

Conclusion by the certified birds protection expert regarding the impact of planned sand mine in Estonia near Estonian – Latvian border to the birds in Latvian part of impact area

Date of issue of the conclusion: 16th of July, 2021

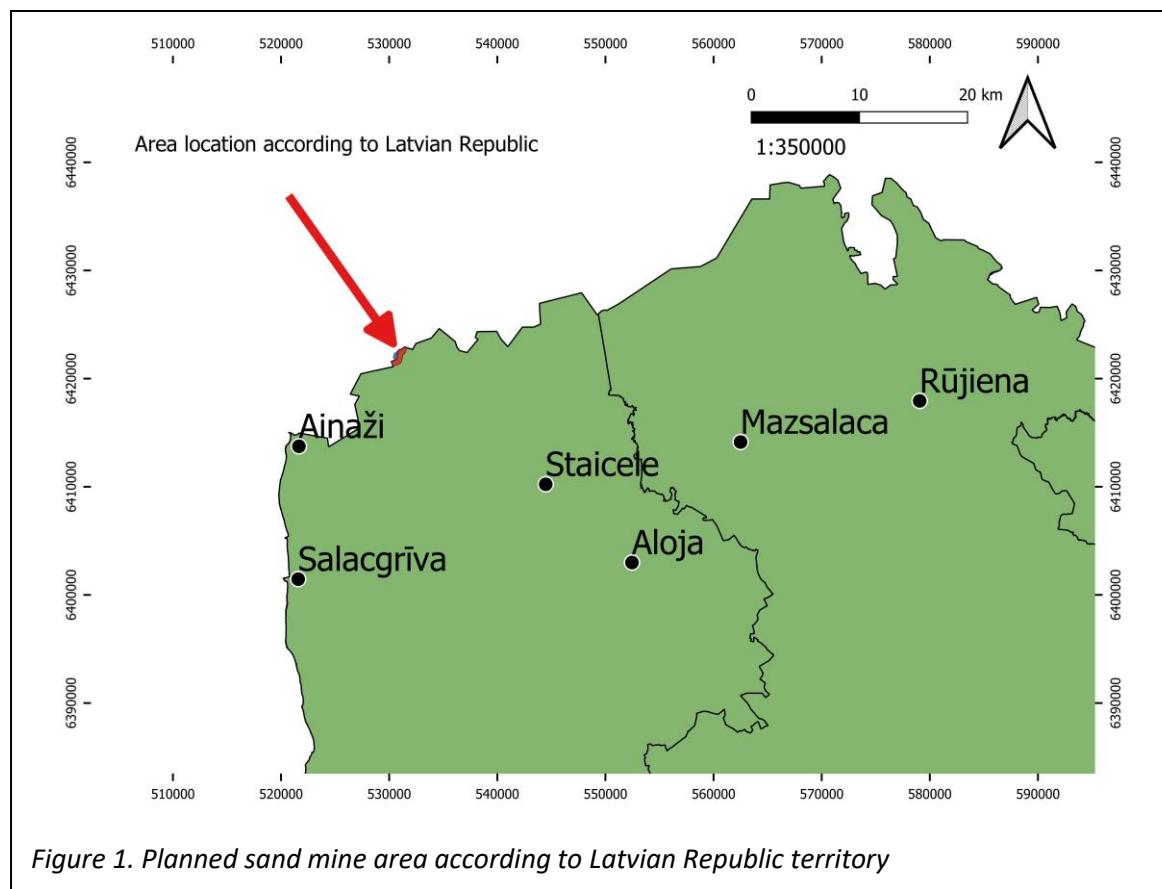
Conclusion issued by: Edgars Dzenis, certified by Latvian Nature Conservation agency to provide conclusions for Birds (certificate #081).

Conclusion ordered by: MAVES OÜ, Marja 4d, Tallinn, Estonia, representative: board member Karl Kupits

Introduction

On 13th of April, 2020, a representative of Maves OÜ, Estonia, Artto Pello, reached out to Latvian Ornithological society with a request to help to find a Latvian ornithologist to do the bird inventory on the Latvian side of impact area of a planned sand mine near Latvian – Estonian border.

On 29th of March, 2021, a contract was signed between Maves OÜ, Estonia, and Edgars Dzenis, Latvia, to conduct a bird inventory on Latvian Republic territory in 500 m radius of planned sand mine area in Kiusumetsa region (further – the area, Figure 1 and 2).



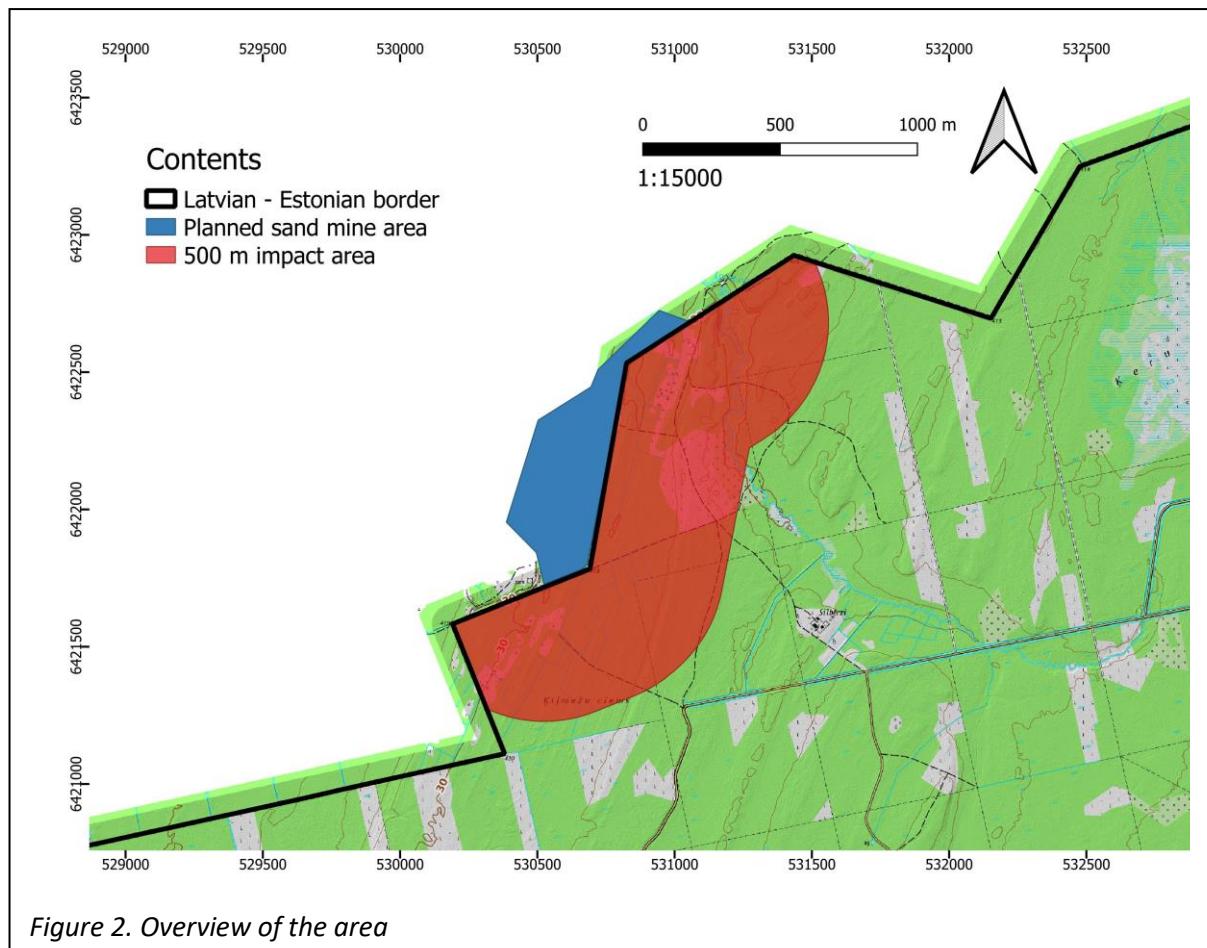


Figure 2. Overview of the area

In this conclusion results of inventory, interpretation and recommendations regarding the planned sand mining are compiled. Unfortunately, only the area of the planned sand mine was given to author in form of a .shp shapefile. No other parameters describing the planned mine were available at the moment of writing this conclusion, including expected noise pollution levels and the extent of the impact to hydrology, thus, the conclusion and recommendations here are based on precautionary principle, unspecific to current case, but to sand mining in general.

Group of species, for which the conclusion is made

This conclusion is made for group of species – Birds.

Date and time of the surveys in the area

In the birds nesting season 2021 the area was visited in following times:

Date	Time	Weather	Target species
19 th of April, 2021	19:20 – 01:00	Clear skies, no wind to slow wind, +8 °C	Owls
20 th of April, 2021	05:40 – 08:42	Clear skies, no wind, +3 °C at sunrise	Woodpeckers
20 th of April, 2021	09:28 – 11:26	Clear skies, no wind, +10 °C	Capercaillies in nearby Kalna marsh

28 th of April, 2021	20:31 – 00:33	Cloud cover ~80%, no wind, +4 °C	Owls
13 th of May, 2021	05:40 – 10:00	Cloud cover ~25%, no wind, +8 °C at sunrise	All nesting birds
22 nd of June, 2021	00:55 – 01:37	Cloud cover ~25%, slow wind, +20 °C	European nightjars and other summer night birds
22 nd of June, 2021	05:55 – 08:45	Clear skies, no wind with irregular gusts, +20 °C to +25 °C	All nesting birds

All visits were carried out in optimal conditions to identify the corresponding target species. The dates of the visits were adjusted as the cold and rainy weather in spring 2021 caused the bird season to shift approximately two weeks later compared to other years – this is unwritten opinion of several Latvian ornithologists complemented by bird count data in other territories in Latvia by author and also other ornithologists. As a result, visits in the area in focus took place in optimal terms according to corresponding target species.

Methods used in the surveys in the area

In 19th and 28th of April provocation method was used to identify the owls in the area. Song recordings of Pygmy owl *Glaucidium passerinum*, Tengmalm's owl *Aegolius funereus*, Tawny owl *Strix aluco* and Ural owl *Strix uralensis* were played back on JBL Flip 3 bluetooth loudspeaker. The playlist sequence was 3 minutes playback, 1 minute silence, 1 minute playback, 1 minute silence, next owl species. Location of provocation points was selected assuming that owls in 500 m radius of place of provocation would react/start to vocalize if present. Points were located approximately 500 m apart on the roads and country border in the area so that the provocation area covered all of the impact area of the planned mining area on the Latvian side. In both cases, the visits were done on foot, starting before sunset and first walking north to south and provoking Pygmy Owls and then back, provoking other owls.

In 20th of April provocation method was used to identify the woodpeckers in the area. Prepared audio files consisting of corresponding species' songs and calls were played back on JBL Flip 3 bluetooth loudspeaker. The audio files were approximately 2 minutes long each and were played back according to the type of forest in proximity and expected species. It was assumed that woodpeckers are less aggressive than owls and react to recordings in lesser distances, so it was assumed to be more rational to choose the species to play according to the forest type in focus. This way, all the suitable areas to woodpeckers were surveyed and prepared audio files playback was done in places where it appeared to be reasonable. The effective radius of woodpecker recordings playback was assumed to be 300 m.

In 20th of April after woodpeckers count in the area author visited the nearby Kalna marsh where a microreserve to protect Capercaillie *Tetrao urogallus* lekking area is established. This visit was done by carefully walking in the seemingly most suitable areas for lekking and looking for characteristic feces of the Capercaillies, at the same time trying to observe the birds visually.

In 13th of May additionally to the general watching and listening in the area, inspection of large tree cavities was done in the groups of old trees located around old farmsteads, described later. Inspection was done visually, by looking into the cavities where possible and by looking for bird feathers attached to the entrances of the cavities, and also by scratching the trunk to simulate the

sound of ascending marten *Martes sp.*, which usually causes birds inside cavities at the moment at least to look outside, but usually to flee, making them identifiable.

