BIOSPHERE EXPEDITIONS.ORG

PROJECT REPORT

Expedition dates: 30 January – 19 February 2010
Report published: March 2011

White wilderness: winter wolf and lynx tracking in the Tatra mountains of Slovakia.

PROJECT REPORT

White wilderness: winter wolf and lynx tracking in the Tatra mountains of Slovakia

Expedition dates:
30 January – 19 February 2010

Report published:
March 2011

Authors:
Robin Rigg
Slovak Wildlife Society

Matthias Hammer (editor)
Biosphere Expeditions

Cover page courtesy of Robin Rigg

Abstract

Many hunters consider wolves and other carnivores such as lynx as competitors, because they prey on valuable game animals such as red deer and wild boar. As a result hunters tend to overestimate carnivore numbers and cull them intensively. While official game statistics list more than 1,500 wolves in Slovakia, others claim that the annual winter hunting season leaves fewer than 150 individuals. Are wolves being hunted to extinction, as the environmentalists say, or too numerous, as hunters claim? The dispute shows the clear need for reliable, objective methods to estimate numbers of predators.

The work of this project aimed to answer that need by designing and testing a methodology for indexing wolf and lynx abundance. In doing so it brought together international volunteers and local people, nature conservationists, foresters, landowners and hunters.

This report deals with the 2010 field season, which was conducted in collaboration between Biosphere Expeditions and the Slovak Wildlife Society. Fieldwork was conducted in the Liptov region of northern Slovakia with Biosphere Expeditions bringing in an international team of volunteers to help with field work from 30 January to 19 February 2010.

After appropriate training, volunteers surveyed 54 transects with a total length of 447 km and identified 102 wolf tracks and 11 lynx tracks. Wolf tracks were found on 44% of the surveyed transects at a track density of 13.6 / 100 km / day, with one wolf track found on average every 7.3 km. Lynx tracks were found on 19% of the surveyed transects at a track density of 1.3 / 100 km / day and a frequency of 77.7 km. All lynx tracks appeared to be of a single individual, whereas between one and four wolves (mean: 1.7, n=61) were tracked. Differences in track abundance were found across the study area, although both percentage of transects with tracks and track density were higher for wolves than for lynx in all three survey sectors. Signs of lynx tended to be found where signs of wolves were also detected. A total of 72 samples suitable for genetic analysis were collected, 17 (24%) of these are thought to be from lynx and 55 (76%) from wolves. Most samples (75%) were of urine and all are awaiting DNA analysis.

The project achieved its main aim of designing and testing a methodology for indexing wolf and lynx abundance. The Slovak Wildlife Society now intends to continue this work for at least four more years, expanding the use of the methodology to a larger area.

Súhrn

Množstvo poľovníkov sa domnieva, že vlky a ostatní predátori ako rys sú pre nich konkurenti, pretože lovia tú istú zver ako jelene, srnčiu či diviačiu zver. Výsledkom je, že poľovníci sa snažia umelo navýšiť štatistické počty predátorov aby ich mohli intenzívnejšie loviť. Pokiaľ oficiálne štatistiky zahrňajú viac než 1500 vlkov, iné tvrdia, že po zimnej sezóne lovu ostane menej než 150 zvierat. Budú vlky vystrieľané do posledného ako tvrdia environmentalisti, alebo sú premnožení ako tvrdia poľovníci. Táto diskusia poukazuje na jasnú a objektívnu metodiku určovania početnosti predátorov.

Práca na tomto projekte cieli k naprojektovaniu metodiky k sčítavaniu početnosti vlkov a rysov. K výsledku dopomáha spolupráca zahraničných dobrovoľníkov a miestnych ľudí, ochranárov, lesníkov, majiteľov pozemkov a poľovníkov.

Táto správa sa zaoberá sezónou 2010 v rámci spolupráce Biosphere Expeditions a Slovak Wildlife Society. Terénne práce boli vykonané v regióne Liptova na severnom Slovensku. Biosphere Expeditions zabezpečila medzinárodný tím dobrovoľníkov, ktorí pomáhali s terénnym výskumom od 30. Januára 2010 do 19. Februára 2010.

Po primeranom tréningu, dobrovoľníci mapovali 54 transektov o celkovej dĺžlke 447 km a identifikovali 102 vlčích stopových dráh a 11 rysích. Vlčie stopy boli nájdené na 44% mapovaného územia, hustota stôp bola 13,6/100km/deň, jedna vlčia stopa bola nájdená každých 7,3 km. Stopy rysa boli nájdené na 19% územia s hustotou 1,3/100km/deň a frekvenciou každých 77,7 km. Všetky rysie stopy boli stopy jednotlivých zvierat, pokiaľ u vlkov to bolo od jedného po štyri indivíduá na jednu stopovú dráhu (1,7, n=61). Boli nájdené rozdieli medzi početnosťou stôp a zastúpením jednotlivých druhov a indivíduí v záujmovom území, aj keď percentuálne zastúpenie vlčích stopových dráh bolo väčšie u vlkov než rysa vo všetkých troch sektoroch záujmového územia. Rysie stopy boli nájdené aj na miestach výskytu vlkov. Bolo nájdených 72 vzoriek vhodných pre DNA analýzu, 17 (24%) bolo rysích vzoriek a 55 (76%) patrilo vlkom. Väčšina vzoriek (75%) bol moč. Čaká sa na DNA analýzu.

Projekt dosiahol svoj hlavný cieľ, načrtnúť, otestovať metodológiu na zisťovanie početnosti vlkov a rysov. Slovak Wildlife society bude pokračovať v tomto projekte nasledujúce štyri roky na rozšírenom území.

Contents

1. Expedition Review

M. Hammer (editor)
Biosphere Expeditions

1.1. Background

Biosphere Expeditions runs wildlife conservation research expeditions to all corners of the Earth. Our projects are not tours, photographic safaris or excursions, but genuine research expeditions placing ordinary people with no research experience alongside scientists who are at the forefront of conservation work. Our expeditions are open to all and there are no special skills (biological or otherwise) required to join. Our expedition team members are people from all walks of life, of all ages, looking for an adventure with a conscience and a sense of purpose. More information about Biosphere Expeditions and its research expeditions can be found at www.biosphere-expeditions.org.

This project report deals with an expedition to the Tatra mountains of Slovakia (Liptov region) that ran from 30 January to 19 February 2010 with the aim to determine more realistic estimates of wolf and lynx numbers in order to create a sustainable future for these icons of the Carpathian wilderness and to promote greater understanding of their role in European ecosystems.

With higher numbers of wolves, lynx and bears in Slovakia since the second half of the 20th century, conflicts with local people have come to public attention. Negative aspects of their presence often make news headlines, promoting a heightened sense of fear. Wolves sometimes cause considerable losses to livestock, particularly sheep, and hunters think they will wipe out game stocks. Lynx and wolves have also been accused of reducing numbers of other threatened animals, such as the Tatra chamois. Such conflicts often lead to calls for culling, which is the approach that almost eradicated carnivores from Slovakia in the past. The concurrent emergence of new threats to wildlife and habitats presented by economic development means that a more sensitive approach is required, one based on a sound understanding of the place of carnivores in ecosystems, but also considering their impact on local people. As very little modern scientific work has been done on large carnivores in Slovakia, there is much to be done in order to achieve these goals.

1.2. Research Area

The Western Carpathian mountains cover much of northern Slovakia, and spread into the Czech Republic with Moravia to the east and southern Poland to the north. They are home to many rare and endemic species of flora and fauna, as well as being a notable staging post for a very large number of migrating birds.

Within these western Carpathian mountains are several national parks, the earliest of which was established in 1949. The parks are dedicated to conserving the unique alpine and subalpine ecosystems found in the Tatra mountains, amongst which are the tallest peaks in Europe between the Alps and the Caucasus. The highest mountain is Gerlach at 2655 m.

Flag and location of Slovakia and study area.

An overview of Biosphere Expeditions' research sites, assembly points, base camp and office locations is at Google Maps.

Once covered by glaciers, which left behind over 100 mountain lakes (also known as 'tarn', or 'pleso' in Slovak), these mountains are home to some 1300 species of plants, about 40 of which are found nowhere else. Chamois, brown bears, lynx, eagles, wolves and marmots are some of the 170 species of vertebrates found.

Forest cover in the area is 90%. The main trees are Norway spruce, beech and fir. The timberline is composed of Norway spruce and in some places beech, between 1400 and 1500 m. Above the timberline is a zone of dwarf pine, then a habitat of alpine meadows and cliffs. The forests are managed and pastures in the valleys are used for grazing livestock, mainly sheep and cattle.

The Tatra mountains in Slovakia. Red arrow marks the location of base.

1.3. Dates

The project ran over a period of three weeks divided into three one-week slots, each composed of a team of international research assistants, scientists and an expedition leader. Slot dates were:

30 January - 5 February | 6 -12 February | 13 - 19 February 2010.

Team members could join for multiple slots (within the periods specified). Dates were chosen to coincide with the best chance for snow cover for tracking purposes.

