



This PDF is a simplified version of the original article published in Internet Archaeology. Enlarged images which support this publication can be found in the original version online. All links also go to the online version.

Please cite this as: Tomášek, M. and Mařík, J. 2023 Archaeology and the Natural Environment in the Czech Republic. Recognition, documentation and protection in a time of climate change, Internet Archaeology 62. <https://doi.org/10.11141/ia.62.6>

Archaeology and the Natural Environment in the Czech Republic. Recognition, documentation and protection in a time of climate change

Martin Tomášek and Jan Mařík

A considerable part of the Czech Republic has been forested with spruce monocultures, which are nowadays at risk of disastrous bark beetle infestation and consequently the destruction of forest stands. Such a development forces us to seek common grounds for landscape conservation and more consistent communication in setting forest management rules. Nevertheless, the trend of rapid deforestation implies a considerable threat to the hitherto unknown but also known archaeological heritage resource. Joint advocacy of the values associated with archaeological sites incorporated within the processes of landscape change assessment constitutes a distinct task aimed at ensuring that such an essential part of the landscape's memory becomes a publicly accepted value.

1. The threat of the bark beetle and the issues of monument protection

The current extreme climate trends impact very severely on the cultural landscape and pose a threat to archaeological sites and finds in their original location, i.e. in the ground. There are many adverse effects of climate change on cultural and, therefore, archaeological heritage of the Czech Republic - for example, the increasing pressure to integrate ahistorical greenery into the urban centres of historic towns, accompanied by large-scale excavations. Constructing new or restoring old



watercourses and waterworks using heavy machinery without regard to the need to protect the cultural landscape proves to be another threat, and cutting down and restoring historic tree avenues or parks that are dying or infested by pests also represents a significant challenge.

Since 2016, the bark beetle calamity has become dominant. The bark beetle, which has existed in the landscape for centuries, is currently infesting large areas of spruce monocultures that are characteristic of Czech commercial forests. The only solution to a disaster of this magnitude lies in immediate logging. However, logging poses the greatest threat to the archaeological cultural heritage in forests. Legally, it is virtually unregulated, owing to its nature as an emergency measure. Therefore, it has become a challenge for the heritage protection authorities, the community of archaeologists and all the people concerned about the fate of the Czech landscape.

The Czech Republic consists almost exclusively of cultural landscapes. The entire territory of our inland country has been affected by human activities, except perhaps for small areas on the summits of the Bohemian Forest on the borders with the Republic of Austria and the Federal Republic of Germany, where the landscape has still preserved its natural character and is untouched by humans. The cultural landscape of the Czech Republic nowadays comprises a varied and fascinating mix of residential, agricultural, forestry and mining areas. It is an environment that naturally combines the interests of protecting heritage as well as nature and landscape conservation values. While both interests, i.e. heritage protection and nature/landscape protection, are legislatively enshrined and regulated in the Czech Republic as parts of the public interest, their respective professional and institutional provision is administered separately. The expert organisation responsible for the protection of the heritage resource is the National Heritage Institute (NHI), while regional or district authorities constitute the executive state bodies for protected monuments and other heritage components. The role of the executive state body for protected areas and the expert organisation for non-protected areas is performed by the Nature Conservation Agency of the Czech Republic (AOPK ČR), with regional and local authorities having executive powers. The split system, introduced in the Czech Republic only in 1992, is proving impractical, especially during major climate changes and fluctuations. Together, we could intervene more effectively in monitoring activities threatening cultural landscapes, especially forest landscapes, which are connected to managing the bark beetle infestation.

Currently, 33.8% of the national territory (26,660km²) is covered by forest that fulfils many functions regarding nature, landscape and society in general. In addition, forests are also important to the economy and ensure the protection of archaeological sites and finds e.g. they slow down surface water run-off, prevent erosion, reduce soil drying or wind speed, influence the climate in their surroundings and protect large areas from deep ploughing. Regarding heritage conservation, forests currently contain the highest number of preserved archaeological monuments, sites and artefacts in the country. A healthy forest, even a commercial one, largely preserves its lost archaeological structures. In fact, landscapes, including terrain structures transformed by humans in the past, are subject to legal protection even in forest management activities. However, the emergency caused by the bark beetle has exerted pressure resulting in the rapid, widespread and thoughtless deforestation of large areas. On the other hand, the forestry legislation



also strongly encourages rapid reforestation of clearings. Both activities can be and have been destructive to known (and as yet undocumented) archaeological sites still protected by the forest.

