

ADOPTED  
by the Minister of Environment  
Precept No. 277  
11. November 2003

**Action Plan  
for the Conservation of Brown Bear (*Ursus arctos*)  
in Latvia**

By Jānis Ozoliņš

**State Forest Research Institute “Silava”**

**2003**

**Salaspils**

## SUMMARY

- **Conservation policy**

Species Action Plan is elaborated according to Clause 17 of the Species and Habitat Protection Law (issued on 05.04.2000.). It is designed for the long-term conservation of bears in Latvia. The aim of conservation is to facilitate natural processes occurring in the brown bear population on the European scale.

- **Population status**

Bear's distribution range in Latvia can be regarded as stable for the last 20 years. The important bear areas, where bears are most often observed, are situated in the east of the country: in the districts of Aizkraukle, Alūksne, Balvi, Gulbene, Jēkabpils, Limbaži, Ludza, Madona, Ogre, Rīga, Valka and Valmiera. The number of bears in Latvia fluctuates around 10 (at present, no more than 6 individuals). This number is too small to allow population to be self-sustainable. Immigration of bears from the neighbouring countries is critical for the population's existence.

- **Legislation**

According to the Species and Habitat Protection Law (05.04.2000.) and to Annex I of the Regulations No. 396 of the Cabinet of Ministers "Regulation on the species list of especially protected species and of species of limited use" (14.11.2000.), brown bear is a specially protected species. The fine for killing or injuring a brown bear is 20 minimum salaries for each individual. If the damage was inflicted within a nature protected area, the fine is threefold.

- **Conservation priorities**

To assess co-existence of brown bears and humans based on the international and Latvian experience and to find out obstacles to the establishment of the local bear population in Latvia.

- **Measures**

To establish an inter-institutional work group of experts for co-ordinating bear conservation measures.

To inform politicians, legislative bodies, scientists and other crucial stakeholders about the most important brown bear's habitat requirements. To timely disperse objective information on bears and bear-related events in mass media, preventing rumours and exaggerations. To translate into Latvian and publish the best foreign literature on bears.

To follow trends in public opinion in relation to the brown bear population status and the frequency of interest conflicts.

To improve monitoring systems in order to obtain data on measures necessary for conservation work in future.

To elaborate a system for a centralised registration of the bear-inflicted damage as well as to set a compensation system in the legislation.

To reduce direct disturbance during the time when bears are looking for winter dens as well as during hibernation (1 October – 31 March). This measure should be done based on evidence of bear presence in a given area, achieving an agreement with the appropriate hunting units.

To increase control over hunting trophies and over legitimacy of trophy import from the countries where bear hunting is allowed.

Habitat conservation measures are not necessary yet. The next update of the plan is to be done in 5 years.

## **Introduction**

Despite its rarity in today's Latvia, brown bear *Ursus arctos* can be regarded as a typical mammal of the East Baltics. Bear is the biggest carnivore in Europe with a relatively long life span and seasonally divided life cycle. Therefore, it has got many specific requirements for the habitat including the factors related to both natural processes and human activity. Mainly due to a low number of bears in Latvia these factors are still not clear enough. Therefore, the main priority of the bear action plan is not the habitat protection and improvement by various measures (including establishment of the new protected areas which is usually the most essential point in conservation of rare species) but a thorough monitoring of population development as well as public information and education. The most important thing at the moment is a thorough assessment of all the aspects of human and bear co-existence based on both local and international experience. Simultaneously, it should be realised that in case of a successful bear conservation and an improvement of the overall protection regime within the existing nature protected areas network in Latvia, it is likely that bear contacts with humans will increase. The way of that contact will then become the critical factor for the future of brown bear in Latvia.

### **1. Species characteristics**

#### **1.1. Taxonomy and morphology**

Brown bear is a mammal belonging to the order of carnivores (Carnivora), bear family (Ursidae). There are 9 bear species in the world (Kruuk 2002), of those brown bear along with the polar bear are the biggest ones (Гептнер и.д.1967). Body length of an adult brown bear male can reach 200cm, its weight – 300 kg. Some individuals can reach 480 kg (Новиков 1956). Females on average are smaller: about 70% of the male's length (Гептнер и.д.1967) and weighing 200 kg (Kojola, Laitala 2001). Sex dimorphism can also be seen in the growth rate – males grow faster but after 10 years the difference between sexes in weight growth rate stops. Skull measurements in Sweden show that males continue growing in length up to age of 5-8 years, females – up to 3-4 years (Iregren et al. 2001). According to body sizes and especially skull measurements in relation to the age of a given individual it is possible to judge the geographic and population origin of an individual (Iregren, Ahlström 1999).

The body is massive, with a big head, long muzzle and short, thick neck (Fig.1). In poorly light conditions, it is possible to mix bear for a wild boar (especially in certain positions) and that can cause unintentional killing of a bear.

The fur is long and thick. Pelt colour varies from greyish- or yellowish- brown to dark brown or almost black (Tauriņš 1982). From Belarus, young animals with a white collar zone or white spots on the chest and shoulders are described (Vaisfeld, Chestin 1993).

The main indirect signs of bear presence (Clevenger 1994) are footprints (Fig.2), scats and scratches by claws on trees. Russian scientists regard the width of the front paw's print a sure individual sign that strongly correlates with the body weight and exceeds 13.5 cm in adult specimens (Vaisfeld, Chestin 1993).



Fig.1. The silhouette of an adult bear (after “Zvēru pēdas dabā”, Gandrs 2001).



Fig.2. Footprints of a brown bear on a forest track in the Valka head forestry district.

## 1.2. Species ecology and habitat

Brown bears are omnivores and feed mainly by picking food from the ground, digging it from the soil, tearing the bark as well as grazing on plants. However, in certain parts of its distribution range and in certain seasons, hunting (stalking) is also important as well as fishing in their concentration places (Новиков 1956, Гептнер и.д.1967, Сабанеев 1988, Vaisfeld, Chestin 1993, Hilderbrand et al. 1999). Plant food is a high proportion of its diet: in the Pskov district, bears often feed in oat and pea fields (Vaisfeld, Chestin 1993). In the beginning of the summer, bears browse on the young tree shoots and leaves, especially aspens. In mid summer and its second half, forest berries become a staple food. In the autumn, acorns are consumed. However, seasonally, especially in the north part of the distribution range (Новиков

1956), meat plays an important role in bear diet. Bears can prey on big animals. In the north of Scandinavia, in spring and summer, the staple food for bears are adult moose and reindeer, in the second part of summer they switch to forest fruit, although still consume a lot of wild ungulates – up to 30% of energy comes from meat (Persson et al. 2001). Wild boar is preyed upon rarely. Bears also attack livestock, especially horses and cattle. It is concluded that in the NW of Russia, bear attacks on livestock almost ceased when in the second half of the 20<sup>th</sup> century moose density increased as well as small farms were destroyed by collectivisation. In spring, carrion is an important resource, especially carcasses of moose that were injured by hunters or drowned (Vaisfeld, Chestin 1993). Ants and their larvae play an important role in bear diet. In order to get to them, bears actively dig out anthills. It was found out in Sweden that ant remains form up to 16% of scat volume. Ants are especially essential to bears in springtime when other food is scarce and ants, due to low temperatures, are not active and concentrate in the upper part of the anthill (Swenson et al. 1999). Also in Belarus, bears actively dig out anthills after snowmelt (Vaisfeld, Chestin 1993).

