



ENHANCING FINANCIAL SUSTAINABILITY OF THE PROTECTED AREAS SYSTEM IN GEORGIA

TECHNICAL ASSISTANCE GRANT AGREEMENT

Biodiversity Monitoring in Selected Protected Areas in Georgia in 2020

Final report



Prepared by: NACRES – Centre for Biodiversity Conservation and Research

No. of the contract: CNFPO/2020/TAGA-GEO-130

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Date of submission: December, 2020



This report was prepared as the result of work sponsored by the Caucasus Nature Fund. Any opinions, findings, conclusions, or recommendations are those of the authors and do not reflect the views of Caucasus Nature Fund, its employees or its funders.

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Executive Summary

In late summer 2020, following a highly participatory process of establishing a short list of priority biodiversity monitoring indicators for the target Georgian PAs and through an extensive process involving the beneficiary (APA¹ and MEPA²), key stakeholders and experts it was agreed to focus the 2020 activities on the following indicators:

- (i) Bezoar goat in Tusheti and Pshav-Khevsureti PAs
- (ii) Red deer in Tusheti (range mapping and population size assessment to plan a detailed census in 2021, if appropriate)
- (iii) Red deer in Lagodekhi (to initiate the *pallet decomposition rate experiment* for subsequent census via pallet group counts)
- (iv) Ungulates: roe deer and chamois in Mtirala, Kintrishi and Machakhela PAs.
- (v) Alien invasive plants in Mtirala and Kintrishi PAs.

During the inception phase, we carried out the analysis of all available information for each of the selected biodiversity value and threat indicators as well as additional consultations with key stakeholders. Subsequently, the summary descriptions of the target PAs in relation to the respective selected indicator, detailed individual monitoring plan and standard operational monitoring protocols (SOMPs), and a time table of activities, were prepared.

In preparation for actual field surveys, two separate field teams were set up – the zoology field team and the botany field team. The alien plants surveys in Adjara PAs were cancelled due to the deteriorated COVID-19 situation in Adjara and associated restrictions imposed by the authorities.

The zoology team carried out zoological surveys as planned, except a delay in ungulate camera trap study in Adjara PAs due to the delayed arrival of the equipment that had to be ordered online from outside the country.

Every field survey began with a brief meeting with the respective park management and detailed discussion with relevant members of the staff such as Head of Ranger Service, Natural Resource specialist and senior rangers. The zoology team presented the planned activities, survey objectives as well as detailed methodology to the local park management teams who in turn provided their comments and suggestions based on which the survey/sampling designs were adjusted accordingly. In most cases, park managers and/or local rangers accompanied the field teams guiding us to specific areas of their park and providing valuable other assistance.

Bezoar goats were observed during October–November, 2020 from 18 observation points in Tusheti and 17 observation points in Khevsureti by 2-3 separate field teams, working simultaneously. Each team was equipped with a *Vortex* spotting scope and at least two pairs of binoculars. We also used a smartphone adapter to the spotting scope that allowed to take photos for subsequent more detailed analysis. From each observation point, we carried out two sets of observations – (i) early in the morning (7:00-10:00) and (ii) in the evening (17:00-19:00). Observers recorded group size, sex and age composition of the group as well as approximate group location (which obviously greatly differed from the location of an observation point).

¹ Agency of Protected Areas of Georgia

² Georgian Ministry of Environmental Protection and Agriculture

The total observation time that NACRES team spent for bezoar goat observations in the two protected areas exceeded 126 hours (50 hours in Pshav-Khevsureti and 76 hours in Tusheti protected areas). We recorded 61 adult individuals (≥ 1.5 years) in Khevsureti and 82 adult individuals in Tusheti. According to the final data analysis there were at least **59** individuals in Khevsureti and **76** individuals in Tusheti. The results should be considered as minimum population numbers for each protected areas.

We observed a total of 50 bezoar goat groups which included all types of groups — female groups, females with kids and juveniles, young males, adult males, and mixed male-female groups of varying age classes. The largest male group was comprised of 10 adult males, in Ighone, Tusheti. The largest mixed group (16 individuals) was observed near Shatili in Khevsureti. Mixed groups were more frequently observed in Khevsureti ($n=7$) than in Tusheti ($n=1$). This may be explained by the fact that the assessment in Khevsureti was carried out later than in Tusheti (in October and November respectively) i.e. closer to the breeding season, which usually begins in the end of November.

NACRES assessed the bezoar goat populations in Khevsureti in autumn 2013 and in Tusheti in autumn 2010. In this survey, we recorded bezoar goats on new slopes close to village Shatili in Khevsureti. New data indicate that the bezoar goat populations both in Khevsureti and Tusheti must have remained stable low, while the Khevsureti population has apparently expanded its range.

For red deer range mapping in Tusheti we placed 11 camera traps throughout the study area – Alatovani valley. We also did transect on the slopes of the gorge to see if red deer faecal pellets were visually detectable. This was done in order to establish if the pellet group count would be a feasible red deer technique for the Tusheti red deer population assessment. We could hear red deer stag roars during the survey. But we could not directly observe them as they only roared during the night.

According to the results of our survey there were at least 3 roaring (breeding) stags in Tusheti's Alatovani valley. In addition, almost all the camera traps that were installed in that valley captured at least one individual and in total we obtained 23 red deer photos. Based on new data that were obtained through various methods and different sources we created a preliminary range map of red deer in Tusheti. The survey results confirmed the existence of a breeding population of red deer in Tusheti and that the estimate provided by the park administration mainly based on expert opinion – approximately 50 individuals should be considered valid. Because of the relatively low density of the population, while the method of pallet group count is not suitable, we recommend to consider using the roar count in subsequent assessments despite its obvious disadvantages or even camera trapping (this method is not generally considered very accurate). Close monitoring and documenting of any red deer sightings outside the Alatovani valley should also continue in order to monitor any expansion of the red deer range in Tusheti.

The ungulate assessment in Adjara PAs relied on rigorous camera trapping. We installed 16 camera traps in Kintrishi PA, 18 units in Mtirala NP and 17 units in Machakhela PA. Due to early snowfall at high altitudes, we placed the camera traps at relatively low elevations, setting them high above the ground to protect them from the snow. The camera traps will remain in the field throughout the winter in all three protected areas, collecting data on ungulates and other large mammals. NACRES team should visit the protected areas at least three times throughout 2021. Jointly with the local rangers all the necessary maintenance of the installed camera traps such as replacing batteries should be carried out and as additional units should be placed in higher altitude areas as snow cover retreats next spring.

The monitoring activities for the selected indicators were the first assessments conducted according to the agreed 10-year mentoring plan. Hence the results will need to be subsequently analysed and interpreted in combination with the data that will be obtained in subsequent years. For example, according to the chosen protocol, the bezoar goat assessment results both for Tusheti and Khevsureti will need to be analysed in combination with the results that will be obtained in the second assessments which will be conducted in spring/summer 2021. Thus, the above presented results of population numbers are not final estimates for those populations.

Moreover, the other assessments that were conducted in 2020 were in fact the launching of the planned activities:

1. *The Faecal pellet group decay experiment* in Lagodekhi PA will continue into 2021 until the pellets will have been completely decomposed.
2. The ungulate assessment in Adjara protected areas will continue into 2021 and the camera traps will remain in the field throughout the winter in all three protected areas and collect data on ungulates and other large mammals.

1 Introduction

This report is the final deliverable under the Technical assistance Grant agreement signed between CNF and NACRES on 17th September 2020. It describes stakeholder consultations and literature review for each indicator, selected for 2020 monitoring activities; summary descriptions of the target PAs in relation to the respective selected indicator; field data collection and related activities for each of the selected biodiversity indicators – the activities implemented, sample plots visited, qualitative and quantitative data collected, an assessment of any deviations from the field monitoring plan and SOMP, problems met and solved, lessons learned; where appropriate proposed management recommendations to protect, maintain or restore selected biodiversity indicators.

2 Background

As a result of the **technical support to prioritize biodiversity monitoring indicators (species and habitats) for 10 Georgian PAs to support the development of standardized PA-specific Management Effectiveness Assessment plans (*Biodiversity Monitoring Indicators*)**, commissioned by CNF in May, 2020, an agreed short list of fauna indicators were elaborated through an intensive, participatory process that involved all leading relevant experts and key stockholders and in close cooperation with the main beneficiaries – Agency of Protected Areas (APA) and the Ministry of Environmental Protection and Agriculture (MEPA). Additional consultations were conducted with APA, MEPA and CNF in order to identify indicators and target PAs for 2020 monitoring i.e. monitoring activities to be conducted already in 2020, considering the limited remaining time before the end of the year.