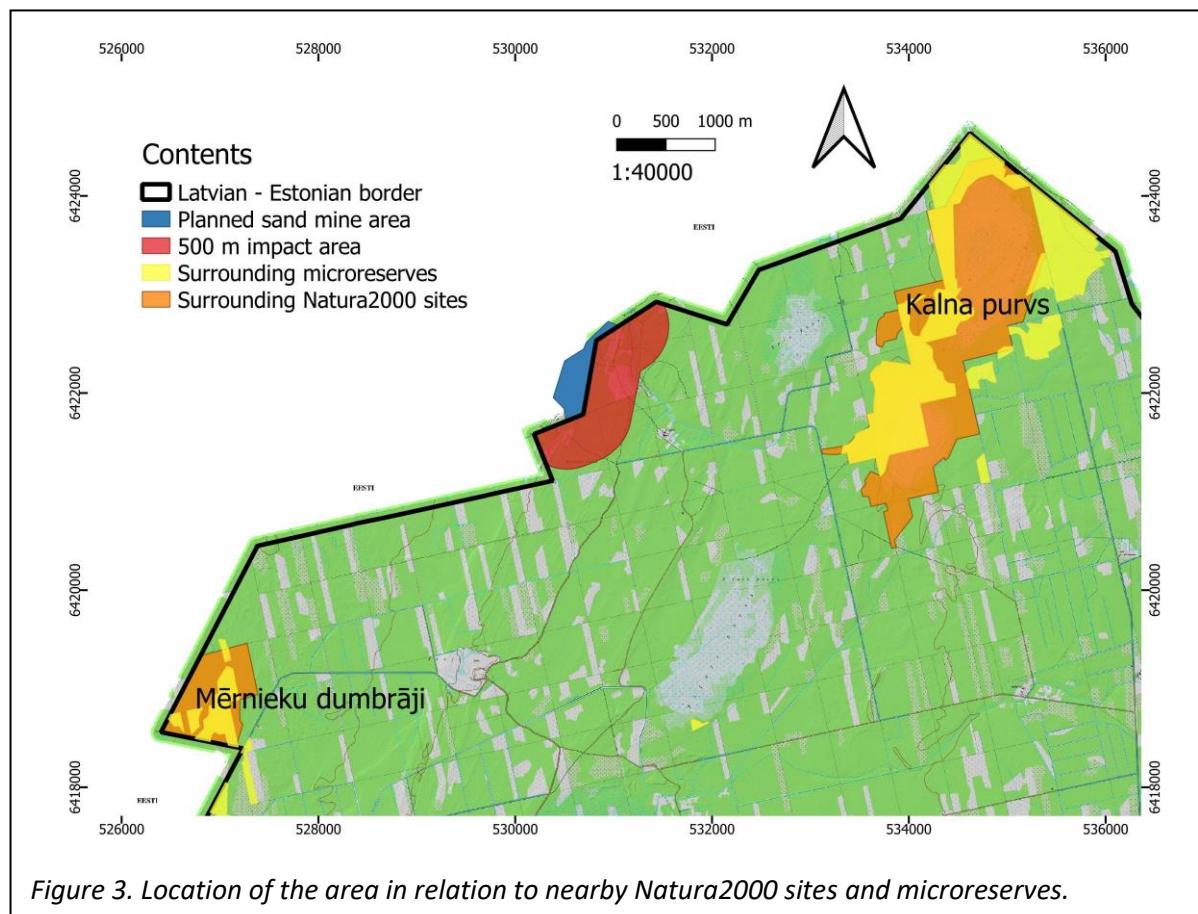
All other visits were done by walking and general watching and listening to all the birds present. Routes were planned to cover as much of the area in focus as possible and as a result, author believes a near total coverage of the area regarding the birds present was achieved. All the routes walked were recorded in Huawei Media Pad T3 8.0 tablet by using Locus Map app and attached to this document as georeferenced files.

The status of protection of the area

The area is located in the northernmost part of Latvia, Limbazi county, Ainazi parish, near house "Silbērzi". The area is located within the landscape protection zone of North Vidzeme Biosphere Reserve. The North Vidzeme Biosphere Reserve was established to balance biodiversity, economical development and preservation of cultural values. The Reserve represents internationally recognised ecosystems characteristic to temperate forest zone.

Meanwhile, one of the aims of landscape protection zone is to reduce anthropogenic pressure to the specially protected nature territories within the North Vidzeme Biosphere Reserve. Sand mining is a **vivid example of anthropogenic pressure with several measurable consequences and as such should be limited.**

About 3 km to the East there's a Nature 2000 area "Kalna purvs" (Kalna marsh), in which also a microreserve to protect the lekking place of Capercaille is located. (Figure 3)



About 4 km to the South-West there's a Nature 2000 area "Mernieku dumbraji" (Mernieki fen) located. Partially overlapping it, there's also a microreserve to protect the breeding district of Lesser Spotted eagle *Clanga pomarine* (Figure 3). About 3 km south there's a small microreserve established to protect wet pine and birch forest habitat (Figure 3).

The closest Nature 2000 site "Kalna purvs" is about 3 km away from the planned mining area. The reach of noise pollution caused by planned sand mine in given case is not known, so author considers the precautionary principle should be used here and the Capercaillie lek in Kalna marsh should be considered as one of the values potentially affected by the planned sand mine, thus, limitations to the sand mining in the interest of Capercaillie should be placed.

The resulting protection level of the area is low. The only actual protection territory-wise comes from the landscape protection zone of North Vidzeme Biosphere Reserve. It's a "light" protection zone, but it refers also to corresponding municipalities local territory planning. Nevertheless, also local territory planning does not enforce any restrictions in the area in the current case, as far as authors competence reaches.

Some of the bird species observed in the area and near it do require certain level of action to at least maintain the current level of their protection. In this case it'd be indirect protection as Latvian laws has no jurisdiction over the sand mining which is the original activity causing the environmental impact. It is responsible and far-sighted for the responsible authorities in Estonia to require the assessment of the impact of the planned mining also for area impacted outside Estonian territory, and for Latvian side it's recognised as optimal way to achieve the best possible balance between the planned activity and its expected impact to surrounding environment.

The aim of this conclusion

The aim of this conclusion is to estimate the impact of the planned sand mining in Estonian territory to the adjacent Latvian territory in a 500 m area. Only the area of the planned sand mine was known to the author when the season started. It was recognised right away that noise pollution and changes in hydrology would be the main threats to the birds in the area. Unfortunately, no parameters important for assessment of the impact to birds by the planned sand mine, including data describing expected noise levels or impact to hydrology, were available until the moment of writing this conclusion. As a result, the conclusion and recommendations here are based on precautionary principle, unspecific to current case, but to sand mining in general.

Description of the area

The area is located in the northernmost part of Latvia, Limbazi county, Ainazi parish, near house "Silbērzi". The planned sand mining area is about 21 ha big and is located in Estonian territory, while the Eastern and Southern border of the planned sand mine area is also Latvian – Estonian border. It was offered by the customer, MAVES OÜ, to evaluate the impact of the planned sand mine in a 500 m radius around the mine, and it was agreed by the author. All of the 500 m impact area East and South from the mine is located in Latvian territory, thus the area in Latvian territory where the assessment of the impact should be done is approximately 97 ha big.

While the relief of the area is quite flat, there's dunes-depressions landscape quite expressed, similar to that in Slitere National park, only much lower in scale. The direction of dunes is almost parallel to Baltic Sea coast about 7 km to the West. The dunes are dry and there's bright, dry Pine *Pinus sylvestris* forests on them. The depressions, not more than 1 – 2 meters lower in height than

dunes, on the contrary are significantly wetter, with much darker mixed leaf tree and Spruce *Picea abies* forests.

There's a small (about 1 – 2 m wide) stream Lode flowing North towards the border through the Eastern part of the area. It has a 3 – 5 m deep valley where close to natural forest still remains. Also, along all the Latvian – Estonian border within the area there's about 2 m deep ditch with couple of cm deep flowing water observed throughout the visits of the area. Although it's possible that the planned sand mine could impact the ground water levels also in the area, causing hydrological changes of unclear extent, the aim of this conclusion is to provide information about the bird species in the area. There's no direct bond between bird species and hydrology in the area – in forest landscapes hydrology-wise bird species are affected through their habitats. There was no data given by the client regarding neither the mine itself, e.g. its depth, or the estimated changes in surrounding hydrology, nor the evaluated extent of the impact to the habitats caused by sand mine, so no realistic estimate of the impact to the birds by the sand mine in terms of impacted hydrology can be done. As a conclusion, the authorities in Estonia are asked to evaluate the expected hydrological changes also on the Latvian side. If they're expected to be significant, further consultations with the author are possible.

The general landscape of the impacted area in Latvian territory is forest. Still, it's forest only virtually. In fact, the area contains mostly clearcuts of various ages (Figure 4). There are also some patches of forest remaining but majority of them are of low biological value. Most of them are quite young, while most of the older ones had been cultivated already, rendering them bright and sparse, thus unsuitable for majority of protected bird species. There are a few patches remaining one could call kind of natural forest, mostly in the Western tip of the area and along the Lode stream in the

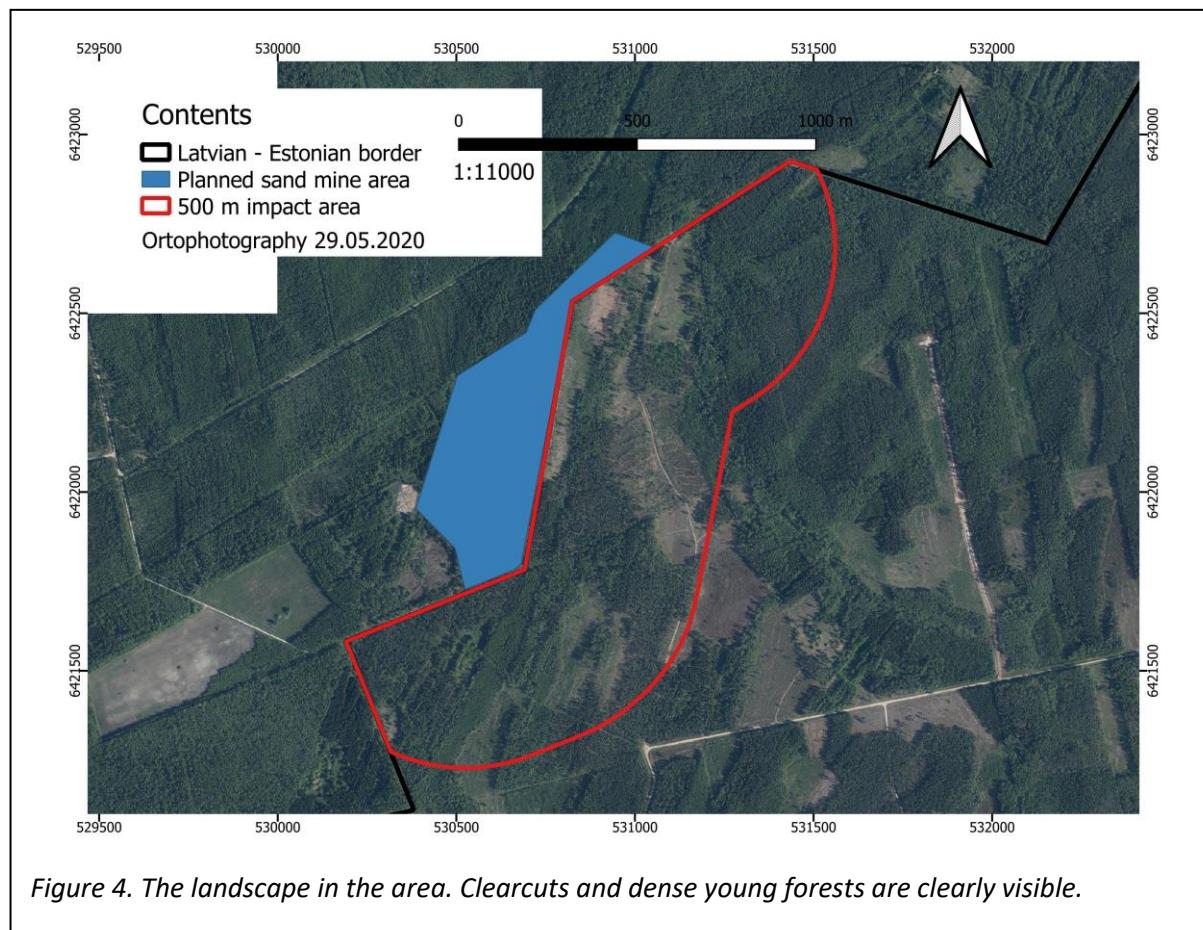


Figure 4. The landscape in the area. Clearcuts and dense young forests are clearly visible.