1.4. Local Conditions & Support

Expedition base

The expedition team was based in the Liptov region of northern Slovakia, in a cottage in the forest with showers and all modern amenities. Team members shared rooms with up to four beds; breakfast and dinner were provided at base and a lunch pack was supplied for each day spent in the field. Vegetarians could be catered for. There was 220 V mains electricity at base. Plug type was European type E.

Weather

In winter the maximum daytime temperature rarely reaches much above 5^{o} C and can be as low as -10^{o} C during the day. In exceptional winters it can drop to below -20^{o} C. More information on the weather during the expedition is given below.

Field communications

In general mobile phones worked throughout the study site, but in some spots signal reception was poor. There were also hand-held radios for groups working closer together. The expedition leader also sent an expedition diary to the Biosphere Expeditions HQ every few days and this diary appeared on www.biosphere-expeditions.org/diaries.

Transport & vehicles

Team members made their own way to Bratislava or Liptovský Mikuláš. From there onwards and back to Bratislava all transport was provided for the expedition team. Courtesy of Land Rover and its Bratislava distributor, T.O.P. Auto Slovakia, the expedition had the use of one Land Rover Defender and one Land Rover Discovery throughout, as well as an additional Land Rover Discovery for the first week.

Medical support and insurance

The expedition leader was a trained first aider, and the expedition carried a comprehensive medical kit. Further medical support was provided via a network of mountain rescue stations. The nearest hospital was in the nearby town of Liptovský Mikuláš (30 km from base). In case of immediate need of hospitalisation, and weather permitting, helicopters of the mountain rescue service were also available. Safety and emergency procedures were in place, but did not have to be invoked.

All team members were required to carry adequate travel insurance covering emergency medical evacuation and repatriation.

There were two minor medical incidents: one team member was sick and confined to camp for a day and another suffered a recurrence of an existing knee injury that restricted her participation on subsequent days.

1.5. Local Scientist

Robin Rigg is a UK-born zoologist who has lived in Slovakia since 1996. He has a Bachelors degree in natural science from Cambridge University and in 2005 gained a Masters with distinction in zoology from the University of Aberdeen for a thesis on "*The extent of predation on livestock by large carnivores in Slovakia and mitigating carnivore-human conflict using livestock guarding dogs*". The main focus of his work is on the long-term conservation of large carnivores through improving coexistence and reducing conflicts with local people. He has set up and led several innovative projects in his adopted country, including the Protection of Livestock and Conservation of Large Carnivores, Bear Education, Awareness and Research in Slovakia and the Slovakia Wolf Census Project. He is the chairman of the Slovak Wildlife Society, which he established in 1998, and is also a member of the International Union for Conservation of Nature (IUCN) Bear Specialist Group's expert team on Human-Bear Conflict.

1.6. Expedition Leader

The expedition was led by Malika Fettak, who is half Algerian, but was born and educated in Germany. She majored in Marketing & Communication at the University of Frankfurt. She started her job career at a newspaper & publishing company and worked for a couple of years in Publishing, PR & Communications. Having grown up with different cultures her love of foreign languages and countries combined with her passion for nature and the outdoors made her travelling widely, especially in Africa, Northern and Southern Europe. Taking part in a few Biosphere expeditions persuaded her that a change of career was in order. She joined Biosphere Expeditions in 2008. Since then she is leading expeditions and is working on PR, Marketing & strategic planning - happy to contribute to conservation of endangered wildlife and nature professionally inside and outside the office. Malika is a keen sportswoman - triathlon, winter sports, volleyball, etc., and holds First Aid and Off-Road driving certificates.

1.7. Expedition Team

The expedition team was recruited by Biosphere Expeditions and consisted of a mixture of all ages, nationalities and backgrounds. They were (with country of residence):

30 January – 5 February 2010

Michael Sweeney (Ireland), Tracey Wright (UK), Alex Betts (UK), Jeanette Sander (Germany), Roy Marsden (UK), Hardy Pleske (Germany), Isabelle Slinckx (Belgium), Julie Marwick (UK), Daniele Terray (France), Tomaš Hulik (journalist, Slovakia), Ann Lockley (journalist, Canada), Matthias Hammer (Biosphere Expeditions staff, Germany).

6 – 12 February 2010

Michael Sweeney (Ireland), Ashley Shaner (USA), Wolfgang Pott (Germany), Gabriele Pott (Germany), Hartmut Spring (Germany), Mirjam Spring (Germany), Wilfrid Hellweg (Germany), Arne Tschmelitsch (Austria), Timothy Moore (UK), Elizabeth Meadowcroft (UK), Lawrence Ninham (UK), Oriol Sagristà Mateo (Spain).

13 – 19 February 2010

Ashley Shaner (USA), Ulf Schweda (Germany), Ilka Schweda (Germany), John Highet (UK), Jane O'Shaughnessy (Ireland), James Cruickshank (Germany), Allison Bergstrom (USA), Steffan Stringer (UK), Kerry Utton (UK), Shannon Morris (journalist, Australia), Aino Forsti-Smith (Biosphere Expeditions staff, Finland), Peter Bedo (SWS, Hungary) and Michal Mazúr (SWS, Slovakia).

Other journalists

In addition to the international journalists who took part in fieldwork as full team members, several Slovak journalists were present for one day each: Rastislav Ekkert (Joj TV), Marián Jaslovský (Sme newspaper), Jana Cavojská (Plus7Dní magazine), Božena Simonidesová (Farmár magazine).

1.8. Expedition Budget

Each team member paid towards expedition costs a contribution of £960 per person per 7 day slot. The contribution covered accommodation and meals, supervision and induction, special research equipment and all transport from and to the team assembly point. It did not cover excess luggage charges, travel insurance, personal expenses such as telephone bills, souvenirs etc., as well as visa and other travel expenses to and from the assembly point (e.g. international flights). Details on how this contribution was spent are given below.

Income	£
Expedition contributions	28,810
Expenditure	
Expdedition base includes all board & lodging, and extra food & meals	5,481
Transport includes car fuel UK – Slovakia return, car fuel during expedition, train rides	2,221
Equipment and hardware includes research materials & gear etc purchased in UK & Slovakia	2,386
Staff & project support includes local and Biosphere Expeditions staff salaries and donation to SWS	4,432
Administration includes miscellaneous fees & sundries	397
Team recruitment Slovakia as estimated % of annual PR costs for Biosphere Expeditions	3,477
Set-up of expedition includes travel, research & staff time	2,433
Income – Expenditure	**7,983**
Total percentage spent directly on project	**72%**

1.9. Acknowledgements

The expedition was conducted jointly by Biosphere Expeditions and the Slovak Wildlife Society. SWS's Svetlana Betková liaised behind the scenes with land owners, foresters, hunters and national park staff to invite them to participate and to ensure volunteers could carry out their work effectively. We are particularly grateful to the volunteers, who not only dedicated their spare time to helping but also, through their expedition contributions, funded the research. We would also like to thank Robert Chmura and his family of Pod Dobakom for providing an excellent expedition base and services. Thanks go to the staff of the state forestry service and Nízke Tatry National Park in Liptovský Hrádok, to Urbárske pozemkové spolocenstvo Hybe and to all those who provided assistance and information. Vehicles were loaned by Land Rover / T.O.P. Auto Slovakia, Bratislava, and other equipment by Swarovski Optik. We also thank the Wolves and Humans Foundation and Cotswold Outdoor for their support. Biosphere Expeditions would also like to thank members of the Friends of Biosphere Expeditions and donors, Land Rover, Swarovski Optik, Cotswold Outdoor, Motorola and Gerald Arnhold for their sponsorship, as well as Ben Rees and other persons for helping with reviewing this report.

1.10. Further Information & Enquiries

More background information on Biosphere Expeditions in general and on this expedition in particular including pictures, diary excerpts and a copy of this report can be found on the Biosphere Expeditions website www.biosphere-expeditions.org.

Enquires should be addressed to Biosphere Expeditions at the address given below.

2. Non-invasive monitoring of wolves and lynx

Robin Rigg
Slovak Wildlife Society

2.1. Introduction

Obtaining reliable estimates of animal populations is vital for effective conservation and management (Gibbs 2000, Wilson and Delahay 2001, Balme et al. 2007). Despite there being a wide range of methods to study carnivores (Smallwood and Schonewald 1998, Gese 2001, Kunkel et al. 2005, Balme et al. 2007), managers in Slovakia have relied on hunters' game statistics, which lack a robust methodology and are known to overestimate carnivore numbers substantially (Rigg 2008).

Whereas official statistics for 2008 list more than 1,500 grey wolves (*Canis lupus*) in spring, some environmentalists claim there to be fewer than 150 individuals. As the number of Eurasian lynx (*Lynx lynx*) is also unknown (Hell et al. 2004), there is an urgent need to improve monitoring of both species.

