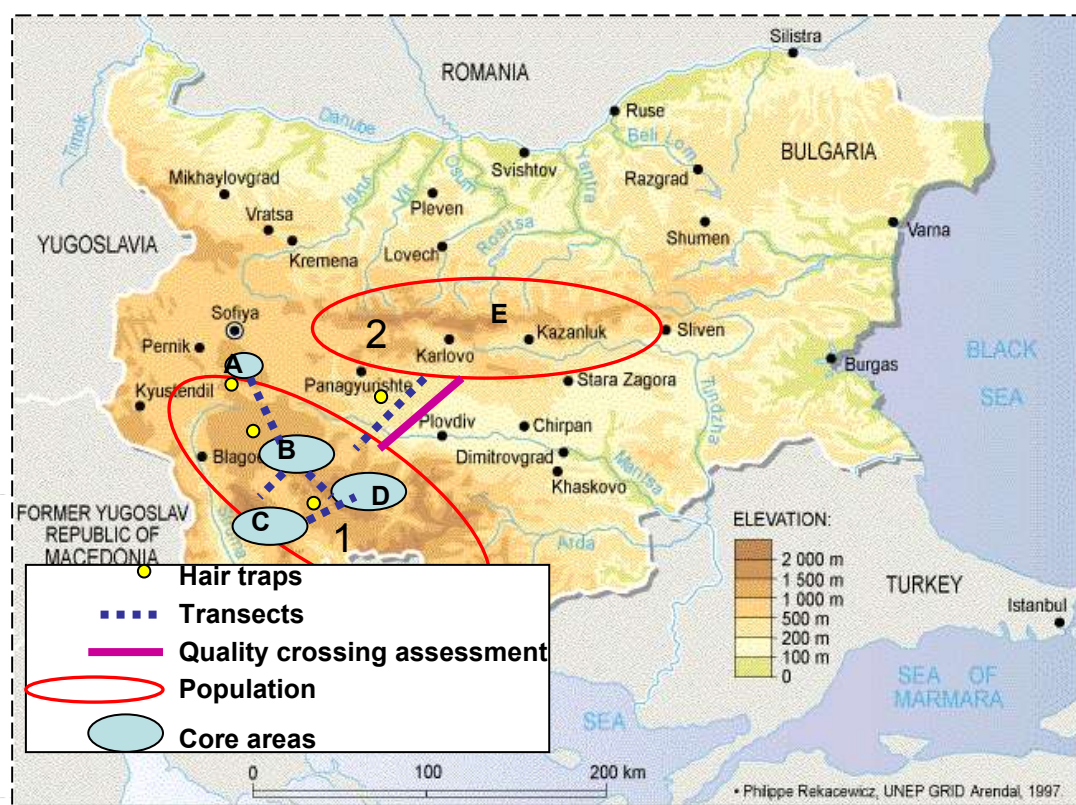


Figure 2: Overview of assumed bear population and first plan research set up. 1: Rila-Rhodope Mountain population and 2: Stara Planina Mountain population. The letters A till E refer to the different core areas A Vithosa Mountain, B: Rila Mountain, C Pirin Mountain, D: Rhodopi Mountain and E: Balkan Mountains.

3.2.1 First focus areas

The first focus of the research was on the corridor areas between the suspected core areas of the brown bear population (see figure 2). This is assumed to be an effective way to get inside in the outside boundaries of these territories, migration routes and problem areas. For the Rila Rhodope Mountain population (1) the corridor areas were between the core areas A till D (see figure 2). In these areas transects were done and hair traps will be placed.

The second focus area was the Sredna gora or Middle Mountain which is a corridor area between the south western mountain ranges and the central Balkan Mountain (see figure 2). There are many questions for this area. Although, it is assumed that the population in the Central Balkan area is isolated from the beginning of the 20th century there is regular information that bears are present in the area. This raised a lot of questions: Is the population in the Central Balkan mountain range, a subpopulation or is it a population on its own?

Are their bears in the corridor area Sredna gora? And if yes, is there migration through the whole corridor from Stara Planina to Rila, Pirin and Rodopi mountain ranges or is their present just the outside range of the different populations? Are the present bears in the corridor area only dispersing males or do they stay in the area? And if there is permanent presence is there reproduction in the area?

The investigation of this area started with measuring quality of the possible crossing points on the highway which is main barrier for bears. Besides the highway the main roads in the corridor are checked. Thirdly villagers are interviewed for information about history presence and damages done by bears. In the area is also planned to do habitat assessments and setting hair traps.

3.2.2 Distribution

To get insight in the distribution of the brown bear population in Bulgaria the presence, diet and habitat of the brown bear are investigated using transect. As mentioned there is chosen to start setting transects in the suspected outside range of the territories and corridors between core areas considering time limitation this will be the most effective way to get insight in the presence of the brown bear. Transects will be 7 a 10 kilometres long depending local circumstances: weather, altitude, slope, accessibility for human (see figure 3).