Eastern tip. In the surveys these patches received most of the owl and woodpecker provocations as well as general watching, listening and searching, but due to their small size, no noteworthy surprises were detected. In general, the area can be described as of low biological value, mostly due to intensive forestry, that has caused the massif to become fragmented, and remaining patches of forest losing their value due to small size.

However, there's a catch. The area is part of an ancient village inhabited in the first half of previous century (Figure 5). The village had been quite sparse and it appears that three old farmsteads can be related to the area, while "Silbērzi" are still in good shape and inhabited until nowadays. While there's almost no visible remains remaining from the houses, only some ruins of the foundations (Figure 6), the leaf trees grown along the farmsteads are still there, and on the contrary to the buildings, seemingly have reached their best years and are at their full power at the moment. In total there could be as much as 100 huge dimension Small-leaved Limes *Tilia cordata*, Ash Trees *Fraxinus excelsior* and Pedunculate Oaks *Quercus robur* in the area.

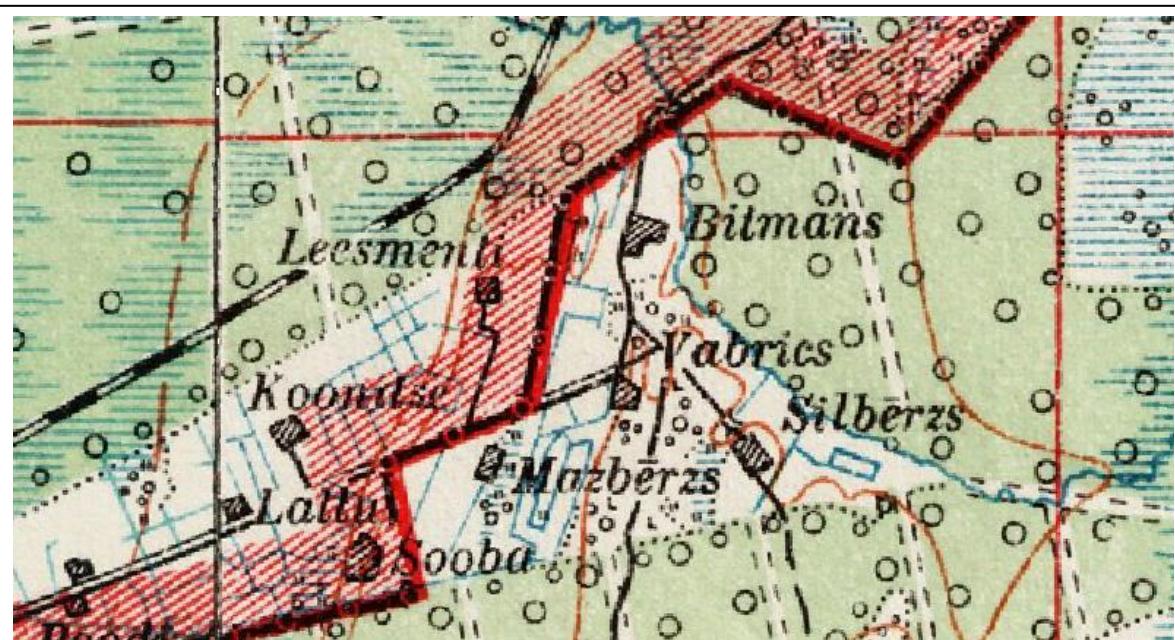


Figure 5. Topographic map 1925 – 1940 of the area (balticmaps.eu)

These groups of large leaf trees hold exceptional biological value and are quite unique, especially in the given landscape. While further, more detailed studies of the groups should be done locally, all the maximum precautions are taken within this conclusion to ensure the lowest possible disturbance to the specially protected bird species breeding in these groups of large leaf trees.

Around “Mazbērzs” house there are several openings in the forest, seemingly ancient hay meadows and/or arable land. Around both other old farmsteads there’s no obvious similar openings, instead, there’s several clearcuts close by.



Figure 6. The remains of a foundation in the area.

As a result, about 10 – 15% of the area can be considered of anthropogenic origin, gradually returning to its natural state due to lack of management, while the rest can be considered of natural origin, hosting heavy anthropogenic pressure in form of forestry.

Description of the adjacent territory

The area is located in Latvian coastal lowland with rather flat relief. No major relief forms are located in close proximity of the area. Wet forests and marshes are the major landscape forms in the surroundings of the area. Several homesteads with small open landscapes around them within couple of kilometres of the area, while the closest group of homesteads is more than 5 km to the south, and the closest villages – Mērnieki and Rozēni – are about 8 km away each.

North of the area, in Estonian territory, the landscape is quite similar. The planned mining area is expansion to the East of an already existing, old sand mine, similar in size of the planned expansion.

Protected species and habitats-wise the surrounding territory of the area appears to be quite well studied with some observations of the specially protected species and habitats. There’s a polygon of Western Taiga (9010) habitat touching the Western tip of the area, and several polygons of Fennoscandian deciduous swamp woods (9080) in close proximity. Regarding birds there are some Stock dove *Columba oenas*, Pygmy owl *Glaucidium passerinum*, Black grouse *Lyrurus tetrix*, Ural owl *Strix uralensis*, Three-toed woodpecker *Picoides tridactylus* and Black woodpecker *Dryocopus martius* observations within 2 km radius around the area, which complements the authors observations, confirming that set of bird species characteristic to boreal forests is dominating in the surroundings of the area.

The microreserve in Capercaillie lekking place in Kalna marsh received a visit by the author. It was successful with at least two observed males and lots of feces on the ground, confirming the lek being

active and vital, thus requiring it to be taken into account when placing the recommendations for the regulations of the planned sand mining.

There are several sightings of Black stork *Ciconia nigra* within 5 – 10 km around the area. Mr. Maris Stražds, Latvian Black stork researcher, confirmed that there used to be a nest in Mernieku dumbrāji, but the nest tree fell several years ago, and since then the nest is not known. Since the sightings in the surrounding territory continues, with author of this conclusion being among the lucky observers (1 - 2 birds observed near Kalna marsh), it's wise to assume that at least one pair of Black storks still breed in relatively close proximity of the planned sand mine, either in Latvian or Estonian side of the border, thus particular limitations ensuring as low disturbance as possible to Black stork breeding will be recommended.

Eagle owl *Bubo bubo* is one of the species that comes in mind when talking about boreal forests, and could seemingly be expected in the silent, seemingly undisturbed borderland forest massifs like the ones in the area and surroundings. There was a mathematical model applied to Latvian forests in search of suitable habitats for six species of owls, Eagle owl being one of them. The model hasn't found any suitable patches of forest in the surroundings of the area. The closest suitable place has been found 5 km to the West. As one of the factors in the model was disturbance, the heavy pressure of the forestry in the area and surrounding territory most likely has rendered it unsuitable for Eagle owl, and when visiting the area, author agreed to this opinion, thus author put no effort in searching for Eagle owl.

Other than mentioned above, no specific ornithological values could be identified in the adjacent territory, expected to be impacted by the planned sand mining. Also, no reasons for potential bird concentrations or possible appearance of any high ornithological value can be identified in the territory.

If discussing any possible cumulative impacts to the territory surrounding the area, the main concern regarding birds would be noise pollution from the sand mine operating. Cumulative impact would appear as the intensive tree cutting continues in the area and surrounding territory, rendering the whole area more open, thus more noise-transmitting. This way the noise pollution would reach deeper inside the area surrounding the mine as time goes and the area becomes more open. Still, no realistic estimate of this effect can be done due to lack of given parameters, including the ones describing the noise pollution itself.

The detected bird species in the area

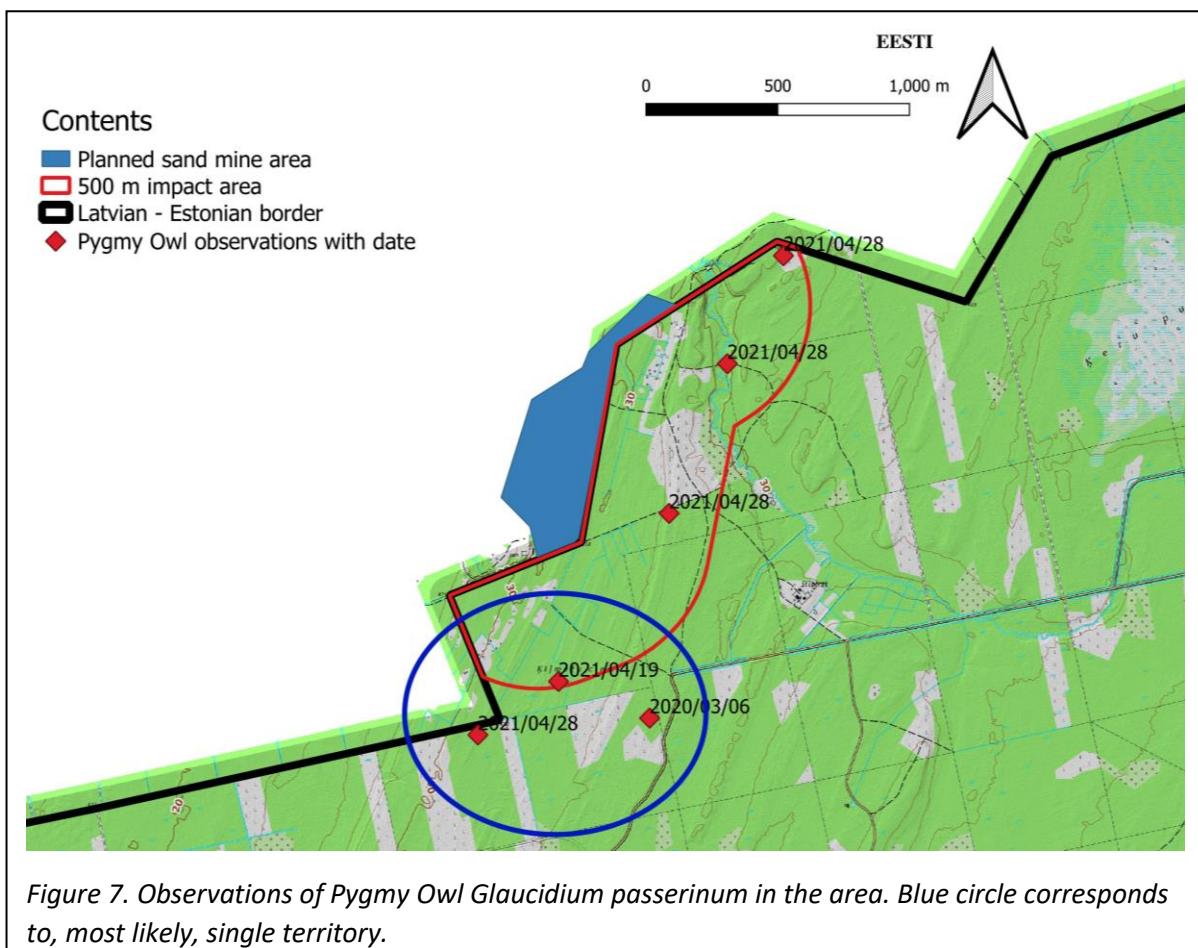
In total within the 500 m impact area of the planned sand mine 47 bird species were observed in Year 2021. Out of them, 8 are included in the list of specially protected species in Latvia (Regulations #396 by Latvian Cabinet of Ministers, Annex 1). Pygmy Owl *Glaucidium passerinum* is included in the list of bird species, for whom microreserves can be established (Regulations #940 by Latvian Cabinet of Ministers, Annex 2). 7 of the observed bird species are included in EU Birds Directive Annex 1 (2009/147/EK) (Table 1).

Latin name	English name	Specially Protected Species in Latvia	EU Birds Directive 2009/147/EK Annex 1	Number estimate in breeding pairs	Status of presence
<i>Glaucidium passerinum</i>	Eurasian Pygmy-owl	+	+	2 - 4	Possible breeding

<i>Grus grus</i>	Common Crane	+	+	1	Credible breeding
<i>Mergus merganser</i>	Goosander	+		1 - 3	Proven breeding
<i>Ficedula parva</i>	Red-breasted Flycatcher	+	+	3 - 4	Possible breeding
<i>Dryocopus martius</i>	Black Woodpecker	+	+	1 - 2	Possible breeding
<i>Lullula arborea</i>	Woodlark	+	+	1	Credible breeding
<i>Strix uralensis</i>	Ural Owl	+	+	2 - 3	Credible breeding
<i>Caprimulgus europaeus</i>	European Nightjar	+	+	1 - 2	Possible breeding

Table 1. The detected specially protected species in the area

Eurasian Pygmy-owl *Glaucidium passerinum*



There are four observations of Pygmy Owls in the area, and two additional ones just outside the territory, shown in map above. One observation used is from year 2020, complementing other observations.