It was agreed to carry out monitoring of the following fauna indicators:

- (vi) Bezoar goat in Tusheti and Pshav-Khevsureti PAs
- (vii) Red deer in Tusheti (range mapping and population size assessment to plan a detailed census in 2021, if appropriate)
- (viii) Red deer in Lagodekhi (to initiate the *pallet decomposition rate experiment* for subsequent census via pallet group counts)
- (ix) Ungulates: roe deer and chamois in Mtirala, Kintrishi and Machakhela PAs.

A short list of indicators for flora, habitats and forest pathogens was still underway. Nevertheless, it was agreed that alien invasive plants were a priority indicator for Mtirala and Kintrishi PAs. Thus, the 2020 monitoring activities also included an assessment of alien invasive plants in Mtirala and Kintrishi.

The above indicators were chosen for the 2020 monitoring activities largely based on the following:

- (i) the importance of monitoring the bezoar goat and red deer as the two most endangered as well as commonly poached ungulates is widely recognised; the first is also protected by the Bern Convention and both are included in the national Red List.
- (ii) According to APA, ungulate assessment in Adjara protected areas, among other things, was especially important for the planning of an adequate management response, if needed and also for resolving somewhat disputed current data on ungulate distribution in those parks.

- (iii) Alien invasive plants are one of the main threats to the unique Colchis forest; their assessment and monitoring is particularly important in the light of expected nomination of the Colchic forest as a UNESCO World Heritage Site.
- (iv) The proposed activities could still be conducted/initiated in the autumn season that was exactly the time remaining in 2020.

3 Preparation phase

During the inception phase, we carried out (i) an analysis of all available information for each of the selected biodiversity value and threat indicators and (ii) additional consultations with stakeholders in order to identify the species' core areas of distribution inside and beyond the respective target PA, seasonal use of habitats, migratory range and routes where applicable, population numbers and abundance if available, population trend, habitat quality and anthropogenic impact factors, etc. Based on this information we prepared working maps for the planning of field surveys. Based on the baseline information we prepared summary descriptions of the target PAs in relation to the respective selected indicator; detailed individual monitoring plan and standard operational monitoring protocols (SOMP), and a time table of activities.

In preparation for actual field surveys, we set up two separate field teams – the zoology field team and the botany field team. The zoology team was led by NACRES' Bejan Lortkipanidze, the project's Chief Zoologist and included 4 experienced field observers from NACRES.

The botany team was led by Dr. David Kikodze, Deputy Director of the Institute of Botany and included two senior botanists from Batumi Botanical Gardens – Drs. Nino Memiadze and Zurab Manvelidze as well as two junior botanists.

However, the invasive alien plants surveys in Adjara PAs in time coincided with the increasingly deteriorated COVID-19 situation in Adjara and associated restrictions imposed by the authorities. Unfortunately, the work could not be postponed till a later time within the project due to its seasonal restrictions and eventually had to be cancelled³.

4 Bezoar goat (*Capra aegagrus*) monitoring in Tusheti and Pshav-Khevsureti PAs

4.1 Preparation phase

The field protocol for the survey of the bezoar goat populations in Tusheti and Khevsureti was developed based on *Monitoring Programme for Mountain Ungulates in Azerbaijan* (P. Weinberg 2012). First, we placed most of the observation points on the map, based on our own previous work. Then we added some new points too, since new bezoar goat locations had become available in both protected areas. The points were distributed in space in order to prevent any double counts of bezoar

³ There is a preliminary agreement with CNF that invasive plants surveys will be conducted in spring 2021 as part of a new grant agreement.

groups. We elaborated a special field form based on Weinberg’s monitoring programme and our own tur census experience in Lagodekhi (see Annex 1).

Following to the original plan, we contacted the Tusheti park director to organize a half day meeting at their lowland office in Alvani in order to plan bezoar goat population assessment in Tusheti. Because they were already in Tusheti, they suggested to meet in Omalo just prior to the fieldwork activities. We arranged a meeting with the Pshav-Khevsureti director too, but the meeting was later cancelled due to director’s unavailability. We agreed to meet in the field in Khevsureti to discuss bezoar goat monitoring activities.

We purchased all the necessary observation equipment through a different grant agreement with CNF. This equipment included: three Vortex telescopes and six pairs of Kowa binoculars. The purchase was done on-line and the items were to be shipped to Georgia via DHL. However, the delivery was delayed due to COVID-19 pandemic. We had to adjust our field surveys schedule accordingly – we decided to carry out the Tusheti red deer range study first and delay the bezoar goat surveys till the equipment would arrive.

4.2 Fieldwork in Tusheti PAs

We had a meeting with the TPA administration in Tusheti on September 21. We met with Vakhtang Giunaidze, TPA director and Onise Ichirauli, Head of Ranger Service. We discussed the fieldwork plan, possible camera trap locations for the red deer range study (see Chapter 5) and the planned locations of bezoar goat observation points. Mr. Onise Ichirauli had useful suggestions on the bezoar goat observation points and we revised them accordingly. Namely, he noted that bezoar goat was observed in Ortskali valley too, one of the most remote areas of Tusheti. He thought the bezoar goat numbers were low there, but nevertheless interesting to explore those areas too, because that would create better understanding of the bezoar goat range in Tusheti. We agreed that, weather permitted, we would include that valley in our field surveys.



Photo 1 NACRES team discussing bezoar goat monitoring with Tusheti PA administration.

We began bezoar goat observations on 27th September, right after the red deer survey. We organized three observation groups and they collected data on bezoar goat groups from a total of 18 observation points (See Annex 2 for map). Each team was equipped with a Vortex spotting scope and at least two pairs of binoculars. We also used a smartphone adapter to spotting scope that allowed to take photos for subsequent more detailed review. We carried out two sets of observations from each point – early in the morning (7:00-10:00) and in the evening (17:00-19:00). Observers noted group size, sex and age composition of the group as well as approximate group location (which obviously greatly differed from the location of a observation point). The weather was favourable and we could complete the originally planned observation sessions according to schedule. However, due to subsequently deteriorating weather it was no longer possible to continue over to the Ortskali valley, the new bezoar goat location. The survey of this site had to be postponed till spring 2021.

4.3 Fieldwork in Pshav-Khevsureti PAs

We carried out fieldwork in Pshav-Khevsureti protected area in November. We went up to Andaki gorge on 15th October and organised a base camp near village Ardoti. We planned to meet Vaja Ichirauli, park director upon arrival, but the meeting was cancelled due to a forest fire in Arkhoti. Later



Photo #2. Observing bezoar goats in Khevsureti

the Chief Ranger visited us at the campsite and we discussed bezoar goat observation points. He noted that it was also possible to observe bezoar goats at Shatili village, namely from Barisakho-Shatili road and suggested to search for the animals in that area too. We included this new site in our fieldwork schedule.

We collected data on bezoar goat group size, sex/age composition and location from 17 observation points (see Annex 3 for map). Similar to Tusheti, from each point, counts we carried out in two sets of observations – in the morning (7:00-10:00) and in the evening (17:00-18:30). Observation data were entered into the field forms.

Bezoar goat groups were visible from almost all observation points. We found bezoar goats in the areas where they were not detected during the previous assessment in 2013. We saw small groups, mostly females or young males. In Adaki gorge we found four large males. They stayed away from the female groups.

4.4 Results and Analysis

4.4.1 Population numbers

The total observation time that NACRES team spent in both protected areas slightly exceeded 126 hours (50 hours in Pshav-Khevsureti and 76 hours in Tusheti protected areas). We recorded 61 adult individuals (≥ 1.5 years) in Khevsureti (please see Annex #4 for sighting locations) and 82 adult individuals in Tusheti (see Annex #5 for sighting locations). We critically analysed the data and excluded possible double counts. According to the final data at least **59** individuals live in Khevsureti and **76** individuals in Tusheti. The results should be considered as minimum population numbers for each protected areas.

NACRES counted about 40-50 bezoar goats in Khevsureti in autumn 2013. Current assessment showed that there were at least 59 individuals in Khevsureti. We used almost the same observation points as in previous assessment. In addition, we recorded bezoar goats on the slopes near village Shatili, which may be an indication that bezoar goats expended their range over the seven-year period.