Presence

The presence questionnaire (appendix 2) includes micro-habitat, track and trail (footprints). For habitat analyzes is necessary to describe the deposition site. The procedure is first record the geographic coordinates with GPS, then describe the habitat around (what kind of forest is meadow, main plantation type etc.). Describe the surface on which the scat is deposited, and the geographic orientation of the slope (E, W, S, SW, SE, N, NE, and NW).

Also the presence of other animals (appendix 3 and 4) will be written down.

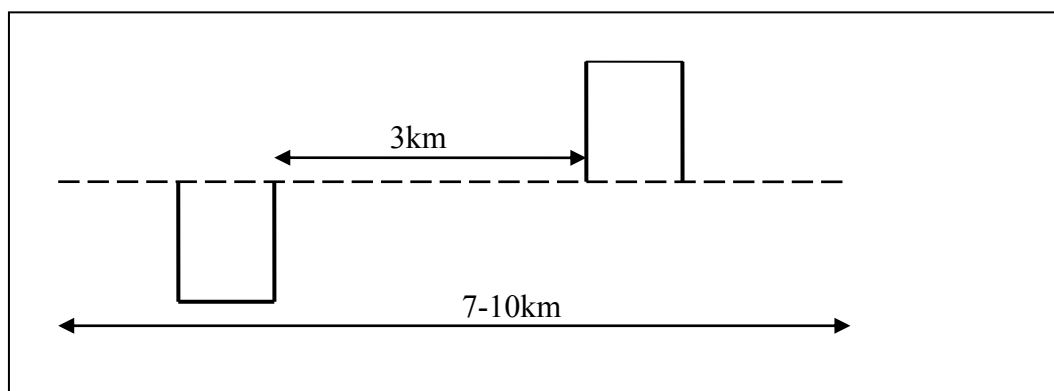


Figure 3. Transects set up, the dotted line is the main transect and the squares are the habitat assessments

Diet

To get insight in diet of brown bear scat are collected. The first thing we get as information from one scat is the presence of the species which left it. For this reason it is wise to describe the deposition site: coordinates, type of habitat, date and condition of the sample. Often the deposition side is a kind of marking the individual territory border (appendix 2).

Analyzing scats is one of the most popular methods for analyzing carnivores' diet. Excrement consist mainly of undigested food remains from animal or plant origin – seeds, leaves, bones, hair, chitin from insects etc.

When the scat is freshly deposited (no more than 12 hours) it is recommended to pick a DNA sample. For that purpose we use plastic tubes with lid. The tubes have to be sterilized and secured against getting organic tissue inside. They are filled with 70%

alcohol. Genetic sample is taken from the surface of the excrement, which has a contact with intestines of the animal. The cover is gently scratched with lancet, tweezers or if not available cleaned stick (wood). The collected material is placed in the tube, than close it tide and then mark the number of the sample, date, place of collection and the name of the collector.

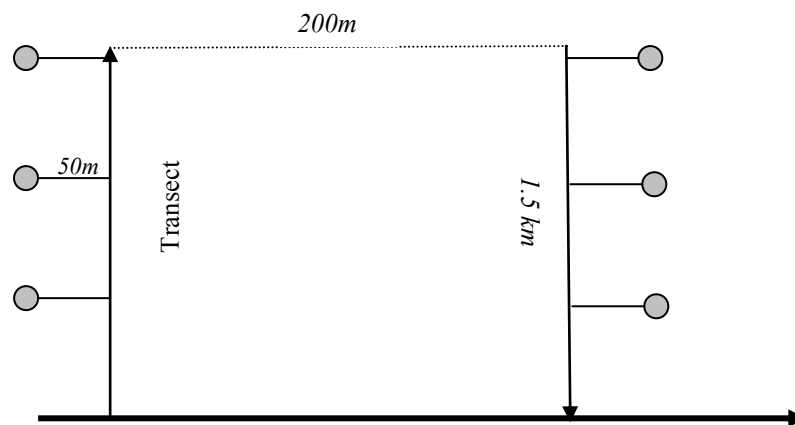
For diet analyzes we collect all scats except this lost their consistence and forma as a result of weathering. Because of the large volume of the samples it is possible to collect pieces of the excrement from different parts. The samples are collected in plastic bags, we use the bag as glove and then after picking the sample we are turning it at the opposite direction and bind it up. The sample is marked with number, place and date of collection and name of the collector. It is recommended to freeze the sample after we get back to laboratory. After collection the scats will be dried and washed with a sieve (0.5mm).