It is worth mentioning that only part of the archaeological heritage resource is known and properly documented, and only a tiny portion is protected. Less than 1400 archaeological sites and areas are being protected as cultural monuments or conservation areas (Figure 1). However, the State Archaeological Inventory of the Czech Republic records about 22,000 unprotected structures and sites comprising archaeological sites of different age, extent, authenticity and, therefore, value. In terms of nature and landscape protection, that also encompasses the legal care of terrains and ancient structures, we must state that the protected areas are much larger (Figure 2). In total, such areas account for up to 16.05% of the national territory. Considering that forested areas are often involved, it is apparent that the interests of heritage protection and landscape and forested areas intersect in many places. The so-called dual protection enhances the possibilities for an active and comprehensive approach concerning the future development of the landscape, provided that the cooperation is sound.

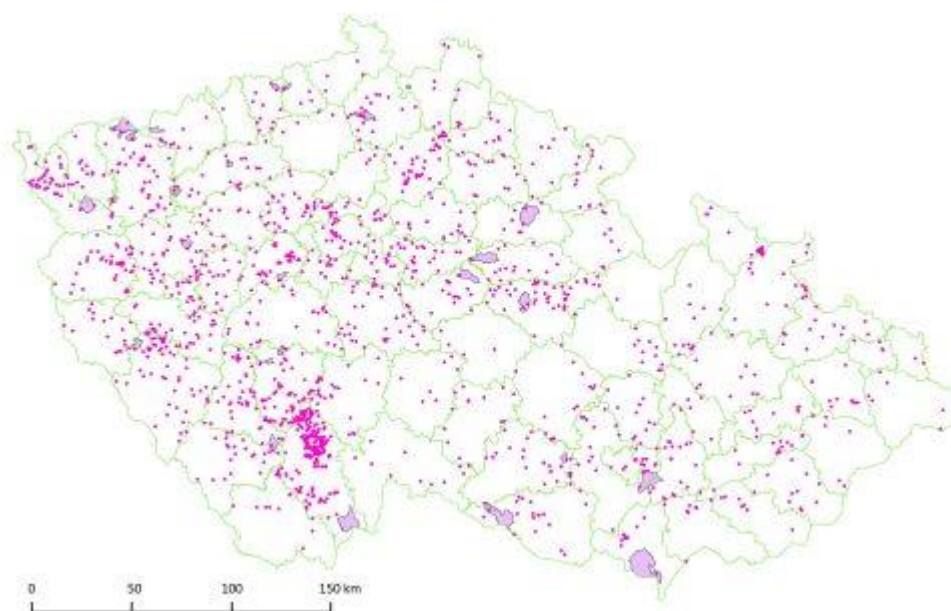


Figure 1: Landscape conservation zones and cultural monuments of an archaeological nature in the territory of the Czech Republic (NHI, J. Ambrožová)