While we collected data from key bezoar goat areas and counted at least 76 individuals in Tusheti, this number was less than we expected as the species habitat is quite large as compared to Khevsureti. Unfortunately we heard gunshots several times during the survey that might have influenced our data.

We compared our new data to the previous assessments that NACRES carried out in autumn 2010⁴. Because we used different observation methodologies in the two assessments, the comparison of the two results could only be considered valid for the Omalo and Chigho areas, in which case we counted more individuals in 2021 than in 2010 (33 and 20 individuals respectively) . Nevertheless, this is insufficient to state that the population has increased over the last decade. Thus, we can speculate that Tusheti bezoar goat population has remained stable low.

4.4.2 Group and sex composition in census data

We observed all types of groups — female groups, females with kids and juveniles, young males, adult males, and mixed male-female groups of varying age classes (total number of groups in both study areas was 50). The largest male group was comprised of 10 adult males, in Ighone, Tusheti. The largest mixed group (16 individuals) was observed near Shatili in Khevsureti. The group included 1 young male, 4 females and 5 kids, and another 4 juveniles. The largest adult female group was comprised of 5 individuals. The average size of female groups was 4 in Khevsureti and up to 2 in Tusheti. The mean size of all male groups was 5 in Tusheti. We saw only one male group with one adult and 3 mature young males in Khevsureti.

Mixed groups were more frequently observed in Khevsureti (n=7) than in Tusheti (n=1). That may be explained by the fact that assessment in Khevsureti was carried out in November i.e. later than in Tusheti and closer to the breeding season during which time female and males were more likely to join together in mixed groups. The timing of the assessment also affected the sex ratio in the observation data. We found proportionally more females in Tusheti (sex ratio was 1 male to 3,75 females) compared to Khevsureti (1 male : 1.9 females).

4.4.3 Range and habitat preferences

Much of the current range of bezoar goats in Tusheti appears to be confined to the Pirikita Alazani river gorge which is characterised with pine forest, extremely steep slopes and rocky formations. However, according to the park administration, in recent years, bezoar goats have also been regularly sighted in the Ortskali gorge, the western section of the national park. This area was not covered by the assessment due to limited time. We recommend to include it in the next surveys.

In Khevsureti, the bezoar goat range covers the Ardoti and Khoni Chala areas, Anatori and Shatili surroundings, where they live in pine and mixed forest on steep rocky slopes.

5 Red deer (*Cervus elaphus*) count preparation activity in Tusheti and Lagodekhi PAs.

5.1 Red deer range mapping and overall population assessment in Tusheti

We had a short meeting with the Head of Ranger Service of Tusheti PA, Mr. Onise Ichirauli in order to outline the preliminary red deer range in Tusheti. He noted that red deer were sporadically sighted in various parts of Tusheti, but the core area probably was the Alatovani valley. He kindly helped us with

⁴ Please see details in the unpublished article - *Current Status and Conservation of Wild Goats in Tusheti – the Last Viable Population in Georgia (it can be downloaded from the NACRES web page).*

our trip to the valley – we were guided there by an experienced ranger, but could not stay with us during the subsequent data collection.

We placed 11 camera traps throughout the valley (see Annex 6). We also conducted transects on the slopes and checked if red deer faecal pellets could be visually detected. Our intention was to evaluate whether the pellet group count would be a feasible red deer census technique for the Tusheti red deer population assessment. Unfortunately, faecal pellet group density was very low and it was concluded that the pellet count method was not suitable for the red deer count there.

We heard roars during the survey, which indicated the presence of at least several breeding stags in the gorge. We could not visually observe them as they only roared during the night.

We checked camera traps before leaving Tusheti and left them to collect more data. The initial plan was to leave the camera traps throughout the winter, but Mr. Ichirauli advised that the valley was characterised with extremely heavy snowfall and persistent deep snow cover. In order to prevent equipment damage and maintain its functionality we would have to go back to each camera trap location once more to adjust the equipment accordingly. This would not be possible considering the time and resource limitations within the project. On the other hand, a good volume of data had already been collected by the camera traps during the first 10 days of their operation. Hence, we decided to have all the camera traps taken down just before the access road to Tusheti would shut down for the winter and kindly requested the park rangers to do it for us before leaving Tusheti for the lowlands. So, all the camera traps were subsequently recovered by the rangers.



Photo #3. A young stag in Alatovani gorge, Tusheti

- According to the results of our survey there were at least 3 roaring (breeding) stags in Alatovani valley. In addition, almost all the camera traps that were installed in that valley captured individuals of red deer. Based on camera trap data, recording of roaring stags, tracking and recording the locations of red deer signs such as pellets, footprints, using the information available at the park administration, and interviews with local shepherds we created a preliminary range map of red deer in Tusheti (Annex #7) However, our assessment of the terrain as well as pellet group abundance made us conclude that the robust method of the Pallet Group Counts is probably not suitable for Tusheti. On the other hand, the survey results confirmed the existence of a breeding population of red deer in Tusheti and that the estimate provided by the park administration mainly based on expert opinion – approximately 50 individuals may be considered valid. Because of the relatively low density of the population, while the method of pellet group count is not suitable, we recommend to consider using the roar count in subsequent assessments despite its obvious disadvantages or even camera trapping. Close further monitoring and documenting any red deer signs outside the Alatovani valley should also continue in order to detect any further expansion of the red deer range in Tusheti.

5.2 Faecal pellet group decay experiment in Lagodekhi PA

We launched a *Faecal pellet group decay experiment* in Lagodekhi PA in September. One of the park rangers, Mamuka Gogoladze was actively involved in the process. First, we collected 11 fresh red deer faecal pellet groups and placed them at varying altitudes throughout the red deer habitat (see Annex #8 for map). Each site was marked with a bright tape to help locate them in subsequent visits (Photo



Photo #4 Red deer pallet groups, Lagodekhi PA

#4). We visited the sites twice – in November and December to check and document pallet condition. In December, the pellet sites that were located at ≥ 1700 m were already covered by snow. Thus, we only visited the lower elevation sites.

The experiment will continue until the pellets will have been completely decomposed. It is, therefore, important to check the sites regularly in order not to miss the time of total

decomposition of the pellets.

Observations will need to be intensified if there is a sign of the pellet groups decaying at a faster rate.

6 Ungulate monitoring in Adjara protected areas via intensive camera trapping

In preparation for the ungulate monitoring survey in Adjara PAs, we purchased the necessary camera trap equipment through a separate grant agreement with CNF. The procurement had to be done on-line. Because we planned to purchase as many as 100 units it was critical that we chose the best available model(s) for the purpose. This turned out a difficult task because a wide variety of camera trap models were available on the global market. After a thorough investigation and a close look into the reviews of various products, we first purchased 11 seemingly best models from five different



Photo #5 Camera trap models purchased for testing

manufacturers (Photo #5). We tested them both indoors and outdoors. One of the models, *Browning Spec OPS Edge* performed the best; It had the longest sensor detection range and the image quality was excellent for both night and daylight photo/videos. In addition, a compact design and camouflaged coloration make this camera trap less visible in the field. The model also has a built-in small monitor allowing viewing photo/videos on the device and is also immensely helpful during the installation.

According to trusted websites, if these cameras are to take 35-day and 35-night pictures every 24 hours, the *Spec Ops Edge* would can last for 27.3 months in the field on a set of 8 AA Lithium Batteries.

The model has some disadvantages too: the camera has a relatively narrow field of view than its sensor. This may result in some pictures being empty i.e. with no animal in them, if the animal moves slowly. The model does not have the so-called combo mode that allows taking video after the taking a photo. Nevertheless, it was obvious that the advantages outweighed the disadvantages and *Spec Ops Edge* was finally selected for the ungulate monitoring in Adjara protected areas.

We encountered some problems purchasing and shipping the camera traps into Georgia; Unfortunately, the preferred on-line shop, B&H while offering a very good discount, was unable to provide all 90 units. We had to split the order between this and another online supplier. Then, the shipping was also delayed due to COVID-19 pandemic.

We began the fieldwork as soon as the equipment (camera traps) arrived.

First, we went to Kintrishi PA. We met with Park Director, Mr. Paata Khinikadze, at their office in Kobuleti to inform him about the ungulate study, the methodology and what we intended to do. The same day, we went up to Kino, the last village at the protected area and set up a camp there. Notably, it was our very first work in Kintrishi. Obviously, we needed assistance from the local administration, which was kindly provided by park rangers. They showed us to the trails and roads and helped us familiarise with the study area. They also advised on specific camera trap sites.