Habitat

Habitat assessment were started in late may due to the grow season the results will other wise not be comparable. In the month March transects for checking bear presence are set in straight line to cover more territory and different altitude. Transects are situated randomly in the area chosen by accessibility of the roads.

All signs of bear activity (foot tracks, diggings, marks on trees) as well as bear sightings were recorded and GPS locations were taken. Mapping and GIS analysis of these and future data will allow understanding of seasonal patterns of habitat use by bears (appendix 1).

To collect sufficient data, the samples should be taken by standardized method. All routes will be defined before the fieldworks start. Each route will have own number. The routes will lead through ravines, ridges, animal trails, tractor roads and or slopes in the study area.



Sampling route

Figure 4. Design of habitat sampling

There will be 2 to 4 groups in the field, with two collectors in each group. The groups will do 1.5 kilometre transects starting from the route at 1 km away from each other (the final length of transects will be decided after first trials). Two of the groups will make turn to the left side of the route. Two other groups will make turn to the right

side and make transects with same length. Transects will be not straight line and not necessary on the animal trail). The members of the group will keep distance from each other to cover more territory (5-10 meters depend on the terrain).

Random sampling of 10-meter-radius plots was carried out for the assessment of bear habitats. At 500 m interval the team turned to the left (or right as defined in advance for each transect) from the transect and walked 50 m perpendicular to the transect line to reach the centre point of a sampling plot. A special data sheet was completed for each sampling plot (see Annex 1). At the end of each transect the observers turned to the direction of the sampling route and walked 200 m. Then they returned to the sampling route keeping as parallel to the transect line as possible and performing habitat assessment procedures as described above (see figure 4). Consequently each team sampled 6 habitat points at each 1.5 km transect.

Quality crossing assessment

In the corridor area the roads are measured for possible crossing point for the bears. For this crossing quality assessment a 5 level scale (that is designed special for this area) is used.

Measurement scale habitat quality of corridors:

1. Locale road, <4 meters just a possibility for crossing
2. Wide of crossing >4 meters, not many hide outs and human presence year round
3. Hide outs, human presence not year round e.g. cottage, cattle trail
4. Slightly imperfect, water source, no human presence, lot of hide outs but no bear presence evidence
5. Perfect, water source, no human presence, lot of hide outs and evidence of bear presence

3.2.3 Population size and composition

Population size estimates are important for the proper conservation and management of species but are difficult to obtain, especially for rare or elusive species such Brown bear. Non-invasive DNA based methods have recently been developed to estimate population sizes. The major advantage of the genetic samples is that they are easily collected without the need to see or disturb the animals. For DNA samples will be used mainly hair samples left by bears on rubbing trees, poles, fences, specially set hair traps etc. as well as freshly found excrements.

The territory of Bulgaria inhabited by bears including the corridors and places visited by bear occasionally is 18,000 to 20,000 square km. It is not possible to cover the whole area but representative territories including all different habitats, different management systems (National park, State game breeding stations, Forestry Units) in Rilo-Rhodopian Mountains, Vitosha and Balkan Mountain will be selected. No less than 30 % from the study area. The representative areas are divided in 7x7km cells. A barbed wire hair trap will be placed in each cell and baited. After the DNA samples processing the number of the bears in the representative area will be interpolated to estimate the number in the whole territory. This method will be compared with other methods for estimating bear's numbers and density.

Hair traps

To sample bears systematically throughout the ecosystem, the representative area is divided into 7x7 km cells. This area size is estimated by the territory size of individual to avoid interfere with more than one animal. A barbed wire hair snag station is placed in each cell and baited with a non-rewarding (Genovesi, appendix 5). Places for setting hair snagging stations (hair traps) should be provide natural food for bears it is also preferable the traps to be fixed in permanently wet and clear from vegetation spots so when bears appeared to leave clear footprints which can be measured. After selecting a site for the hair snag station, 25 m length of barbed wire is set up 50cm above the ground and wrapped around three or more trees to create a corral. Site vegetation data, location, and other snag site characteristics are also collected. At the centre of the barbed wire corral a pile of rotten wood is made and a non-rewarding liquid lure (aged cattle blood and rendered fish oil) is poured on to it. In addition to the lure a film canister containing a "love scent" is hung from a tree approximately 5 m from the ground. "Love scent" is a liquid substance (such as rotten egg or skunk essence) that is changed with each snagging session so that a bear will be interested in the smell even if it has already been to a previous hair snag.

Hair snag stations will be relocated within each cell every two weeks for a session. Samples are collected from hair snag stations after they have been out for 14 days. Hair is collected from the barbs using tweezers, placed in paper collection envelopes, and stored in desiccation chambers at the end of each 14 day period. All hair samples as well as information about any other bear tracks are given to the region coordinator who enters the data in a database and sends them to the genetics lab for processing and DNA analysis.