Their relatively low population densities, large home ranges and cryptic behaviour make carnivores especially hard to observe directly. Wildlife surveys therefore tend to sample indirectly (Wilson and Delahay 2001, Linnell et al. 2007b, Long et al. 2008). Non-invasive techniques applicable to monitoring populations of canids and felids include: track surveys, either on the ground (Zimen and Boitani 1975) or by aerial reconnaissance (Ballard et al. 1995); scat surveys (Crete and Messier 1987, McNay et al. 2009); scent stations and hair collection (McDaniel et al. 2000); camera trapping (Heilbrun et al. 2006); howling surveys (Fuller and Sampson 1988); and genetic analysis (Kohn et al. 1999). Surveys employing a system of transects to search for tracks and other sign provide data on presence/absence, helping to map species distribution (Becker et al. 1998, Resource Inventory Committee 1998, Kunkel et al. 2005), along with a range of other information, including breeding status, diet (Wydeven et al. 2004), habitat use and activity as well as the gender and individual identity (Ulizio et al. 2006). They can also be used to generate indices of relative abundance and monitor substantial changes (Gese 2001). Counting tracks of target species on predetermined survey routes provides an index of relative abundance that can be used to monitor spatial variation as well as trends over time. Changes in count estimates over time within each count unit should provide an indication of changes across the entire range and/or of regional or local change (Nikolaeva 2004). Snow tracking protocols have been used successfully for both wolf (e.g. Beyer et al. 2004) and lynx (e.g. Squires et al. 2004, Linnell et al. 2007b). If potential biases and variation are accounted for, sign surveys have been found to indicate relative abundances similar to photo rates and genetic individual identification results (McCarthy et al. 2008).

Sign surveys are particularly applicable where there is consistent snow cover for tracking combined with good access for fieldworkers (Kunkel et al. 2005), as is the case in Slovakia's Tatra Mountains in winter (Rigg 2009a). Tracking is relatively inexpensive, though labour intensive, and allows the collection of more data than would be possible using expensive methods such as telemetry (Wydeven et al. 2004). It is a cost-effective and reliable approach that is highly amenable to the involvement of trained volunteers. Winter provides the opportunity to track animals over extensive areas in snow. An additional advantage is that at this time of year ungulates concentrate in low elevation wintering areas comprising a small percentage of their annual range. Predators also concentrate their activities within these wintering areas, reducing the geographic area to be surveyed (Kunkel et al. 2005). Moreover, samples for

genetic analysis are best collected in winter, when they are better preserved for analysis (Lucchini et al. 2002). DNA can be extracted from hair and faeces (McKelvey et al. 2006) as well as urine (Hausknecht et al. 2007) and used to determine not only species, but also the gender and individual identity of the animal that deposited it (Kohn et al. 1999). The ability to distinguish between individuals and family groups allows population size to be estimated on the basis of minimum counts and mark-recapture methods (Kohn et al. 1999, Ulizio et al. 2006, McCarthy et al. 2008).

Figure 2.1a. Satellite image of the study area showing the three main mountain ranges surveyed, the Liptov Basin and towns in the area.

2.2. Study area

The research was conducted in the Liptov region of north central Slovakia, comprising the two districts of Ružomberok and Liptovský Mikuláš (total area 1,988 square km). This region, which has been the focus of much of the Slovak Wildlife Society's work, has relatively high densities of wolves, lynx and bears and conflicts with local people are frequently reported. According to Voskár (1976, 1993), wolves re-colonised the area in the 1970–80s after previous extermination by hunting, trapping and poisoning.

The study area extends south–north from 48°54´N to 49°13´N and west–east from 19°17´E to 20°00´E, including the northern portion of the Low Tatras (Nízke Tatry) National Park and the south-western portion of the Tatras (Tatranský) National Park, as well as the Chocské vrchy Mountains (see Fig 2.1a above). Elevation ranges from 500 to 2,248 m.

In the foothills and mountains there are continuous forests, mostly dominated by Norway spruce (*Picea abies*), up to the timberline at 1,400–1,600 m. Some forests are commercially managed for timber extraction. Above the timberline is a subalpine zone with extensive stands of dwarf pine (*Pinus mugo*) interspersed with open meadows up to about 1,800 m. Above this is alpine tundra with some rocky cliffs.

The central part of the study area comprises the Liptov Basin of relatively flat agricultural land, made up of a mosaic of pastures, fields, meadows and woodland. Along with the foothills of the Západné Tatry and Nízke Tatry Mountains, these are important wintering areas for ungulates and therefore also their main predators, the wolf and lynx. Three species of ungulates occur at medium–high densities: roe deer (*Capreolus capreolus*), red deer (*Cervus elaphus*) and wild boar (*Sus scrofa*). Hunting and game management, including supplementary feeding, are legal and widespread even in protected areas.

Mean annual precipitation measured at Liptovský Hrádok (637 m) is approx 690 mm, of which 215 mm falls during the vegetation period, and the mean annual temperature is around 6°C (range of minimum to maximum in recent years: –25°C to 31°C). On average, 160 days a year are frosty and 35 days have snowfall. Snow lies for 80 days per year. At higher elevations, snow cover can be 300 cm and persist for up 180–200 days (Vološcuk 1999). January is the coldest month, with temperatures averaging –8°C and a record low of –38°C in Liptovský Hrádok in 1929.

2.3. Materials and methods

2.3.1. Track survey

After training, experienced fieldworkers and trained volunteers searched for tracks and other natural signs of the target species along pre-determined transect routes from 31 January to 18 February 2010.

A potential problem of sign surveys is the reliability of correctly identifying tracks and other signs (Gese 2001). Volunteers received training and illustrated guides on how to distinguish tracks in the field. Distinguishing wolf and dog tracks presents a particular difficulty, but it can be done according to the shape, size and pattern of tracks (Nowak and Myslajek 2000) or, most accurately, by DNA analysis of scats, urine or hair found along tracks (Lucchini et al. 2002, McKelvey et al. 2006, Ulizio et al. 2006).

The study area was divided into three sectors: south of the River Váh and west of Demänovská Valley in the Nízke Tatry (sector 1); south of the River Váh and east of Demänovská Valley (sector 2); north of the River Váh, focusing on Západné Tatry and Chocské vrchy (sector 3). A stratified sampling plan was then prepared to survey 100–200 km in each sector (Wydeven et al. 2004, Balme et al. 2007). Typically, carnivores favour particular travel routes. Therefore rather than being randomly scattered, transects were placed selectively, based on experience gained in preliminary studies (Rigg 2007, 2009a), in order to maximise the chance of detecting the target species (Wilson and Delahay 2001, Potvin et al. 2005, Linnell et al. 2007b). Large carnivores usually occur at low densities, so tracks and other sign are not found on many transects, which can make statistical analysis problematic. A large number of transects are therefore needed to detect changes in occurrence (Kunkel et al. 2005). Variance and the proportion of routes with zero counts can be decreased by having longer transects. However, route length should make allowance for difficult travel in deep snow (Nikolaeva 2004). Transects were therefore designed to average 10–15 km of travel on foot or snowshoes.

Transects were mapped using the tracklog function of a handheld GPS. Two types were used: the Garmin® GPS 60 and GPSMap 60CSx. The former sometimes lost satellite reception in dense forest cover or steep-sided valleys, so missing sections of tracklog were reconstructed in Garmin® MapSource for Windows® version 6.16.3 before calculating the cartographic length of each transect. When tracks of either target species were identified, they were followed a short distance to determine group size (Beyer et al. 2004, Linnell et al. 2007a). Track size, direction of movement and estimated age of tracks were recorded along with the GPS location. Territorial pairs and breeding activity were identified by scent marks such as raised leg urination and blood in urine (Mertl-Millhollen et al. 1984, Kunkel et al. 2005). To gather data on movements and activity as well as to increase the likelihood of finding samples suitable for DNA analysis, tracks of wolves and lynx identified on transects were usually followed the next day and mapped using the GPS tracklog function, marking locations of interest as waypoints.

Indices of relative abundance were computed as the proportion of transects with tracks of the target species as well as the number of tracks observed as a function of distance surveyed: the number of individual tracks observed per unit distance (track density) and the number of kilometres surveyed per target species track (track frequency) (Stander 1998, Balme et al. 2007). To calculate track density, the number of tracks found was divided by the length of the route surveyed, giving an estimate of tracks/km. This was then divided by the number of days since the last snowfall, thus estimating tracks/km/day, which was arbitrarily multiplied by 100 to estimate tracks/100km/day (Nikolaeva 2004).