Photo #6 *Installing camera traps in Kintrishi*

Because we were very limited in time (due to the late arrival of the equipment), we split in two groups and tried to install at least two camera traps a day. Snow cover was already quite deep at the elevation of ≤ 1400 m. Hence, we decided to place camera traps at lower elevations, namely in areas where ungulates were expected to spend much of the winter. We tried to install cameras at least at 1 m. above the ground, facing down toward the trail. This would ensure that snow would not cover the camera and that they would remain functional throughout the winter. In total, we installed 16 camera traps in Kintrishi protected areas (see Annex #9 for map).

After Kintrishi we moved to Mtirala national park. We had a phone communication with Mtirala Park Director, Mr. David Khomeriki. He recommended to get in touch with Mr. Ruslan Kontselidze, Senior Ranger in Chakvistavi, who turned out to have very good knowledge of animal trails in the area. He accompanied us in the field and saw us to the most remote areas of Mtirala protected areas. We installed 18 camera traps distributing them more or less evenly throughout the park (see Annex #10 for map).

We then moved to Machakhela national park. We met with Mr. Giorgi Kuridze, park director and Mr. Iveri Shavadze, natural resource specialist at their office in Adjara Agmarti. We discussed the methodology in detail, worked on the maps and planned the fieldwork. The director kindly accompanied us during the fieldwork, personally guiding us to specific sites. We installed 17 camera traps on the main trails in Machakhela PA (Annex #11). We placed them at relatively low elevations, setting them high above the ground to protect them from snow.

The camera traps will remain in the field throughout the winter in all three protected areas and collect data on ungulates and other large mammals. NACRES team should visit the protected areas at least three times throughout 2021. Jointly with the local rangers we should do all the necessary maintenance of the installed camera traps such as replacing batteries and additional units in higher altitude areas should also be placed as snow cover retreats.

7 Next steps

The monitoring activities for the selected indicators were the first assessments conducted according to the agreed 10-year mentoring plan. Hence these results will need to be subsequently analysed and interpreted in combination of the data that will be obtained in subsequent years. For example, according to the chosen protocol, the bezoar goat assessment results both for Tusheti and Khevsureti will need to be analysed in combination of the results that will be obtained in the second assessments which will be conducted in spring/summer 2021. Thus, the above presented results of population numbers are not final estimates for those populations.

Moreover, the other assessments that were conducted in 2020 were in fact the launching of the planned activities:

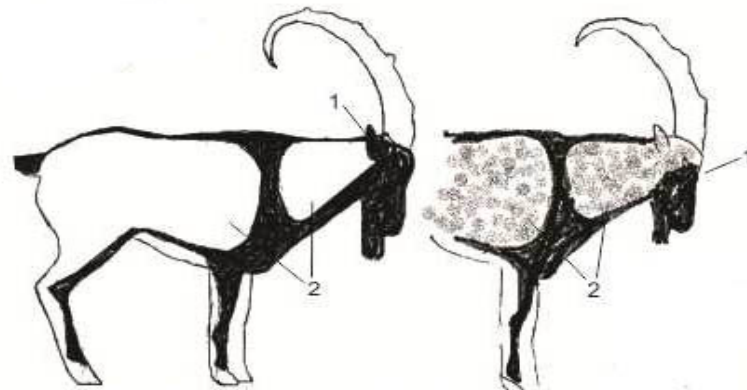
3. *The Faecal pellet group decay experiment* in Lagodekhi PA will continue into 2021 until the pellets will have been completely decomposed.
4. The ungulate assessment in Adjara protected areas will continue into 2021 and the camera traps will remain in the field throughout the winter in all three protected areas and collect data on ungulates and other large mammals.

Annex #1. Bezoar goat observation field form

Note: The field form developed according to Veynberg, P. (2012). Monitoring Programme for Mountain Ungulates in Azerbaijan. Baku: GIZ Programme on Sustainable Management of Natural Resources, Southern Caucasus;

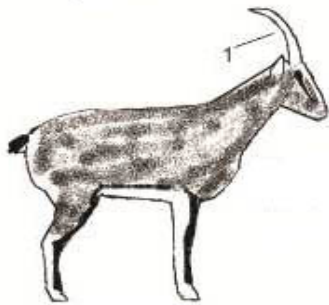
Date		Weather		Observation start	Observation end	Observers							
						1. 2.							
Observation Coordinates (GPS position)				X		Y							
#	Location Name of the gorge or mountain	Exact time of animal detection	Altitudinal zone F: forest A: subalpine-alpine	Surface type S: scree C: cliffs SM: smooth	Exposure (In degrees)	Bezoar goat							
						Adult male	Young male	Yearling male	Adult female	Yearling female	Juvenile	Unknown	Total
Total													

1. Each single animal or group should be written down separately (use separate row).
2. If the individual/group is isolated from others and the gap is 50-100 meters, it should be considered as a separate group.

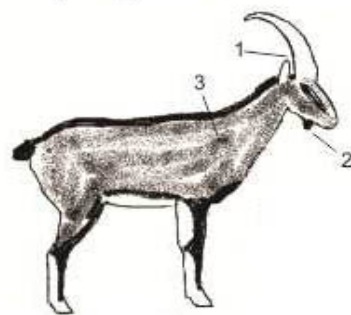


A) Adult Male

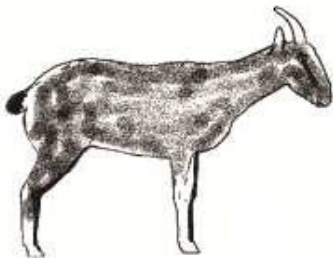
B) Young Male



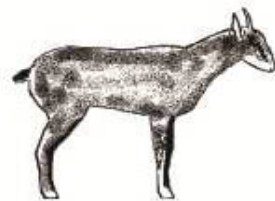
C) Adult female



D) Yearling male



E) Yearling female



F) Juvenile

A) Adult male ($\geq 5-6$ years). (1) Head wholly black. (2) Body color is white or silvery, or silvery grey. Male body has black stripes.

B) Young male (2-5 years). (1) Head is not completely black, have beard; (2) Body color is mostly brownish and just turning grey. It has dark stipes along the body.

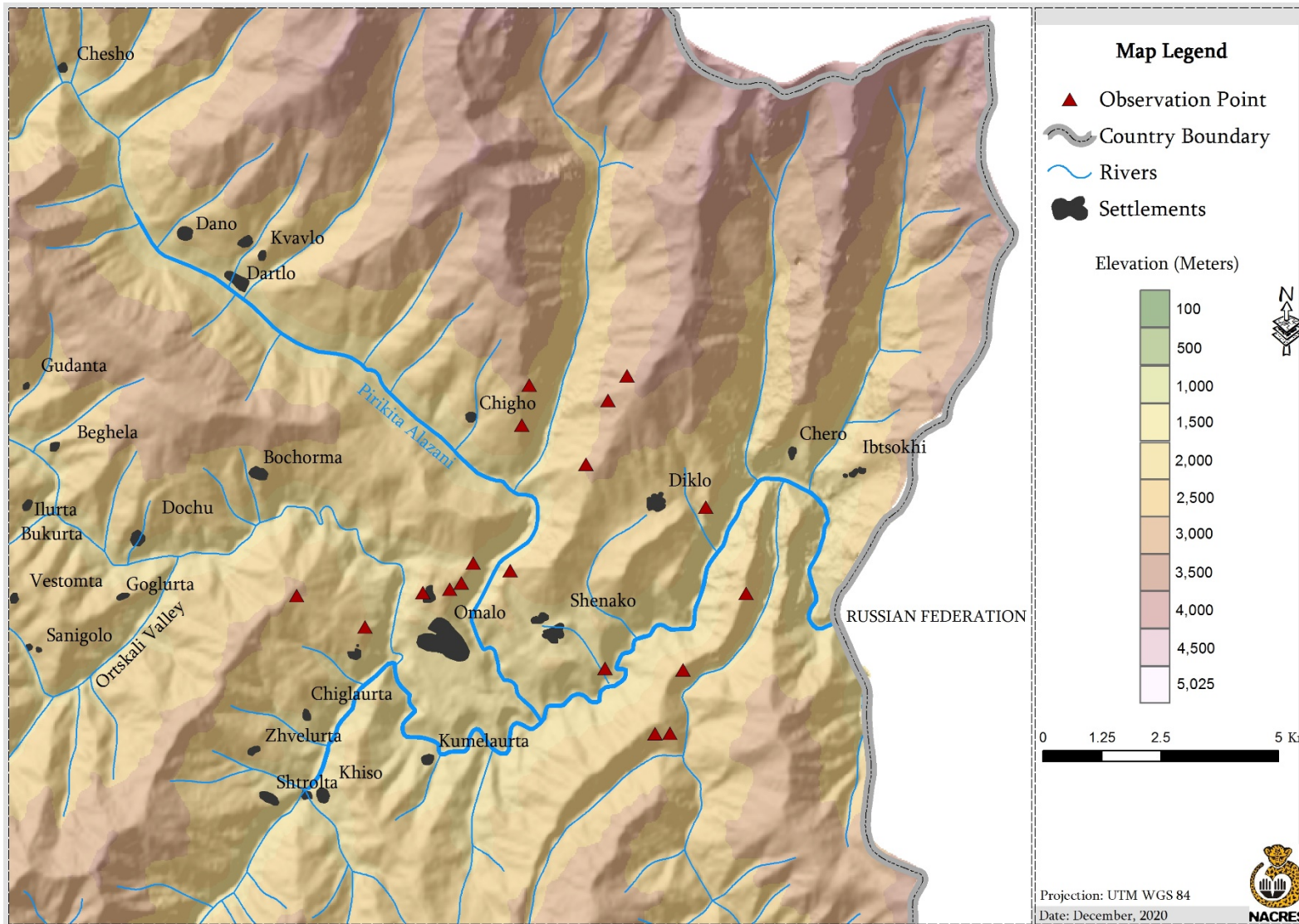
C) Adult female. Females are brownish with thin spiky horns (1) considerably longer than the ears and no beard. They have a stripe masking the eyes, a stripe separating white belly from brown sides and back, and a stripe along the spine.