Rub object surveys

Rub object surveys involve hiking trails, forest roads, and other areas throughout the ecosystem and collecting hair from trees, posts, power poles, fences or other objects that bears rub on as they travel through an area. Information such as tree species, diameter, and distance from trail will be recorded and entered into a database. The objects would be marked with small tags and short pieces of barbed wire would be attached to the rubbing surface. The short pieces of barbed wire are used to ensure quality samples are obtained.

4 Process and problems

In this chapter the process and problems are described related to the organisation of the project and specifically the practical process of the fieldwork.

4.1 Fieldwork

During the month of April, work mainly involved applying for permits with the Ministry of Forestry and Agriculture, writing reports to different organisations in order to organise the fieldwork, and making arrangements for field equipment e.g. cars for the fieldwork.

Moreover, during the first half of April a field trip was organised to visit the Forest Departments and different National Parks and Reserves. The purpose of this trip was three fold; firstly to inform people of the project, secondly to create cooperation for the collection of data by rangers in the field and thirdly to collect existing data of the bears.

In the middle of May, the preparation for setting/placing hair-traps started. To attract a bear lure/bait had to be placed. For this purpose, blood, fish and eggs were collected. However, up to this present date, the hair-traps have not been put in place. The reason for this is that there was not a four-wheel drive car available. The plan was to buy two cars for a certain amount of money. The amount of money that was planned to spend appeared to be too little. It was based on the price for handicapped cars where you have to pay a lot of money afterwards for taxes. It was decided to buy just one car which was hard enough to find given the available budget. Recently the project was able to buy a suitable car and the planning is now to position the hair-traps in June.

Transect

In the second half of April fieldwork was started. Transects were set up only on the outside ranges of the territories of the bears as time limitation did not allow to cover the whole area. The first line transects were not put in place as described in the methods. Adjustments were made as primary data collection aimed at gathering tracks of animals and did not involve habitat assessment. As a result, transects coincided mostly with the existing roads and had a length of 7.5 – 10 km. Moreover the choice of this method allowed for a larger area and bigger altitude coverage.

At the end of May transects for habitat assessment were placed. Habitat assessment started late May because of the growing season. Literature from Italy and Scandinavia showed that when placing hair traps and collecting data on habitat assessment too early in the season, results would not be comparable.

Besides the methods of transects and hair-traps to collect bear presence information, there are plans to radio collar a few animals in core areas of their habitat for detailed information on movement patterns, activity ratio and home range size. This, however, depends on sufficient funding in the future.

Problems encountered:

1. There were no vegetation maps available of the study areas. Only the forestry units had detailed information about the forests but were unwilling to cooperate. And even

if you would be able to obtain the information, it is hard to understand because they use codes that are not easy to interpret.

2. When Forestry units provided information about the presence of bears in their forest units, the information was not dated. Furthermore, no data on the presence of bears did not necessarily imply the absence of bears, but could also be explained by a lack of interest in the species on the behalf of the Forestry units.

3. There was no precise data on where the bears like to be during spring, what kind of habitats they prefer during this time of year and at which altitude they like to stay. Also it was not clear what their main food preference is and where you can find it in the field.

4. The equipment was not ready e.g. cars.

5. Team leaders had to do other things in Sofia, which made the project planning difficult.

4.2 Organisational culture

External

The project needs permits from both the Ministry of Forestry and Agriculture and the Ministry of Environment in order to work in the field. Although, there is regular contact between the ministries and the project coordinator up till now the governmental ministries are not willing to give permission for the research this is mainly due to a lack of interest because of the fact that there are elections coming in June.

Also both ministries want to be initiator of informing the forest departments about the project, only Balkani has already talked to a lot of forestry units and informed them about the project. Furthermore Balkani have planned to organise a meeting with all the stakeholders' e.g. local people, farmers, beehive owners and foresters. The purpose of the meeting will be to listen to their opinion about bear presence and human-bear conflicts and not to tell them what Balkani experts think. However, this different approach by Balkani and the lack of cooperation between Balkani and the government could lead to twice as much work and irritations on both sides.

The first meeting between stakeholders is planned for the 20th of June. Of the organisation all 4 team-leaders, the project coordinator of Balkani, the overall coordinator of Alertis and a facilitator will be present at the meeting.

This meeting is also set up to put more pressure on the Ministry of Environment and Forestry and Agriculture as to obtain their cooperation and stimulate the process procedure.

Internal

The involvement of different organisations in this research is a very positive aspect. However, the NGO's in Bulgaria are very suspicious towards each other and normally do not cooperate. Each NGO wants to keep the power to them selves and not share information. To change this attitude will be a slow process which will take a long time and communication between the different parties involved will be a crucial factor, considering that there were not many meetings held so far. Positive is that there is intensive telephone contact between the coordinator of the project and the team-

leaders of the different regions. And although communication process is going slowly the coordinator of the project has good relationships with the team-leaders and governmental ministries and is aware and capable of solving problems.