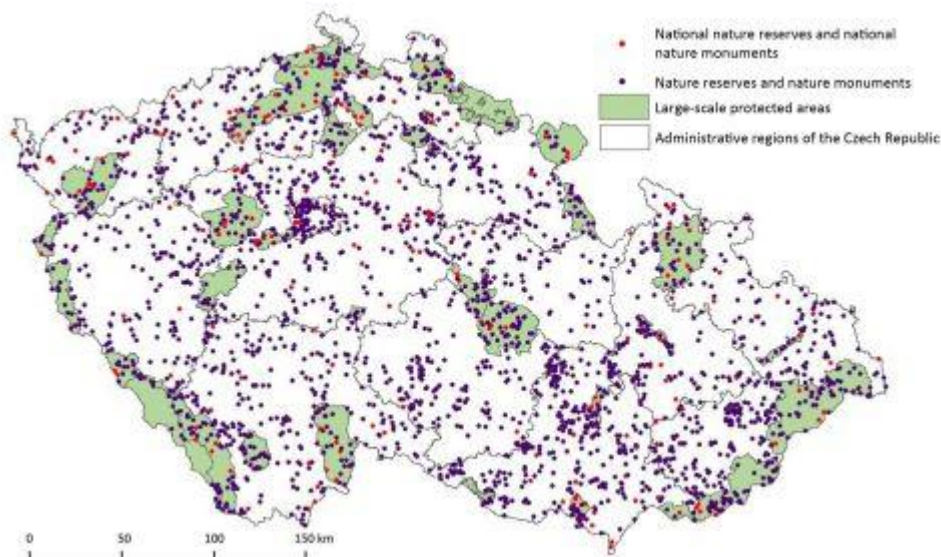


Figure 2: Small- and large-scale (natural and landscape) protected areas in the Czech Republic (Source: AOPK ČR)

The bark beetle infestation and its extent implies that the conservation authorities, together with the whole archaeological community in the Czech Republic, have been challenged with the enormous task of ensuring at least elementary documentation of disturbed sites and continuous monitoring of the condition of already registered archaeological monuments. Although the bark beetle has always existed in the Czech Republic's commercial, mainly spruce forests, its incidence has never been so extensive (Figure 3). Open sources have enabled, for example, assessment of the area of logging and the dead-standing forests in predominantly coniferous stands using differential analysis of satellite data between July 2021 and September 2021. Altogether, 9000 hectares of new logging in mainly coniferous stands and 10,500 hectares of dead-standing forests were identified as of September 2021. Similar amounts of logging have been recorded for several years. Heritage management and archaeology have suffered from personnel and financial constraints, in addition to the current legislation, which dates back to 1987 (Act No. 20/1987 Coll.), i.e. before the political and social change of our society towards democracy. Neither the specialised organisation for heritage management, i.e. the National Heritage Institute, nor the leading scientific organisations and guarantors of the competence of archaeological excavations, i.e. the Archaeological Institutes of the Czech Academy of Sciences, were given much leeway to intervene. The aforementioned nature and landscape protection, i.e. the AOPK ČR, is somewhat better off. It has the legal means to actively protect the landscape character (Landschaftscharakter), including anthropogenic terrains and, thus, archaeological structures (Article 12 of Act No. 114/1992 Coll., on Nature and Landscape Protection). However, they have neither the capacity nor the possibility to respond quickly enough in cases where such structures constituting the landscape character are already being damaged owing to large-scale logging.

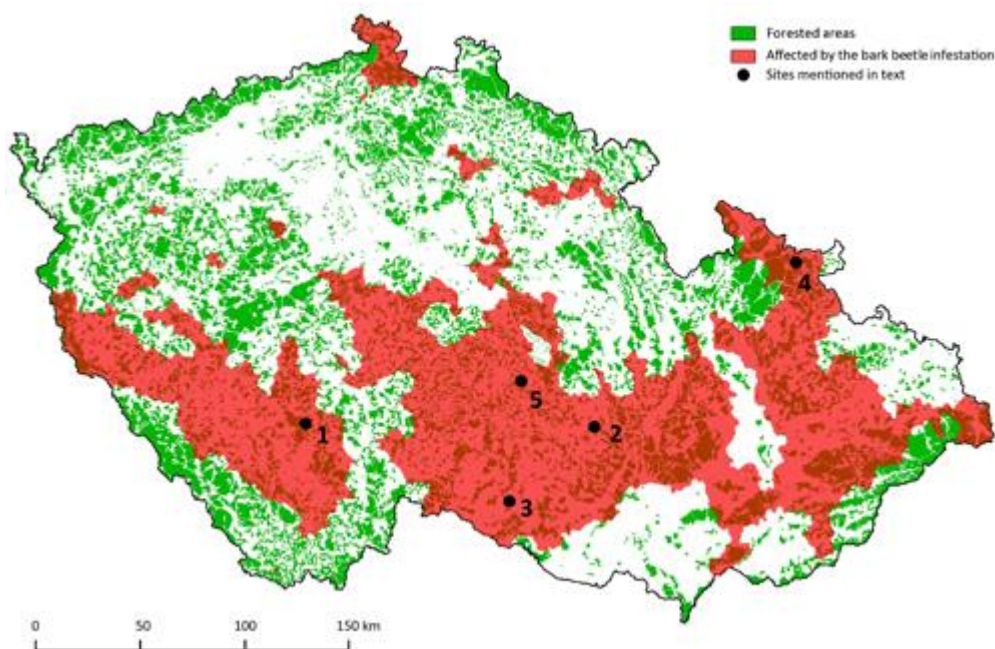


Figure 3: The intensity of bark beetle infestation in Czech forests (open sources). 1. Údraž (Písek district), 2. Mitrov (Žďár nad Sázavou district), 3. Komárovice (Třebíč district), 4. Petrovice (Bruntál district), 5. Utín (Havlíčkův Brod district)