D) Yearling male. Yearling males are about the size of a female (1) their horn size are the same length as those of females, but are noticeably broader at the base; (2) may have a vestige of a beard; (3) display the same pattern of stripes but have a greyish tinge to their upper parts.

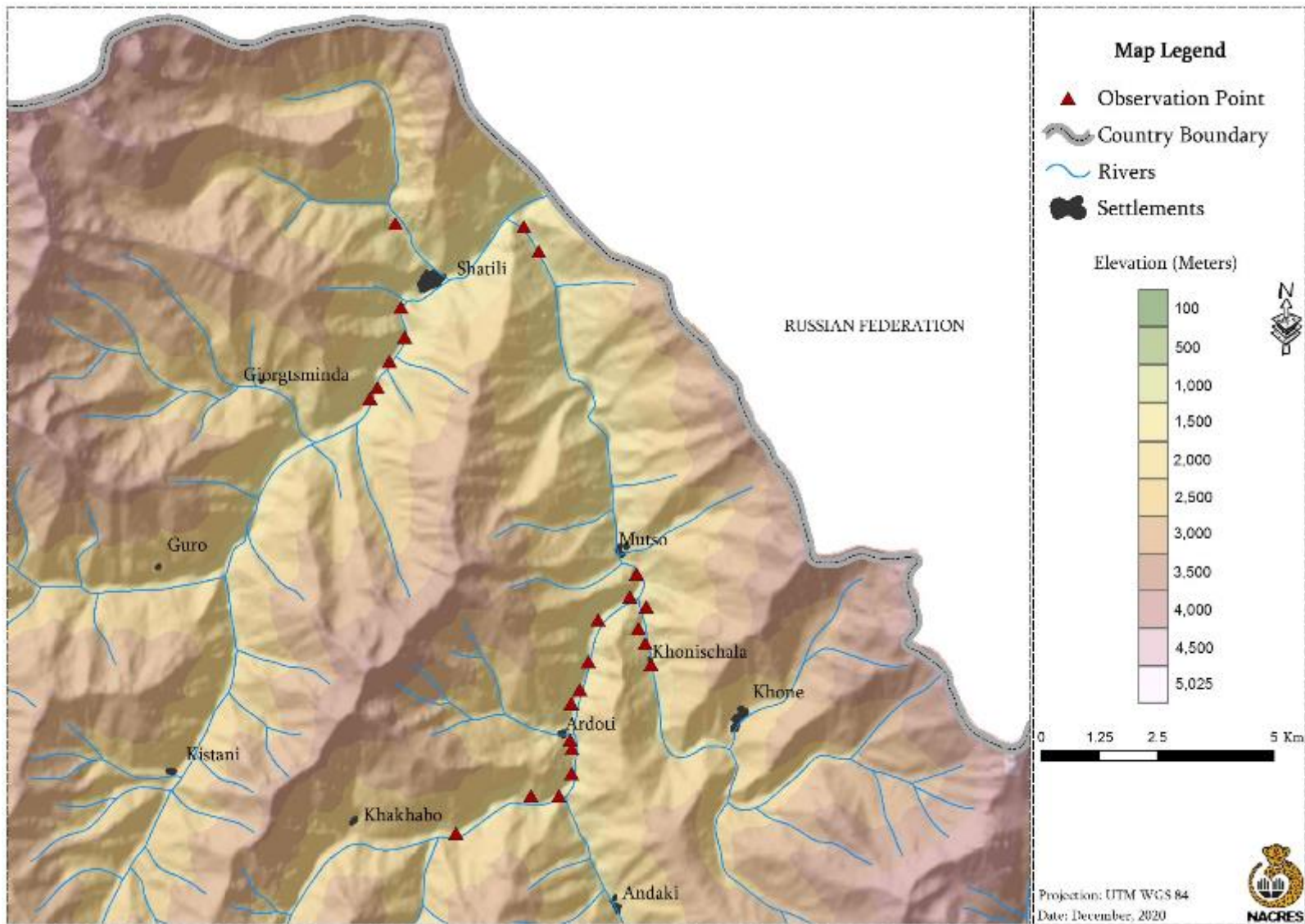
E) Yearling females. Yearling females are smaller and more slender than adult ones, with horns just longer than the ears.

F) Juvenile. Juveniles are small with no visible (in summer) or spiky horns up to the length of the ears (during the rut)

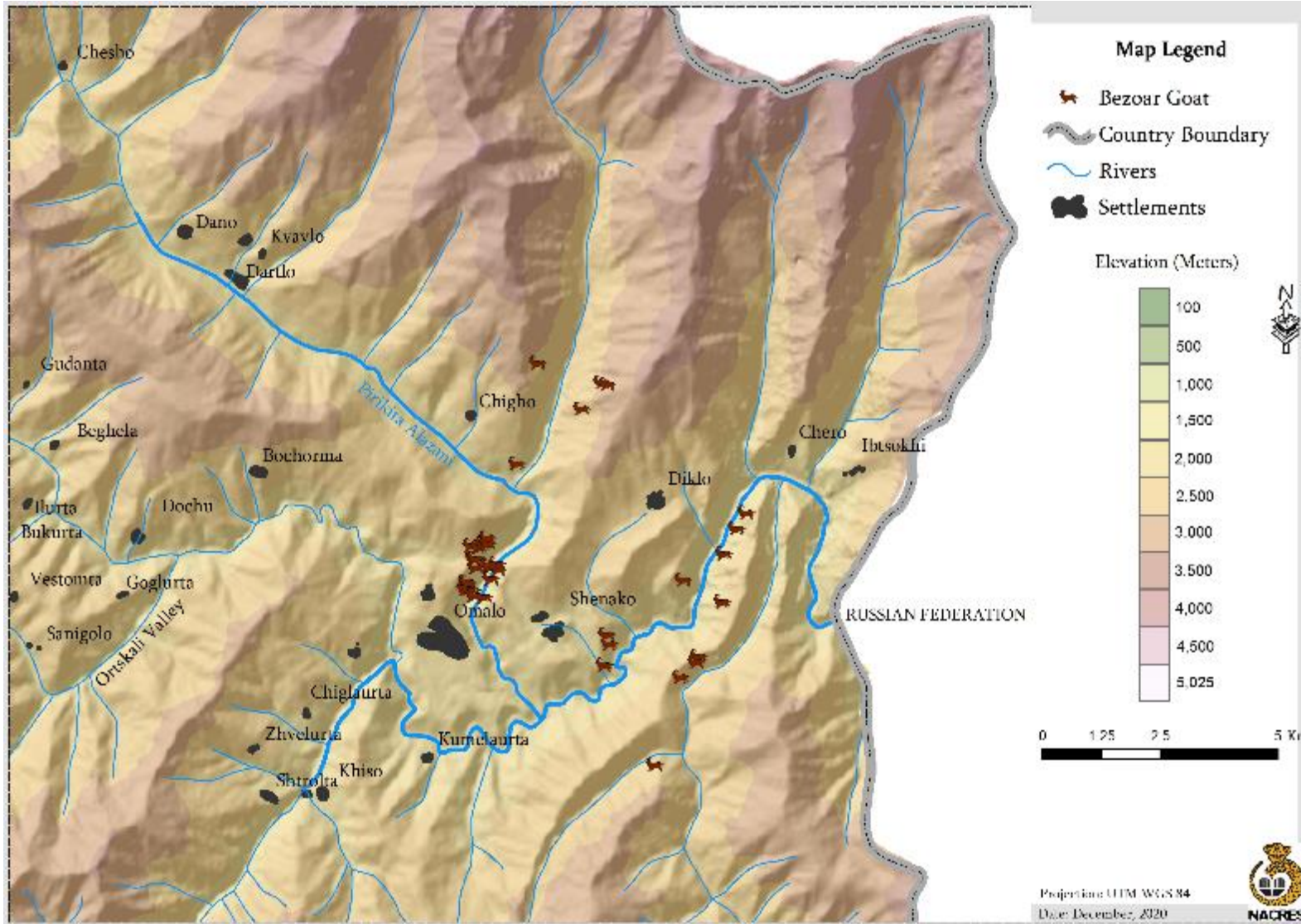
Annex #2. Bezoar goat observation points in Tusheti PAs