A second influence on the process delay of the project was that the coordinator, who is also team leader for one of the regions, had an accident and was/is not able to work in the field for several more months. Replacement of this person for the work that needs to be done in the field is advisable, as fieldwork has now come to a stand still, contributing further to the delay of this project.

Literature

- Breitenmoser, U. 1998. Large predators in the Alps: the fall and rise of man's competitors. *Biological conservation*. 83 (3), 279-289
- Clevenger, A.P., Purroy, F.J., Angel Campos, M. 1997. Habitat assessment of a relict brown bear *Ursus arctos* population in northern Spain. *Biological conservation*, 80: 17-22
- Dutsov, A. 2005. "Human dimension analysis of the attitude towards bears"
Results from a sociological research. Not published
- Dutsov, A., Valchev, K., Tsingarska-Sedefteveva, E. 2002. Large Carnivores in S.W. Bulgaria. Protected areas in the southern Balkans, legislation-large carnivores-transborder areas. *Arcturos*. 95-104
- Große, C., Kaczensky, P., Knauer, F. 2003. Ants: a food source sought by Slovenian brown bears (*Ursus arctos*). *Can. J. Zool.* 81: 1996-2005.
- Kobler, A., Adamic, M. 2000. Identifying brown bear habitat by a combined GIS and machine learning method. *Ecological modelling*. 135, 291-300
- Kusak, J., Huber, D., 1998. Brown bear habitat quality in Gorski Kotar, Croatia. *Ursus* 10, 281–291.
- Linnell, J.D.C., Steuer, D., Odden J., Kaczensky, P., Swenson, J.E. 2002. *European Brown Bear Compendium*
- Naves, J., Wiegand, T., Revilla, E., Delibes M. 2003. Endangered species constrained by natural and human factors: the case of brown bears. *Conservation Biology*. 17 (5), 1276-1289
- Swenson J.E., Gerstl N., Dahle, B., Zedrosser, A. 2000. Action Plan for the conservation of the Brown Bear (*Ursus arctos*) in Europe. Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). *Nature and environment*, No. 114. Council of Europe Publishing,
- Spasov N., Goergiev K., Ivanov V., Stoev P. 1999. Study on the potential ecological corridors between the local populations of the brown bear in Bulgaria. *Historia naturalis bulgarica*. 10, 133-146
- Voeten, M., Dutsov, A. 2005. Bulgaria Bear Management. *International Bear News*. 14 (1), 19-20.

Bear habitat assessment sheet

Rout # -----	Transect # -----	Date -----
Full Name of Collector 1 -----		Transect start time -----
Full Name of Collector 2 -----		Transect end time -----

Point # 1	
1. GPS Coordinates -----	
2. Horizontal cover (measured in four directions)	N ----- E ----- S ----- W ----- Total -----
3. Tree and shrub species and their numbers:	4 Canopy cover ----- (100%-0%)
a. ----- () e. ----- ()	5 Ground cover ----- (Max. covering – 100% Min, 0%)
b. ----- () f. ----- ()	6 Under growth min. height ----- (proportion ----- %)
c. ----- () g. () # of Dead Trees	7 Under growth max. height ----- (proportion ----- %)
d. ----- () h. () # of Stumps	

Notes

Point # 2	
1. GPS Coordinates -----	
2. Horizontal cover (measured in four directions)	N ----- E ----- S ----- W ----- Total -----
3. Tree and shrub species and their numbers:	4 Canopy cover ----- (100%-0%)
a. ----- () e. ----- ()	5 Ground cover ----- (Max. covering – 100% Min. 0%)
b. ----- () f. ----- ()	6 Under growth min. height ----- (proportion ----- %)
c. ----- () g. () # of Dead Trees	7 Under growth max. height ----- (proportion ----- %)
d. ----- () h. () # of Stumps	

Notes

Reference numbers of samples -----	Total No. of samples taken on transect: -----
------------------------------------	---

General notes:

For all data collected on the spot. Write with black pencil!

Name of the observer:

Date:

National park / mountain	Section
Sub- section	Locality
GPS coordinates:	

MICROHABITAT

1. Exposure:		2. Close to water Yes/ No		
3. Vegetation:	grass	shrubs	trees	other
4. Close to:	forest	road	path	rocks
5. Cover	snow cm	soil	rock	other

Sigh type

EXCREMENTS

Color
consistence
composition
Size
Notes:

DEN

Entrance direction
Size of the entrance
Depth
Location of the nest chamber (distance from entrance)
Used /not-used the last year
Notes

BEDDING

Type
Usage (temporary, permanently, recently, etc.)
Covering
Location (where found)
Notes:

DIG UP

Species
Notes

TRACK

Species
Notes

MIRE

Species
Notes

FEEDING ACTIVITIES

Species
Remain types
Notes

MARKING ACTIVITIES

Species
Kind of mark
Object marked
Notes

Other

notes:

SPECIES OBSERVED:

For all data collected on the spot. Write with black pencil!

