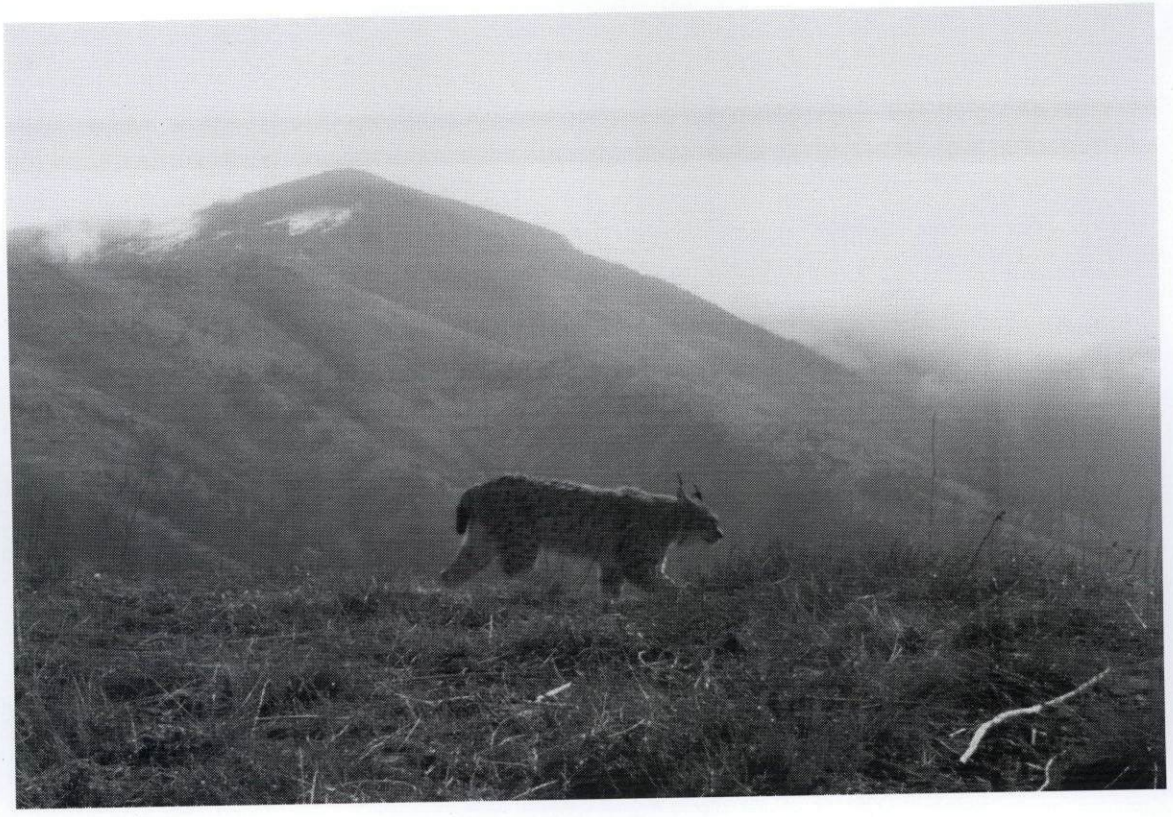
PPNEA

Protection and Preservation of Natural Environment in Albania

Munella Mountain

Summary of findings from the Balkan Lynx Recovery Programme



Aleksandër Trajçe, Bledi Hoxha & Kujtim Mersini

Protection and Preservation of Natural Environment in Albania (PPNEA)

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Background

Munella is a mountain in North Albania bordering the districts of Puka (N and NW) and Mirdita (S and SE). The highest point is the Peak of the Cross (Maja e Kryqit) reaching an altitude of 1991 m a.s.l. It is composed mainly by effusive volcanic rocks (up to 1300 - 1400 m) that are topped by a limestone plaque. Munella forms the highest point of a chain with a direction from NE to SW and when seen from a distance it resembles a tooth, rising up from the lower surrounding hilly areas. Munella is known to be very rich in mineral resources, particularly with copper, but also other minerals like chromium, quartz, aluminium, etc. (FESH 1985).

The highest limestone-part of the mountain has an alpine-like character with very steep slopes; however the top of the mountain is a plateau with many carstic holes and funnels. Munella is located between Big Fan and Little Fan rivers - both tributaries of Mati River - and they form the natural geographical border of the mountain massif. The broad vegetation belts are oak and pines (600 to 1100 m), beech (1100 - 1600 m) and above this altitude there are rocks with scarce conifers (mainly Bosnian pine *Pinus heldreichii*). The top plateau has very good alpine pastures. There is very little information on the biodiversity of Munella Mountain and to date there have not been comprehensive studies conducted in the area. According to old literature accounts, Munella, is home to important faunal elements, including brown bears (*Ursus arctos*), wild boars (*Sus scrofa*), capercaillie (*Tetrao urogallus*), martens, (*Martes sp.*), etc. (FESH 1985) and was considered as one of the few sites in Albania with remaining old-growth virgin forests (Vangjeli et. al. 1997; Tabaku 1999).

Here, the findings of the Balkan Lynx Recovery Programme (BLRP) in Munella Mountain and surrounding areas for the period 2007-2016 are reviewed and summarized in a chronological fashion. The review is focused mainly on the findings concerning the status and distribution of Balkan lynx (*Lynx lynx balcanicus*) in the area. To date Munella and its surroundings is the only habitat in Albania to have a reproducing population of Balkan lynx. Presence of Balkan lynx in Albania has been proved also for Shebenik-Jabllanica National Park and Thethi National Park, however these remain sporadic occurrences and without any further indication for reproduction. The discovery of two dead lynx cubs in Munella region (June 2015 and December 2015) proved for the first time evidence for Balkan lynx reproduction in Albania. The evidence indicates that Balkan lynx have, so far, only two reproducing nucleus, respectively in Munella Mt. in northern Albania and in Mavrovo National Park in western Macedonia. The whole population is estimated to be less than 40 mature individuals in the entire distribution range (Melovski et. al. 2014). According to the IUCN Red List criteria, the Balkan lynx is considered as Critically Endangered (CR). The information generated by the PPNEA lynx team in the region of Munella Mountain is therefore of crucial importance for the future survival of the population.