In Eurasia, brown bears normally pose no threat to humans. Even mother bears, when defending their cubs, usually frighten a human away with a series of snarls and short chase instead of attacking directly (Новиков 1956). Some cases are known from Russia when bears showed aggressiveness even towards tractors, although such situations usually have its explanation (Корытин 1986). An injured bear can be very dangerous. Attacking humans is much more common for the North American subspecies of the brown bear – grizzly bear (Floyd 1999, Kruuk 2002).

Daily activity is not particularly cyclic (Гептнер и.д. 1967).

Brown bear does not truly hibernate. Its body temperature decreases by 3-5 °C only, bear also keeps an ability to synthesise amino acids necessary for the organisms (Hissa 1997). Observations from Russia show that in the first phase of hibernation the bear can quickly leave the den if disturbed or if it smells food, e.g., a moose approaching (Сабанеев 1988). For hibernation, bears choose undisturbed places 70% of the found bear dens were situated in spruce growths (Vaisfeld, Chestin 1993). According to the Swedish data, female bears on average spend 181 days in a den. Females that gave birth to cubs during winter “sleep” about one month longer than single females. Hibernation period starts in the end of October, although even before that females attend the den site more often compared to the rest of their home range. Starting from the 6<sup>th</sup> week before hibernation female bears decrease their activity and stay around the den site. If disturbed in the beginning of hibernation, females do not come back to the den but choose a new den up to 6 km away from the previous one (Friebe et al. 2001).

Brown bear is polygamous. Males live separately and do not take part in raising cubs. The rut is in the beginning of summer – June – until the first half of July. Bears sexually mature at the age of 5-8 years. Females mate only every second year as cubs stay with the mother up to 2 years (Гептнер и.д. 1967, Tauriņš 1982, Lõhmus 2002). Cubs are born during hibernation in the second half of winter. When they are born their weight does not exceed 500g (Новиков 1956). In the Novgorod and Pskov districts, the average litter size is 2.23 (Vaisfeld, Chestin 1993). In Estonia, the average litter size is 1.8 (Lõhmus 2002). Potential fecundity of bears can be much higher – up to 6 cubs but it is rare (Vaisfeld, Chestin 1993). Mother bear does not

usually defend cubs in a den and abandon them when escaping but in spring and summer, after leaving the den, it actively defends cubs, also from humans (Vaisfeld, Chestin 1993). Sex ratio at birth is 1:1, however, there is a slight male prevalence in the population (Vaisfeld, Chestin 1993). When dispersing from the central part of the population, the demographic structure of the population changes: the proportion of males increases, especially that of sub-adult males 2 –4 years old (Swenson et al. 1998). Also, females have smaller litters (Kojola, Laitala 2000). When studying dispersal differences between male and female grizzly bears, it was concluded that this kind of information is very important. That helps planning nature protected areas in order to facilitate restoration of the distribution range, decrease inbreeding and animal mortality outside the boundaries of protected areas (McLellan, Hovey 2001).

Bears do not have natural enemies in Europe and their life span may exceed 30 years (Гептнер и.д. 1967). Cubs have a high mortality in their first year. It is known that cubs can be killed by adult bears. It is believed that it is mainly done by adult male immigrants (Swenson, Sandegren et al. 2001). According to the Scandinavian studies, young bears can be killed until they reach the age of 3 years. The reasons of this phenomenon are unclear (Swenson, Dahle et al. 2001). In Belarus, it is believed that wolves should be blamed for the mortality of cubs and of young bears (Vaisfeld, Chestin 1993).

Under favourable conditions, bear number can increase relatively quickly. It was found in Scandinavia that in 1985-1995, the annual population increase was 10-15% (Zedrosser et al. 2001). Besides, it is typical for bears to disperse outside the main distribution range before carrying capacity is reached in its central part (Swenson et al. 1998).

Due to a long life span and successful survival of adult individuals, even very small micro-populations can survive for a certain period. In the West Pyrenees, on the border between France and Spain, only 6 bears live in an area of 1000 km<sup>2</sup>, and in the South Alps in Italy 4 bears live in an area of 240 km<sup>2</sup>. Such isolated population cannot exist in the long term without artificial measures like introduction of new animals (Zedrosser et al. 2001). Modelling the development of grizzly bear population, it was concluded that the minimum population size should be 200-250 and their area – 8556 – 17 843 km<sup>2</sup>, depending on the possible density in a given area (Wielgus 2002).

In Latvia, boreal forests are the most appropriate bear habitat, especially where spruce dominates. It requires diverse forest structure, thick undergrowth, numerous rivers and lakes, raised bogs with lots of inaccessible places like windbreaks (Новиков 1956, Tauriņš 1982, Vaisfeld, Chestin 1993).

### **1.3. Distribution**

The brown bear appeared in the territory of the present Latvia in the early holocene, i.e., around 8000 BP (Tauriņš 1982; Mugurēvičs Ē., Mugurēvičs A. 1999). Excavations show that during the bronze era (1500 BP) bear remains constituted 5,3% of all hunting remains in the settlements in Latvia (Mugurēvičs Ē., Mugurēvičs A. 1999). Many bears were hunted in Latvia up to the second half of the 19<sup>th</sup> century. At the border between the 19<sup>th</sup> and the 20<sup>th</sup> centuries, a few bears remained only in the

east of Latvia around Lubāns and Gulbene (Grevé 1909). The area of Latgale was not mentioned in that report on bear distribution but it is believed that the remaining individuals in the eastern part of Vidzeme were not isolated from the Russian population. Therefore, W.L. Lange (1970) in his distribution map mentions the link between the areas of Lubāns and Gulbene even up to 1900. The last local bears in that area were killed in 1921 – 1926. Those bears that periodically came to Latvia (where the borders of Latvia, Estonia and Russia meet) were quickly shot. Due to this reason, the former Forest Department deliberately did not report the known bear observations (Lange 1970), and



Fig.3. The present distribution of the brown bear in Europe (after Swenson et al. 2000).

in the official Latvian game statistics before WWII, bears were not mentioned (Kalniņš 1943). Bears began coming from Russia more often starting from 1946 (Lange 1970), but only in the 1970s, thanks to the information obtained by J. Lipsbergs, it was confirmed that bears were regular (Tauriņš 1982). In the second half of the 20<sup>th</sup> century, bear population started recovering throughout Europe, the number increasing almost twofold (Mitchell-Jones et al. 1999). In the Central Europe, bear return happened mainly in the mountainous areas (Kaczensky, Knauer 2001), resulting in a few isolated populations (Fig.3).