Name of the observer:

Date:

Time:

Weather

National park / mountain	Section
Sub- section	Locality
GPS coordinates:	

MICROHABITAT

1. Exposure:		2. Close to water Yes/ No		
3. Vegetation:	grass	shrubs	trees	other
4. Close to:	forest	road	path	rocks
5. Cover	snow cm	soil	rock	other
Notes				

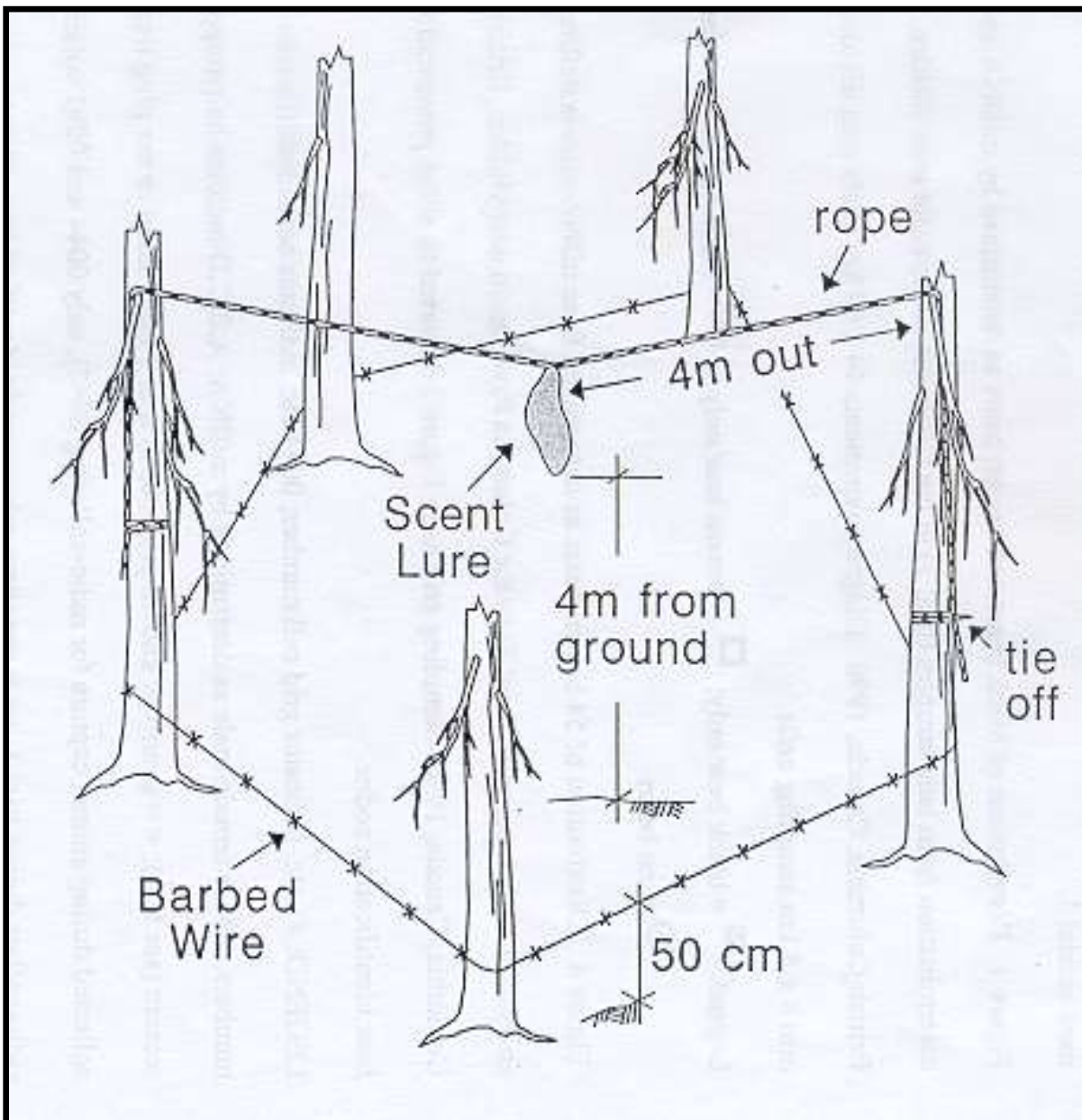
BEHAVIOUR OF THE ANIMAL/GROUP OF ANIMALS IN CASE IT/THEY DIDN'T SEE THE OBSERVER

Lying down
Feeding
Observing the area
Digging
Playing
Fighting
Defecating
Walking
Runing
Marking
Chasing
Attacking (aggressive behaviour)

Notes:

Appendix V

Hair traps method recording to P Genovesi



Appendix VI

Field expeditions

(Ik kan een kaart toevoegen met de plaatsen waar ik ben geweest voor onderzoek van de beren en andere projecten. Mede hierbij kan ook worden aangegeven waar er gepland staat onderzoek te doen en dan voor de beer.)