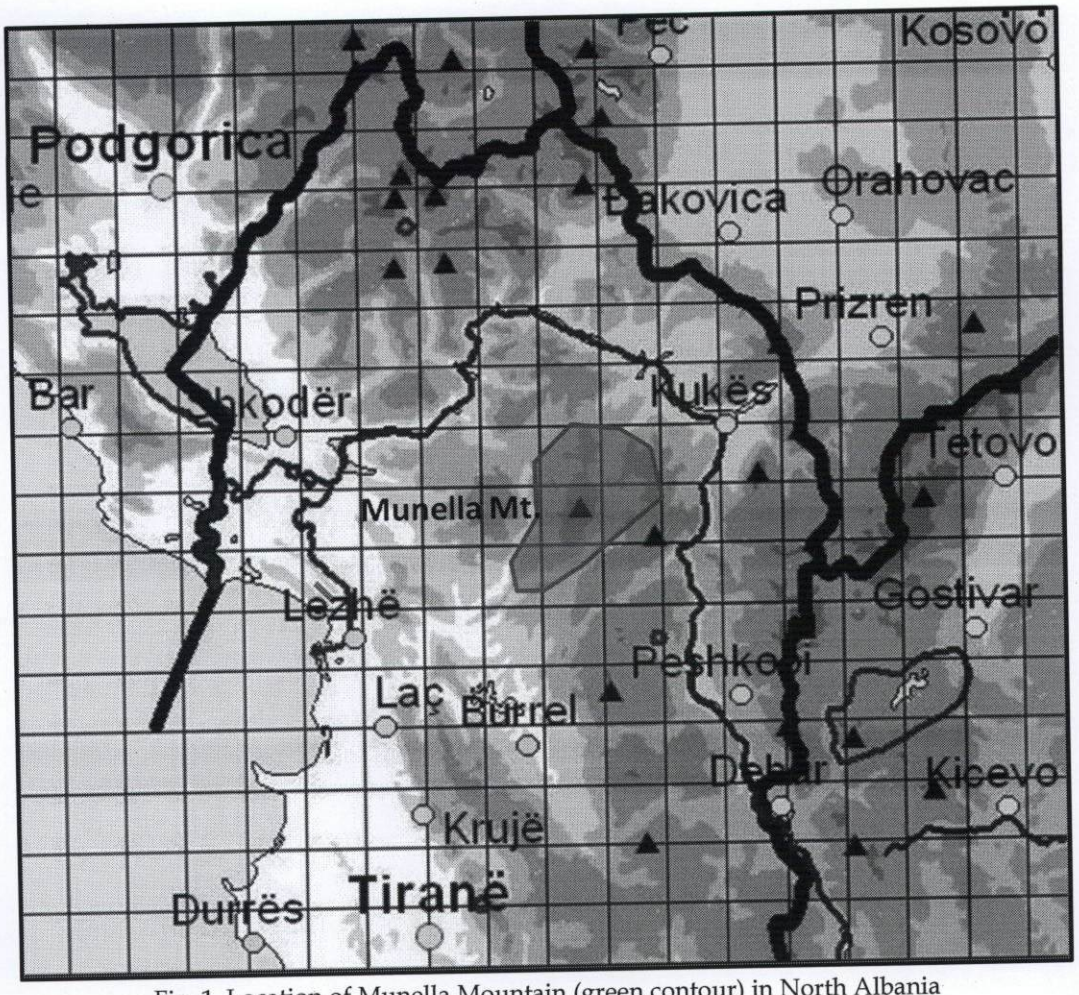

Fig. 1. Location of Munella Mountain (green contour) in North Albania

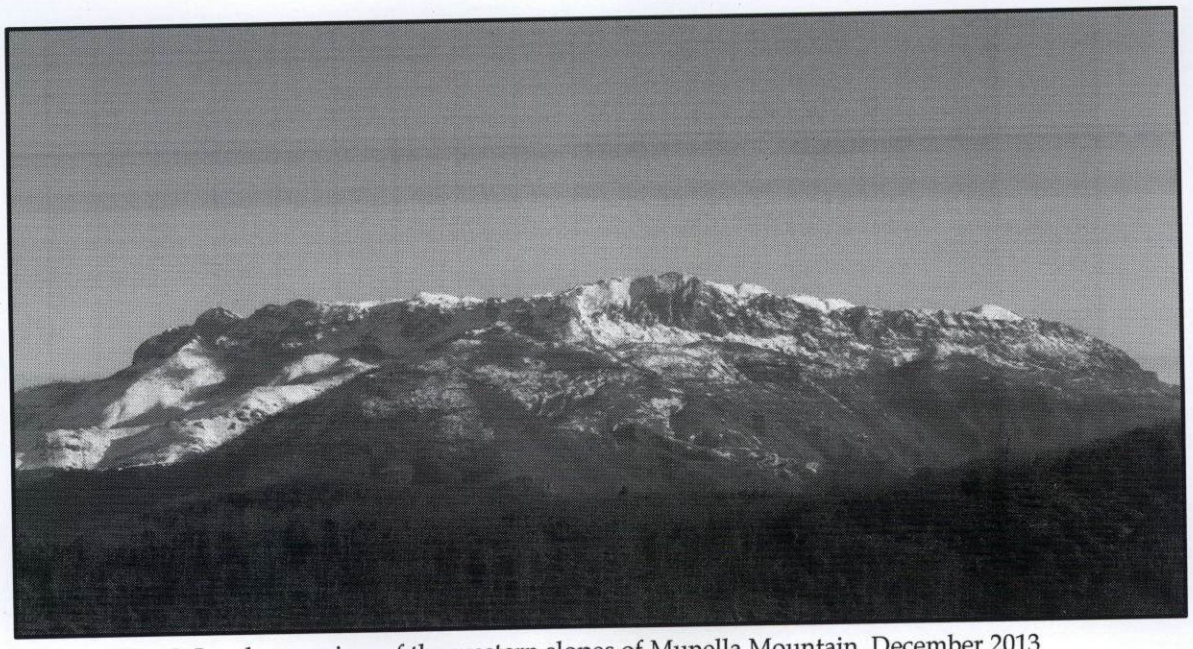

Fig. 2. Landscape view of the western slopes of Munella Mountain, December 2013

Baseline Survey (2006-07)

Munella Mountain and the surrounding region were initially investigated in 2007, by the lynx research team of PPNEA within the frame of the Balkan Lynx Recovery Programme. Several questionnaires were conducted with hunters, foresters and shepherds as part of a baseline survey to assess the potential presence of the critically endangered Balkan lynx (*Lynx lynx balcanicus*) and other wildlife species. Besides questionnaires, during the baseline survey the lynx team searched for hard evidence of lynx presence, such as killed/trophy individuals of lynx, preserved skins, photographs, etc. (Ivanov et. al. 2008; Trajçe et. al. 2008).

The results of the baseline survey generated good indications for potential lynx presence in the region, however when compared to other areas, such as Shebenik-Jabllanica region, Balgjaj-Mbasdeja mountains and Valbona valley, Munella did not seem to come up as equally important. During the baseline survey, the lynx team was able to record two hard evidences of Balkan lynx from the wider Puka region, these being a stuffed lynx individual in the town of Fushë-Arrëz and a stuffed lynx individual held in a private family house in Shkodra that had originated from "the mountains of Puka" according to the owner's statement. In both cases however, the team was unable to pinpoint the exact location of where the animals had been shot, as the stuffed specimens were bought by the current owners; they were not the original hunters of lynx. However the broad localities were defined according to details given by the current owners during interviews (Trajçe et. al. 2008).