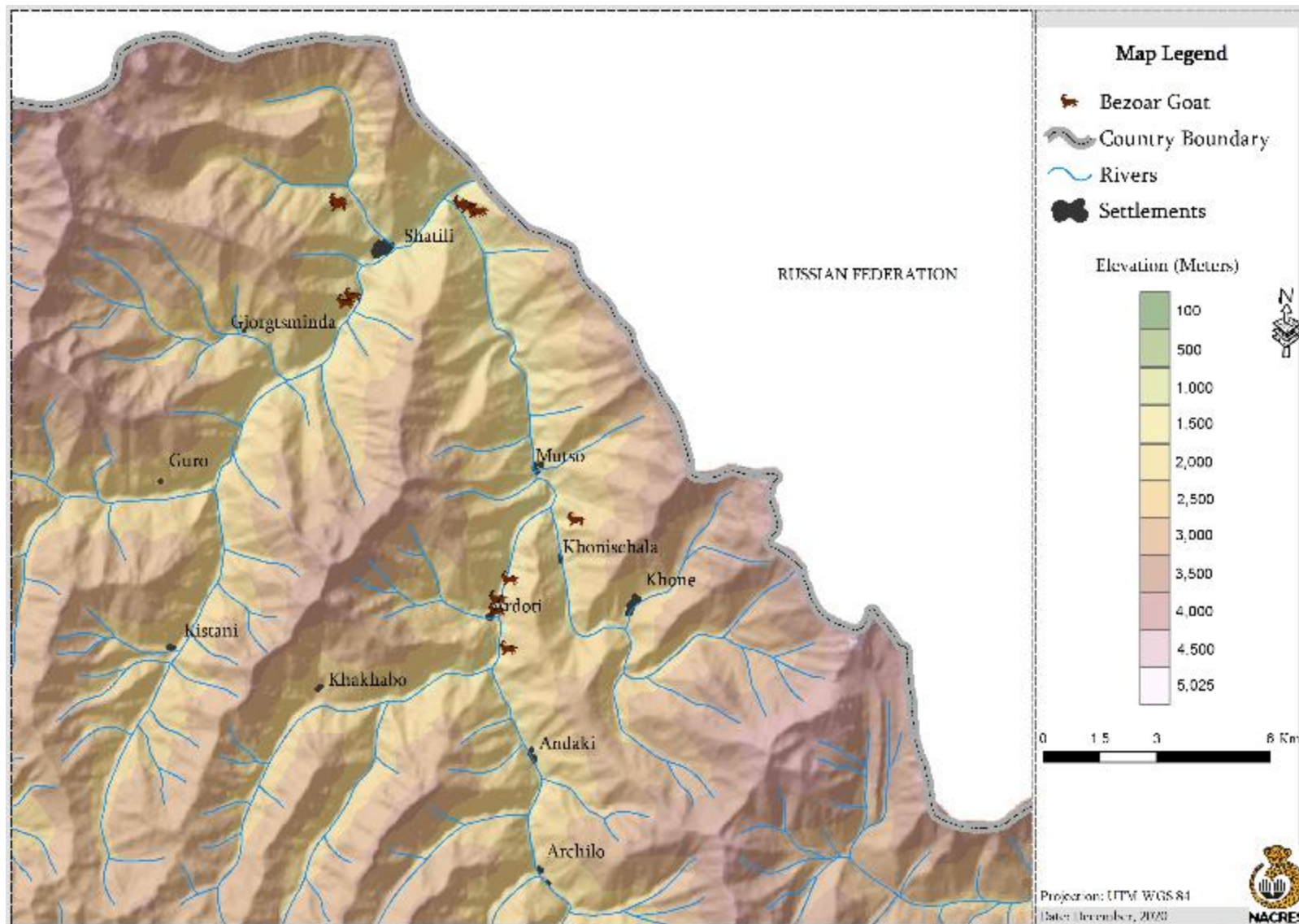
Annex #3. Bezoar goat observation points in Pshav-Khevsureti PAs



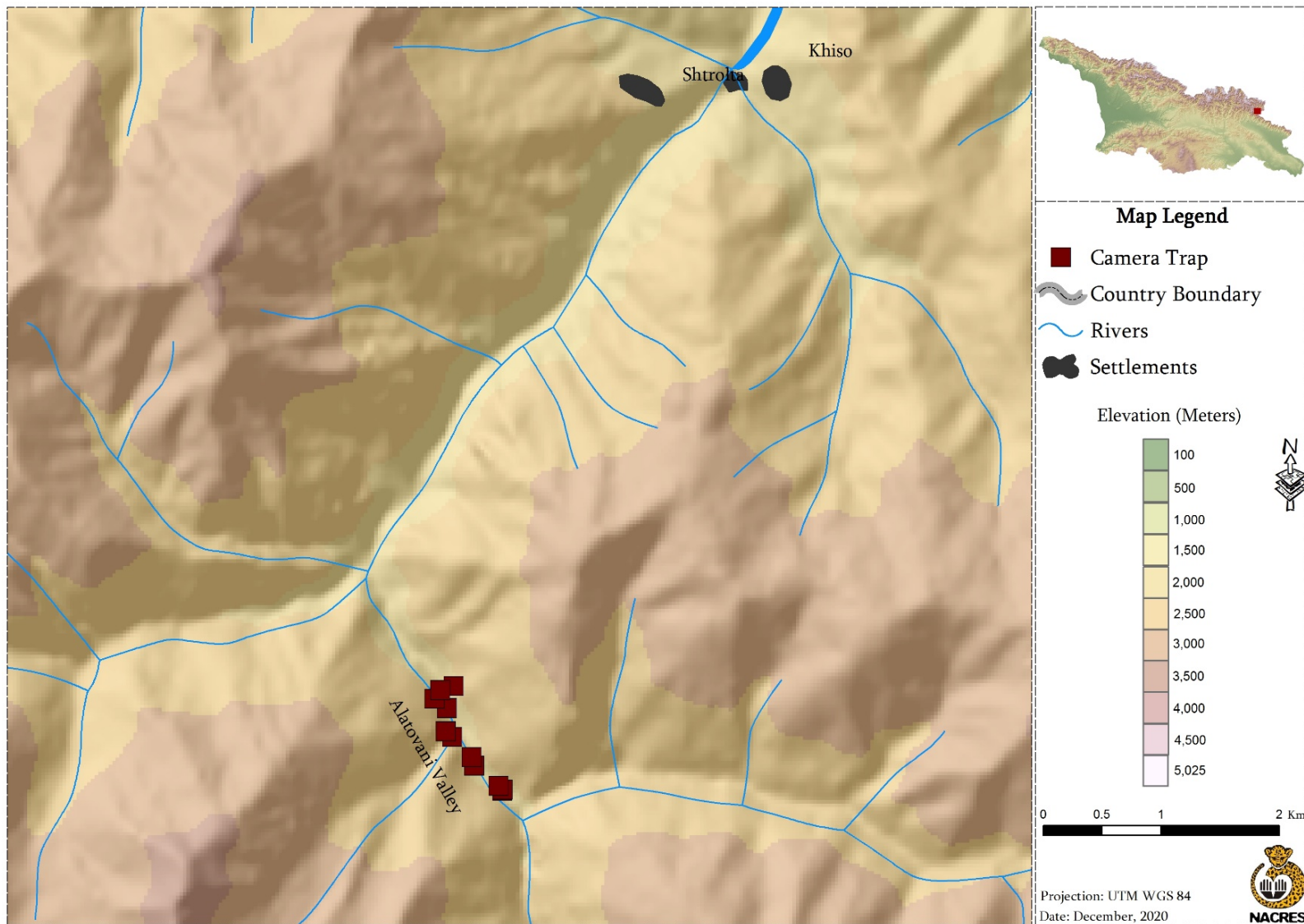
Annex #4. Bezoar goat sighting locations in Tusheti protected areas