In this chapter the sites are described that I visited during my stay. The sites are divided by bear visiting sites and other projects I participated at Balkani Wildlife Society. Per visiting site a brief description will be given of the area and the reason of visiting this site and how I participated in the project.

Bear field trips

1 South western Bulgaria Pirin, Rila mountain.

The purpose of this trip was to inform forest departments and national parks about the bear project and collect all the available information on what they already know about the bear presence in the area.

This was my first expedition and it gave me the possibility to orientate myself in the bear issues and get an impression of the landscape.

2 Central Balkan Mountains: Mazalat

Game Breeding Station "Mazalat" is situated on the southern slope of the most beautiful part of the Balkan range, near the town of Kazanlak and the famous Rose valley. It is about 220 km from Sofia Airport and 200 km from the airport nearby city of Bourgas. The altitude varies from 1,450 m at its highest point - Bouhala peak to 550 , at its lowest point. The beech forests dominate the scenery while in the lower parts oak stands mixed with coniferous species are prevalent.

In the alpine part of the Station the animal hunting opportunities are red deer, roe deer, wild boar, bear and wolf. Small game areas offer an opportunity for the hunting of pheasant, rock partridge, hare and migratory game species. The Station has a breeding farm for pheasant and Chukar.

The game rancher thinks there are approximately about 40 bears in the region. There are several feeding places through out the park. They feed the animals with maize, hay and Lucerne. On the tracking we did we collected 4 excrements and 5 different footprints of bear on two slopes between and at feeding places. These feeding places provided us on a better chance to see the bear. We saw a male bear of about 200 kg with a yellowish colour on his head. The shoulder was good visible so it must be young adult or a adult.

We also found wolf and wild boar tracks and saw roe deer and red deer.

Poachers were a problem the last years there was hardly any red deer and left. Nowadays there is good protection against poaching. And people that are caught will be fined and will be send to court.

3 Vithosa mountain

In the chamois enclosure at Vithosa Mountain we found two dens. They didn't want the bears to use the possible dens in the enclosure so they put old clothes dropped in petrol in the two used dens they could find. One of the dens was used this winter, all clothes were gone and the den was cleaned. Also the area in front of the den was intensively walked on. The den was left approximately 3 weeks ago. The other den was not used all clothes were there and there was no sign that a bear had visited the den. The one that was used was more suitable for using it had a smaller entrance and the size was smaller.

4 Pirin and Slavianka Mountain

The Pirin mountains and Slavianka Mountain are located in the south-west of Bulgaria. The Slavianka mountain is a border mountain between Bulgaria and Greece and bears can free migrate between the two countries.

This expedition had as a goal to do get a first idea of the presence of bears in the area through interviewing local people and setting out transects.

Three transects were set in the Pirin mountain. The places of footprints of bear were collected probably from the same bear. In the Slavianka Mountain two transects were done which had a direct observation as result.

5. Rila and Verila mountain

Verila is a lower mountain range which is situated between Vitosha Mountain and Rila Mountain. It functions as a corridor for species migrating between the two mountains. It is known that bears migrate through the area. The reason of visiting this site is to see if they are permanently staying in this area. The second reason was to see if there were suitable places to set hair traps. This areas also suits with the decision to firstly look at the outside range distribution of the bears in the research.

However, the result of the visit was a bit disappointing due to the fact that there were no signs of bear found in the area instead several suitable places to set hair traps were found.

West Rila area: one transect done no signs of bear tracks nevertheless good bear habitat.

Other projects at Balkani wildlife society

1. Conservation of Balkan chamois and restoration of the species in Vitosha nature park

Balkan chamois is a different subspecies, which is listed in Annexes II of Directive 92/43 of EU and Annex III of Bern Convention. Balkan chamois is included in Bulgarian Red Data Book as endangered species.

The purposes of the project are conservation and stabilizing of Balkan Chamois by creating additional subpopulation. Its aims are research on species biology, possibilities for its conservation and gain public for the cause of conservation of Balkan chamois and support to other endangered populations with animals reproduced in Vitosha.

Chamois from the West Rhodope Mountains will be transported to a breeding enclosure built in territory of Vitosha Nature Park. The animals will be kept in captivity in order to reduce the kids' mortality rate and to increase the possibilities of forming the herd (herds) from animals that were brought from different places. After that the herd will be released in the territory of Vitosha Nature Park.