Under such highly challenging circumstances, we, as a professional heritage management organisation and leading academic institution, believe that raising owners' awareness about the value of archaeological sites on forestland they own and manage in the cultural landscape is essential. The Central Inventory of Cultural Monuments of the Czech Republic (<https://www.pamatkovykatalog.cz/>) provides information for the owners of cultural monuments, including archaeological sites already protected by law. The State Archaeological Inventory of the Czech Republic information system (<https://iispp.npu.cz/rozcestniky/isad>), created by the National Heritage Institute, registers already known archaeological sites. Last but not least, the Archaeological Map of the Czech Republic (<https://digearchiv.aiscr.cz/home>), developed by both Institutes of Archaeology of the CAS in Prague and Brno, in cooperation with all archaeologists in the country, provides information about archaeological excavations and finds. Our main task consists of integrating the information they contain into information sources that can affect the economic forest and landscape management. Such tools are, in the case of economic forest management, the regional forest development plans (<https://geoportal.uhul.cz/mapy/MapyOprl.html>) and, in the case of landscape character, the information system for nature and landscape protection (<https://drusop.nature.cz/portal/>). However, the effective integration of information resources represents only a medium-term goal and does not address the current pressing difficulties.

The heritage management authorities therefore intervene directly in negotiations with large forest owners. The fact that the Czech state owns about 58.7% of all commercial forests in the Czech Republic provides a particular advantage. The state enterprise Lesy ČR manages about 1.17 million hectares of forest. At the same time, it also maintains almost 20,000km of small watercourses. The National Heritage



Institute has started negotiations with this organisation on categorising forests with regard to the existence of archaeological monuments, and relating to the rules of logging and replanting clear-felled areas. Simultaneously, we have been striving to contact individual forest managers directly, especially in the regions most affected by the bark beetle infestation, and inform them that archaeological sites exist in the forests they manage. In this way, we try to influence their approach to the necessary logging at a local level.

Within the framework of scientific activities, the National Heritage Institute has also focused on this topic systematically (grant project Memory of the Moravian and Silesian Sudeten Landscape in Danger, NAKI II./DG20P02OVV008). The project involved a field survey of a part of the border mountains in the north-east of the Czech Republic, covering an area of about 6300km². As part of this project, a 'Heuristic Map of Archaeological Monuments' (<http://krajinasudet.cz/mapa/heuristicka.html>) was created (project 2020-2023). By intersection of aerial polygons delineating archaeological sites with areas affected by bark beetle logging, 227 threatened sites (of 1444 sites total in this area) were identified. Currently, the following locations are threatened by logging according to the data collection results using field research: urgently 25 sites, probably (i.e. in the perspective of about 2-5 years) 97 sites and potentially a further 105 sites. Furthermore, the project also assessed the methodological procedures intended for heritage management officers, nature and landscape conservation officers and owners in particular. To sum up, the project aimed to harmonise the interests of the economical use of the forest and the care of the archaeological monuments as much as possible.

The results of the project are quite clear. The lack of information is crucial in information systems, especially in the field. Archaeological sites are not marked directly in the landscape (by tree markers). The markings facilitate better orientation for the owner, forest managers and logging companies. Nature and landscape conservation can utilise such delimitations for protected areas; however, heritage management authorities cannot yet do so in terms of legislation or practice. Another essential instrument, currently not available, would be an Archaeological Site Management Plan, which would instruct the owner and the forest manager. Such a plan has not been incorporated into heritage legislation, and its concept relies on nature and landscape conservation. Such a document should include a detailed description of the anthropogenic landforms of the site, particularly considering above and below ground features wherever they are characteristic of the site. Moreover, a detailed breakdown of the site in terms of the potential risks of disturbance by logging could be included. Therefore, corridors could be identified in advance, which, given the nature of the site, can be used to transport harvested timber. This zoning could then be used to identify areas where harvesting by machine is not possible, or if so, where there should be the utmost respect for the anthropogenic landscape features of the archaeological site. However, the recommendations should not only focus on reducing the risks of damage to the site associated with large-scale logging, but also on establishing basic rules for the necessary reforestation.