2.3.2. Faecal analysis

Scats (faeces) were collected as they were encountered along tracks and transects to extend an ongoing study of wolf diet (Rigg and Gorman 2004, Parry 2006) in winter months and to increase sample size for a study of lynx diet. Wolf and lynx scats were identified on the basis of their size, shape, content and odour (Bang and Dahlstrøm 2001) though in many cases the task was made simpler as they were associated with a set of tracks. Without handling them directly and being mindful of hygiene, each scat was placed in a separate plastic bag and labelled with the location and date of collection. Location was recorded using a handheld GPS (Garmin® GPS 60 or GPSMap 60CSx). Scats were stored at –18°C as soon as possible after collection until processing using standard methods (Litvaitis et al. 1996). Mammalian hair was identified by examination of the medulla and cuticular surface structure using a stereoscopic microscope with 200x magnification in comparison with a reference collection, keys and atlases (Dziurdzik 1973, Teerink 1991, De Marinis and Asprea 2006).

2.3.3. Genetic analysis

Urine (in snow), scats, hair (e.g. from day beds) and blood (from breeding females) of wolves and lynx were collected as they were encountered along tracks and transects (McKelvey et al. 2006). Care was taken to ensure that each sample came from a single animal. Without handling them directly and being mindful of hygiene, each sample was placed in a separate plastic bag and labelled with the location and date of collection. They were then stored at –18°C pending processing by a specialised wildlife genetics laboratory.

2.3.4. Camera trapping

A field trial was conducted from 11 to 17 February using two automatic cameras (Wildview STC-TGL1) placed for a total of 2 x 6 = 12 trap nights on opposite sides of a male red deer carcass that appeared to have been already largely consumed by wolves and foxes.

2.4. Results

2.4.1. Track survey

Weather and snow conditions for the survey were generally very favourable. Temperatures mostly remained below 0°C until the last two days (Fig. 2.4.1a). There were snowfalls within the study area on at least eight of the 20 days that the expedition was in the field (including training weekends). Transects were surveyed on average 1.9 days (range: 1–4) since the most recent track-obliterating snowfall.

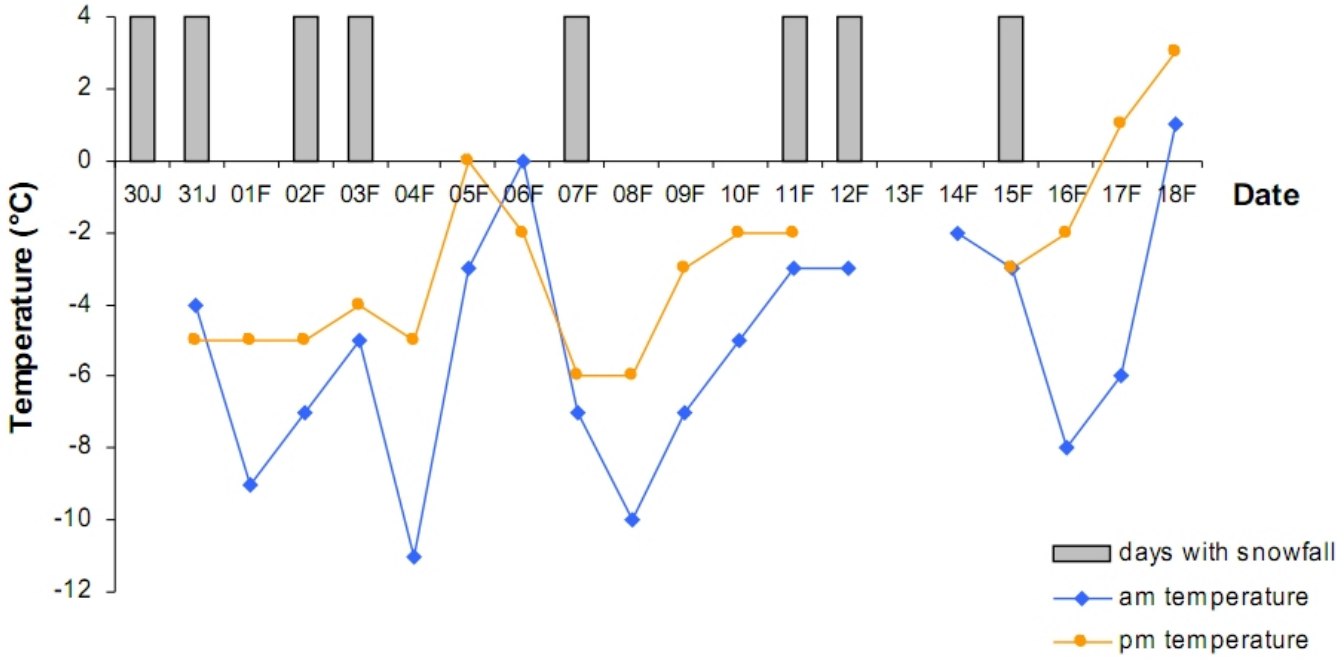

Figure 2.4.1a. Daily temperature readings at base and days with snowfall in the research area during the survey. Morning temperature readings were taken daily at 06.00–09.20 and evening readings at 16.00–20.05.

Forty-nine different transects were surveyed over the course of the expedition (Fig. 2.4.1b), three of which were repeated with slight variations in the route and another (a short route used to train each group of volunteers) was covered on three separate occasions. The total length of all 54 transects surveyed was 447 km with a mean length per transect of 8.3 km.

A total of 102 wolf tracks and 11 lynx tracks were identified on surveyed transects. Average group size was 1.0 for lynx (range: 1, n = 11) and 1.7 for wolf (range: 1–4, n = 61). Wolf tracks were found on 44% of the surveyed transects at a track density of 13.6 / 100 km / day, with one wolf track found on average every 7.3 km. Lynx tracks were found on 19% of the surveyed transects at a track density of 1.3 / 100 km / day and a frequency of 77.7 km (Table 2.4.1a).

Tracks of both wolves and lynx were found most frequently in sector 3 (north of the River Váh, focusing on Západné Tatry and Chocské vrchy) and least often in sector 1 (River Váh and west of Demänovská Valley in the Nízke Tatry) of the study area (Table 2.4.1a). Both percentage of transects with tracks and track density were higher for wolves than for lynx in all three sectors. Signs of lynx tended to be found where signs of wolves were also detected (Fig. 2.4.1c).

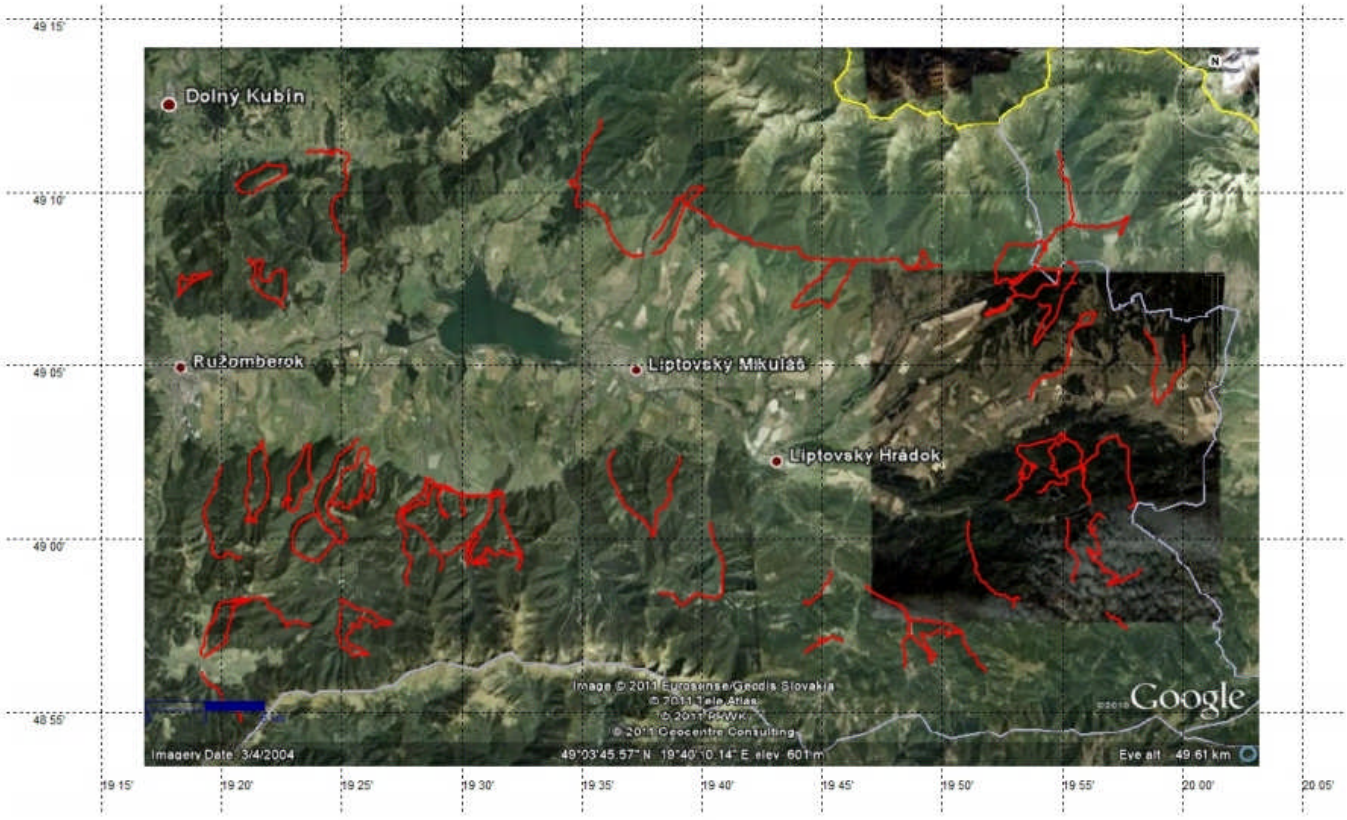

Figure 2.4.1b. Routes of transects (shown in red) surveyed for signs of wolves and lynx in winter 2010.