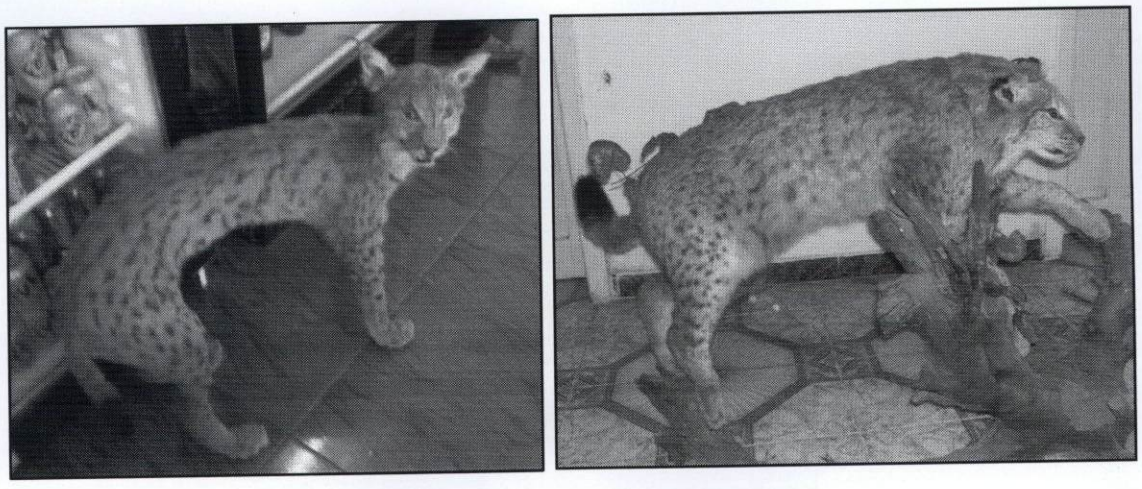

Fig. 3. Hard evidences of lynx presence in Puka region uncovered during the baseline survey in 2007. The lynx on the left was exhibited in a restaurant in Fushë-Arrëz and had potentially been shot in Munella Mountain. The lynx on the right was kept in a private house in Shkodra and had potentially been shot in Kunora e Dardhës Mountain.

Sporadic occurrences and beginning of camera-trapping (2008-2011)

Following the baseline survey, the PPNEA lynx team began with camera-trapping monitoring activities in order to collect hard evidences of lynx presence in Albania. However, initial efforts were focused mostly in Shebenik-Jabllanica due to baseline survey indications for more probable lynx presence in this region and Munella Mountain was not selected as a study area.

Nonetheless, the PPNEA lynx team continued to get sporadic information from Puka region with more hard facts on lynx presence. On November 2008, another stuffed specimen of lynx was found in a roadside restaurant near Gomsiqe village in Pukë (Fig. 4). Unfortunately, the owner refused to give precise information on the origin location of the specimen and behaved very hostile towards the lynx team. Judging from the conditions of the specimen, preparation techniques, and location of the village where the stuffed lynx was found, it could be inferred that the lynx originated from the region of Puka.

Fig. 4. Stuffed lynx specimen found in Gomsiqe village, Puka region, November 2008

A major discovery happened in January 2011. The lynx team was informed about the presence of a live lynx individual being kept in captivity in Shqiponja Restaurant-Complex at the entrance of Shkodra city in North Albania. A visit by the PPNEA lynx team on 27 January 2011, confirmed the presence and subsequently several actions were taken. The lynx had been captured with a foot snare and it could not make use of its front left leg. The PPNEA team negotiated with the owner during several visits at the restaurant and was able

to get valuable information on the case and individual itself and ensured some veterinary interventions do diagnose the conditions of the leg. A detailed summary of this process is given in a specific report prepared by PPNEA in 2011 (PPNEA 2011).

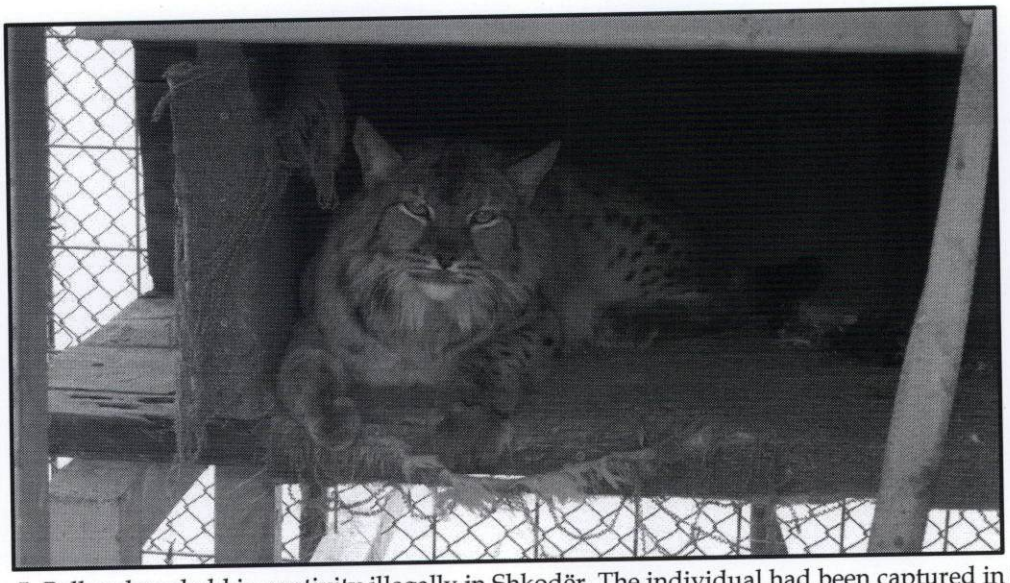

Fig. 5. Balkan lynx held in captivity illegally in Shkodër. The individual had been captured in the mountains of Puka

Information collected by the owner of the captive lynx in Shkodra, helped the PPNEA team to focus monitoring efforts in Puka region. The owner was not aware of the exact capture location, but stated that some villagers from Puka had brought the individual to him for selling it and that they had captured it in the Puka mountains.

An initial assessment done by the PPNEA lynx team pinpointed four possible mountain areas for starting camera-trapping activities in the Puka region: (i) Bjeshkët e Tërbunit dhe Kushnenit; (ii) Krrabi Mountain; (iii) Kunora e Dardhës and (iv) Munella Mountain. Judging from available data and habitat quality, Munella was selected as a first choice for camera-trapping surveillance. In March 2011, the lynx team set four cameras in the southern slopes of Munella and on their first check done in 21 April 2011 a Balkan lynx picture was revealed, being taken by one of the camera-traps on 26 March 2011 (Fig. 6.). This was the first evidence of an alive Balkan lynx in the wild in Albania, proving that the species still survived in the country (Trajçe & Hoxha 2011).