In Estonia, already in the 1950s, bear number in the official statistics exceeded 100. The maximum (more than 800 bears) was registered in the end of the 1980s and nowadays there are about 600 bears in Estonia. It should be noted that in the second part of the 1980s, around 60 bears were harvested annually for a few years in a row. Data on the bear density in the Pskov region in Russia confirm that bears are relatively scarce in that area, while around Lake Peipsi and the Estonian border zone bear density is 2-3 times higher (Vaisfeld, Chestin 1993). In Belarus, bears are most common in the north, especially in the area of the territory of the Berezin nature reserve. In Lithuania, bears are occasional immigrants and they are not regarded as a part of the local fauna (Prūsaite et al. 1988).

From March to September 1999, a survey on bear occurrence was done in all Latvian head forestry units (except the head forestry of Bauska) as well as in nature reserves. In total, 220 questionnaires were distributed, and 104 (47.3%) questionnaires were returned. In order to verify the most recent data, in the summer of 1999, 9 expeditions were organised to those forestry units where bears were included into the official census or fresh signs were seen in the last 6 months: Birži, Dviete, Katleši, Naukšēni, Nereta, Pededze, Ramata, Viesīte and Zilupe. During those expeditions, forestry workers and local inhabitants were additionally interviewed about bear observations and damage as well as it was looked for fresh bear tracks on forest roads. The majority of questionnaires mentioned observations that were more than 3 years old. In all 66 questionnaires that mentioned more or less recent information on the bear presence respondents also mentioned the signs that proved bear occurrence. In 57 cases, bear activity signs were reported, in 37 cases, bears were observed directly. Only in 3 cases bear cubs were observed, in other 3 cases also dens were found. The given 66 questionnaires also reported on 5 bears that got killed in Latvia. One more case (after 1999) is known from the Alūksne district, and one bear was deliberately shot in the Valmiera district in order to prevent danger to humans. Relatively few information was acquired on bear-inflicted damage – only 8 cases. In 7 cases, bears damaged apiaries, and one questionnaire mentioned considerable damage to an oat field. The last known case of damage happened in August –September 2003 in the Krāslava district, Svairiņi municipality when a bear damages 6 bee hives in 4 attacks.



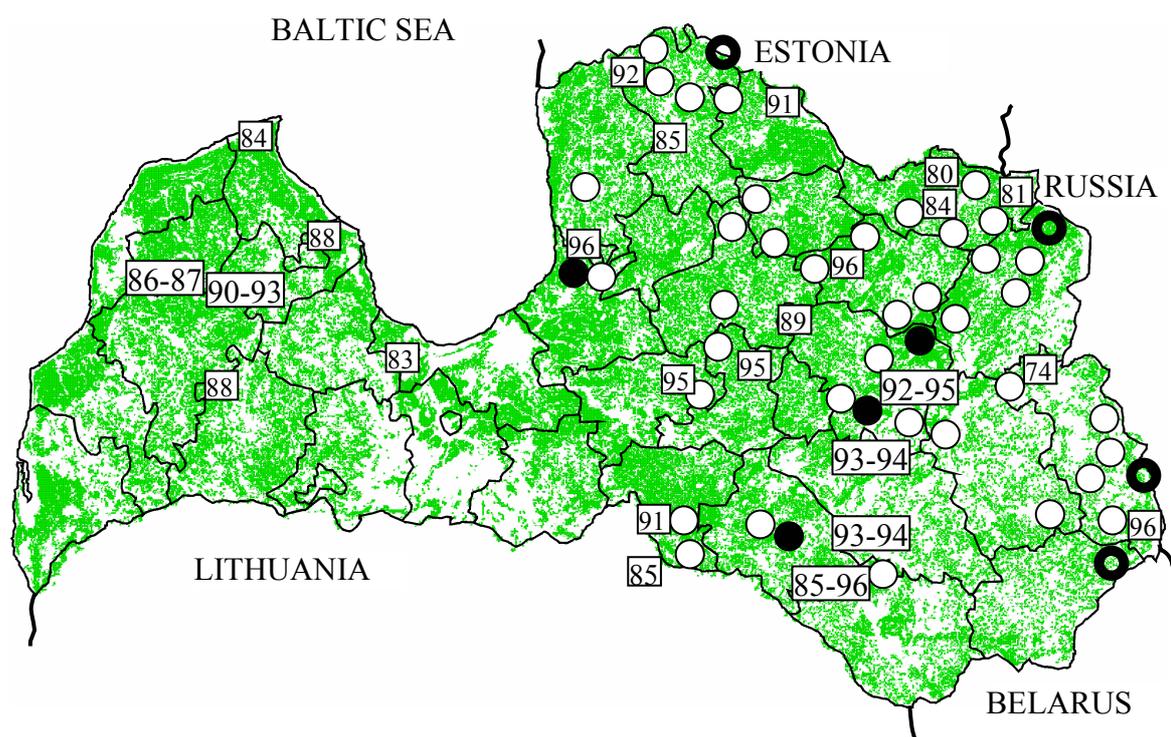


Fig.5. Bear distribution in Latvia based on the survey of 1999. The background shows forest distribution and borders of head forestry districts in 1990 – 1999.

- Bears that were present in Latvia in 1999
- ◉ Bears that are partly in Latvia, partly in the neighbouring countries
- Bear observations in 1997 or 1998
- ▣ Previous bear observations

When assessing bear distribution data, it should be taken into account that bears cover longer distances in spring after hibernation in order to find food as well as during mating season when looking for a partner. Such a high mobility caused by the low population density or lack of food can give a wrong impression of the increase in bear numbers and distribution (Vaisfeld, Chestin 1993). Nevertheless, bear distribution in Latvia in the last 20 years can be regarded as stable. The most important bear areas are the districts of Aizkraukle, Alūksne, Balvi, Gulbene, Jēkabpils, Limbaži, Ludza, Madona, Ogre, Rīga, Valka and Valmiera (Fig.5). Bear number in Latvia fluctuates around 10 (at present, no more than 6 individuals) (Fig.6).