Simple rules should be applied to avoid planting new trees on the tops of earthworks or, alternatively, at the bottoms of sunken archaeological features. Such a plan should constitute a comprehensive source of information for the owner specifying



individual restrictions on use and economic activities necessary to preserve the cultural landscape assets i.e. archaeological sites and entire structures. However, logging does not pose the only risk. Leisure activities and excessive tourism also belong among such hazards. Forests in the Czech Republic, including privately owned forests, are open to the public. It is, therefore, relatively easy to damage an archaeological monument by mountain biking, for example, or by using metal detectors to search for archaeological artefacts illegally. Last, but not least, such a plan should be supplemented by a map depicting the above-mentioned site zoning. Implementing such measures requires the personal commitment of a number of archaeologists and possibly amateur collaborators (while monitoring the monuments) and a legal mandate. The current state of affairs serves as an essential incentive and a call from the professional community for new legislation that would better reflect the systematic cooperation between heritage management and nature and landscape conservation, as well as ensure the information flow from professional organisations to owners.

2. Examples

2.1. Barrows

Barrows: **Údraž** (Písek district). Burial mounds from the early Middle Ages. The site is a cultural monument registered in the Central Inventory of Cultural Monuments of the Czech Republic under reference No. 40008/3-2788. Altogether, there are 38 Slavic barrows arranged into three rows (Figure 4). Six barrows were damaged by heavy machinery during logging in winter 2020/2021 and were reduced in mass by half. Two barrows were utterly destroyed (Figure 5). In this instance, the forest is owned by the town of Písek, which enabled the Museum of the Prácheň Region in Písek to at least carry out subsequent archaeological rescue research.

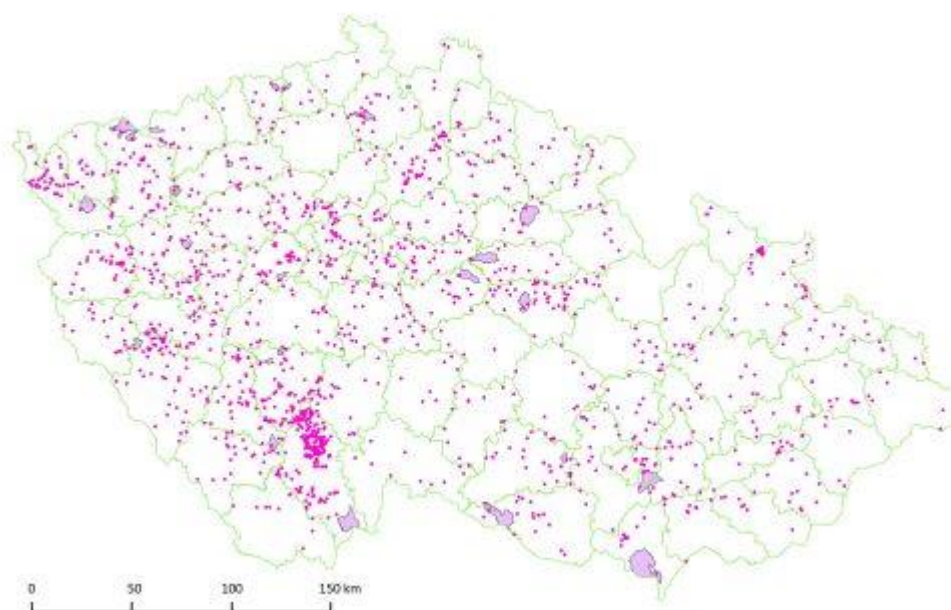




Figure 4: Údraž (Písek district). The state of preservation of the barrow site prior to its damage by harvesting bark beetle-infested timber (NHI, photo by J. Havlice, 2021)



Figure 5: Údraž (Písek district). The visible outline of a completely destroyed barrow, which disappeared in 2020/2021 due to forest management activities related to the bark beetle infestation (NHI, photo by J. Havlice, 2021)