Table 2.4.1a. Transects surveyed and tracks found, indicating the percentage of survey routes on which tracks of the target species were found, track density (tracks found / 100 km / day since last snow fall) and track frequency (number of kilometres surveyed per target species track).

	Transects surveyed		Wolf tracks			Lynx tracks		
	n	km	%	Density	Freq.	%	Density	Freq.
Sector 1: Nízke Tatry W	21	194.7	28.6	8.3	12.0	9.5	0.6	155.8
Sector 2: Nízke Tatry (sector 1)	16	110.2	62.5	21.5	4.7	43.8	3.5	28.7
Sector 3: Západné Tatry & Chocské vrchy	17	142.1	47.1	14.8	6.8	5.9	0.5	213.2
Total	**54**	**447.0**	**44.4**	**13.6**	**7.3**	**18.5**	**1.3**	**77.7**

2.4.2. Diet analysis

A total of nine faeces (five of which are thought to be from lynx and four from wolves) were collected during fieldwork, which is insufficient for a stand-alone quantitative analysis of diet. Results from these samples, which contained hair of wild boar (*Sus scrofa*) and deer (cervidae) will therefore be added to the Slovak Wildlife Society's database for analysis once sufficient samples have been collected.

2.4.3. Genetic analysis

A total of 72 samples suitable for genetic analysis were collected, 17 (24%) of which are thought to be from lynx and 55 (76%) from wolves. Most samples (75%) were of urine (Table 2.4.3a). The majority of samples were found in the eastern third of the study area (Fig. 2.4.3a). Results of genetic analysis were not available when this report was finalised and the samples are awaiting DNA analysis.

Table 2.4.3a. Summary of the number and type of samples collected for genotyping.

	Urine	Faeces	Hair	Blood	Total
Lynx	9	5	3	0	17
Wolf	45	4	5	1	55
Total	**54**	**9**	**8**	**1**	**72**

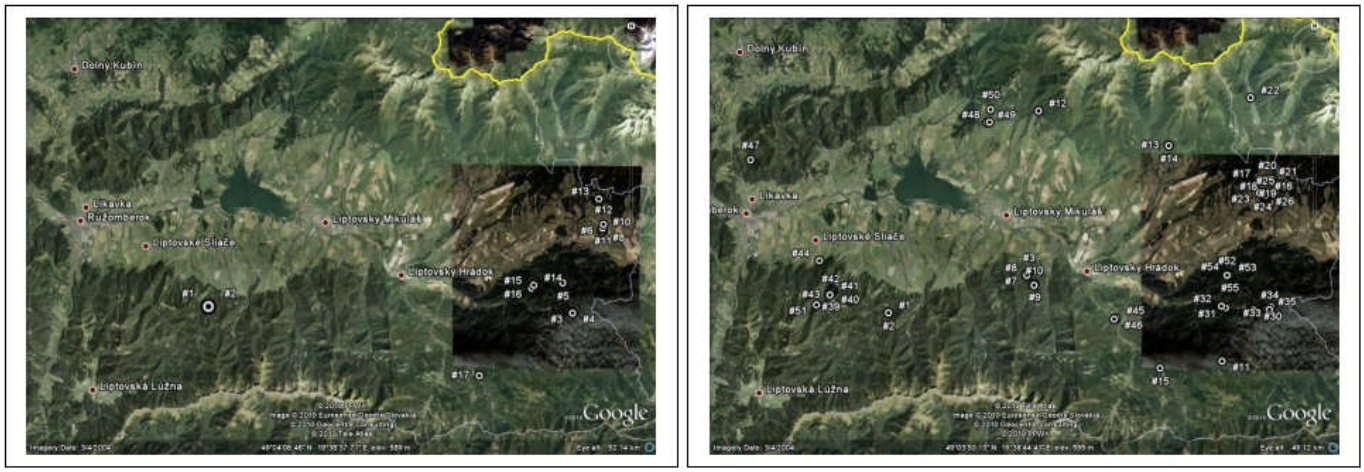

Figure 2.4 .3a. Locations where samples from lynx (left) and wolf (right) were collected.

2.4.4. Camera trapping

One camera took three pictures while team members were absent, on one of which two foxes were visible at the deer carcass. No animals were photographed by the second camera.

2.5. Discussion

On the basis of track counts obtained in February 2010, wolves appeared to be more numerous than lynx in the study area. The finding that signs of both species tended to be identified in the same locations refutes a belief commonly held among hunters in Slovakia that these two species compete to the extent that wolves displace lynx. However, this is only a preliminary conclusion, which merits further investigation.

Observed group sizes were rather small. Only single lynx tracks were found on transects, although a local hunter's report of a female with two young in sector 3 of the study area was confirmed by a visit to the site. Wolf pack cohesiveness tends to break down during the mating season, so surveys should ideally be conducted prior to this period (Resource Inventory Committee 1998). In Bialowieza Primeval Forest, Poland, signs of wolf mating were seen from 12 January to 22 March (Schmidt et al. 2008). The dates of fieldwork for the present study were determined by the availability of volunteers and had the advantage of falling immediately after the wolf hunting season closed (on 31January), potentially providing an opportunity to assess the impact of legal hunting.

Timing in relation to snowfalls

Snow-tracking requires a fresh snowfall of at least 5–10 cm to enable accurate track interpretation. Rates of detection increase with length of time after snowfall, but there is a trade-off against the possibility of older tracks becoming unidentifiable (Nikolaeva 2004), of further snowfall covering them (Linnell et al. 2007b) or of an increasing abundance of tracks as animals move around making interpretation difficult (Kunkel et al. 2005). Recommendations in the literature for the timing of surveys include up to three days (Resource Inventory Committee 1998), 3–4 days (Bayne et al. 2005) and 5–10 days (Nikolaeva 2004) after fresh snowfall. The manner of recruiting volunteers for fieldwork in the present study precluded flexibility of timing, nevertheless the timing of transect surveys in relation to snowfalls largely conformed to the lower limits of published recommendations.

Distinguishing between groups / individuals

One of the major inherent difficulties of assessing abundance is the need to ensure not only that animals are not missed, but also that the same individuals are not counted more than once. This is a particular problem for wide-ranging species such as wolves and lynx. Genetic analysis and camera-trapping can help to distinguish between individuals, as can telemetry. Protocols to avoid double counting have been developed for wolves (Beyer et al. 2004). These include: finding fresh tracks in adjacent areas with no movement between; separate sets of fresh tracks leading away from each other; prior knowledge of territories; and localisation of den sites. Repeat surveys are sometimes required. Surveys in adjacent areas should be coordinated spatially and temporally along shared boundaries to detect movements from one area to another. An alternative would be to use a survey design and analytical methods that do not require identification of individual animals (e.g. Stephens et al. 2006). Estimates can be based on sampling in a random sample of areas, using either tracks (Becker et al. 1998) or DNA analysis (Flagstad et al. 2004).

Relative vs. actual abundance

Extrapolating from an index to actual abundance should be approached with caution (Linnell et al. 2007b). Relationships between indices and real density are largely untested and may depend on habitat, climate, detectability of sign, time of year, prey density and population social structure (Thompson et al. 1989, Heinemeyer et al. 2008). However, methods based on line-intercepts have been found to correspond well to actual density determined, for example, by telemetry (O'Donoghue et al. 1997, Stander 1998, Linnell et al. 2007b).

A simple estimate of actual abundance is a minimum (late) winter count (Wydeven et al. 2009). A disadvantage of this method is that it does not provide a statistical estimate of error, which is important when trying to determine the accuracy of an estimate of population trend (Kunkel et al. 2005). It is also assumed that all packs have a high probability of detection and that double counting is avoided, either by back-tracking all tracks encountered or by ensuring that one or more transects without tracks lie between two transects with observed tracks. If back-tracking has not clarified which tracks belong to different animals, a distance rule can be used to separate observations that are so far apart they are not likely to have derived from the same animals (Linnell et al. 2007a,b). Determining wolf group size and the number of lynx kittens in a group can require several kilometres of snow-tracking, so group size should be used with caution as a criterion to distinguish between groups.