Although there were four different birds observed in the evening of April 28th, it could be an effect of wandering of the birds, as pointed out in Species Protection Plan (Avotiņš 2019). Four singing males are considered the upper limit of the number estimate in the area. There are three observations close by in the South – West tip of the area, most likely belonging to the same territory / breeding pair (blue circle in the map). There are also three different observations in the central and North – East part of the area. They're believed to be different birds, while considering the habitats, only one actual territory regarding these observations is believed to exist, located around Lode stream valley, where remains of suitable habitat is found. Thus, 2 breeding pairs in the area is a realistic estimate, based upon results of the surveys and habitats found in the area. Nevertheless, the structure and placement of suitable habitats in the Estonian side of the impact area is not known. It's highly possible that cross-border territories exist in this case, with nest being located in Estonian side, while the breeding territory reaching in Latvian side. Thus, up to two possible nests, but up to four possible breeding territories located within the 500 m impact area is the total estimate of the area.

According to the Species Protection plan, the area is outside the priority locations for Pygmy Owl protection. General inventory is required, it has been done with positive results, and corresponding recommendations are pointed out. As the groups of big leaf trees around ancient farmsteads is believed to play a significant role in the presence of species in the area, the possible extra protection of the groups described later will help in protection of also this species.

Pygmy Owl is quite common throughout Latvia in suitable habitats. The newest population estimate states there's 3671 to 9464 breeding pairs in Latvia with observed long-term decline (Avotiņš 2019).

Forestry is currently the main negative impact to the species in the area, both in forms of physical disturbance and fragmentation of the massif. The main negative impact regarding the planned sand mining to the species is noise pollution caused by sand mining operations. Nevertheless, Pygmy Owl more than other owls use sight when hunting rather than sound (Avotiņš 2019), so particular noise pollution could be less critical to presence of the species than in other species. Still, March to August is mentioned as the breeding season of Pygmy Owl, when noise pollution should be limited in the breeding area. Nevertheless, the expansion of the sand mine will cause the forest there to disappear, globally creating another opening in the massif, fragmenting it ever further. Another, more long-term impact is the possible changes in hydrology caused by sand mine, resulting in drying out the wet and dark forests suitable to Pygmy Owl found in the area.

Common Crane *Grus grus*

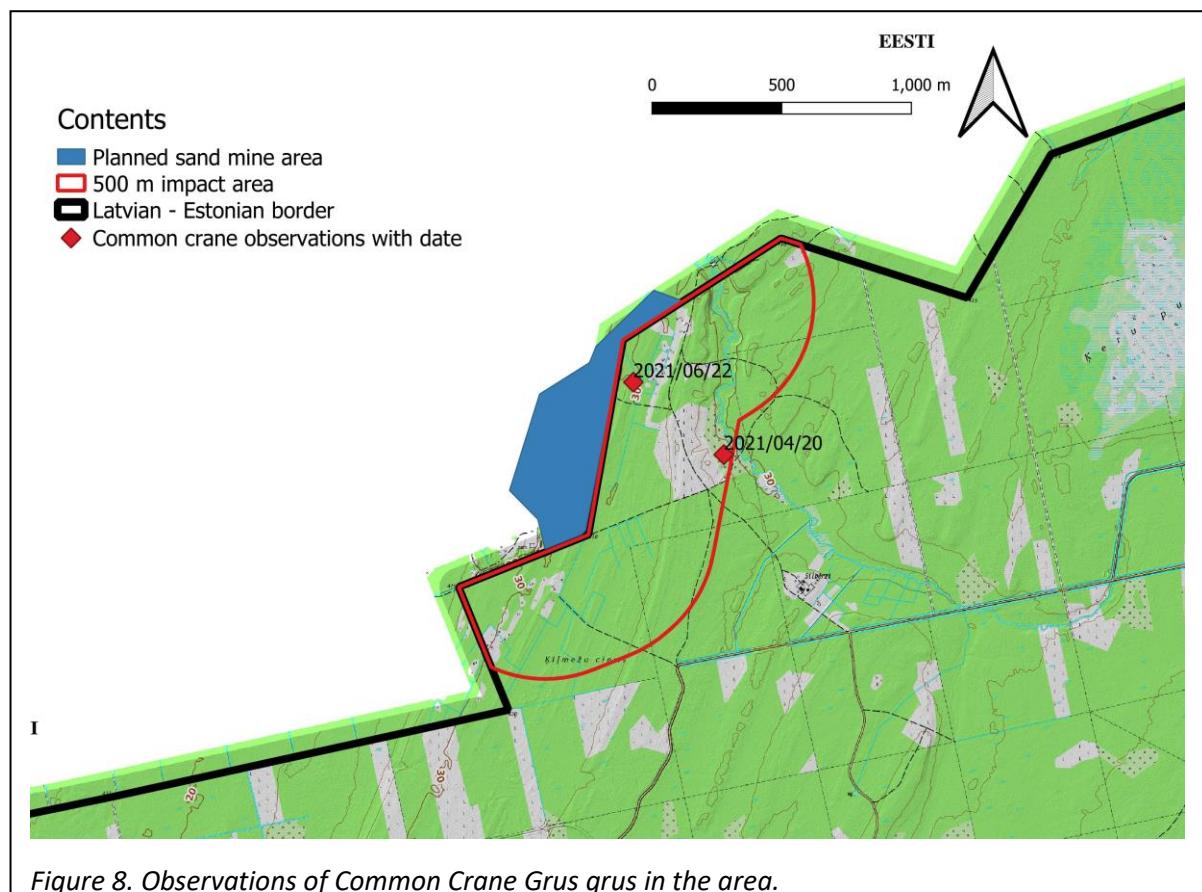


Figure 8. Observations of Common Crane *Grus grus* in the area.

There are two observations of Common crane in the area, most likely belonging to one pair. In 22nd of June two shy birds were observed in a wet clearcut – it was a typical breeding behaviour.

Common crane has become really common in Latvia recently. The newest population estimate states there are 2800 – 10000 breeding pairs in Latvia (Ķerus et.al. 2021), with observed both short- and long-term increase.

For Crane as ecologically increasingly plastic species no major threats are known in the area. The current landscape in the area appears to be very suitable for species, even with forestry taken into account. The planned sand mining seem to cause no difference as Cranes are known to breed in highly disturbed places, rural and even urban areas. The only concern here is again hydrology – in case the ground water levels would lower causing the area to become drier, Cranes would most likely leave the area.

Goosander *Mergus merganser*

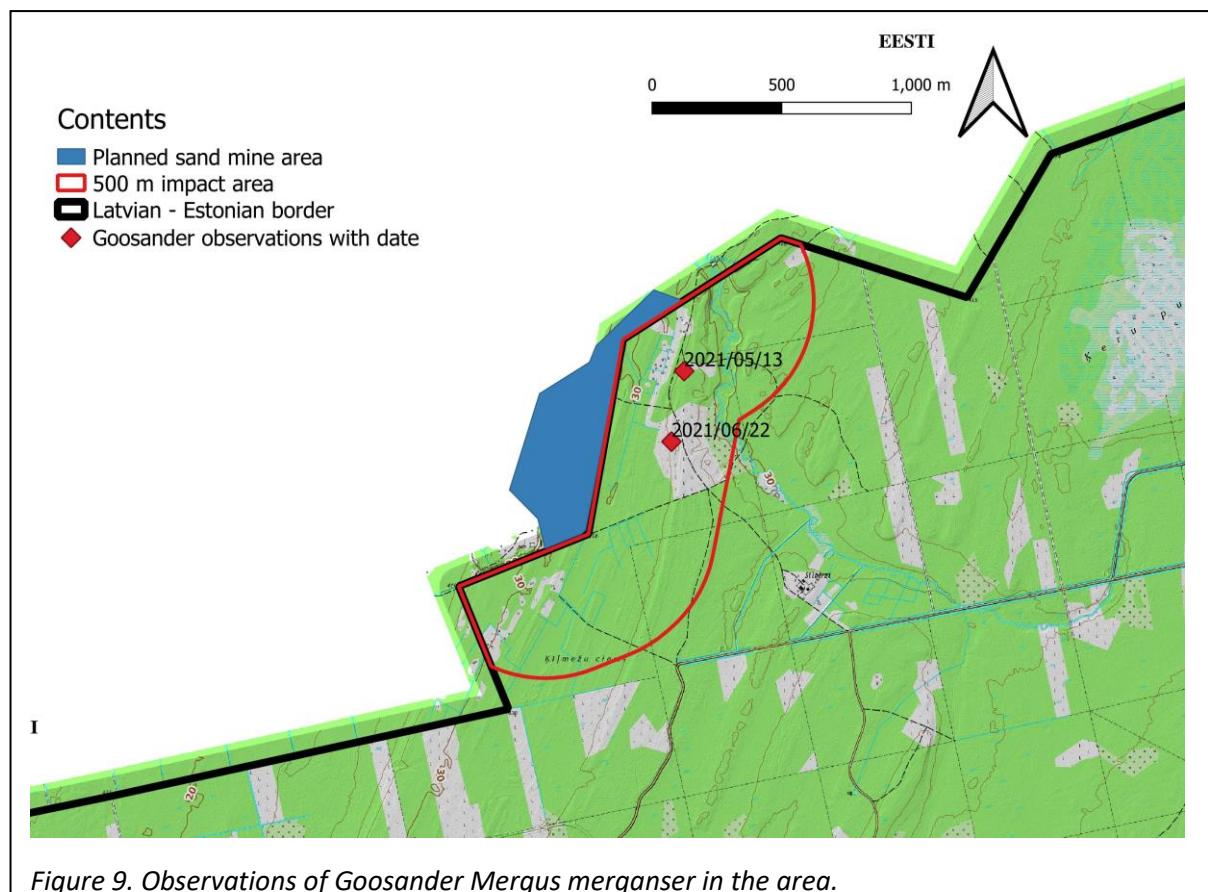


Figure 9. Observations of Goosander *Mergus merganser* in the area.

There are two observations of Goosander in the area. On 13th of May an inhabited nest was found in huge cavity of an Ash tree in one of the groups of large leaf trees surrounding ancient farmsteads, mentioned earlier (Figure 10).