2.2. Castle

Castle: Mitrov (Žďár nad Sázavou district). The ruins of the medieval castle are a cultural monument registered in the Central Inventory of Cultural Monuments of the Czech Republic under reference No. 38427/7-4444. Currently, the ruins of a small castle with a distinctive moat, 10-12m deep, and visible remains of several buildings and sections of the ramparts are threatened. The logging has been the result of the bark beetle infestation. Heritage management personnel recorded the logging quite accidentally at the moment when it impacted the relics of the walls. None of the professional organisations was informed in advance about such activities. Moreover, the damage to the monument has remained undocumented and irreversible (Fig. 6). Subsequently, the extent of the damage was documented by the National Heritage Institute in Telč (P. Macků)



Figure 6: Mitrov castle (Žďár nad Sázavou district). The picture illustrates the onset of timber harvesting, already damaging the relics of the walls (NHI, photo by P. Macků 2018)

2.3. Mining field

Mining field: Komárovice (Třebíč district). Silver ore mining area. The site is not protected as an immovable cultural monument. It comprises a relatively large mining field with sink-holes and a treatment area with archaeologically datable finds originating from the 13th–14th centuries (Figure 7). The logging occurred there as part of addressing the bark beetle infestation in 2019/2020; however, only some of its effects have been documented. The original anthropogenic relief was destroyed as a result of logging and the use of heavy machines (Figure 8). The subsequent documentation of the extent of the damage was carried out by Masaryk University in Brno (J. Mazáčková).