Fig. 6. First photo of a Balkan lynx in Albania taken by PPNEA in Munella Mountain

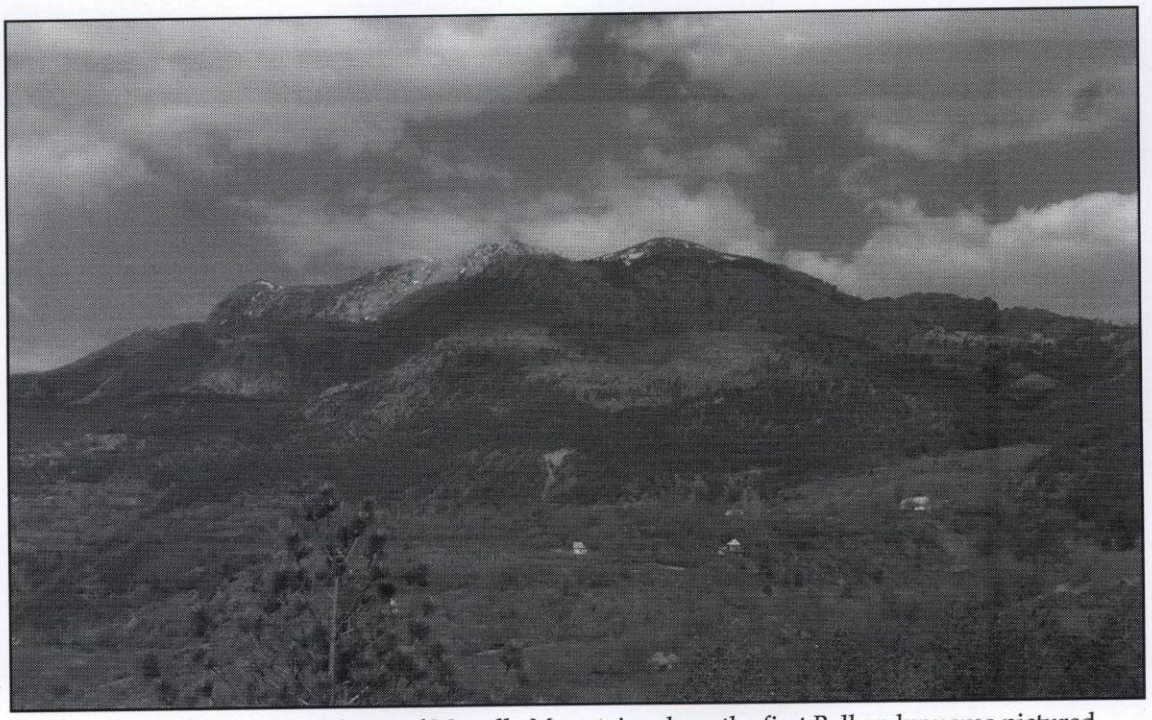

Fig. 7. View of southern slopes of Munella Mountain where the first Balkan lynx was pictured

Camera-trapping monitoring (2011-16)

Following the first proof of Balkan lynx in Albania, PPNEA concentrated and intensified monitoring efforts through camera-trapping in the region of Munella Mountain. In 2012, the lynx team was able to prove the existence of at least two different individuals (Fig. 8.) residing in Munella Mountain through four photographs of lynx. These signs hinted at a possible sub-population of Balkan lynx residing in and around Munella.

In 2013 and 2014, PPNEA conducted semi-intensive camera-trapping in Munella and was able to collect a substantial amount of information related to Balkan lynx presence in the region, but also for many other large mammal species. These surveys helped to create a clearer picture on the importance of Munella for Balkan lynx and other species.

In period of time 2014 - 2016, PPNEA conducted two further monitoring surveys in Munella region: the intensive camera trapping survey in 2014/15 and the extensive camera-trapping survey in 2016. Priority question for the camera trapping surveys in 2014-2016 were the clarification of the reproduction status of lynx in Munella. Evidence for reproduction was not gathered through camera-traps, as no photo of mother and cubs or a couple of lynx together were collected. However, constant presence in the field of the PPNEA team and help of the monitoring network, discovered two dead lynx cubs in the area, respectively in June and December 2015 (see photos below). Moreover, PPNEA's Balkan lynx team proved the presence of lynx in the new areas within the extended Munella region, such as Thirra, Zeba and Krrabi mountains. The results of camera-trapping field research for the period 2011-2016 have been summarized in Table 1 below.

The number of Balkan lynx photographs has been steadily increasing from year to year - this also connected to the fact that the monitoring effort and number of cameras in the field have been increasing as well. In total, 76 photos of the Balkan lynx have been taken in Munella Mountain and surrounding during the whole camera trapping survey 2011-2016 (Table 1.).

Fig. 8. Two different Balkan lynx individuals pictured in Munella mt., 2012.

Table 1. Species and number of respective photographs taken during the camera-trapping surveys in Munella Mountain, 2011-2016

Season	2011		2012		2013		2014		2015	2016
Species	No. of cameras	No. of photos	No. of cameras	No. of photos	No. of cameras	No. of photos	No. of cameras	No. of photos	No. of photos	No. of photos
Lynx lynx balcanicus		1		4		13		27	21	10
Felis sylvestris		-		2		1		33	13	3
Ursus arctos		-		58		25		55	25	23
Canis lupus		-		-		2		19	5	14
Vulpes vulpes		15		224		7		197	85	44
Martes foina		2		19		11		19	28	20
Martes martes		-		7		-		1	2	-
Meles meles	4	-	17	12	20	2	37	42	80	24
Mustela putorius		-		-		-		1	-	-
Lepus europaeus		88		207		83		449	493	154
Erinaceus roumanicus		-		1		-		1	2	4
Capreolus capreolus		-		2		9		6	25	22
Sus scrofa		-		1		4		4	19	16
Rupicapra rupicapra		-		1		-		-	1	-
Bird species		-		1		-		3	3	2

Munella's importance for Balkan lynx and other large mammals

The results of the camera-trapping surveys indicate that Munella Mountain is a crucial area for lynx in Albania and in the Balkans. From all the camera-trapping efforts in the period 2011-2016, 76 lynx pictures have been taken. Preliminary evaluation of the photographs by identifying individuals through their coat pattern shows that the photographs derive from at least 7 different individuals throughout all years. For the last camera-trapping season conducted from December 2013 to May 2014, which produced the higher number of lynx pictures, at least 4 different individuals from 27 pictures can be distinguished. These results prove that a small sub-population of Balkan lynx survives in the region of Munella Mountain. To date, it is the only area outside of Mavrovo National Park in Macedonia and that is not directly connected to this park, to have a sub-population of Balkan lynx surviving. Albeit tiny in numbers, Munella's population remains very important for the survival of the Balkan lynx, considering that the total population is estimated to be less than 40 individuals – critically endangered by the IUCN Red List criteria (Melovski et. al. 2014).

In spite of proving the existence of several individuals, camera-trapping research hasn't been able to record photo or video of cub(s), mother with cub(s) or two adults together. However, continuous presence of PPNEA in the field and efficiency of monitoring network in the area made possible the discovery of two dead lynx cubs in 2015, which prove lynx reproduction in Munella Mountain (Fig. 9).

