**Bear monitoring in Latvia: report from field visit, June 2019**

From June 1st to 6th John Linnell and Alexander Kopatz from the Norwegian Institute for Nature Research visited Latvia to assess and provide advice on bear monitoring. We were accompanied in the field by Janis Ozolins, Edgars Bojars, Aivars Ornicans, Dainis Ruņģis, and Guna Bagrade from SILAVA. We visited 8 hair trap sites and a good proportion of Latvia's bear habitat in the north (along the Estonian border), the east (along the Russian border), and in the centre of the country. We also visited the site of a known bear den and a bear damage site (an attack on a beehive). Bear tracks and signs were found at most sites.

In our view the test with hair traps has been well conducted. The 8 traps we visited were well constructed and located in good areas. The lure (attractant) was produced and used according to current guidelines. The traps were being inspected with a high frequency (every two weeks), were being monitored with camera traps, and all field procedures appeared to be good. We only had some minor recommendations to lower the height of the wire by a few centimetres in some locations and to ensure consistent height from the ground. We also visited the genetics laboratory at SILAVA and discussed the procedures that will be used to extract and analyse DNA from the hairs and scats obtained.

On the basis of this visit we can conclude that the pilot program to test hair trapping has been done according to the current best-practice guidelines and that we expect the genetic analysis of biological samples to be successful and enhance the monitoring.

The next questions concern the utility of this method for monitoring bears in Latvia. The bear situation in Latvia is very challenging because it is on the dispersal front of a larger population. This means that it is very likely that the population consists of a large proportion of young males that can be very mobile and not very stable in their space use, and a very low proportion of reproductive age females. In other words, there are likely to be relatively few bears moving over large areas making them challenging to monitor. Hair traps can certainly make a contribution to this – for example protected areas (such as Natura 2000 sites for bears) could all maintain a few hair traps as a low intensity form of collecting hair samples from, and thus confirm the presence of bears. Furthermore, if there is a need to obtain a density estimate from a smaller area it would be possible to deploy a high-density grid of hair traps for a short period (e.g. two months). However, a

nation-wide monitoring of bears will need to be based around multiple techniques including a wider use of citizen scientists – (hunters, foresters, naturalists, bee-keepers) and a network of state employees (rangers and wardens of the various state environmental and forest authorities plus border guards) – that report observations of bears with varying degrees of documentation (photos of tracks, camera trap phots of bears). Only by combining the "many eyes" approach will it be possible to monitor this ongoing and dynamic process of bear colonisation. There are various web-based as well as mobile based applications available (which could be adapted to Latvian conditions) that could make this citizen science process much easier to administer.

In addition to keeping a constant track on all verifiable observations of bear presence there should be an effort to collect hairs from all sources – such as hair traps, from hairs, scats or saliva collected from damage sites (e.g. beehives), dens and abandoned orchards – for genetical analysis to try and identify female bears and monitor individual movements. In particular we suggest another pilot to assess a systematic searching of orchards in late summer as a potential source of hair samples.

Yours sincerely,

John Linnell and Alexander Kopatz