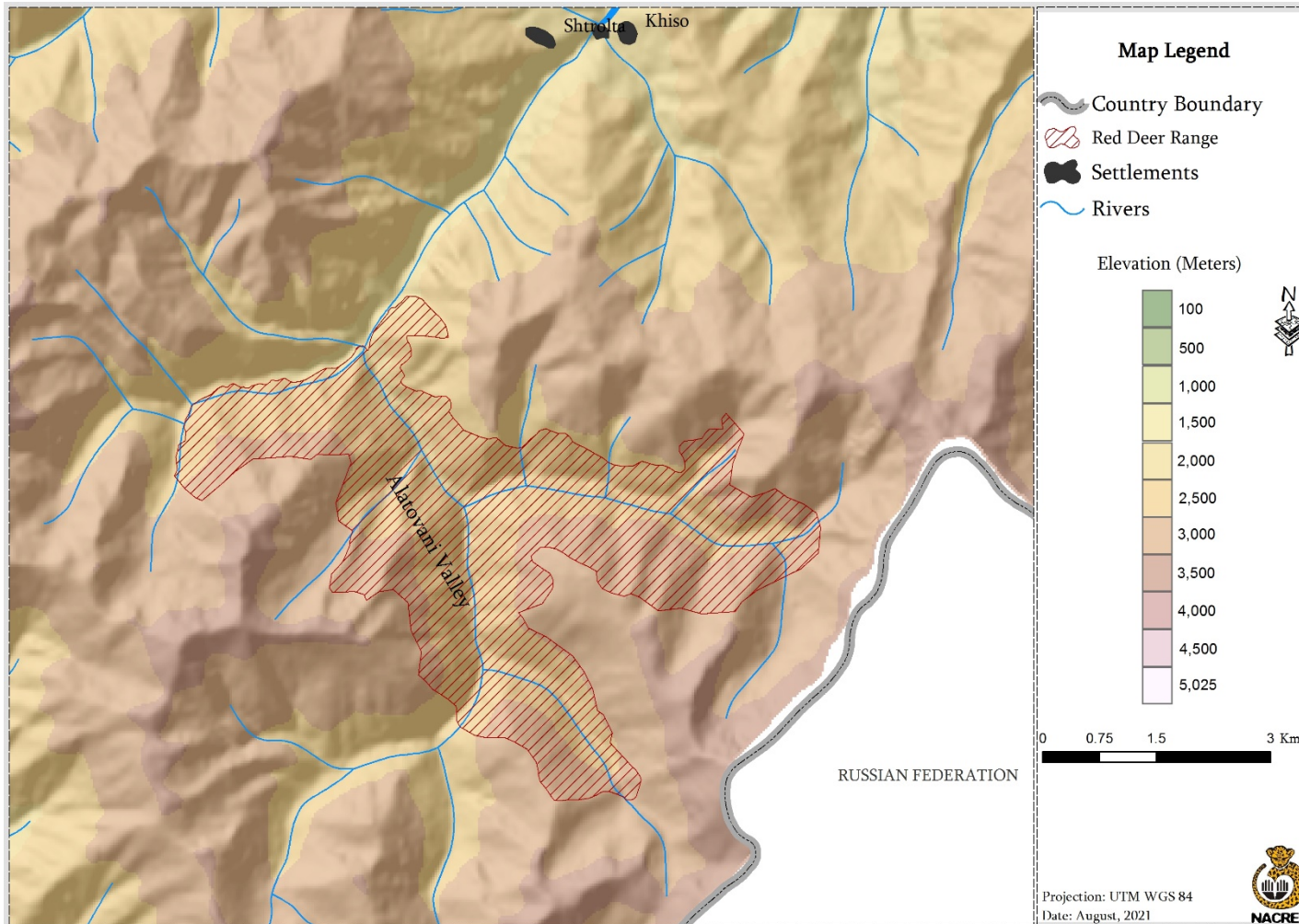
Annex #5. Bezoar goat sighting locations in Pshav-Khevsureti protected areas



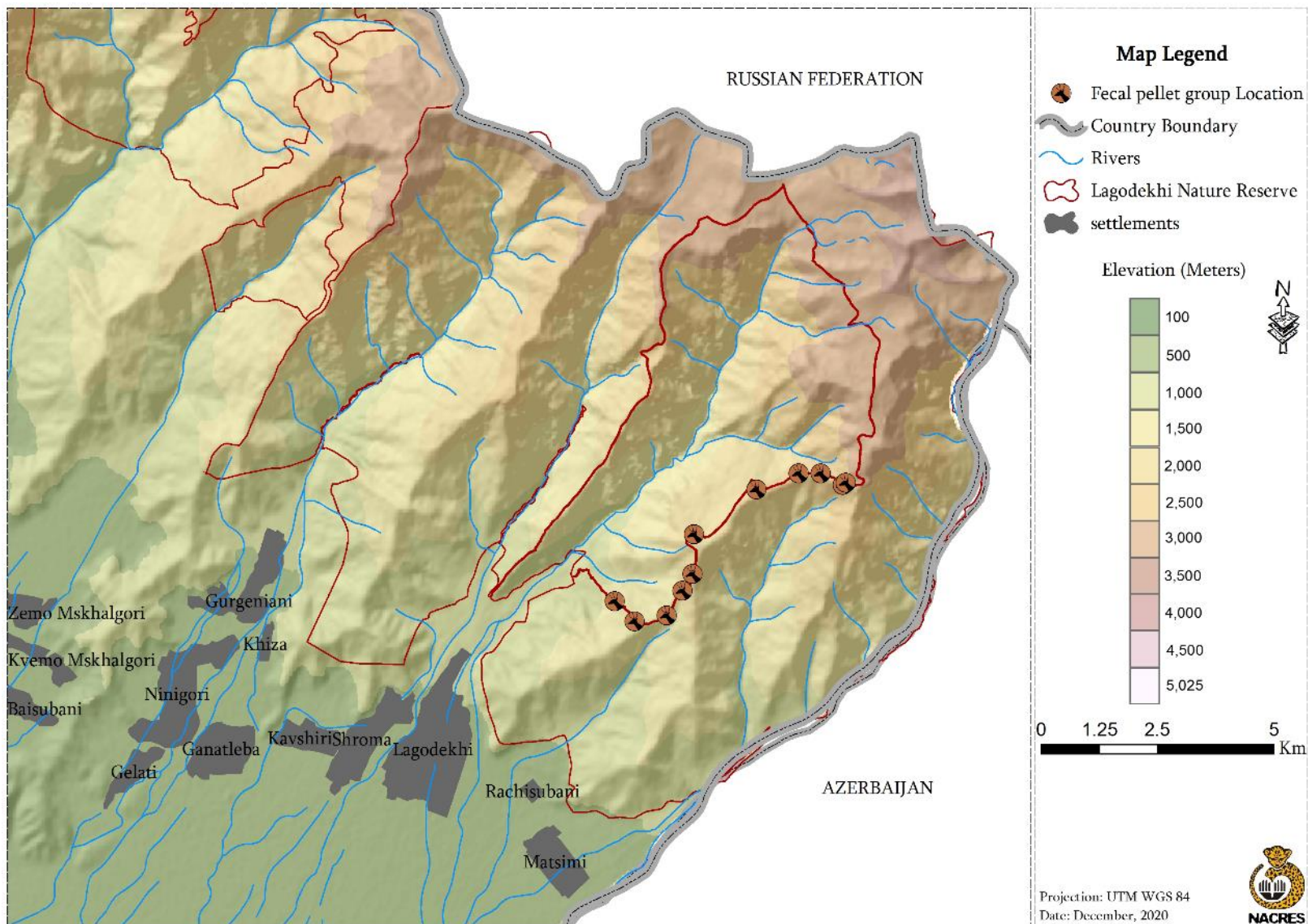
Annex #6. Locations of camera traps in Alatovani valley, Tusheti.