#### 1.4. Species status

Since 1977 bears have been protected in Latvia. The status of the brown bear in Latvia is still the same as in the Latvian Red Data Book of 1980 (Andrušaitis 1985):

Category 2 – *rare species, which are not endangered but occur in such low numbers or in such a restricted area that potentially can go extinct quickly; a special state legislative protection is necessary.* In the new Red Data Book (Andrušaitis 2000), bear is included into category 3 (according to the IUCN system) with the same definition as in the former category 2.

Also in the Red Data Book of the Baltic region (Ingelög et al. 1993), the bear is included into category 3 for Latvia. On the global scale, the species is not endangered.

### **1.5. Present research and monitoring in Latvia and abroad**

Bear monitoring in Latvia started in the 1970s, when collecting data for the first issue of the Latvian Red Data Book (Andrušaitis 1985). The main role here was played by zoologist J. Lipsbergs (Pilāts, Ozoliņš 2003).

The best bear monitoring traditions and experiences are in countries that has kept their bear populations until nowadays or successfully restored them – Russia, North Europe, the Carpathians and the Balkans (Mitchell-Jones et al. 1999; Zedrosser et al. 2001). On 16 – 17 May 2002, an international workshop on monitoring systems of large carnivores was held in Helsinki. Carnivore experts from North Europe – Finland, Sweden, Norway and the Baltics – participated in the workshop. In Scandinavia, the following information is used for bear monitoring: attacks on livestock and semi-domestic reindeer, occasional observations, harvested or unintentionally killed individuals, genetic sample database, hunters' observations, capture – recapture method and radio-telemetry. In Finland, additional information comes from the so-called wildlife census triangles. This method is based on registering all found tracks on a triangular route with snow. Such triangles are found in all the territory of the country. It is possible to compare track indices (number of tracks per route km) for each species both between years and regions. Information on the Russian bear population and monitoring methods is summarised in the detailed monograph (Vaisfeld, Chestin 1993). For the future work in Latvia, it is important to know that in the Russian Carelia, the following parameters of the front paw's prints (cm) are used for determining population age structure: subadult cubs up to 1 year – 6 – 9 cm, 1-2 years old cubs – 9.5-11.5, older than 2 years –  $\geq 12$ . Also in Estonia, bear population structure is determined by the footprints of front paws. Information about winter dens is an important part of the bear monitoring in Estonia (Lõhmus 2002).

Scientific research and analysis of the existing facts has not been done in Latvia so far, except by the publication of one scientific paper on the present status of the population (Pilāts, Ozoliņš 2003). An international research project “Large carnivores in northern landscapes: an interdisciplinary approach to their regional conservation” in co-operation with Norway, Estonia, Lithuania and Poland has been started in 2003. The project is funded by The Research Council of Norway, and it is also supported by the involved institutions in each country, e.g., in Latvia – by the State Forest Service and by the State Forest Research Institute “Silava”. The project is planning to radio-collar bears in Estonia. It will also give an opportunity to analyse the rest of bear-related information such as distribution, species ecology and relevant human dimensions in all project partner countries. The study is planned for the period until 2005.

## 2. Reasons for changes in the species and its habitat

### 2.1. Influencing factors

In Latvia, there is a continuous, relatively undisturbed migration of bears in relation to disturbance factors and food supply. Immigrant bears after some time either leave Latvia or die. Mortality is most often caused by accidents: killed by electricity, killed in a hunt mistaken for a wild boar etc. It is believed that there are too few bears in Latvia (Fig.6) to ensure a self-sustainable population. Therefore, a crucial role in the population's existence is the immigration possibility from the neighbouring countries. Due to a small population size, it is impossible to judge correctly what factors significantly influence species survival in Latvia, however, it is possible to make theoretical assumptions.

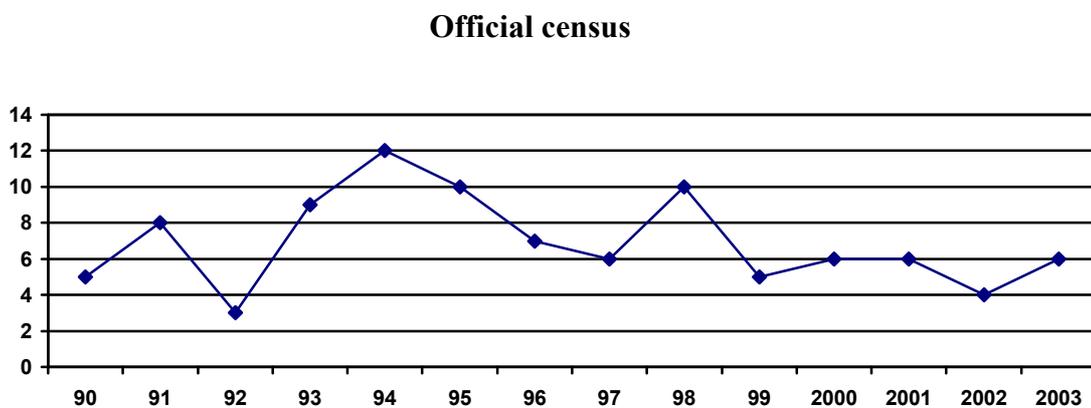


Fig.6. Bear dynamics in Latvia in the last 14 years (Official statistics of the State Forest Service).

The majority of direct observations of bears are related to hunting for other species. It is possible that hunting, especially drive hunts in late autumn and winter, is the main disturbance factor for bears in Latvia. Drive hunts disturb bear hibernation and breeding. An increased forestry activity as well as mushroom- and berry- picking are also important disturbance factors.

Experience from countries with stable bear populations point to factors that hinder a more rapid restoration of the former bear distribution range. In Sweden, it was found out that bear disturbance during hibernation and before that decrease breeding success of females. In the central part of Sweden, bear start hibernating in the end of September – middle of November. At that time, any human activities in the forest (hunting, driving, skiing, ice fishing, forestry etc.) are a disturbance but it is impossible to prevent them completely (Friebe et al. 2001).

Public attitude can be an essential obstacle to the increase in bear numbers. In the Slovenian Alps, where lives one of the biggest bear populations in that region, the main obstacle to the further increase in bear numbers is bear-inflicted damage to livestock and public fear of bear attacks. Due to that, only 5% hunters and 19 non-hunters support increasing bear (Kaczensky, Knauer 2001). This problem can only

party be solved by compensating the damage, because unfortunately, compensations usually are not used to introduce prevention measures. In 1995 – 1996, 1.15 mlj. USD was paid in total for the bear inflicted damage in Europe (Zedrosser et al. 2001). Additional problems might be caused by complexity in damage investigations (Mysterud and Mysterud 1994).