Besides presence of Balkan lynx, Munella Mountain and the surroundings seem to be very important for other mammal species in Albania. Camera-trapping research done by the PPNEA lynx team has generated a substantial amount of information on the presence and distribution of several species. Up to date, 14 different wild mammal species have been photographed by camera-traps in Munella Mountain (Table 1.) and this diversity is the highest that has been recorded by PPNEA through camera-trapping in various regions. In addition, Munella Mountain is the only monitored area so far where there is confirmed presence of the whole guild of wild ungulate community in Albania, including roe deer (*Capreolus capreolus*), wild boar (*Sus scrofa*) and chamois (*Rupicapra rupicapra*). For chamois, Munella is the only area besides the Albanian Alps (Valbona valley) where we have confirmed presence in Albania through camera-traps (Fig. 10). The two other large carnivores, brown bears (*Ursus arctos*) and grey wolves (*Canis lupus*), are present in Munella and seem to have active reproduction as it is evidenced by camera-trapping photographs of couples and mother with cub (Fig. 11 & 12). In addition, four mustelid species have been photographed in Munella; namely pine marten (*Martes martes*), stone marten (*Martes foina*), Eurasian badger (*Meles meles*) and European polecat (*Mustela putorius*) – the latter being photographed only in Munella out of all areas monitored by PPNEA. This makes for the highest number of mustelids photographed in a single area, out of all areas in Albania that have been surveyed so far.

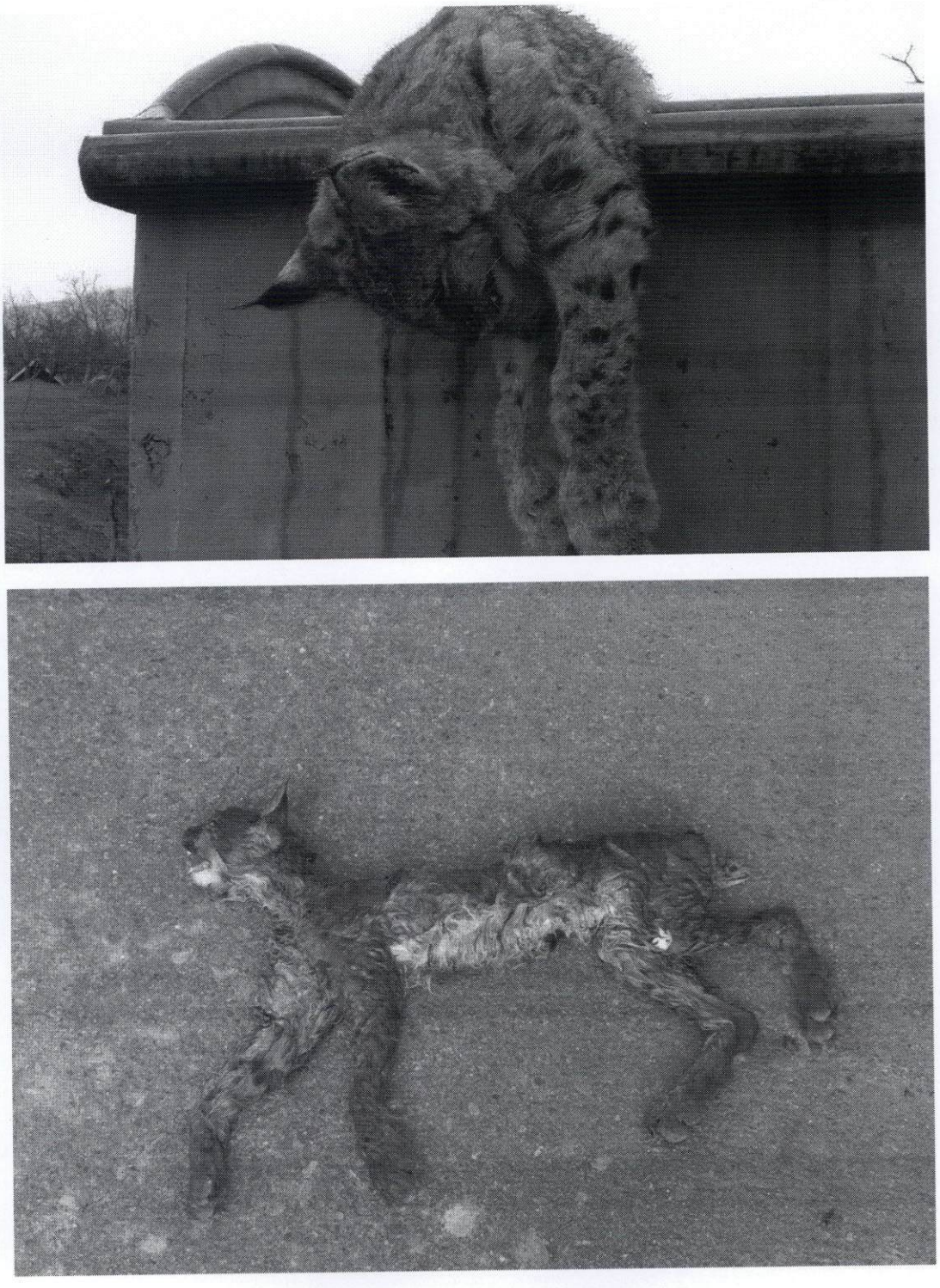

Fig. 9. Two dead lynx cubs found in Puka region (June 2015 and December 2015)

Fig. 10. Chamois (*Rupicapra rupicapra*) photographed in the eastern part of Munella Mountain

Fig. 11. Brown bear (*Ursus arctos*) mother with cub, indicating active reproduction of bears in Munella

Fig. 12. Couple of grey wolves (*Canis lupus*); indicating active reproduction in Munella Mt.

Fig. 13. Roe deer (*Capreolus capreolus*) photographed on south-western edge of Munella Mt.

Major human-induced threats in Munella Mountain

Throughout the several field trips conducted within the frame of the BLRP, the PPNEA lynx team has been also assessing the general habitat and natural conditions of Munella and the main concerns that they are facing to date. The area, currently, does not enjoy a protected area status and is characterized by high exploitation and human activities that directly affect natural habitats and their preservation. Main problems identified in Munella by PPNEA throughout the years are:

Forest logging and degradation

Munella's high forests have been vastly destroyed due to intensive wood-cutting either legal or illegal. There are several logging concessions in Munella Mountain, and in parallel to that, illegal logging has been rampant and continues to date in the area. In addition, the risk from forest fires remains high, often set by illegal loggers to cover their activity in exploiting the forest.

Fig. 14. Typical view of forest conditions in the high parts of Munella Mt. This area has been extensively logged and set on fire afterwards.

Mining activites

Munella is relatively rich in mineral resources, particularly with copper. There are several mines that have been operating in the area for decades, some of them intensively during the communist era. The area has been defined as a priority area for mining development in the country's strategies and besides the existing mines, several concessions are being given to mining companies to search for and open new mines in the near future.