Summary and future work

The project achieved its main aim of designing and testing a methodology for indexing wolf and lynx abundance. The Slovak Wildlife Society now intends to continue this work for at least four more years, expanding the use of the methodology to a larger area.

2.6. References

Ballard W.B., McNay M.E., Gardner C.L. and Reed D.J. (1995) Use of line-intercept track sampling for estimating wolf densities. In: Ecology and conservation of wolves in a changing world. Carbyn L.N. Fritts S.H. and Seip D.R. eds. Canadian Circumpolar Institute, Edmonton, Aberta, Canada: 469-480.

Balme G.A., Hunter L.T.B. and Slotow R. (2007) Evaluating methods for counting cryptic carnivores. Journal of Wildlife Management 73(3): 433-441.

Bang P. and Dahlstrøm P. (2001) Animal tracks and signs. Oxford University Press, Oxford. 264 pp.

Becker E.F., Spindler M.A. and Osborne Y.O. (1998) A population estimator based on network sampling of tracks in the snow. Journal of Wildlife Management 62: 968-977.

Beyer D. E., Roell B.J. and Lonsway D.H. (2004) 2003 survey of the gray wolf population in Michigan's Upper Peninsula. Michigan Department of Natural Resources, Marquette, Michigan, USA.

Crete M. and Messier F. (1987) Evaluation of indices of gray wolf, *Canis lupus*, density in hardwood-conifer forests of southwestern forests of southwestern Quebec. Canadian Field-Naturalist 101: 147-152.

De Marinis A.M. and Asprea A. (2006) Hair identification key of wild and domestic ungulates from southern Europe. Wildlife Biology 12: 305-320.

Flagstad Ø., Hedmark E., Landa A., Brøseth H., Persson J., Andersen R., Segerstrom P. and Ellegren H. (2004) Colonization history and non-invasive monitoring of a reestablished wolverine population. Conservation Biology 18: 676-688.

Fuller T.K. and Sampson B.A. (1988) Evaluation of a simulated howling survey for wolves. Journal of Wildlife Management 52(1): 60-63.

Gese E.M. (2001) Monitoring of terrestrial carnivore populations. In: Carnivore Conservation. Gittleman J.L., Funk S.M., MacDonald D.W. and Wayne R.K. eds. Cambridge University Press and The Zoological Society of London: 372–396.

Gibbs J.P. (2000) Monitoring populations. In: Research techniques in animal ecology: controversies and consequences. Boitani L. and Fuller T.K. eds. Columbia University Press, New York: 213-252.

Hausknecht R., Gula R., Pirga B. and Kuehn R. (2007) Urine – a source for non-invasive genetic monitoring in wildlife. Molecular Ecology Notes: 208-212.

Heilbrun R.D., Silvy N.J., Peterson M.J., Tewes M.E. (2006) Estimating bobcat abundance using automatically triggered cameras. Wildlife Society Bulletin 34: 69-73.

Heinemeyer K.S., Ulizio T.J. and Harrison R.L. (2008) Natural sign: tracks and scats. In: Noninvasive survey methods for carnivores. Long R.A., MacKay P., Zielinski W.J. and Ray J.C. Island Press, Washington: 45-73.

Hell P., Slamecka J. and Gašparík J. (2004) Rys a divá macka v slovenských Karpatoch a vo Svete. (The lynx and wild cat in the Slovak Carpathians and the world). PaRPress, Bratislava, 162 + xvi pp [in Slovak].

Kohn M. H., York E.C., Kamradt D.A., Haught G., Sauvajot R.M. and Wayne R.K. (1999) Estimating population size by genotyping faeces. Proceedings of the Royal Society of Biological Sciences 266: 657-663.

Kunkel K., Mack C.M. and Melquist W.E. (2005) An assessment of current methods for surveying and monitoring wolves. Nez Perce Tribe, Lapwai, Idaho. 58+16 pp.

Linnell J.D.C., Odden J., Andrén H., Liberg O., Andersen R., Moa P., Kvam T., Brøseth H., Segerström P., Ahlqvist P., Schmidt K., Jedrzejewski W. and Okarma H. (2007a) Distance rules for minimum counts of Eurasian lynx *Lynx lynx* family groups under different ecological conditions. Wildlife Biology 13: 447-455.

Linnell J.D.C., Fiske P., Herfindal I., Odden J., Brøseth H. and Andersen R. (2007b) An evaluation of structured snow-tracking surveys to monitor Eurasian lynx *Lynx lynx* popuations. Wildlife Biology 13: 456-466.

Litvaitis J.A., Titus K. and Anderson E. (1996) Measuring vertebrate use of terrestrial habitats and foods. In: Research and management techniques for wildlife and habitats. 5 ed., rev., Bookhout T.A. ed. The Wildlife Society, Bethseda, Md.: 254-274.

Long R.A., MacKay P., Zielinski W.J. and Ray J.C. (2008) Noninvasive survey methods for carnivores. Island Press, Washington. 385 pp.

Lucchini V., Fabbri E., Marucco F., Ricci S., Boitani L. and Randi E. (2002). Noninvasive molecular tracking of colonizing wolf (*Canis lupus*) packs in the western Italian Alps. Molecular Ecology 11: 857-868.

McCarthy K.P., Fuller T.K., Ming M., McCarthy T.M., Waits L. and Jumabaev K. (2008) Assessing estimators of snow leopard abundance. Journal of Wildlife Managemen 72(8): 1826-1833.

McDaniel G.W., McKelvey K.S., Squires J.R. and Ruggiero L.F. (2000) Efficacy of lures and hair snares to detect lynx. Wildlife Society Bulletin 20(1): 119-123.

McKelvey K.S., Von Kienast J., Aubry K.B., Koehler G.M., Maletzke B.T., Squires J.R., Lindquist E.L., Loch S. and Schwartz M.K. (2006) DNA analysis of hair and scat collected along snow tracks to document the presence of Canada lynx. Wildlife Society Bulletin 34(2): 451-455.

McNay R.S., MacDonald F. and Giguere L. (2009) The relative abundance and spatial distribution of wolves in north-central British Columbia Wildlife Infometrics Inc. Report No. 317. Wildlife Infometrics Inc., Mackenzie, British Columbia, Canada. 13 pp.

Mertl-Millhollen A.S., Goodmann P.A. and Klinghammer E. (1984) Wolf scent marking with raised-leg urination. Zoo Biology 5(1): 7-20.

Nikolaeva K. ed. (2004). A monitoring program for the Amur tiger seventh year report: 2003-2004. Wildlife Conservation Society, Russia. 56 pp.

Nowak S. and Myslajek R. (2000) Tropem wilka (Tracking wolves). Stowarzyszenie dla Natury "Wilk", Godziszka. 97 pp [in Polish].

O'Donoghue M., Boutin S., Krebs C.J. and Hofer E.J. (1997) Numerical responses of coyotes and lynx to the snowshoe hare cycle. Oikos 80: 150-162.

Parry E. (2006) A comparison of wolf diets in the Low Tatras and Western Tatras National Parks, Slovakia. Bachelors thesis. Sparsholt College, Hampshire. 59 pp.

Resource Inventory Committee (1998). Inventory methods for wolf and cougar. Standards for components of British Columbia's biodiversity No. 34. BC Ministry of Environment, Lands and Parks, Resource Inventory Branch for the Terrestrial Ecosystems Task Force, Resource Information Standards Committee, Vancouver. 57 pp.

Rigg. R. (2007) Slovakia wolf census project. Unpublished report. Slovak Wildlife Society, Liptovský Hrádok. 14 pp.

Rigg R. (2008) Pocetnost, odstrel a ochrana vlka dravého (*Canis lupus*) v slovenských Karpatoch – privela ci málo? (Abundance, hunting and protection of the wolf (*Canis lupus*) in the Slovak Carpathians – too much or not enough?). Výskum a ochrana cicavcov na Slovensku VIII: 200-213 [in Slovak with English abstract.]

Rigg. R. (2009a) Tracking wolves and lynx in northern Slovakia, winter 2008/09. Unpublished report. Slovak Wildlife Society, Liptovský Hrádok. 12 pp.

Rigg. R. (2009b) Non-invasive monitoring of wolf (*Canis lupus*) and lynx (*Lynx lynx*) in the Tatra. Mountains of northern Slovakia. "White Wilderness" project rationale. Unpublished report. Slovak Wildlife Society, Liptovský Hrádok. 28 pp.

Rigg R. and Gorman M. (2004) Spring-autumn diet of wolves (*Canis lupus*) in Slovakia and a review of wolf prey selection. Oecologia Montana 13 (1-2): 30-41.