## **2.2. Habitat influencing factors**

Already K. Grevé (1909) wrote that the main reason for the rapid decline of bears in the 1860s in Livonia was introduction of the modern forestry, not so much direct persecution by humans. Along with the active forestry, the total forested area also decreased. Before WWII, only 25% of the Latvian territory was forested (Matīss 1987, Priedītis 1999). Large forest massifs can be regarded as bear habitats in Latvia, as locations of bear observations concentrate around the most forested parts of the country. Both in the 1970s and nowadays, bears have been seen mainly in the east of Latvia. Their distribution is at least partially related to distribution of continuous forest massifs (see Fig. 4 and 5). Low percentage of forested areas can explain the absence of bears from the central part of Latgale (E Latvia). Kurzeme (W Latvia) does not differ in the forest cover from Vidzeme (N Latvia) or Sēlija (left bank of the river Daugava in the south). But it is likely that it was one or, at maximum, two individuals that were observed in Kurzeme in the 1980s. Data by J. Lipsbergs mention 2 bears (bigger one and smaller one) in the Vandzene forestry district, and in 1984 – in the Babīte forestry district. In the beginning of the 1990s, these bears either left Kurzeme or died. Therefore, much more important than the forest cover is where a particular area is situated, in western or eastern part of the country, i.e., in relation to the distance from the core area to the N and E from the Latvian border. Besides, the proportion of the forests in Latvia has been gradually increasing in the last 50 years (Matīss 1987, Priedītis 1999). We have no evidence to think that bear habitats are endangered unless we have a detailed information on the impact of the qualitative forest condition on the bear distribution.

In several cases, bear presence was found at carcasses in the forest. Carcasses of wild animals are an important food resource for bears in winter (to disturbed individuals) and in early spring. In Latvia, there are many animal species (Priednieks et al. 1989, Ozoliņš, Pilāts 1995, official census data of the State Forest Service) that can at least theoretically be bears' trophic competitors: other carnivores and ravens that also quickly consume carcasses of animals that died during winter, wild boar that destroy anthills, consume carrion, acorns and other important bear food. An increase in the number of trophic competitors decreases environmental carrying capacity and can hinder the settling of incoming bears in Latvia.

## **3. The present conservation of the species and its habitat**

### **3.1. Legislation**

The brown bear is a specially protected animal according to the Species and Habitat Protection Law (05.04.2000) and to Annex I of the Regulations No. 396 of the Cabinet of Ministers "Regulation on the species list of specially protected species and of species of limited use" (14.11.2000.) Based on paragraph 3 of Clause 4 of the Species and Habitat Protection Law and on Annex I of the Regulations No. 117 of the

Cabinet of Ministers “Regulations on the compensation for exterminating or damaging specially protected species and habitats”, the fine for killing or injuring a brown bear is 20 minimum salaries for each individual. If the damage was inflicted within a nature protected area, the fine is threefold. Namely, from 1 January 2004, the fine for the illegal killing of a brown bear is from 1600 to 4800 LVL.

Conservation of brown bears is determined by the following international agreements:

Washington Convention – “Convention on the international trade of endangered wild fauna and flora species (CITES)”. Bear is included in Annex II – a potentially endangered species. This means that international trade of this species is limited and controlled.

Bern Convention – “Convention on the conservation of European wild species and natural habitats”. Bear is included in Annex II. That means that countries that ratified this convention (Latvia – on 01.05.97.) ensure species protection, banning its exploitation.

Directive of the European Council 92/43/EEC on conservation of natural habitats, wild fauna and flora. Bear is included in Annex II (its habitats should be included into specially protected areas) and Annex IV (exploitation ban). When Latvia becomes a member state in the EU, decisions of the European Parliament will be valid for Latvia, too (Swenson et al. 2001).

### **3.2. Habitat conservation measures**

In the 1970s, there was a nature reserve for bear conservation in the Smiltene forestry district (Valka district) (Tauriņš 1982, Andrušaitis 1985). Due to its small area and isolation, most likely it did not give a significant input into habitat conservation of the species. The present legislation does not foresee special habitat protection measures for the species. In the latest edition of the Red Data Book, there is a proposal to conserve old growth forests (Andrušaitis 2000), however, the fate of this proposal at the legislative level is not related to any specific bear conservation measures. There is also no reason to state that insufficient habitat protection has had any influence on bear survival or created any direct obstacles to their immigration or settling in Latvia.

In 2001 – 2002, inventory of specially protected nature areas was done within the so-called EMERALD project, the aim of which was to find out whether the existing network of protected areas is in accordance with the NATURA 2000 requirements of the EC Habitat Directive. During that inventory, bear presence (at least temporary) was found in 3 out of 236 areas. A few more areas reported bear observations in the past. Only one of them – Teiči Nature Reserve – is big enough to ensure species conservation.

### **3.3. Connection with other species and habitat conservation plans**

Theoretically, brown bear distribution in Latvia is promoted by any conservation measures towards forest and bog habitats that happen on a sufficiently

large scale in eastern Latvia. The most important projects are the following: Restoration of the hydrological regime of the Teiči bog (Bergmanis et al. 2002), LIFE project proposal for the North Gauja valley, elaboration of the management plan for the Gruzdova forests, PIN-Matra project “Integrated Wetland and Forest Management in the Trans-Border Area of North Livonia”, inventory of forest key habitats etc.

IUCN and International Bear Association (IBA) are the main international organisations that aim at bear conservation in the world (Zedrosser et al. 2001). Besides, there is the Large Carnivore Initiative for Europe (LCIE) in Europe. This initiative was started in 1995 in Italy. It is supported by WWF, other organisations that collaborate with it and individual experts from European countries. The aim of the initiative is to create a wide co-operation network for large carnivore conservation, including governments, international organisations, conventions’ councils, landowners and managers, scientists and general public. Specifically, LCIE works in order to achieve co-existence of brown bears, lynx, wolves, wolverines and humans in today and tomorrow’s Europe.

In April 2000, the Baltic Large Carnivore Initiative (BLCI) was founded with the support of the LCIE. Its aims was to create a strategy and co-ordinate large carnivore research and conservation taking into account Baltic conditions. In Latvia, BLCI contact persons are Žanete Andersone and Jānis Ozoliņš.