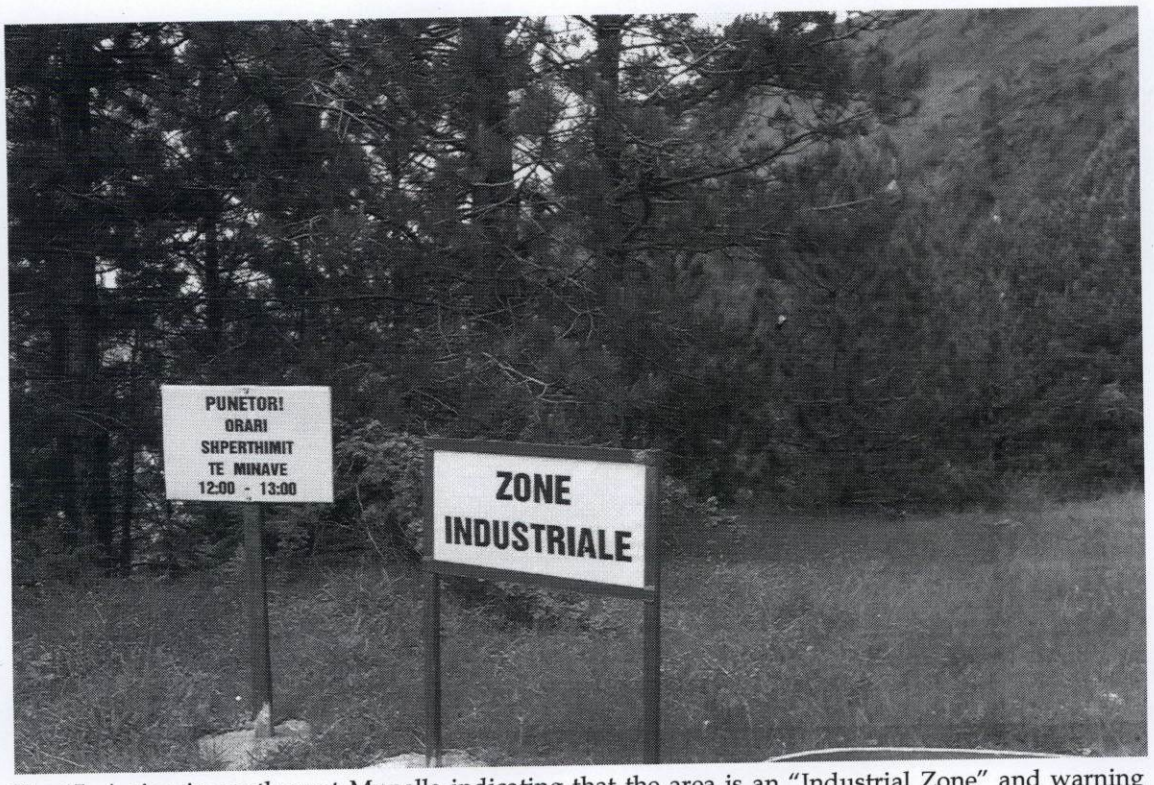

Fig. 15. A sign in south-west Munella indicating that the area is an "Industrial Zone" and warning workers about explosions going on between 12:00 - 13:00. These signs are 600 m away from the closest place a Balkan lynx was pictured in 2014.

Illegal hunting

Poaching is a large scale problem all over Albania, however given the importance of Munella in holding a small sub-population of Balkan lynx it becomes even more alarming in this particular area. The PPNEA team has documented several incidences of illegal hunting going on in the area in the past. Since 15 March 2014, Albania is implementing a hunting moratorium that implies a total ban of hunting for all species during all seasons for a period of two years. This is a very positive step forward in solving the critical problem of poaching and since the start of the ban hunting seems to have decreased dramatically all over the country. However from the camera-trapping information, the PPNEA lynx team was able to document cases of illegal hunting even after the moratorium entered into force.

Fig. 16. Illegal hunter photographed by camera-traps in eastern Munella Mountain. Albania enforced a 2-year total hunting ban, starting from 15 March 2014.

Conclusion

The research conducted by PPNEA in Munella Mountain shows that the area is extremely important for the survival and reproduction of the critically endangered Balkan lynx in Albania and wider region. The information generated by camera-trapping surveys indicates that a small sub-population consisting of at least 4 mature individuals survives in Munella and surroundings. This is the only resident and reproductive population of lynx proven to exist in Albania. In addition to lynx, Munella is important for other large carnivores, having reproductive populations of brown bears (*Ursus arctos*) and grey wolves (*Canis lupus*) and the highest mammal diversity photographed by camera-traps from all monitored areas in Albania.

On the other hand, the area is characterized by a high degree of exploitation by humans. Forests have been heavily exploited in the past and logging (be it legal or illegal) is continuing to date. Vast fires have destroyed much of the vegetation cover. Illegal hunting has been rampant in the area for many years. There is heavy mining activity and plans to expand mining further in the future. It comes to a great surprise that even under all these

human-induced threats, Balkan lynx have managed to survive miraculously in this part of Albania. The results stemming from PPNEA's work in the area call for urgent measures of protection in Munella as the area does not have a protected area status and is largely unknown by the nature conservation community and the public. The information summarized here, is an initial step towards defining a clear strategy and action plan for the future protection and conservation of Munella Mountain as a crucial area for the survival of Balkan lynx in Albania.