I visit the enclosure of the chamois in the Vithosa Mountain. This is a fenced area where 11 chamois live. The came in February 2004 and will be released in approximately 2 years. The enclosure was made to reintroduce the species in the area.

2. *The dragoman marsh*

Balkani Wildlife Society in cooperation with EURONATURE and with the financial support of EECONET Action Fund and Stitching DOEN started in 1999 a project for restoration and preservation of Dragoman marsh and Chepun hill.

The main activities of the project are:

- Research and monitoring of the flora and fauna in the region of the marsh and Chepun hill;
- Elaborating a plan and constructing a sewage water treatment plant;
- Restoring the population of some rare plants and animal species - *Fritillaria meleagroides*, *Nymphaea alba*, *Leucojum aestivum* and others.
- Establishing the site as a protected area according to the Bulgarian legislation and elaborating a management plan;
- Creating opportunities for eco-tourism. As part of this activity, in August 2003, an international volunteer camp built an eco-route in the marsh and constructed a hide for bird watching.
- Improving the natural habitats of waterfowl and fish.
- In order to guarantee the protection of biodiversity in the marsh, the Balkan Wildlife Society is in the process of buying or renting cultivated land in the area.

My participation

I visit the Dragoman marsh. On this expedition we measured the size (320 ha) of the area with the GPS and also counted all the birds.

3. *Kresna gorge*

Balkani Wildlife Society is involved in the campaign since 1997. Kresna gorge is a region with high global and European conservation value, threatened by the construction of Trans-European motorway. In order to save the gorge the motorway should be diverted 5-6 km east on the slopes of Pirin mountain. In 2002 the Society and its partners developed an alternative route of the motorway, which meets this requirement.

To prove the impact of the current motorway on the migration route for animals they count all the death animals on both sites of the road ones a week. It is a 18km long transect from the starting point of the gorge to the town of Kresna.

My participation

19 April 2005 visit with Andrew walked 18 km collected 37 animals (bird of prey and a owl, green lizards, frogs, mouse, bat). And let free two tortoises in a valley.

4 *Natura 2000 project*

The Pirin mountains and Slavianka Mountain are located in the south-west of Bulgaria. The Slavianka mountain is a border mountain between Bulgaria and Greece and bears can freely migrate between the two countries.

For the Natura 2000 project several species will be monitored. In this expedition the Teckmans owl and the pigmy owl. I participated to listen in the night and collected excrement. Also traces of presence of other key species as caper calie and hazel grouse were searched for. The result was several sound observation of the owls and excrements and direct observations of caper calie.

March

1. Creating of primary bear distribution map, based on available/not available information from Forestry Units in Bulgaria. Defining the Target areas for bear distribution borders, potential ecological corridors and areas with occasional bear presence.
2. Defining field polygons.
3. Meeting with local forestry units.
4. First tracking records.

April

1. Collecting field data.
 - ❖ Tracks
 - ❖ Faces
 - ❖ Marking activity
2. Human dimensions questionnaire.
3. Organizing meeting of the working group.

May

1. Collecting field data.
 - ❖ Tracks.
 - ❖ Faces.
 - ❖ Marking activity.
2. Human dimensions questionnaire.
3. Collecting data for damages on agricultural practices.

June

1. Collecting field data.
 - ❖ Tracks
 - ❖ Faces
 - ❖ Marking activity
 - ❖ Setting hair traps
2. Human dimensions questionnaire
3. Working out the collected excrements

July

1. Collecting field data.
 - ❖ Tracks
 - ❖ Faces
 - ❖ Marking activity
 - ❖ Setting hair traps
2. Human dimensions questionnaire
3. Working out the collected excrements

August

1. Collecting field data.
 - ❖ Tracks
 - ❖ Faces
 - ❖ Marking activity
 - ❖ Setting hair traps
2. Human dimensions questionnaire
3. Working out the collected excrements
4. Collecting data for damages on agricultural practices.

September

1. Collecting field data.
 - ❖ Tracks
 - ❖ Faces
 - ❖ Marking activity
 - ❖ Setting hair traps
2. Human dimensions questionnaire
3. Working out the collected excrements
4. Collecting data for damages on agricultural practices.
5. Preparing and organizing Working Group Meeting.

October

Finalizing the field work and analyzing primary data.
Preparation of primary report.
Working Group Meeting.

Remark: Based on the fact that there will be 2 cars 4WD and 4 teams, the field work will be separated in 2 periods. At the beginning of the month 2 teams are going to field, after they return the other 2. The rest of the time will be spent on working out the collected data, collected samples, preparing papers and presentations.

When setting of the hair traps started they have to be checked every 10-14 days, In this case the team will spend half of the time on the field and then return to the other half to check and move the traps to other sampling square.