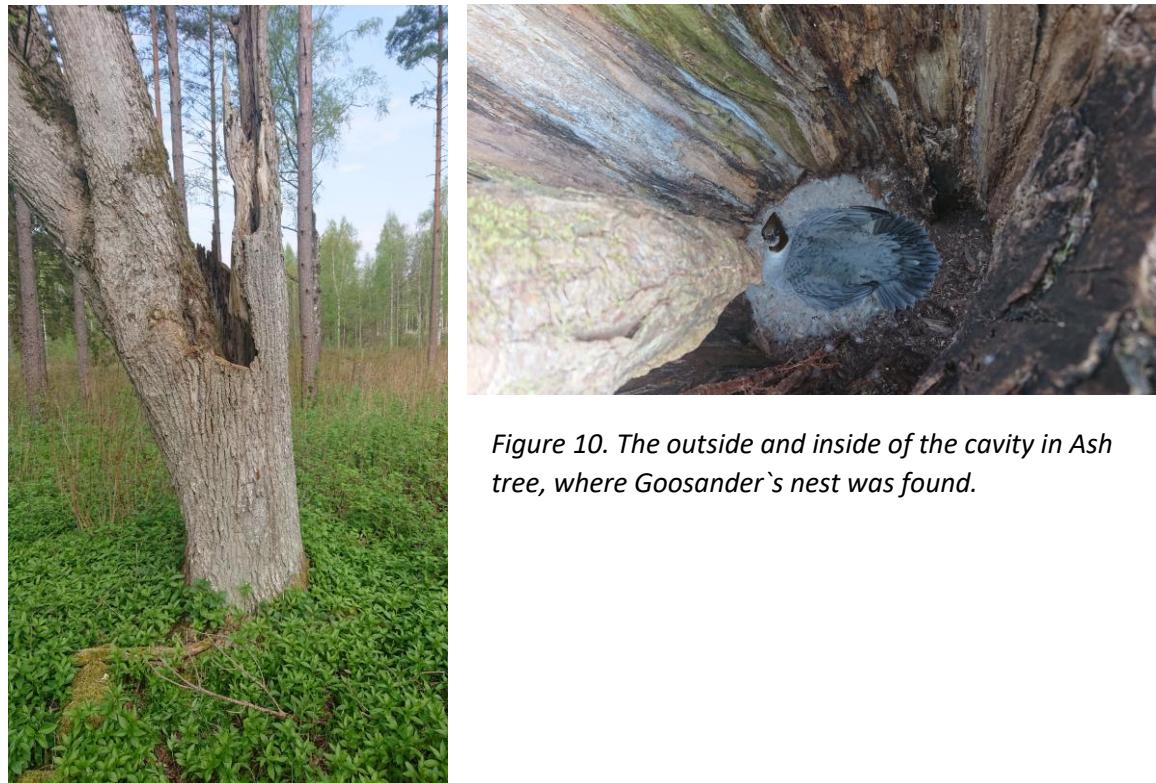


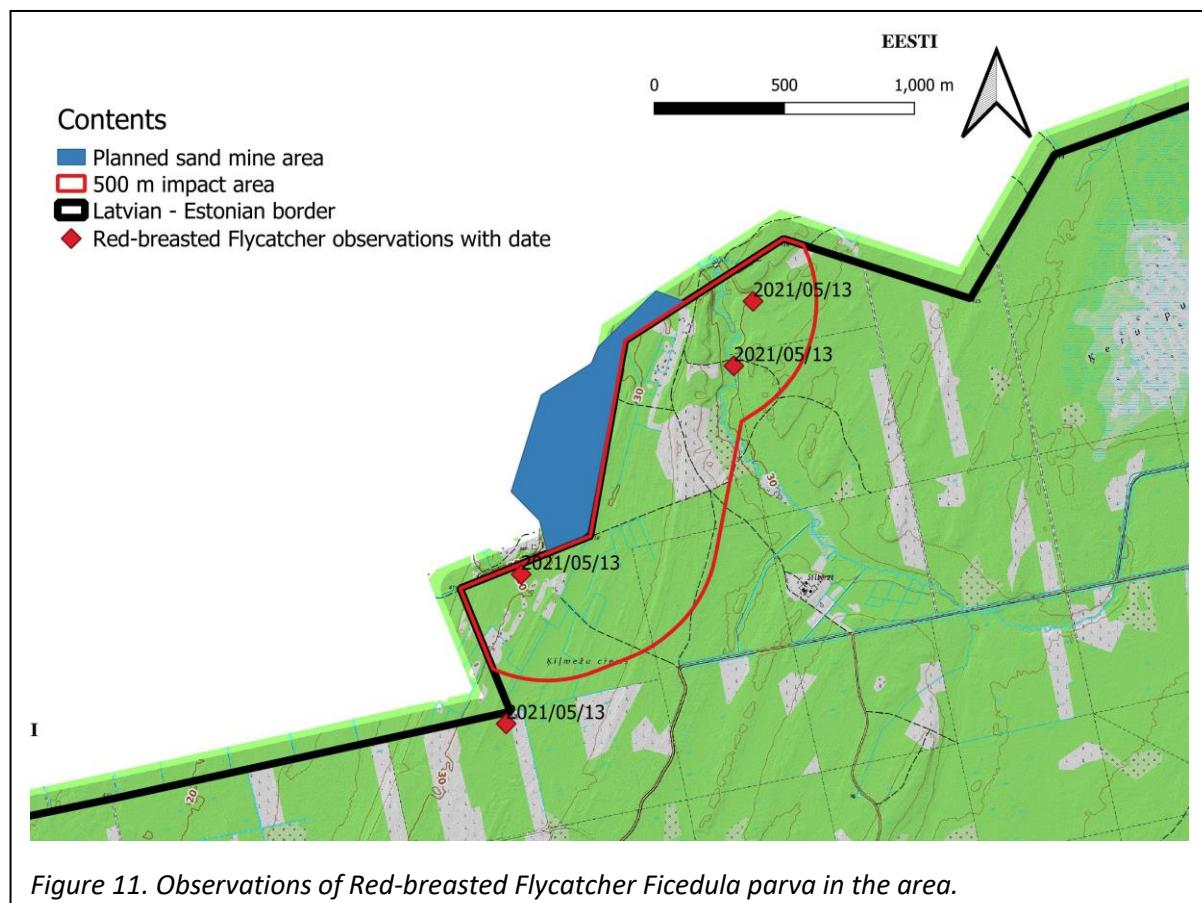
Figure 10. The outside and inside of the cavity in Ash tree, where Goosander's nest was found.

Goosander is a common breeder in Latvia, with estimated 500 – 1200 pairs (Ķerus et.al. 2021) and increasing in long-term. Availability of tree cavities large enough to fit inside is one of the main issues for the species, just like for several other large secondary cavity-breeders. As mentioned already, there's quite unique situation formed in the area - large leaf trees are left to grow on their own in actual forest. This is just one example how exceptionally high biological value these groups of large trees hold as there's a huge potential of large-size cavities in the rest of the them. All the groups were walked through, all the suspicious trees checked by scratching the trunk as well as visually, but no other big cavity-breeders were found. Nevertheless, in total up to 3 pairs of Goosanders are estimated to be possibly breeding in the area, considering the high volume of suitable cavities.

The disappearance of the suitable cavities can be considered the main threat to Goosander in the area. Disturbance by forestry doesn't seem to be an issue as Goosanders are known to breed even in single trees in the middle of a field, thus the cavities being the decisive factor – as long as there are cavities, there are Goosanders. There are several regulations for cutting the trees in force in Latvia, demanding to leave standing trees with cavities, as well as dead and dying trees, but obviously it's not always the case. With that being said, although the risk for the large leaf trees in discussion to be cut is quite low, further actions perhaps in form of some extra protection will be discussed with local authorities to ensure the trees stay in their place.

The threats regarding the planned sand mining are similar to those in Common Crane – noise is not expected to be problem as Goosanders breed even in private house districts, while lowering the ground water levels due to altered hydrology could cause the nearby waterbodies, including Lode stream to dry out, and, what's more important, it could speed up the large leaf trees to wither, causing the disappearance of the large cavities afterall.

Red-breasted Flycatcher *Ficedula parva*



Four different singing birds were observed. Their locations precisely correspond to the suitable habitats to the species, i.e. birds were found exactly in places where they were expected. 3 – 4 pairs is a realistic estimate, considering the placement of suitable habitats in the area.

Red-breasted Flycatcher is common throughout Latvia with 49 972 – 105 507 estimated breeding pairs with stable trend long-term and increasing in short-term (Ķerus et.al. 2021).

Forestry is main current threat to the species in the area, mostly due to impacting the quality of the habitats. Noise doesn't appear to be a critical factor, as the species is observed in highly disturbed areas, thus it's considered the limitations for sand mine operations recommended for other species would be enough also for Red-breasted Flycatcher.

Black Woodpecker *Dryocopus martius*

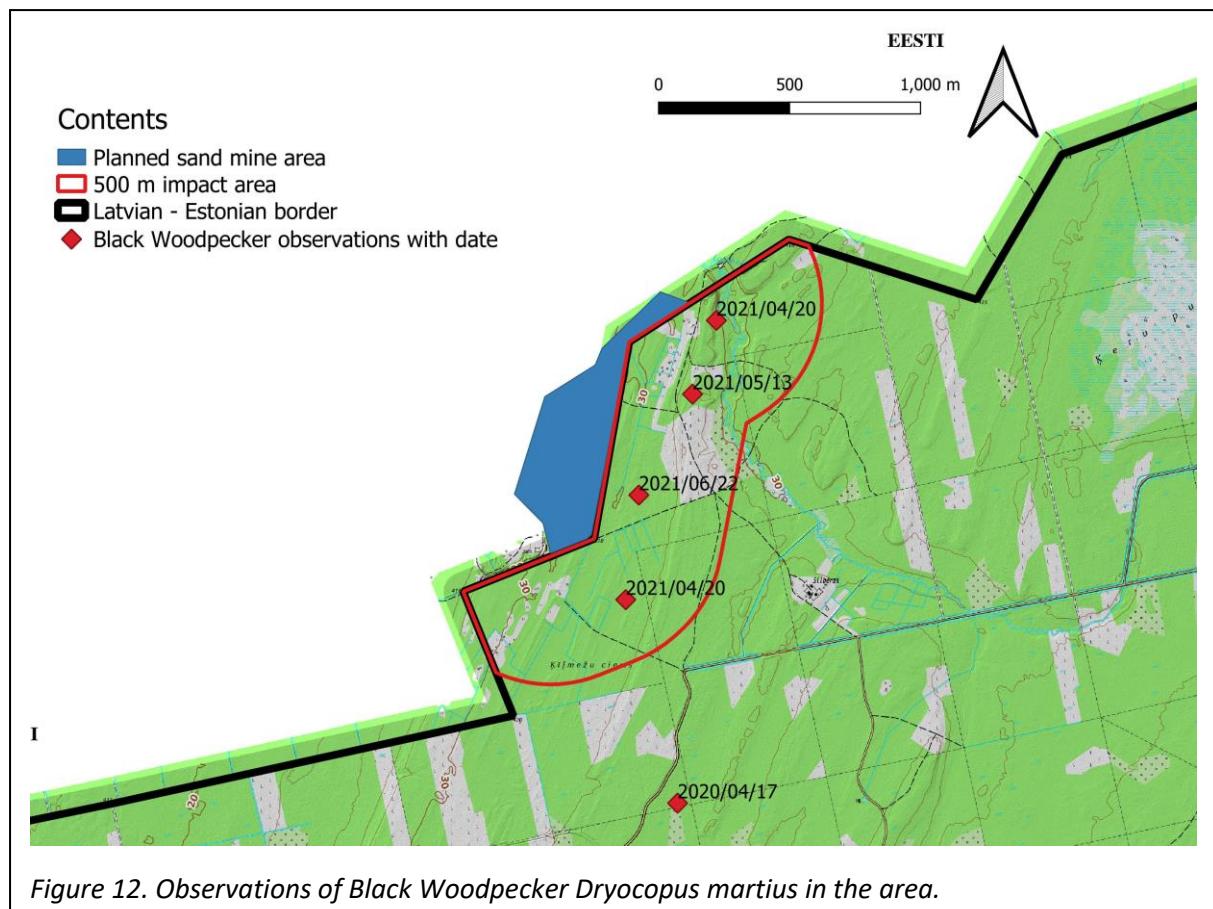


Figure 12. Observations of Black Woodpecker *Dryocopus martius* in the area.

Four observations in the area with fifth nearby from Year 2020. Due to huge individual territories characteristic to species (200 – 300 ha, Bergmanis et.al. 2020) it's believed that they all belong to one territory. The sparse old patches of forest in the area complement this opinion.

Black Woodpecker is one of the common woodpecker species in Latvia with estimated 6000 – 10 000 pairs breeding, with stable short-term, but decreasing long-term trend (Ķerus et.al. 2021).

Forestry is the main current threat to the species as it's continuously increasing the fragmentation of the massif, mostly at the expense of the older forest pieces. This way it lowers the quality of the habitat both by taking away the suitable pieces as well as by increasing the fragmentation.

The species is known to be disturbance tolerant (Bergmanis et.al. 2020), thus noise is not considered to be an issue regarding the planned sand mine. The further fragmentation of the massif by clearing the planned expansion of the sand mine area is recognised to be the greatest threat here, still, as the planned sand mine area is quite small compared to the size of the breeding territory of the Black Woodpecker, it alone wouldn't cause the species to leave the area.

Woodlark *Lullula arborea*

Contents

- Planned sand mine area
- 500 m impact area
- Latvian - Estonian border
- Woodlark observations with date



Figure 13. Observations of Woodlark *Lullula arborea* in the area.

Two observations in the area, both around a large, about 10 years old clearcut. Most likely both observations belong to the same breeding territory. Woodlark is common species in dry pine woods and even prefers plains in massif. It's estimated 6497 – 30 995 pairs to be breeding in Latvia with trend being stable in short-term and increasing in long term (Kerus et.al. 2021).

Woodlark is related to clearcuts in current case as a short-term habitat of anthropogenic origin and as no similar habitats of natural origin are found in the area, no recommendations regarding this species will be given. The remains of the plains around ancient "Mazbērzs" farmstead would be more long-term suitable habitat if they were managed. Now they seem to be no more suitable to Woodlark because of overgrowing.