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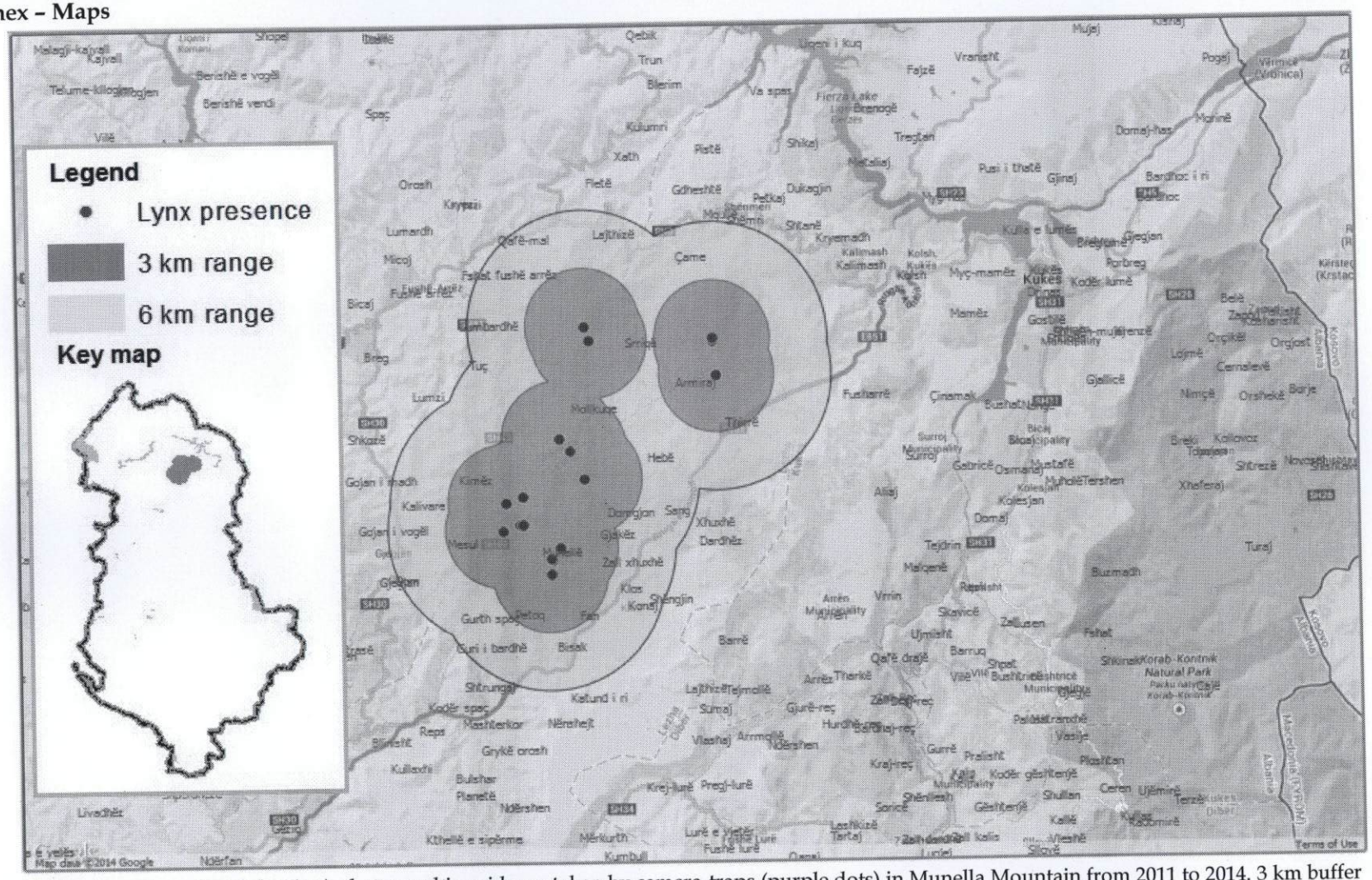
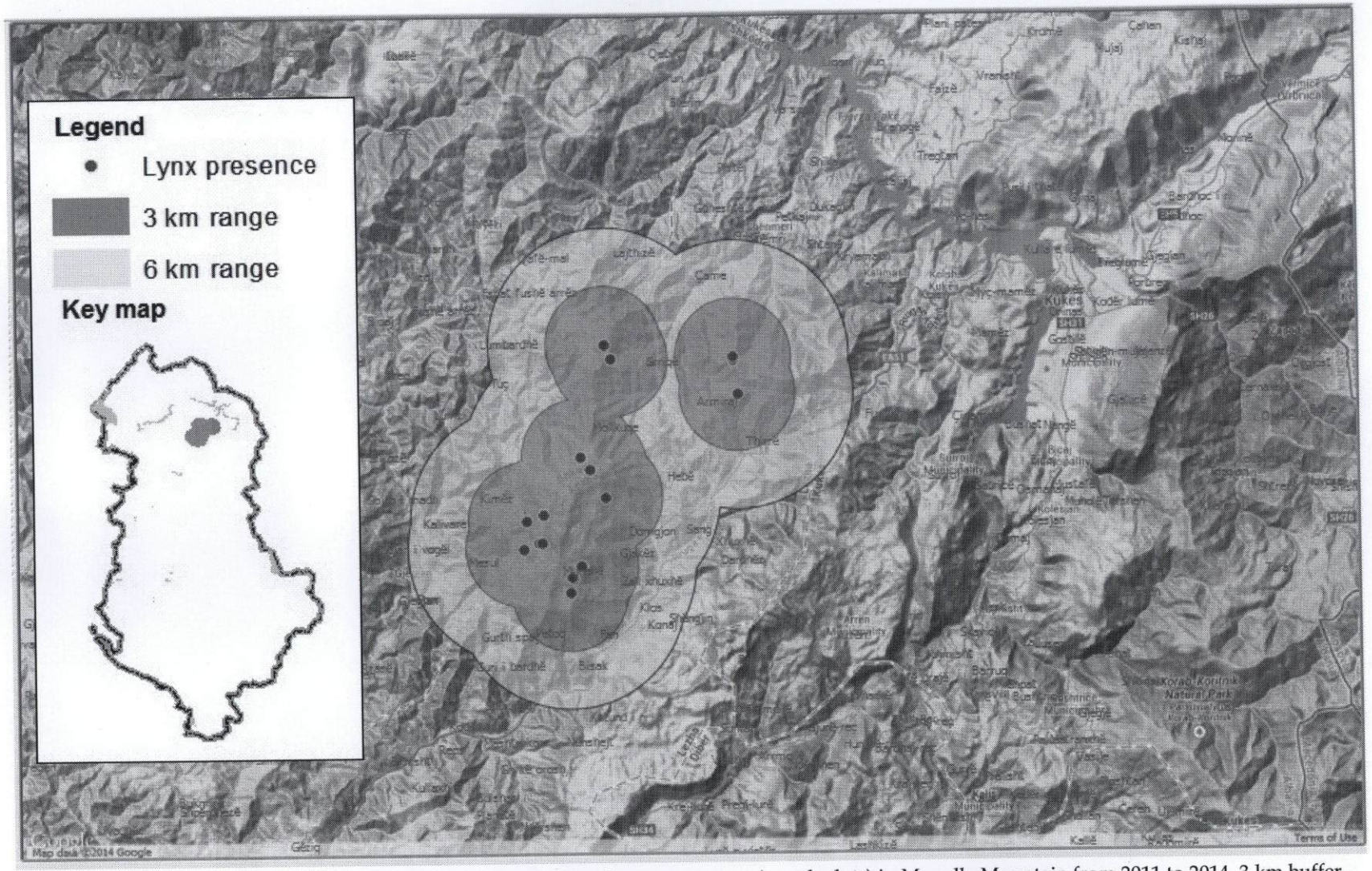
Annex – Maps



Balkan lynx (*Lynx lynx balcanicus*) photographic evidence taken by camera-traps (purple dots) in Munella Mountain from 2011 to 2014. 3 km buffer distribution area from sign marked with green and 6 km buffer from sign marked with yellow.