Schmidt K., Jedrzejewski W., Theuerkauf J., Kowalczyk R., Okarma H. and Jedrzejewska B. (2008) Reproductive behaviour of wild-living wolves in Bialowieza Primeval Forest (Poland). Journal of Ethology 26(1): 69-78.

Smallwood K.S. and Schonewald C. (1998) Study design and interpretation of mammalian carnivore density estimates. Oecologia 113: 474-491.

Squires J.R., McKelvey K.S. and Ruggiero L.F. (2004) A snow-tracking protocol used to delineate local lynx, *Lynx canadensis*, distributions. Canadian Field-Naturalist 118: 583-589.

Stander P.E. (1998) Spoor counts as indices of large carnivore populations: the relationship between spoor frequency, sampling effort and true density. Journal of Applied Ecology 35: 378-385.

Stephens P. A. Zaumyslova O.Yu., Miquelle D.G., Myslenkov A.I. and Hayward G.D. (2006) Estimating population density from indirect sign: track counts and the Formozov–Malyshev–Pereleshin formula. Animal Conservation: 339-348.

Teerink B.J. (1991) Hair of West-European mammals. Atlas and identification key. Cambridge University Press, Cambridge. 224 pp.

Thompson I.D., Davidson I.J., O'Donnell S. and Brazeau F. (1989) Use of track transects to measure the relative occurrence of some boreal mammals in uncut forest and regeneration stands. Canadian Journal of Zoology 67: 1816-1823.

Ulizio T.J., Squires J.R, Pletscher D.H., Schwartz M.K., Claar J.J. and Ruggeiro L.F. (2006) The efficacy of obtaining genetic-based identifications from putative wolverine snow tracks. Wildlife Society Bulletin 34: 1326-1332.

Vološcuk I. ed. (1999) The national parks and biosphere reserves in Carpathians – the last nature paradises. ACANAP, Tatranská Lomnica. 248 pp.

Voskár J. (1976) Vlk obycajný (*Canis lupus* L.) a problémy jeho ochrany na Slovensku. (The wolf (Canis lupus L.) and problems of its protection in Slovakia. Folia Venatoria 5-6: 326-332 [in Slovak].

Voskár J. (1993) Ekológia vlka obycajného (*Canis lupus*) a jeho podiel na formovaní a stabilite karpatských ekosystémov na Slovensku. (The ecology of the wolf (*Canis lupus*) and its share in the formation and stability of Carpathian ecosystems in Slovakia.) Ochrana prírody 12: 241-276 [in Slovak].

Wydeven A., Sabor A.A., Schultz R.N., Megown R.A., Boles S.R. and Wiedenhoeft J.E. (2004) Guidelines for carnivore tracking during winter in Wisconsin. Online: http://dnr.wi.gov/org/land/er/mammals/volunteer/pdfs/tracking_guidelines.pdf

Wydeven A.P., Jurewicz R.L., Van Deelen T.R., Erb J., Hammill J.H., Beyer D.E., Roell B., Wiedenhoeft J.E. and Weitz D.A. (2009) Gray wolf conservation in the Great Lakes region of the United States. In: A new era for wolves and people: wolf recovery, human attitudes and policy. Musiani M., Boitani L. and Paquet P. eds. University of Calgary Press, Calgary: 69-93.

Zimen E. and Boitani L. (1975) Number and distribution of wolves in Italy. Zeitschrift für Säugetierkunde 40: 102-112.

3. Expedition leaders' diary: Slovakia 2010 by Malika Fettak and Matthias Hammer

17 January

Hello everyone and welcome to the Slovakia 2010 diary. Malika (Fettak), your expedition leader, and I will be sharing this diary for the set-up phase and first slot. My name is Matthias (Hammer) and I am the founder and managing director of Biosphere Expeditions and you will be hearing from us regularly over the next few weeks.

Malika and I will be packing/setting up until Wednesday before making our way to Bratislava where we will give a press conference at Land Rover and collect a vehicle before heading to the Tatra mountains and our study site. Since this is the first expedition to Slovakia with our new scientist Robin (Rigg) and working in winter, we'll have a full week or so to get everything ready at our base Pod Dobakom.

We'll be trailblazers on this expedition together, so please expect the unexpected and come prepared for anything ;)

Once we've made it to Slovakia, we'll be in touch again with news of the weather and the work ahead. We'll also buy a Slovakian SIM card and will let you have this as an emergency contact number.

I hope your preparations are going well and we look forward to seeing you in due course.

Best wishes

Dr. Matthias Hammer
Founder & Managing Director
Biosphere Expeditions

19 January

Packing, packing, packing - that's the story of the last couple of days. 15 snowshoes & poles, several pairs of skis (mountaineering & cross-country), ropes, descenders, binoculars, computers, books, projectors, you name it.

AND we found the Slovakian SIM card, so you can reach us on +421-191-0574628 (remember this is for emergency purposes only, such as being late for assembly - in which case you'll be sampling the delights of Slovakian trains by yourself :)

Safe travels & we'll see slot 1 soon.

24 January

We've been getting things ready for trailblazing slot 1, talking with Robin about the science, checking out the study site, unpacking, etc. Our host family at the Pod Dobakom cottage are as friendly and helpful as ever and the food is good and very plentiful.

The only thing in short supply so far is snow. This year there's been a weird inversion with England having snow, as well as Bratislava, but with relatively little in the Tatras. When we left Bratislava a few days ago, we did so in heavy snowfall, but as we got closer to the Tatras the snowfall stopped and the hills turned greener and greener. At the moment the tops and northern slopes have enough snow for tracking, but the valleys are largely green. But there is snow forecast and we'll keep you updated. It's certainly cold (yesterday morning it was -14 C) and we went up one of the northern slopes in beautiful sunshine and with plenty of good, crisp snow crunching away under our boots. Once away from the village, you have the mountains to yourself and there were plenty of tracks around, including wolf tracks and a rock solidly frozen pile of wolf scat too ;)

27 January

We're almost ready for you. The temperature is minus 17 degrees, breakfast has been set for 06.30 each day and a scary datasheet is attached alongside the day-to-day plan and the kit list, just to get you all into the spirit of things. Anyone still thinking they are about to come on a little "holiday", better think again ;)

But seriously, we are all looking forward to welcoming you to the Tatra mountains. The only thing missing now is more snow. It was forecast for yesterday and today, but all we had was glorious winter days with blue skies, sharp frost and a crisp dust cover of snow crunching away under our feet. It's good enough for tracking in most places, except the green valleys, but those of you keen on a ski mountaineering outing with Matthias will have to live in hope for the next few days.

Malika is off to Bratislava tomorrow afternoon. She'll be staying at the Chez David and will be in the lobby there at 18.30 from there she will go to the "Slovak Pub" for 19.00 where some team members have already arranged to meet up for dinner. Anyone wanting to join Malika at the Chez David at 18.30 or the crowd later at the Slovak Pub is very welcome to do so.

Oh, and by the way, a little joke is hidden in the attachments (and no, it's not the 06.30 breakfast ;). First one to correctly identify it gets to lie in until 06.45 ;)

See you soon

1 February

Pod Dobakom has become a lively place since the team arrived on Saturday. Everyone went through 1 ½ days of theory and practical training and is now well aware of risks in mountainous terrain in winter, has gained practical experience of map reading, navigation with compass and handling the GPS, etc., etc.. Heavy snowfall during our first field walk from base yesterday also felt like a heavy usage test of clothing and hiking boots ;).

Today 5 groups went out for survey walks along set routes. We recorded the routes in GPSs and will do so everytime we go out in the next couple of weeks. As part of the Data entry in the evening the track logs will be downloaded into a GIS program in order to create a map of the study area.

Best conditions for finding tracks today: The snowfall stopped during the night and therefore enabled us to clearly identify many fresh tracks - mainly Roe and Red Deer but also a fresh lynx track as well as wolf tracks.
Some team members even came back with samples of hair & scat. It is obvious that the study species are around – depending on the weather conditions one group will try and track the lynx trail tomorrow.

3 February

All teams had an adventurous day yesterday. Apart from Tomas and Jeanette who were tracking a lynx trail, everyone came back late. Hip high snow, missed markings of the route and lost mobile phones were some of the reasons – only funny that it happened all on the same day.

We have shortened the transects due to the fact that it is still snowing and walking in deep but very light snow slows us down and is very tiring. Again we found wolf tracks and will continue to follow their direction – if we are lucky we may find scat samples for DNA analysis.

4 February

Fantastic sunny weather today on the last survey day and great fun for all of us crossing untouched snow fields with snow shoes and walking through the amazingly beautiful winter forest. But also a great succes for the research:
More wolf trails were found and very fresh scat and urine (yes, we also collect the frozen stuff! ;)).

We had an early dinner and afterwards spent some time around a campfire outside kindly lit by Robert. Everyone had a hot after dinner drink as we had to say goodbye to the first slot.

Again, many thanks for your input and hard work, your enthusiasm & great team spirit. I hope you enjoyed the week as much as I did and I hope to see some of you again, some time.