Also there are no limitations regarding the planned sand mine related to Woodlark. Species is known to be breeding in highly disturbed areas, and preferring openings in the forest massif, and also preferring dry habitats over wet ones so no limitations here.

Ural Owl *Strix uralensis*

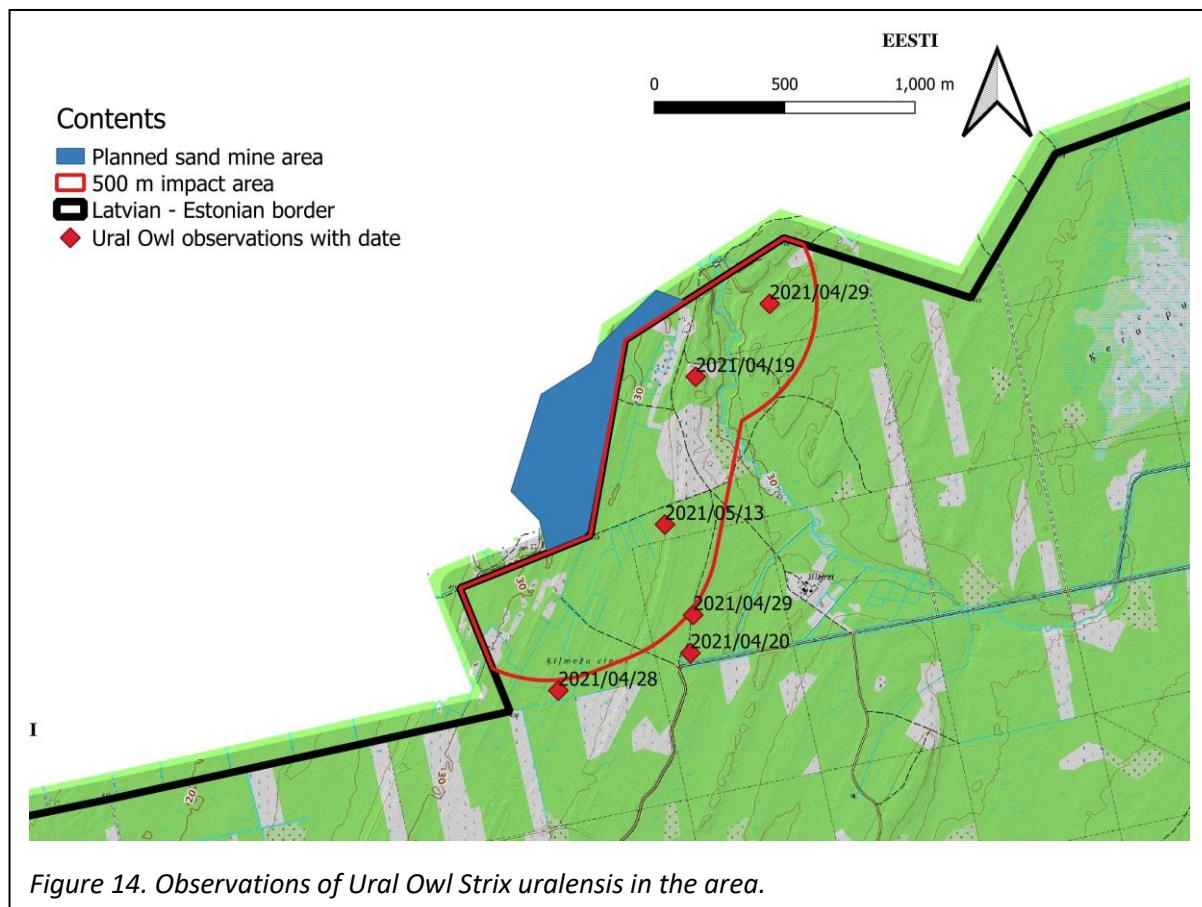


Figure 14. Observations of Ural Owl *Strix uralensis* in the area.

There are three observations of Ural Owl within the area and three more close by. The observation on 13th of May occurred in the morning at daylight pointing to group of old leaf trees around ancient farmstead "Vabrics" to be one of the possible breeding spots in the area. Still, no actual evidence of breeding neither here nor in other mentioned groups of old leaf trees was found, although the trees were searched especially careful.

As the owl counts are quite long and take a lot of time in one place to playback all the planned species before moving on, covering the whole area in the given case takes about 2 – 3 hours.

Provocation do cause birds in their actual breeding territories to become worried and extremely active both by singing and moving around to attack the unknown intruder. This way birds provoked in the beginning of the evening most likely showed elevated activity throughout the evening.

Looking at the placement and dates of the observations within such a small area, compared to usual size of Ural Owls territory (300 – 600 ha, Avotiņš 2019), it's hard to distinguish separate breeding territories in the current situation. Still, taking the undocumented conditions in surveys, and location of suitable habitats into account, it's most likely that there are two breeding territories of Ural Owls in the area with third being possible. Author won't speculate regarding the placement of territories, nevertheless, the groups of old leaf trees around the ancient farmsteads appear to play a significant role in the presence of Ural Owls in the area, although no actual evidence confirming this was found.

Ural Owl is a common owl in North - eastern part of Latvia. It becomes rare West of Lielupe river. There's estimated 1825 – 5381 pairs breeding in Latvia with stable long-term but decreasing short-term trend (Ķerus et.al. 2021). Ural Owl is one of the six species of owls for whom Species Protection Plan has been made (Avotiņš 2019). According to it, there are several 25 ha "cells" in close proximity

of the area where high density of suitable habitats has been found thus they're indicatively recognised as priority protection places for the species (Figure 14).

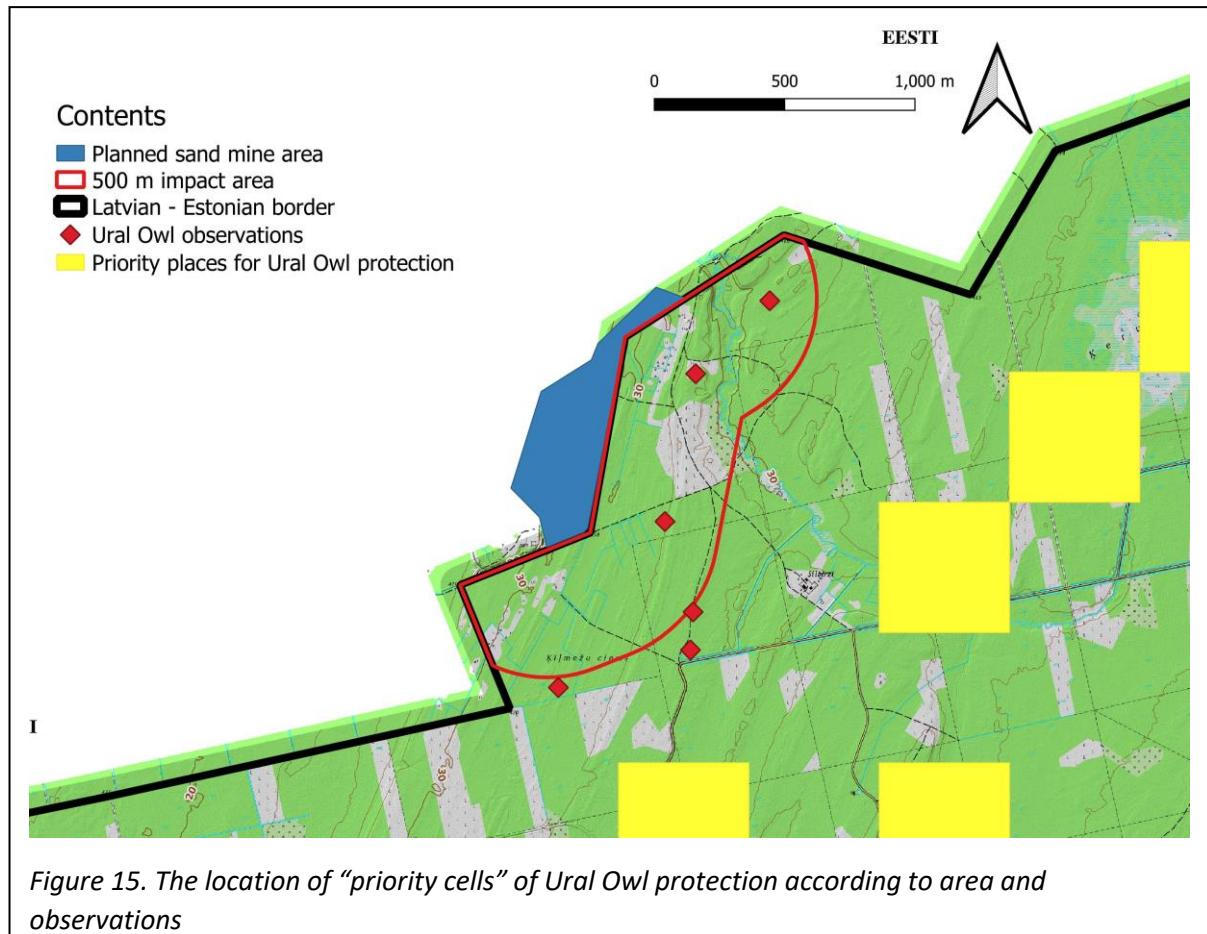


Figure 15. The location of "priority cells" of Ural Owl protection according to area and observations

The area falls outside these "priority cells", thus, the forests within the area are not considered to be essential for the Latvian population of Ural Owl. Meanwhile, in most of the area general inspections of the species are recommended, and placing the nest boxes is also recommended.

As the Ural Owl hunts mostly by sound, the noise pollution is named as the major threat to Ural Owl throughout the Species Protection Plan. This is just the case regarding the planned sand mine. Considering the many observations of the species in the area, and the amount of potentially suitable nesting spots, the conflict between the Ural Owls and the sand mine regarding noise pollution can be stated as the most important conflict of interests in the area according to birds and their protection.

With that being said, precautions to the maximum recommended extend will be taken and the maximum recommended time span – from 1st of February to 31st of August – will be recommended to ban all the operations in the sand mine causing noise pollution. If a compromise is needed, this period can be reduced starting with the end, i.e. for August and July conditions can be discussed, while February to June as the core breeding season cannot be reduced by any means.

There's no surprise that disturbance by forestry and massif fragmentation is named as the main current threat to the species in Latvia. The high number of Ural Owls in the area in the given situation with the many clearcuts in place is actually quite surprising. It suggests that the mentioned groups of big leaf trees are extremely important, and the high pressure by forestry can be tolerated

as long as those big leaf trees remain. While the new plain in forest caused by sand mine alone would not necessary cause a negative impact as Ural Owls do use forest edges for hunting, the cumulative effect of high forestry pressure topped by noise pollution from the planned sand mine may cause the species to leave the area, thus the sand mine operations should be limited. In the meantime, local regulations on Latvian side will also be discussed regarding the groups of big leaf trees, and in case of successful extra protection establishment, as a result the big secondary cavity-breeders like Ural Owl, Goosander and maybe also Pygmy Owl should be relatively safe.