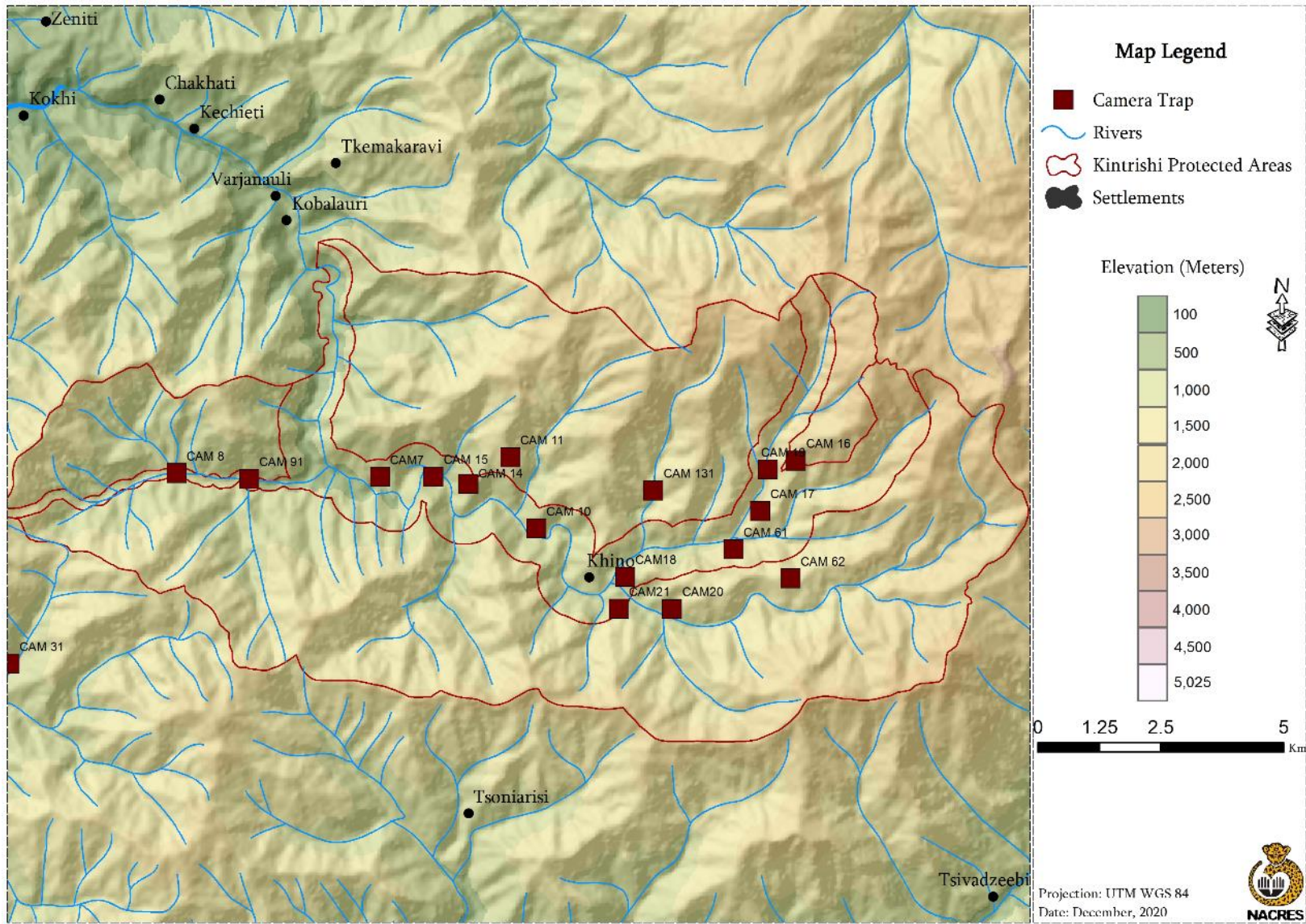
Annex 7. Preliminary range map of red deer in Tusheti



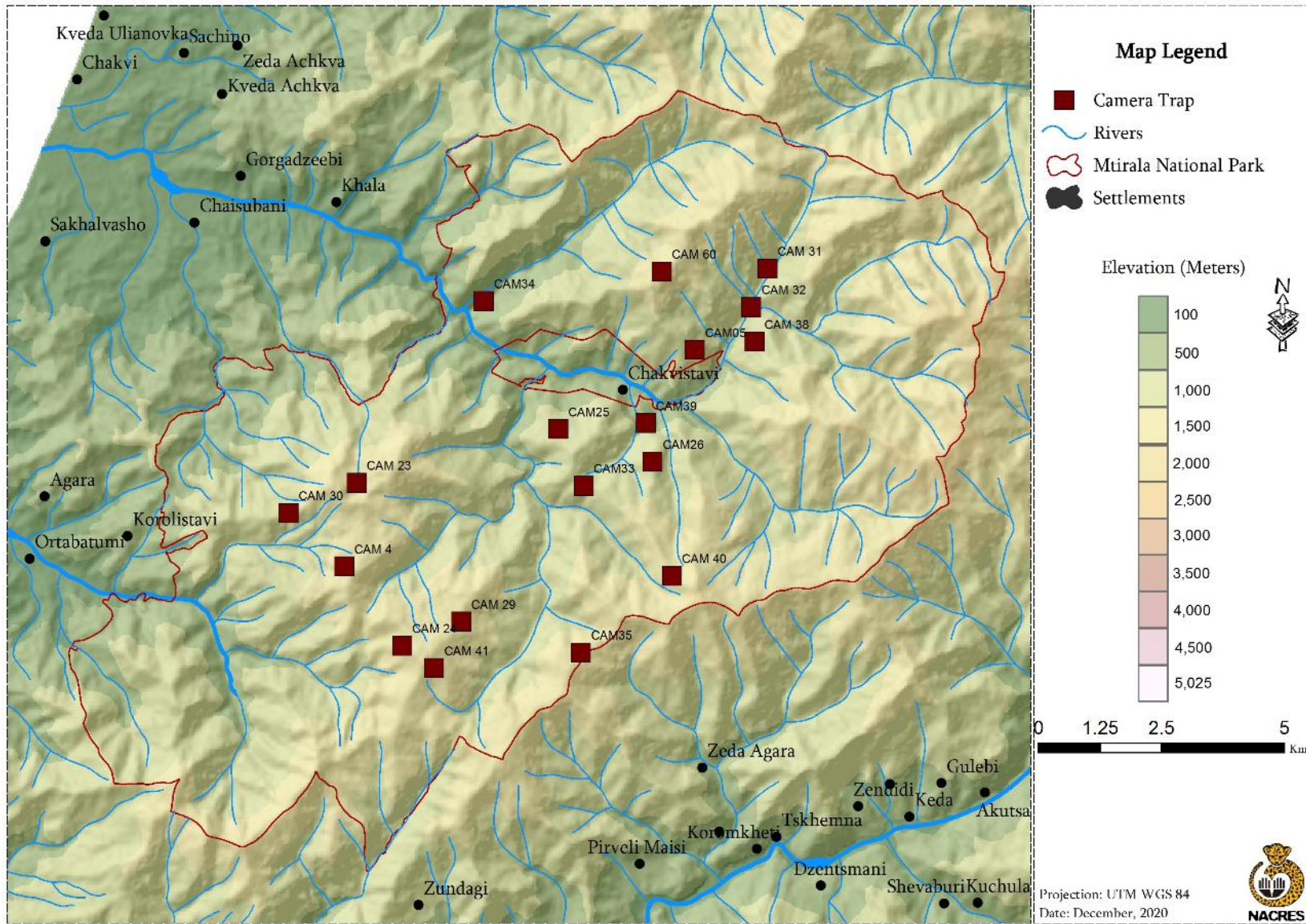
Annex #8. Red deer pellet group decay experiment sites in Lagodekhi PA.



Annex #9. Camera trap locations in Kintrishi protected areas



Annex #10. Camera trap locations in Mtirala national park



Annex #11. Camera trap locations in Machakhela national park