5 February

The first team has travelled back to Bratislava by train today except for Michael, who is staying for one more week and decided to spent his "day off" at Pod Dobakom. Writing this, I'm at the Chez David in Bratislava, preparing to meet team 2 tomorrow morning at the main station. Some of of the slot 1 team members are still in town so we will meet again later for the very last dinner..

Everyone from slot 2 is very welcome to join us and can meet me either at 7p.m. at the Hotel lobby or at the Slovak Pub (Address: 62 Obchodna Ul.,
Directions: northeast of the old town center, about 1/2 way between Postova and Marianska, Website: http://www.slovakpub.sk/).

See you soon

8 February

Everyone from team 2 arrived safely & on time on Saturday and 8 of us had a comfortable train ride from Bratislava to Liptovski Mikulas. The IC from Zilina to Kosice is probably one of the newest trains in the whole of Slovakia! We had heavy snowfall during training days on Saturday and Sunday, so we had the best conditions for our first surveying day today.

Yesterday evening we saw the trailer about our expedition in the daily news, filmed and produced by Ratislav & Marian who joined us for 1 ½ days last week. It was very timely as Robin had a very successful meeting with National Park authorities today and some of the rangers already knew about the project…

Today we are all excited about the findings of Michael and Wilfried. They spotted blood on their transect route and followed the track expecting to find a fresh kill or a carcass. What they found was even more blood in the snow - on branches and reddish frozen water when they crossed a small river. Footprints from two wolves could be identified as well as the print of a wolf lying in the snow, probably cooling his bleeding nose. They took dozens of photos which are now on our expedition computer for everyone to see. As I write this Robin is still trying to make a story out of the details. We have already added an entry to the whiteboard: RESULTS / OTHER / BLOOD ;)).

10 February

6 teams were out both yesterday and today and Robert's extra fridge (for dog food) is filling up quickly with loads of samples that we have collected. A tip from a National Park ranger who called yesterday morning, led one of the teams to tracks of 3 lynx, presumably a mother and two young ones. The tracks could be followed for almost 2 kms and urine, scat and hair samples were collected.

Today all teams went to the area around Cierni Vah, a water resort in the foothills of the Low Tatra mountains. Sian and Michael found a carcass of a half eaten male Red deer but unfortunately didn't know where they were. They had taken the wrong map with them, but managed to make their way back to the pick-up point, once we had radioed the GPS position; FIND/WAYPOINT/GO TO - you will all learn how to use the GPS ;). Ash & Wilfried also got lost but finally reached a marked hiking trail. Thanks to our Land Rovers we were able to drive up the narrow and deeply snow covered path to pick them up. Although late, we decided to set up 2 camera traps at the carcass site, so it was only just before dinner when most of the team arrived back at base.

There was plenty of laughter during the daily review, when each team told their story. Hartmut, who set out together with Arne in his own car to collect samples he had lost the day before, proudly announced that the samples were found but announced that he again "lost" something - 100 Euros. He had been stopped by the police for speeding and unfortunately had no driving licence or ID card with him! Michael is "the guy who can smell blood" from now on and Wolfgang and Gabi, who had been reminded about working within a timeframe, eventually overcame their temptation to follow tracks until it gets dark!

12 February

The 2nd slot has come to an end and this morning we had to say goodbye. Gabi, Wolfgang, Hartmut & Mirjam left in their own cars and the rest of the team is now on the train to Bratislava.

Once again, all teams came back yesterday - our last day of surveying - with lots of findings & samples and the results checklist on our whiteboard is growing ever longer. We added "wolf sighting" in the 'others' section, thanks to Arne, who saw an animal crossing the transect some distance away. He wasn't sure exactly what it was that he saw, but when we finally reached that point, we found a very fresh wolf track. Without a doubt a wolf must have crossed our survey route!

This slot's survey results, presented by Robin as we stood around the campfire last night for our final evening celebration, are impressive. Based on the experience we gained during the first week, we were able to collect more than twice as many samples as slot 1. We have set 16 new survey routes and have now partly covered all 4 sections of the survey area at least once. Thanks again to all of you for your hard work, flexibility and good spirit!

I am now looking forward to meeting slot 3 tomorrow. Safe travels to everyone & see you soon.

15 February

My colleague Aino met team 3 on Saturday morning at Bratislava station and the whole team arrived safely in Liptovski Mikulas. Training days as usual - and the first field walk with the whole group on Sunday was great fun. There was some snowfall in the past few days however the temperature has risen to -3 degrees in the mornings - much too warm as the snow becomes wet these days ;).

2 SWS members (Slovakian Wildlife Society) have joined the team: Michal, from Slovakia has been with us since Saturday and was forced to do the GPS training even though he doesn't like electronics at all ;) as well as tracking expert Peter, from Nothern Hungary, who joined us on Sunday.

Today we went out in 5 groups for surveying transect routes, all in the Western Tatras - an area we haven't covered yet. The review after dinner revealed, that Ilka and Ulf might have had the most exhausting day of all of us. Led by local guy Michal, they found themselves tracking lynx and wolf tracks cross country the whole day - up and down and uphill again, until they lost their orientation. Well done, Ilka and Ulf for guiding the group back to the car in time. Peter and Steffan found BLOOD today, so this is not only Michael's domain anymore.

Writing this at 9.30pm the plan for tomorrow is written up on the whiteboard for everyone to sign in. I can still hear laughter from downstairs but am sure that it will be quiet shortly ;).

17 February

Except for one urine sample and a couple of wolf and lynx tracks we didn't find much during the last two surveying days. This doesn't sound rewarding but is as valuable as any other result from a scientific point of view.
But it is great that with 5 teams logging new routes each day, the GIS map is now showing survey routes throughout the study area.

It has been much warmer in the last few days: only -3 to -6 degrees in the mornings. Still, the GPS batteries seem to suffer a lot. Gently treated by being kept in a warm & cosy place, hopefully they will keep the GPSs going for two more days.

Yesterday evening, after dinner and the daily review, Steffan presented a slideshow of the Namibia 2007 expedition he and Kerry took part in. Well equipped with laptop and loudspeakers we saw lots of beautiful pictures - thanks Steffan for the professional performance. Peter then showed some of his own camera trap videos of lynx.

Today two teams headed out to Cierny Vah again and will also check the camera traps, while another team with Peter will do a mix of transect and tracking in the High Tatras area. Allison, Kerry, Aino & Steffan went to Maluzinska to survey two valleys we haven't been to yet, while I went back to base, catching up with admin work. More about the results later and hopefully some photos from the camera traps.

18 February

The last surveying day was full of action and anticipation as Robin sent the teams to track wolf and lynx cross-country based on the findings of the previous day. The small teams spent a good few hours tracking up and down the mountain ridges, and this time they didn't have to come back to base empty handed. Scat turned out to be the theme of the day as one of the teams presented a sample of a lynx scat and the other one had been lucky enough to collect an impressive amount of wolf scat. This finding inspired Ash, Ilka, Ulf, Jane and James to make it into an educational occasion for the whole group by announcing a competition. Proudly presenting the sample during the review after dinner everyone had to guess the weight (Tesco had kindly provided scales for this experiment ;)). The sample's weight was 300 g and the winner with the closest guess was Ulf who was presented with a chocolate log!

Another highlight was the collection of the camera traps that were set next to the carcass by slot 2. However, unfortunately the pictures were of two foxes and the key species remained out of sight.

In the evening Robert proved to be the perfect host again and provided the tired but happy team members with a hot drink and a good laugh round the camp fire.

The earlier guessing game got the team's competitive spirit going, and the group also initiated a few other slightly less educational games. Slot 3 would like to thank Sian for the kind liquid donation, which was happily downed during one of the games.

19 February

The last day of Slovakia 2010 Project, and I'm saying farewells to both the last team and the Tatra mountains. The last meeting with Robin confirmed my perception, and we both agreed that this project resulted in a lot more data than any of us expected. This is thanks to all our committed, passionate and hard-working team members who carried out the work. A quick summary shows that in the last 3 weeks we found more than 20 lynx tracks and 50 wolf tracks, and followed 23 of them cross-country. We also collected over 60 samples for Robin to analyse and report back to us.

Aino and I would have loved to celebrate the success of this project with slot 3 in Bratislava on Friday night but unfortunately did not make it to the city until late. But I'm sure you had a few for us too ;)

21 February

Today I arrived back home in Germany after a looong drive with the fully packed Defender. Writing this the equipment, snow shoes and poles are back in the storage waiting for the next winter project.

Before saying over and out for the last time, I would like to say thanks to you all. I had a great time, and I hope you had too. I will upload my photos to box.net soon and would be grateful if you share some of yours on our pictureshare site (please see www.biosphere-expeditions.org/pictureshare for details).

Best wishes to you all and thank you again for all your hard work and enthusiasm

Malika Fettak
Expedition leader