European Nightjar *Caprimulgus europaeus*

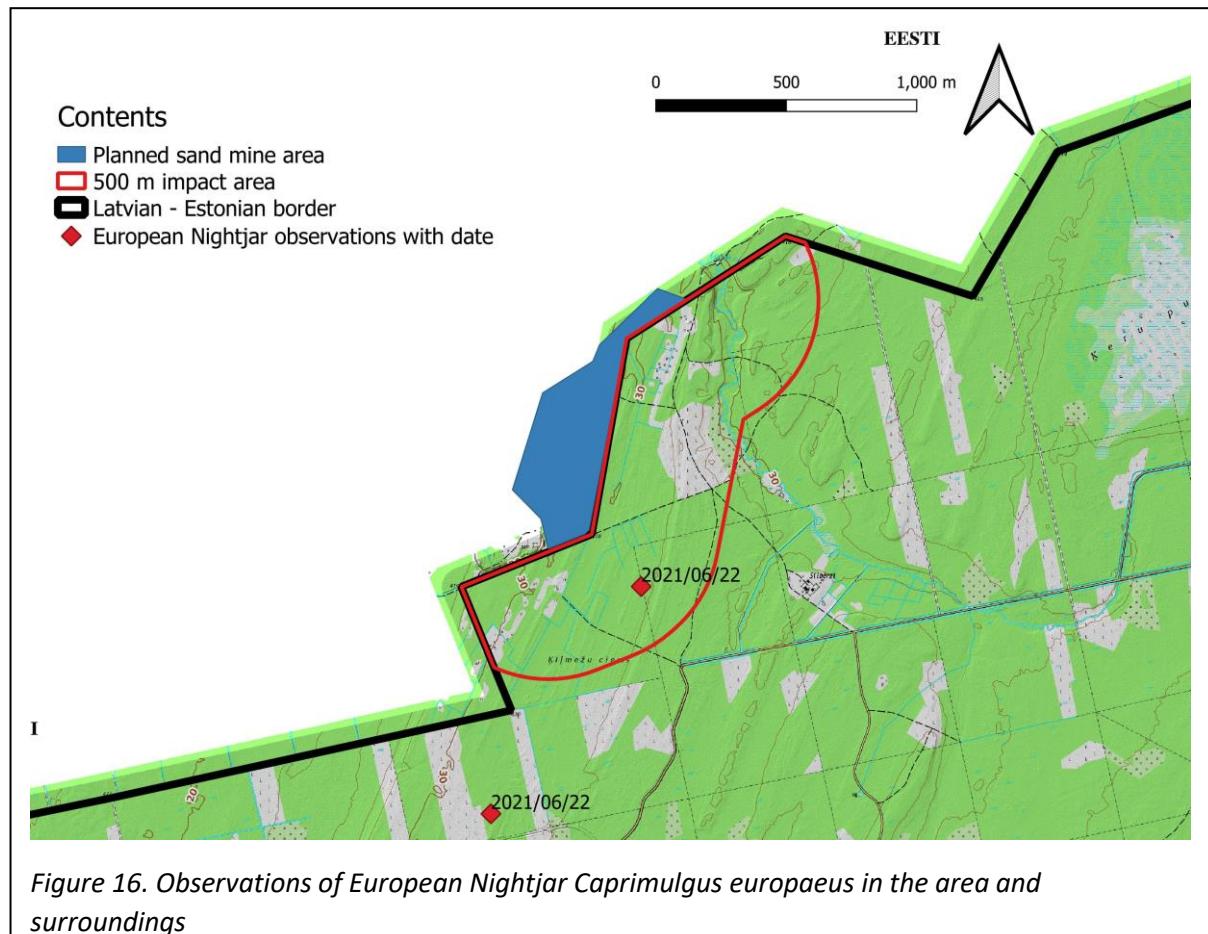


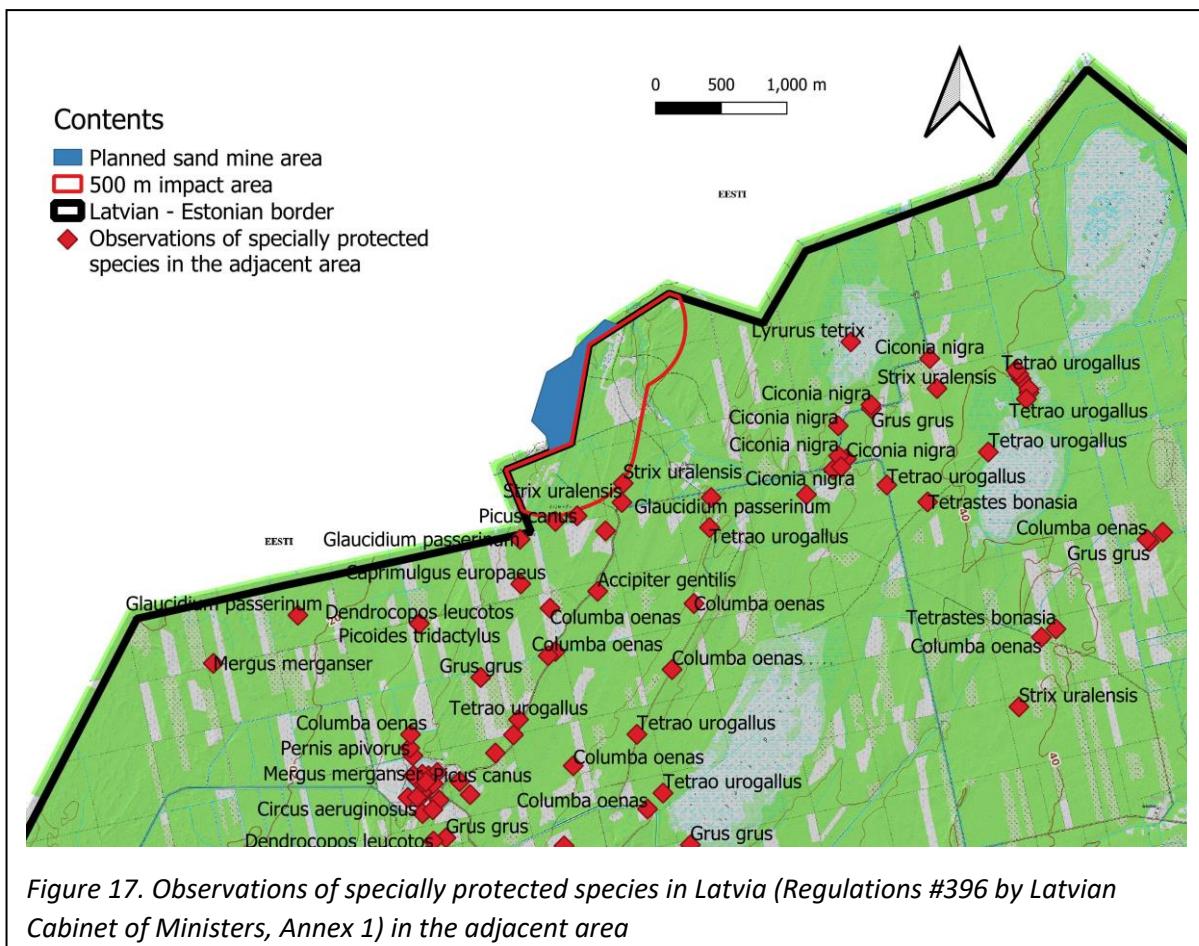
Figure 16. Observations of European Nightjar *Caprimulgus europaeus* in the area and surroundings

There's one recording of Nightjar in the area and another not far from the area, two different individuals in total. 1 – 2 pairs are estimated to be breeding in the area. The area is evaluated to be moderately suitable for species, with about half of the area containing habitats suitable for Nightjar.

European Nightjar is a common species in dry pine forests and marsh edges throughout Latvia. The population is estimated to 16 500 – 31 000 singing males with unclear trends both in short- and long-term.

Species is tolerant to disturbance caused by forestry and uses the clearcuts for feeding (Polakowski et.al. 2020). There's no actual studies regarding noise pollution impact to Nightjar but species is known to be singing in highly noise-polluted areas. Thus no special limitations regarding sand mining are required as limitations regarding other species in area are believed to be enough.

The detected specially protected bird species in the adjacent area



When combining all observations of the specially protected species in Latvia (Regulations #396 by Latvian Cabinet of Ministers, Annex 1) in the adjacent area, the total coverage is quite dense. Stock Dove *Columba oenas* and several other species are tolerant to disturbance as known to breed in rural and even urban areas. There are species in the area like woodpeckers, gallinaceous birds, and birds of prey to which there most likely would be minimal impact of the planned sand mine to unknown extent, as there's not much experience with these species regarding newly established sand mines in terms of impact, but in general they're known to be quite tolerant to disturbance. While there are no sightings of the Lesser-spotted Eagle *Clanga pomarina* in the current map extent, there's a microreserve for this species in Mernieku dumbraji Nature 2000 area – it used to breed there (current status is unknown). On the other hand, this place appears to be too far from the planned sand mine to receive any negative impact, and also species is known to be tolerant to noise pollution. But most important, there are many observations of Capercaillies (Figure 17) and several Black Stork sightings (Figure 18), which both are known to be highly intolerant to disturbance, specifically noise pollution (Hofmanis and Strazds 2004, Strazds 2005).

Capercaillie

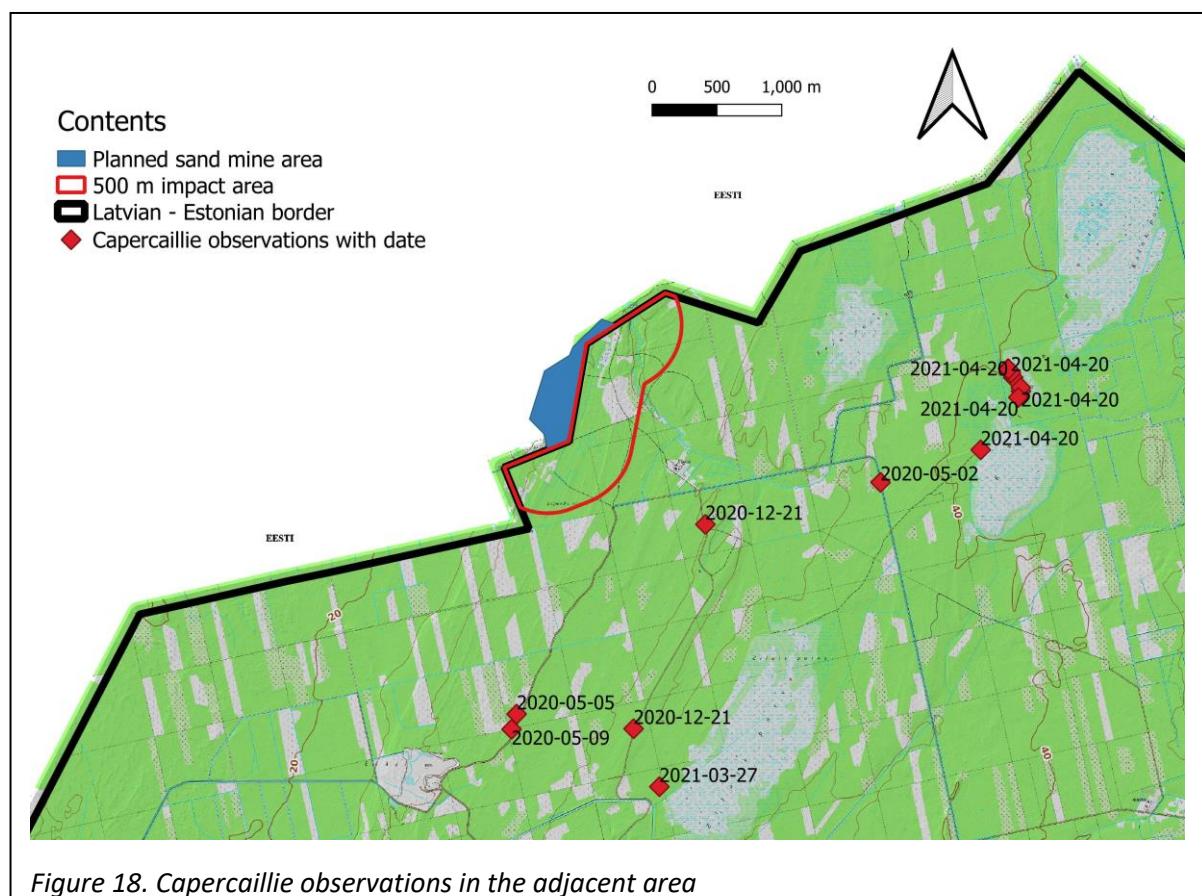


Figure 18. Capercaillie observations in the adjacent area

Two groups of observations can be recognised, with one probably unknown lek near Zilais purvs, about 1 – 2 km South from the planned sand mine, and a known, conformed lek in Kalna purvs microreserve about 3 km East from the planned sand mine.

As noted in Species Protection plan (Hofmanis and Strazds 2004), Capercaillie is highly sensitive to noise pollution as it's song is really quiet, and can be heard by other males only in very quiet conditions. There are observations when birds stop singing in lek when a noise pollution (a passing train in distance, for example) appears. To protect this species, the lek has to be protected as the core species distribution unit, so any negative impact endangering the lek has to be limited. Thus, a constant noise pollution source like a sand mine can be allowed to operate only outside the active lekking period of Capercaillie – February to June.