In co-operation with the EC, the above-mentioned organisations have elaborated “Brown bear action plan for Europe” (Swenson et al. 2001). This plan also includes measures relevant to Latvia, as a result of consultations with a zoologist Valdis Pilāts. These tasks were taken into account when elaborating the national species conservation plan.

### **3.4. The present conservation and the analysis of implementation risks**

In accordance with criteria under paragraphs e) - i) of Clause 1 of the EC Habitat Directive and Clause 7 of the Latvian Law of Species and Habitat Protection, the recent conservation status of the brown bear can not be considered as favourable. This statement, however, is not related to an insufficient legal protection or lack of suitable habitats. The species has been marginal in the country for almost two hundred years (Pilāts, Ozoliņš 2003). The conservation measures prescribed below rather are aimed at preparing for a case if bears will expand in their range and become to reside in Latvia. Tauriņš (1982) describes such a possibility already in 1970s-80s and more recent evidences mentioned above confirm it still.

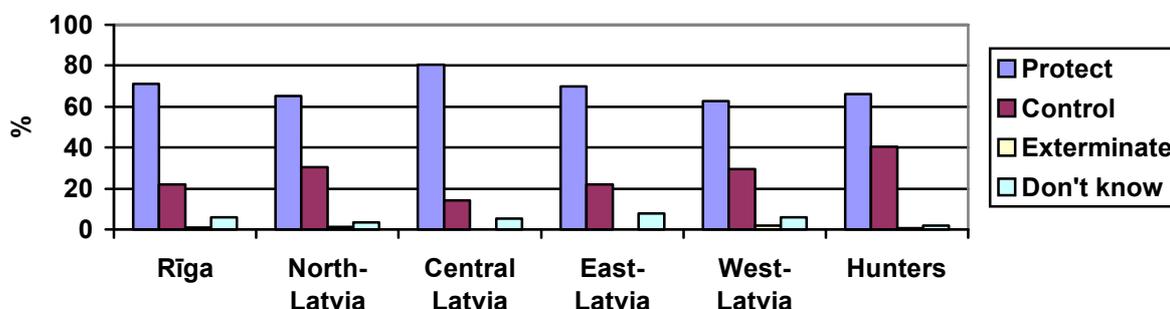
In 2001, with the financial support of WWF-Denmark, a study was carried out in Latvia - Investigation of the public opinion about three large carnivore species in Latvia – brown bear (*Ursus arctos*), wolf (*Canis lupus*) and lynx (*Lynx lynx*)” (Andersone, Ozoliņš 2001). It was co-ordinated by WWF-Latvia and comprised 558 various representatives of the Latvian public. The majority thought that bears should be protected, 25% supported bear control, 1% supported bear extermination and 5% did not have an opinion. The inhabitants of Riga and Zemgale (S Latvia) were most positive towards bears while in Vidzeme (N Latvia) and Kurzeme (W Latvia) had a high proportion of those who supported bear control. Also the majority of hunters

(66.2%) (readers of the hunters' magazine MMD) support bear protection. Young people are most supportive towards bear protection (79.6%).

Despite a theoretically high public support, the choice of bear conservation strategy and tasks is related to the following problems:

- Lack of hard evidence why bear population in Latvia is not developing.
- If bear number increases, economic loss and fear-caused conflicts will become an inevitable problem.
- Bear existence conditions can be improved only by radical measures that are connected with significant restrictions – and in some cases, a total ban – of economic exploitation of the area.
- At present, any conservation measure is of experimental character and there is no guarantee that it will result in a stable bear population in Latvia.

**Fig.7. What should be done with bears in Latvia?**



#### 4. The aim and tasks of the species conservation plan

The **aim** of the bear conservation plan at the moment is not to increase bear distribution in Latvia or to create a self-sustainable local population in the short term. Instead, the aim is to ensure and facilitate natural processes that are occurring in the distribution range on the scale of joint Baltic-Russian bear population. Latvia must not become an obstacle to bear dispersal or fluctuations of the borders of their distribution range that are related to bear dynamics at the European scale.

To achieve the above-mentioned goal, it is necessary to gradually implement the following **tasks**:

- To inform politicians, legislative bodies, scientists and other crucial stakeholders about the most important of brown bear's habitat requirements
- To timely disperse objective information on bears and bear-related events in mass media, preventing rumours and exaggerations
- To follow trends in public opinion in relation to the brown bear population status and the frequency of interest conflicts

- To improve monitoring systems in order to obtain data on bear population status and to acquire the knowledge necessary for conservation work in future
- To elaborate a system for a centralised registration of bear-inflicted damage as well as to set a compensation system in the legislation
- To formulate and justify measures that would theoretically improve conservation of brown bear and its habitats in Latvia
- To create a priority list for conservation measures when their practical implementation is necessary.

## **5. Conservation measures for the species and its habitat**

### **5.1. Legislation and nature conservation policy**

The present species status in the legislation is in accordance with the current situation with the species conservation in the country and to its international obligations. The main problem is the lack of compensation system for bear caused damage. At the moment, it is regulated by *“The order how significant losses to land users caused by specially protected non-game species and migrating species are calculated”* (Regulations No. 345 of the Cabinet of Ministers, accepted on 31 July 2001). These regulations practically do not work in relation to bears, if a bear attacks livestock or damages apiaries. Besides, bee hive owners often have an agreement with other land owners or land users to place their bee hives there, i.e., outside their own property. These regulations do not cover such cases, therefore, amendments are needed.

### **5.2. Species conservation measures**

Summarising the available research on species biology and ecology, we can conclude that bear conservation status in Latvia could be improved by the following measures:

5.2.1 To decrease direct disturbance in late autumn when bear start looking for dens as well as during their hibernation (1 October – 31 March). It can be achieved if drive hunts are not organised. Also, there should be a minimum distance between places where forest cutting is happening simultaneously. Loading of vehicles by timber and timber transportation from the forest should be prohibited during the dark period of the day. These measures would be useful in forestry districts along the border with Estonia, Russia and Belarus, starting with bear observations sites and later – in the whole border area. Introduction of this measure should be done on the basis of agreement with holders of hunting rights and with forest owners. Failing that, the appropriate amendments in the legislation should be made.

5.2.2. In areas of bear distribution, State Forest Service, when issuing wild boar licences for individual hunts, should warn hunters about possibilities to encounter a bear (in order to prevent accidental killing). It should also increase control in these hunting grounds.

5.2.3. Bear hunting is legal in the neighbouring countries – Russia and Estonia. Therefore, an increased control is recommended over the legitimacy of hunting trophies' import from these countries. Hunters should have a possibility to declare bear trophies they possess from the past indicating their origin and obtaining an appropriate permit.

### **5.3. Conservation measures for species habitat**

No proposals.