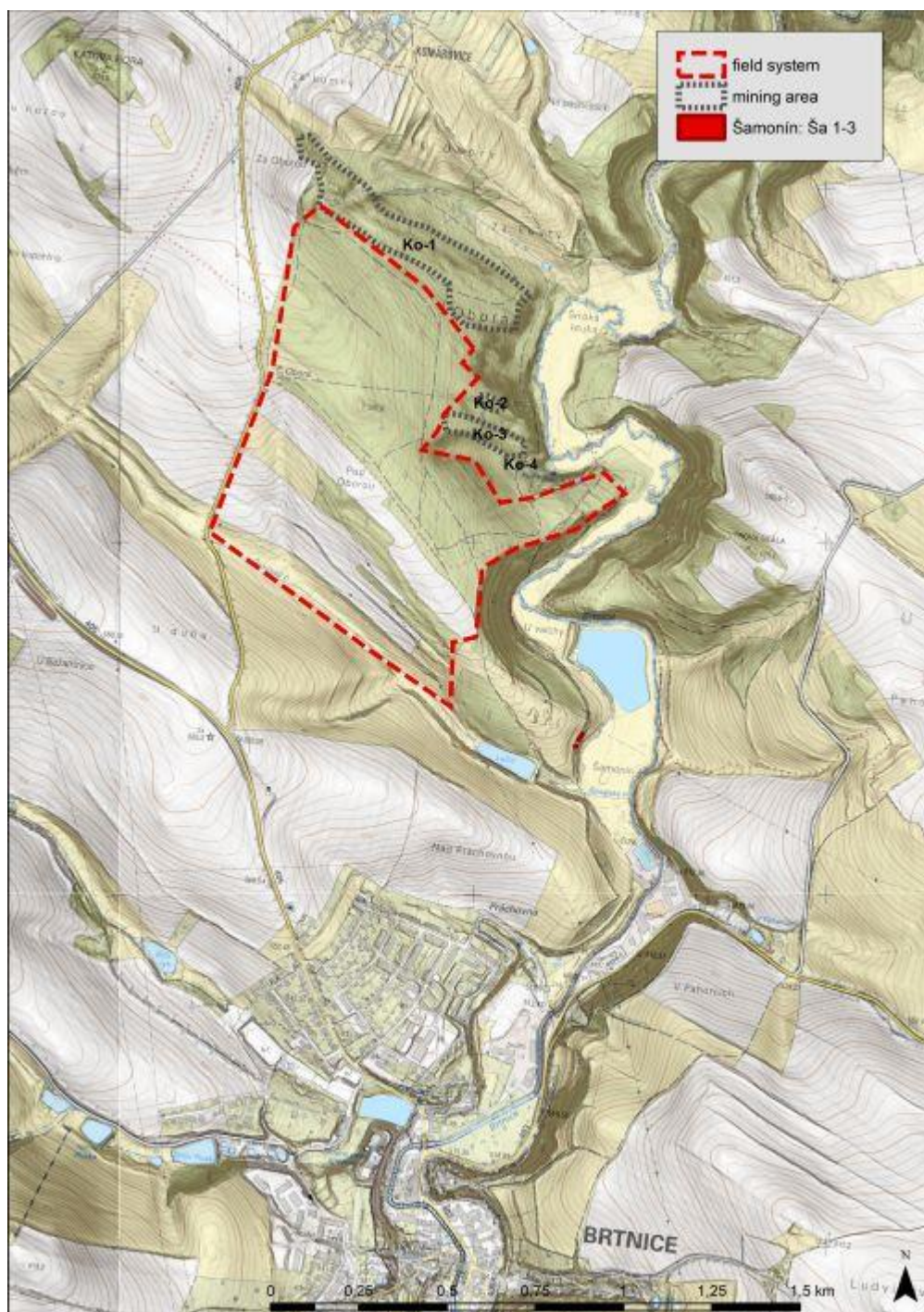


Figure 7: Komárovice (Třebíč district). Forest Obora preserves traces of ore mining, locations Ko-1 to Ko-4. The arrow indicates the Ko-1 shaft. Ko-4: ore treatment area with a water supply and a defunct water reservoir. Ša-1-3: sites where spurs and pottery were found during prospecting in 2019 (J. Mazáčková, MUNI Brno, 2020)



Figure 8: Komárovice (Třebíč district). Ko-1 site, the shaft is marked with an arrow. A part of the site destroyed by logging adjoins it (NHI, photo by P. Macků 2018)

2.4. Agricultural landscape

Agricultural landscape: Holčovice, Valštejn, Petrovice (Bruntál district, Jeseníky/Ash Mountains). The so-called clearance cairns form an essential part of the agricultural landscape in the Czech Republic, which in many places are being swallowed up by the forest. They form irregular collections of fieldstones removed and collected from arable land along field edges to minimise the land grab as much as possible. Some clearance cairns can be very extensive and are well preserved in the area of Petrovice in the foothills of the Ash Mountains. Their documented length in the village of Valštejn, adjacent to Petrovice, is 1.4km, and they are over 2m high (Figure 9). The clearance cairns constitute a distinctive landscape feature. They were partially destroyed near Petrovice because loggers used them as a paved road to the logged forest (Figure 10). The area was documented by archaeologists from the National Heritage Institute in Ostrava in 2018.



Figure 9: Valštejn (Jeseníky), Velký lán. Terraces with fields adjusted along the contour line (NHI, photo by T. Nitra, A. Halamíčková)



Figure 10: Petrovice - Devil's Mountain (Jeseníky). Petrovice, a clearance cairn completely eroded by driving along it (Photo by T. Nitra, A. Halamíčková)

2.5. Good practice example

Good practice example: **Utín** (Havlíčkův Brod district) Silver ore mining area (15 ha). The site was documented in 2017-2020 as part of an international project. Thanks to continuous communication with the owner, timber harvesting and planting of new trees were carried out without any damage (Figs 11-12).



Figure 11: Utín (Havlíčkův Brod district). Medieval mining area after deforestation (IAP, J. Unger 2020)



Figure 12: Utín (Havlíčkův Brod district). Medieval mining area after replanting of new trees (IAP, J. Mařík 2021)

3. Conclusions

The bark beetle infestation has undoubtedly threatened many known and unknown archaeological sites in recent years. Unfortunately, even sites that have already been protected by law as cultural monuments are at risk. It is obvious that some specific sites have been damaged and destroyed by logging and replanting. Others are situated in areas at risk. All involved professionals strive to minimise the effects of the bark beetle infestation on particular sites at various levels and varying degrees of intensity, according to their capabilities. However, these challenging circumstances can also be seen as an opportunity to put rules in place regarding information, communication and coordination between institutions with different interests and forest owners. We believe that the generalisation and application of the



proposed rules, preferably followed by changes in legislation, can positively influence the management of archaeological cultural heritage in the Czech Republic.