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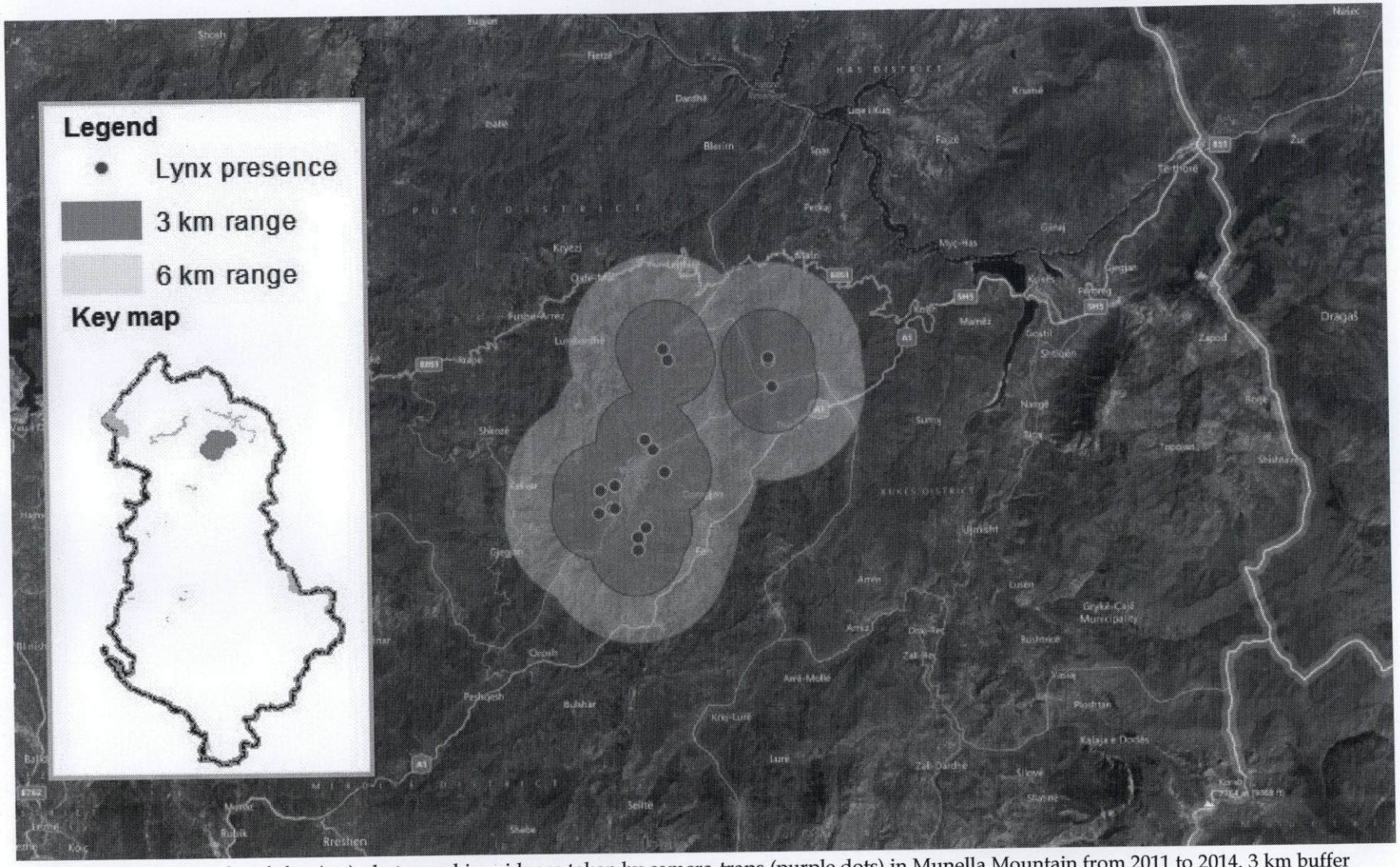

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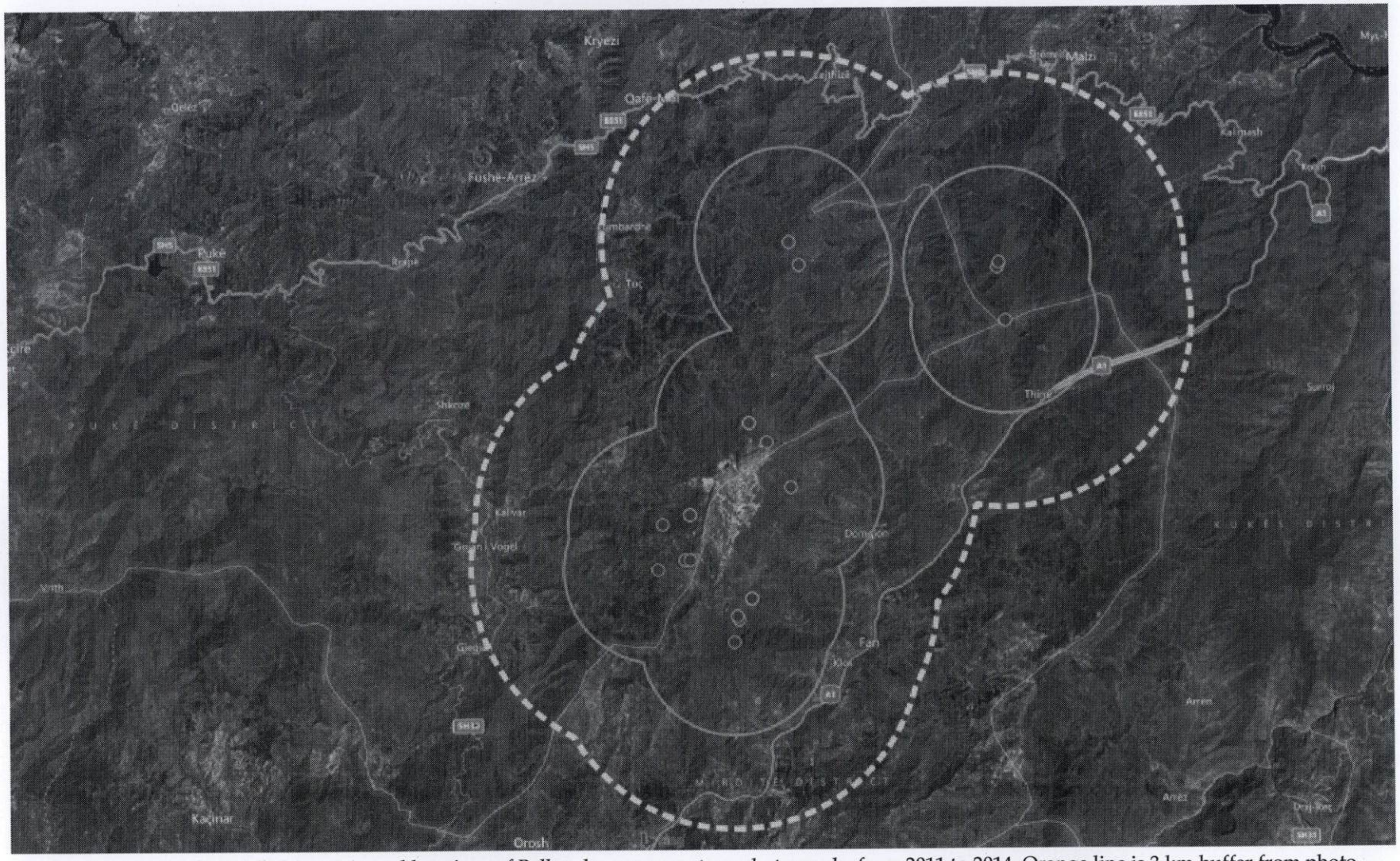

Satellite image of Munella Mountain and locations of Balkan lynx camera-trap photographs from 2011 to 2014. Orange line is 3 km buffer from photo evidence locations sing and yellow dashed line is 6 km buffer from photo evidence locations.