### **5.4. Species research and monitoring**

Based on the existing knowledge, a centralised database on brown bear distribution and contacts with humans should be elaborated. There should be a system in order to summarise all future observations in all the possible details. That will allow finding connections between individual facts and to analyse them, thus helping to understand why bears do not settle in Latvia.

Monitoring should pay a particular attention to hibernation, breeding evidences, damages and crossing the border of Latvia. Monitoring should register data that indicate sex and age of the bears observed.

It is recommended to use in monitoring the experience of the State Forest Service implementing order No. 158 (22.08.2003) "On verification and registration of carnivore caused damage".

### **5.5. Information and education**

Information on observations of bears and their activity signs should be quickly dispersed in local mass media (district and municipality newspapers, regional television etc.) in order to warn livestock and apiary owners and to invite them to use preventive measures to avoid damage.

In Latvia, there is a lack of literature oriented towards forming understanding about the necessity of large carnivore conservation. This gap can be filled with translated literature and digests from research in other countries.

Such places as Līgatne wildlife park, where brown bears are in captivity, can be used for informing the general public on the species status in Latvia. Along with the information on bear size, diet and breeding, such facilities could inform the public about the latest situation with bear distribution in the wild, conservation problems and even give an e-mail or website address where further information can be found.

Latvian hunters more and more often go abroad to hunt. It is necessary to make amendments to the hunters' examination programme and the appropriate information sources in order to include questions about permits that are necessary to bring bear trophies to Latvia from foreign countries.

## 5.6. Table of implementation of bear conservation measures

The urgency of bear conservation measures depends on our knowledge on the species status (how endangered bear in Latvia is) and on public willingness to accept the return of this controversial species to its former range.

### Priorities for the species conservation measures

Measure	Executor	Implementation time (months)	Costs (LVL)	Potential funds
Creating a co-ordination centre for bear experts	National representative of IUCN Bear specialist group	12	500 (costs to arrange workshop)	Nature Protection Fund
Supplements to the regulations on damage compensation	Ministry of Environment	3	-	-
Elaboration and implementation of the monitoring system (centralised data base)	Experts	3 + continuously	1000	?
Publicity in mass media	Experts	Continuously	-	-
Restoring co-operation with the State Border Guard Service in registering border-crossing bears	Experts	1+ continuously	-	-
Warning hunters about cases when bear presence in their hunting grounds is likely	State Forest Service	Continuously	-	-
Co-operation with forest owners and hunters in areas where bears occur regularly	Experts	If necessary	-	-

Translating and publishing in Latvian a book by H.Kruuk (2002)	?	24	10 000?	Environmental Protection Fund
Implementation of a sociological study in order to find out how ready the society is to accept forest exploitation restrictions for bear conservation	Experts	12	3000	?
Revision of the Action plan's aims and tasks in 5 years	Experts	6	1000	Nature Protection Board

## 6. Implementation of the species conservation plan

Following the example of other countries (Kaczensky, Knauer 2001), Latvia should create a co-ordination centre for large carnivore conservation. Bear conservation measures should be done together with wolf and lynx conservation measures. The centre could act as an inter-institutional network of experts. That would be a work group with a united statute but its members would work at various state and non-governmental institutions related to environmental protection, science and education. Their work would be on voluntary basis (at least initially) and their tasks would be co-ordinated with their direct tasks at work. The group could be initiated by a national representative of IUCN SSC Bear specialist group. The national group would use the infrastructure of the appropriate institutions, therefore separate funding would only be necessary to cover some unexpected expenses.

It would be reasonable to arrange a workshop as a consequence of adoption of species conservation plan. All relevant individual bodies and institutions should be involved including wolf and lynx experts, Department of Environmental Protection of the Ministry of Environment, administrations of particularly protected areas (reserves, national parks), Environmental Agency, Nature Protection Board, Latvian Society of Mammalogy as well as local rangers from State Forest Service and environmental inspectors from areas with bear occurrence. The main task of this workshop would be to identify local experts and achieve agreement on a system how to collect bear data on a regular basis.

Following tasks are proposed for experts:

- To examine occasional records on bear occurrence in nature, registering proves on number of individuals, sex and age.
- To visit the sites of monitoring on a regular basis.
- To be ready to expertise the damages and conflict situations.
- To ensure data input to a joint data format.
- To be prepared for carrying out public relations.

## Acknowledgment

English translation of the text is prepared by Žanete Andersone.

## References

- Andersone Ž., Ozoliņš J. 2001 (unpubl.). Investigation of the public opinion about three large carnivore species in Latvia – brown bear *Ursus arctos*, wolf *Canis lupus*, and lynx *Lynx lynx*. Riga: WWF Latvia. 34 pp.
- Andrušaitis G. (red.) 1985. Latvijas PSR Sarkanā grāmata: retās un iznīkstošās dzīvnieku un augu sugas. Rīga: Zinātne. 526 lpp.
- Andrušaitis G. (red.) 2000. Latvijas Sarkanā grāmata: retās un apdraudētās augu un dzīvnieku sugas, 6. sējums, putni un zīdītāji. Rīga: Terras Media. 274 lpp.
- Bergmanis U., Brehm K., Matthes J. 2002. Dabiskā hidroloģiskā režīma atjaunošana augstajos un pārejas purvos. Grām.: Opermanis O. (red.) Aktuāli savvaļas sugu un biotopu apsaimniekošanas piemēri Latvijā. Rīga: ULMA. 49.-56. lpp.
- Clevenger A.P. 1994. Sign surveys as an important tool in carnivore conservation, research and management programmes. – Environmental encounters 17: 44-55.
- Floyd T. 1999. Bear-inflicted human injury and fatality. – Wilderness and Environmental Medicine 10: 75-87.
- Friebe A., Swenson J.E., Sandegren F. 2001. Denning chronology of female brown bears in central Sweden. – Ursus 12: 37-46.
- Grevé K. 1909. Säugetiere Kur-, Liv-, Estlands. Riga: W. Mellin u. Co. 183 pp.
- Hilderbrand G., Schwartz C.C., Robbins C.T., Jacoby M.E., Hanley T.A., Arthur S.M., Servheen C. 1999. The importance of meat, particularly salmon, to body size, population productivity, and conservation of North American brown bears. – Can. J. Zool. 77: 132-138.
- Hissa R. 1997. Physiology of the European brown bear (*Ursus arctos arctos*). – Ann. Zool. Fennici 34: 267-287.
- Ingelög T., Andersson R., Tjernberg M. (Eds.) 1993. Red Data Book of the Baltic Region. Part 1. Södertälje: Fingraf ab. 95 pp.
- Iregren E., Ahlström T. 1999. Geographical variation in the contemporaneous populations of brown bear (*Ursus arctos*) in Fennoscandia and the problem of its immigration. In: N. Benecke (ed.) Archäologie in Eurasien, Band 6, Rahden/Westf.: Verlag Marie Leidorf GmbH., S. 237-246.
- Iregren E., Bergström M.-R., Isberg P.-E. 2001. The influence of age on metric values in the brown bear cranium (*Ursus arctos* L.). – Animals and Man in the Past, ARC-Publicatie 41, the Netherlands: 21-32.
- Kaczensky P., Knauer F. 2001. Wiederkehr des Braunbären in die Alpen – Erfahrung mit einem anspruchsvollen Großräuber. – Beiträge zur Jagd- und Wildforschung, Bd.26: 67-75.
- Kalniņš A. 1943. Medniecība. Rīga: Latvju Grāmata. 704 lpp.
- Kojola I., Laitala H.-M. 2000. Changes in the structure of an increasing brown bear population with distance from core areas: another example of presaturation female dispersal? – Ann. Zool. Fennici 37: 59-64.