Black Stork

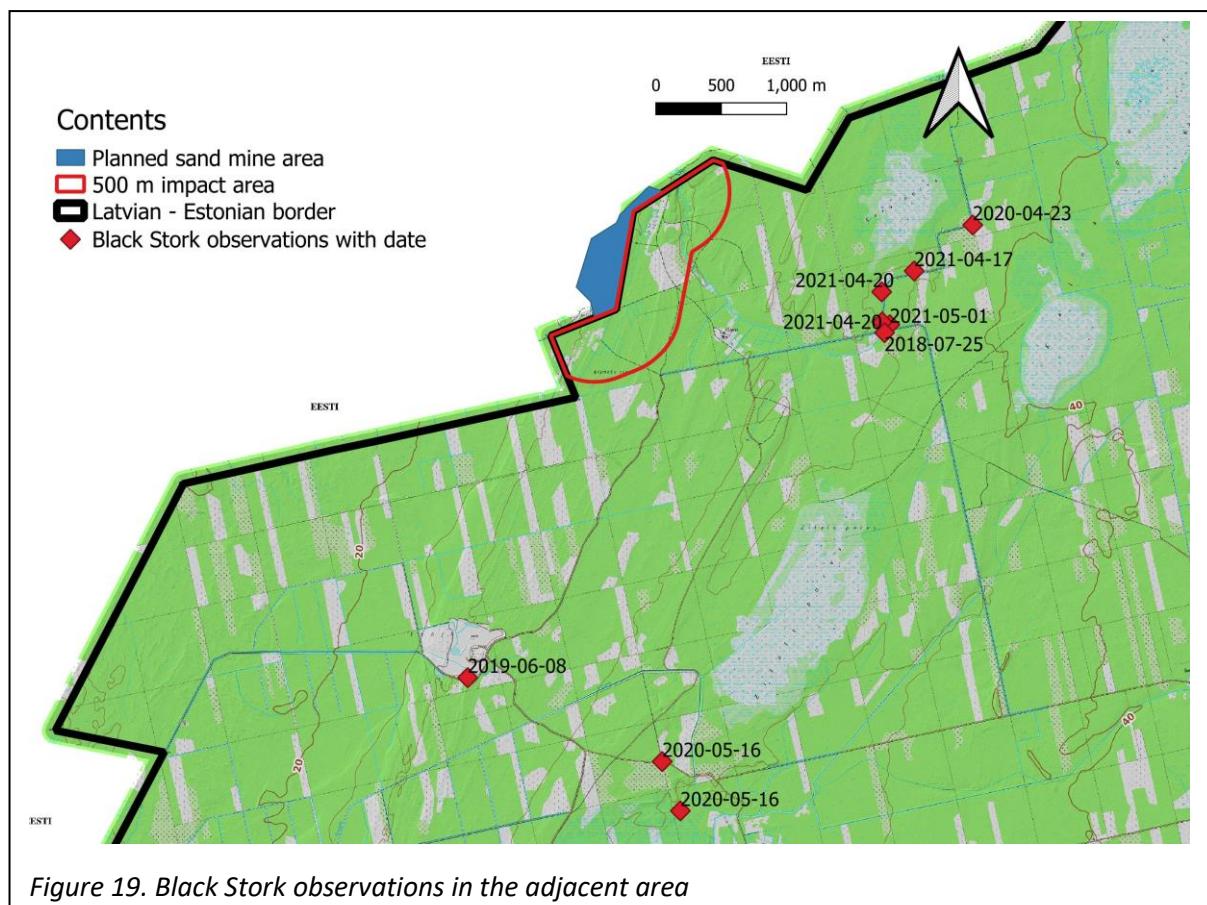


Figure 19. Black Stork observations in the adjacent area

Again, two groups of observations, still, this seemingly corresponds more to appearance of observers rather than distribution of the species. Both groups can belong to either one or several different nests as Black Stork is known to be flying tens of kilometres to feeding spots (goris.lv). Mr. Maris Strazds, Latvian Black stork researcher, confirmed that there used to be a nest in Mernieku dumbraji, but the nest tree fell several years ago, and since then the nest is not known. Thus, the actual nest can be located virtually anywhere in the area, visible in map.

As mentioned in Species Protection plan (Strazds 2005), Black Stork is highly sensitive to disturbance. Indirect disturbance in form of noise and presence of human is named among the factors causing the abandonment of the nest. In two cases construction of a road close to nest is believed to be the main reason of abandonment. Sand mining appears to be very similar in this aspect, so, as long as the place of the nest is not known, sand mining should be limited to outside of sensitive period of breeding season of Black Stork – 15th of March to 31st of May.

Other values in the area

In the 500 m impact area around the planned sand mine in Latvian side, remains of three ancient farmsteads can be found. Fourth, just North of the area, "Silbērzi", is still inhabited nowadays. Farmsteads "Mazbērzs", "Vabrics" and "Bitmans" used to belong to a bigger, sparse village called "Ķīlmežu ciems" as the historical topographic map of the area shows. Farmsteads here used to be on both sides of the border, still, it is unknown if they were considered a joined, or two different villages.

Nowadays, only remains of the buildings from "Mazbērzs", "Vabrics" and "Bitmans" farmsteads can be found in site. Still, in all three places there are groups of large leaf trees growing, either planted in time the buildings were built or preserved since then. In "Mazbērzs" place along with several overgrown plains, most likely ancient meadows or arable land, the group of big leaf trees form an alley seemingly placed along a road used to be here. In total there could be as much as 100 huge dimension Small-leaved Limes *Tilia cordata*, Ash Trees *Fraxinus excelsior* and Pedunculate Oaks *Quercus robur* in the area.

According to birds, these trees hold exceptional biological value because of the both existing and potential large cavities that form in them. Also, in future when the surrounding forest will reach the height of these leaf trees and the area will become a homogeneous forest without large openings, the big birds with big nests like Black Stork and birds of prey can potentially build nests here. These are no Aspens *Populus tremula*, fast growing big and falling just as fast. These trees are here to stay for long if undisturbed.

Goosander is already breeding here and up to three pairs of Ural Owls most likely also. Pygmy Owls also most likely benefit from these groups of trees, either in form of cavities or food. Other species can be expected as soon as the nearby clearcuts grow up and the openings in massif fill up. Inspections of plants, moss and lichens should be carried out in these groups of trees as specially protected species can be expected here due to unique situation.

Meanwhile, the rest of the impact area appears to be of low biological value due to high level of forestry both in forms of massif fragmentation and mostly young forests remaining.

Requirements to ensure a favourable status of protection of the specially protected bird species in the area and conclusions regarding the impact of the planned sand mine to the specially protected bird species in the area

Noise pollution is considered to cause the main negative impact to the specially protected bird species in the area. At the moment of writing, no parameters describing the expected noise pollution from mining operations were given to the author. As a result, general limitations, unspecific to current case but in author's opinion applicable to any planned sand mine as long as it impacts particular specially protected bird species, are recommended.

In general, a precautionary principle should be applied here. Even if the noise pollution parameters were given to the author, the known permissible noise pollution levels for owls are highly theoretical because of many factors impacting them. The only way to measure them is in site, while the mine is operating. Only then it'd be possible to decide, if the levels are permissible or not. This creates a logical loop – to decide if the mining is allowed, mine has to be established in the first place.

Understanding that this'd be a risk too high to handle for the developer of the mine, hard limiting recommendations based on precautionary principle are given. This gives a clear evaluation of the frame the mine is allowed to operate within, thus allowing the developer to decide to keep on or not before actually investing in the mine.

There are four bird species, intolerable to noise pollution detected in the area surrounding the planned mine – Pygmy Owl, Ural Owl, Capercaillie and Black Stork. For all of them, Species Protection plans exist in Latvia. For each of them, the recommended periods of silence were mentioned earlier, based on those Species Protection plans. Here they are all combined:

Pygmy Owl	1 st of March to 31 st of August
Ural Owl	1 st of February to 31 st of August
Capercaillie*	1 st of February to 15 th of June
Black Stork	15 th of March to 31 st of May

*Table 2. The recommended time periods of silence in the area for the four specially protected bird species in the area. *end date for Capercaillie is author's interpretation as no exact date was given in Plan but 3rd of June was mentioned as the last date males were observed in lek.*

As a conclusion, considering the high number of Ural Owls in such a small area, the period of silence recommended for Ural Owl as being the longest and covering the periods recommended for three other species, is recommended here. As recommended in Species Protection plan for both Pygmy Owl and Ural Owl (Avotinš 2019), a noise pollution level in frequency range 0,1 to 20 kHz should not exceed 35 dB in any place in microreserve established for the species, including its border.

Considering the observations of Pygmy Owls and Ural Owls in the area, it's wise to assume that whole of the 500 m impact area of the planned sand mine is important for both species for hunting for both adults and juveniles, thus, the requirements for microreserves are used in this case as a reference. As a result of all above mentioned, **any noise emitting operation of the planned sand mine, that causes the noise pollution level in frequency range 0,1 to 20 kHz to exceed 35 dB anywhere in the 500 m impact area, should be ceased from 1st of February to 31st of August.**

August and July can be discussed if necessary at the expense of a compromise – for example, during August and July noise emitting operations in sand mine could be allowed only during daytime, an hour after sunrise to an hour before sunset. Meanwhile, February to June should be a complete ban for noise pollution with no exceptions possible. Author found no recommendations for similar measurable noise pollution levels permissible for Capercaillie and Black Stork, therefore, it's considered that levels mentioned above should be enough also for these species to maintain their current status of protection.

Another theoretically possible option might be noise walls similar to those built along highways. This is highly hypothetical, not considering neither practical nor financial aspect of this. Thus, **if a noise pollution level in frequency range 0,1 to 20 kHz below 35 dB anywhere in the 500 m impact area of the planned sand mine can be achieved via noise walls or any other solution blocking noise pollution, in terms of noise pollution the sand mining can be allowed all year round.**

Another concern is hydrology. At the moment of writing, no data were given to author regarding the planned impact to hydrology of the surrounding area caused by the planned sand mine. **If major changes in hydrology are expected, with the chance to cause drying of the dark wet forests suitable for Pygmy Owl, or withering of the big leaf trees around old farmsteads in the area, the mining should not be allowed.** However, author believes that the impact can be controlled and measures as extreme as dams and other artificial structures could be used to prevent any negative impact to hydrology. Again, if such measures are taken, any noise emitting actions causing noise above levels mentioned earlier, should be done in time period from September to January.

Noise and hydrology are two main concerns in the 500 m impact area regarding the planned sand mine. If these are limited, other minor threats will be eliminated with them.

No management measures are recommended other than non – interference due to legal considerations. Placing of nest boxes recommended for Ural Owl in the area is considered redundant because of the high number of big leaf trees with big cavities already in the area.

Recorded walked and driven paths during inspections of the area in digital form are attached to this conclusion.

Used sources of information:

Avotiņš jun. A. 2019. Apodziņa Glaucidium passerinum, bikšainā apoga Aegolius funereus, meža pūces Strix aluco, urālpūces Strix uralensis, ausainās pūces Asio otus un ūpja Bubo bubo aizsardzības plāns. Latvijas Ornitoloģijas biedrība, Rīga.

Ķerus, V., Dekants, A., Auniņš, A., Mārdega, I. 2021. Latvijas ligzdojošo putnu atlanti 1980 – 2017. Rīga: Latvijas Ornitoloģijas biedrība.

Bergmanis M., Priednieks J., Avotiņš A. jun., Priedniece I. (2020) Mazā dzeņa Dryobates minor, vidējā dzeņa Leiopicus medius, balmugurdzeņa Dendrocopos leucotos, dižraibā dzeņa Dendrocopos major, trīspirkstu dzeņa Picoides tridactylus, melnās dzilnas Dryocopus martius un pelēkās dzilnas Picus canus aizsardzības plāns. Latvijas Ornitoloģijas biedrība, Rīga.

Polakowski M., Broniszewska M., Kirczuk L., Kasprzykowski Z. 2020. Habitat Selection by the European Nightjar Caprimulgus europaeus in North-Eastern Poland: Implications for Forest Management. *Forests* 2020, 11(3), 291; <https://doi.org/10.3390/f11030291>

Hofmanis H., Strazds M. 2004. Medņa Tetrao urogallus L. aizsardzības plāns Latvijā. Rīga: Latvijas Ornitoloģijas biedrība.

Strazds M. 2005. Melnā stārķa (Ciconia nigra) aizsardzības pasākumu plāns Latvijā. Ķemeru Nacionālā parka administrācija.

Goris.lv

Dabasdati.lv

Ozols.gov.lv

Balticmaps.eu

26 pages in total.

This document is signed with safe digital signature and contains a time stamp.