- Kojola I., Laitala H.-M. 2001. Body size variation of brown bear in Finland. – *Ann. Zool. Fennici* 38: 173-178.
- Kruuk H. 2002. Hunter and hunted: relationships between carnivores and people. Cambridge: University Press. 246 pp.
- Lange W. L. 1970. Wild und Jagd in Lettland. Hannover-Döhren: Harro von Hirscheydt Vrlg. 280 S.
- Lõhmus A. 2002. Management of Large Carnivores in Estonia. – *Estonian Game No.* 8a. 71 pp.
- Matīss J. 1987. Latvijas mežainums. – *Latvijas meži*, Bušs M., Vanags J. Rīga: Avots, 83-95.
- McLellan B.N., Hovey F.W. 2001. Natal dispersal of grizzly bears. – *Can. J. Zool.* 79: 838-844.
- Mitchell-Jones A.J., Amori G., Bogdanowicz W., Kryštufek B., Reijnders P.J.H., Spitzenberger F., Stubbe M., Thissen J.B.M., Vohralik V., Zima J. 1999. *The Atlas of European Mammals*. London, San Diego: Academic Press. 484 pp.
- Mugurēvičš Ē., Mugurēvičš A. 1999. Meža dzīvnieki Latvijā. – *Latvijas mežu vēsture līdz 1940. gadam*. Rīga: WWF – Pasaules Dabas Fonds, 207-247.
- Mysterud I., Mysterud I. 1994. Viewpoint: The logic of using tracks and signs in predation incidents where bears are suspected. – *J. Range Manage.* 47: 112-113.
- Ozoliņš J., Pilāts V. 1995. Distribution and status of small and medium-sized carnivores in Latvia. – *Ann. Zool. Fennici* 32: 21-29.
- Oetjen R., Ader K. 2000 (unpubl.). Final report on internationally important species in Estonia. Tartu: Estonian Fund for Nature. 23 pp.
- Persson I.- L., Wikan S., Swenson J.E., Mysterud I. 2001. The diet of the brown bear *Ursus arctos* in the Pasvik Valley, northeastern Norway. – *Wildl. Biol.* 7: 27-37.
- Pilāts V., Ozoliņš J. 2003. Status of brown bear in Latvia. – *Acta Zoologica Lituanica* Vol. 13, No. 1: 65-71.
- Priedītis N. 1999. *Latvijas mežs: daba un daudzveidība*. Rīga: WWF. 209 lpp.
- Priednieks J., Strazds M., Strazds A., Petriņš A. 1989. *Latvijas ligzdojošo putnu atlants 1980-1984*. Rīga: Zinātne. 350 lpp.
- Promberger Ch. 2001. *The Integrated Management Approach in Wildlife Conservation Field Projects*. HACO International Publishing. 32 pp.
- Prūsaite J., Mažeikyte R., Pauža D., Paužiene N., Baleišis R., Juškaitis R., Mickus A., Grušas A., Skeiveris R., Bluzma P., Bielova O., Baranauskas K., Mačionis A., Balčiauskas L., Janulaitis Z. 1988. *Lietuvos fauna: žinduoliai*. Vilnius: Mokslas. 295 lpp.
- Swenson J.E., Dahle B., Sandegren F. 2001. Intraspecific predation in Scandinavian brown bear older than cubs-of-the-year. – *Ursus* 12: 81-92.
- Swenson J.E., Gerstl N., Dahle B., Zedrosser A. 2001. Action Plan for the Conservation of the Brown Bear in Europe (*Ursus arctos*). – *Nature and environment* 114. 69 pp.
- Swenson J.E., Jansson A., Riig R., Sandegren F. 1999. Bears and ants: myrmecophagy by brown bears in central Scandinavia. – *Can. J. Zool.* 77: 551-561.
- Swenson J.E., Sandegren F., Brunberg S., Segerström P. 2001. Factors associated with loss of brown bear cubs in Sweden. – *Ursus* 12: 69-80.

- Swenson J.E., Sandegren F., Söderberg A. 1998. Geographic expansion of an increasing brown bear population: evidence for presaturation dispersal. – *Journal of Animal Ecology* 67: 819-826.
- Tauriņš E. 1982. *Latvijas zīdītājdzīvnieki*. Rīga: Zinātne. 256 lpp.
- Vaisfeld M.A., Chestin I.E. (eds.) 1993. Bears: brown bear, polar bear, Asian black bear; distribution, ecology, use and protection. Moscow: Nauka. 519 pp.
- Wielgus R.B. 2002. Minimum viable population and reserve sizes for naturally regulated grizzly bears in British Columbia. – *Biological Conservation* 106: 381-388.
- Zedrosser A., Dahle B., Swenson J.E., Gerstl N. 2001. Status and management of the brown bear in Europe. – *Ursus* 12: 9-20.
- Гептнер В.Г., Наумов Н.П., Юргенсон П.Б., Слудский А.А., Чиркова А.Ф., Банников А.Г. 1967. Млекопитающие Советского Союза, т. 2: морские коровы и хищные. Москва: Высшая школа. 1004 с.
- Корытин С.А. 1986. Повадки диких зверей. Москва: Агропромиздат. 318 с.
- Новиков Г.А. 1956. Хищные млекопитающие фауны СССР. Москва, Ленинград: Изд. АН СССР. 293 с.
- Сабанеев Л.П. 1988. Медведь и медвежий промысел на Урале. - В кн.: Охотничьи звери. Москва: "Физкультура и спорт": с. 238-267.