Improving the Pond Bat (*Myotis dasycneme*) habitats in Estonia

Layman's Report

ELF

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Life

NATURA 2000

KIK

KESKKONNAINVESTEERINGUTE KESKUS

Title: Improving the Pond Bat (*Myotis dasycneme*) habitats in Estonia
Acronym: EstBatLIFE
Code: LIFE16 NAT/EE/000710
Period: 4 years (48 months) from 30th of June 2017 to 30th of June 2021 – prolongation 6 months until 31st of December 2021
Budget: 972 395 €, incl. 583 437 € (60%) European Commission contribution
Partners: Estonian Fund for Nature (leading partner) and Estonian Museum of Natural History
Target species: Pond Bat (Myotis dasycneme)
Project sites: Piusa (Natura 2000 sitecode: EE0080621), Ülgase (EE0010116), Vääna-Posti (EE0010175), Vääna (Humala, EE0010125)
Website: elfond.ee/bats

Text: Lauri Klein, Rauno Kalda, Oliver Kalda
Cover photo: Rauno Kalda
Bat illustrations: Maris Pärn
Design: Uku Peterson

Why?:

- During the 20th century the population of Pond Bat (*Myotis dasycneme*) has declined considerably across the EU, especially in the boreal part of it's distribution range.
- Wintering population of Pond Bat in Estonia has declined during the last century. In project sites (Piusa, Ülgase, Vääna (Humala) and Vääna-Posti) is hibernating 80% of Estonian Pond Bat wintering population that is ca 40% of wintering population in boreal region.
- The most significant wintering sites of the Pond Bat for the whole boreal region are located in Estonia (all project sites), therefore the conservation activities in Estonia play crucial role for the whole EU population of Pond Bat.
- The previous attempts of managing the visitor flows or prohibiting the entrance to the underground sites were unsuccessful as the placed grilles either had proved to be inappropriate for bats, had been destroyed or removed. Therefore the existing experience and knowledge of the EUROBATS and Estonian bat conservationists must be combined with the community involvement approach.
- Wintering sites of Pond Bat are also suitable for other bat species hibernating in Estonia.

Main objective:

to improve wintering conditions for Pond Bat in four internationally important wintering site – Piusa, Ülgase, Vääna (Humala) and Vääna-Posti.

Tasks:

1. Protection improvement

- To reduce the visitor flows during the hibernation period in four most important wintering sites of Pond Bat (goal was to fence and take into electronical surveillance ca 40 existing entrances of these sites and reach at least 75% less visitor flow as before project).
- To stop degradation of wintering habitats caused by low temperatures, draught and collapsing: reach stable underground temperature above zero degrees and avoid draught in Vääna (Humala) site and secure safe entrance into most important wintering part of underground site in Piusa against possible roof collapsing.
- To improve the protection of Pond Bat by making the policy recommendations for protection plan of bats in Estonia and for management plans of relevant protected areas.

2. Awareness rising

- To involve volunteers, private companies and local communities into cleaning the caves and surroundings, especially the swarming areas (at least 6 voluntary camps with at least 100 volunteers in total).
- To rise awareness on Pond Bat and other bat species in Estonia: train at least 20 nature guides for knowledge on bats and reach at least 50 000 people with interactive exhibition and information materials.
- To share knowledge on Pond Bat wintering ecology and project results in Estonia as well as internationally, with purpose of better protection of bats in wintering sites (EUROBATS AC meetings, knowledge sharing in Netherlands and in Latvia).

Piusa (Natura 2000 sitecode: EE0080621)

Before:

- **Abundance of wintering bats:**
2000/2001 winter more than 4500 bats;
2017/2018 winter 3109 bats;
2018/2019 winter 3004 bats.
- **Abundance of wintering Pond Bats:**
2017/2018 winter 722 bats;
2018/2019 winter 593 bats.
- **Visitor load:**
2018/2019 was 36 illegal visits;
2019/2020, when there was no fence, but video surveillance already existed, was 21 illegal visits by at least 42 persons.
- **Fences:** before project there was 0 m of secure fence, just symbolic log fence; it was possible to enter through ca 20 entrances without any barrier.
- **Security equipment:** before project was under surveillance only one entrance – leading to viewing platform of the visitor cave.
- **Awareness rising:** before project there was one information board near the visitor centre.
- **Habitat security:** Unsecured and dangerous section with collapsing roof in the only existing access tunnel to rear part of the biggest cave system – best wintering habitat for Pond Bat.

Photo: Lauri Klein

Photo: Lauri Lutsar

Piusa (Natura 2000 sitecode: EE0080621)

After:

- **Abundance of wintering bats:**
2019/2020 winter ~3499 bats;
2020/2021 winter ~3355 bats.
- **Abundance of wintering Pond Bats:**
2019/2020 winter ~671 bats;
2020/2021 winter ~723 bats.
- **Visitor load:** 2020/2021 when fences where in place, only one person visited caves illegally.
- **Fences:** in total 1250 m of welded panel metal fence with height of 1,5-1,7 m, around 8 entrance area (ca 20 entrances in total); every area have at least one lockable gate (9 gates in total).
- **Security equipment:** in total 8 entrance area under surveillance with 6-13 security videocameras.
- **Awareness rising:** large information board near visitor centre, with information in three languages and map of the area;
10 small information plates on fences around 8 entrance area, with most important information in three languages.
- **Habitat security:** Dangerous tunnel section secured against roof collapsing with security culvert that is 24 m long and 2 m in diameter.

Photos: Lauri Klein

Ülgase (Natura 2000 sitecode: EE0010116)

Before:

- **Abundance of wintering bats:**
1993/1994 winter more than 1000 bats;
2017/2018 winter 208 bats;
2018/2019 winter 270 bats.
- **Abundance of wintering Pond Bats:**
1993/1994 winter 124 bats;
2017/2018 winter 36 bats;
2018/2019 winter 43 bats.
- **Visitor load:** in 2017/2018 winter from November to January was in frontal part of tunnel system 548 illegal visits and during a year (2016/2017) in rear part of tunnel system 88 illegal visits; in winter 2019/2020 when there was no fence, but video surveillance already existed, was in whole tunnel system 33 illegal visits by at least 50 persons.
- **Fences:** before project there was 0 m of secure fence; it was possible to enter through 6 entrances without any barrier.
- **Security equipment:** before project none of the entrances were under security surveillance.
- **Awareness rising:** before project there was one information board where clear information about year around prohibition to enter was missing.

Photo: Forus security camera

Photo: Lauri Klein

Ülgase (Natura 2000 sitecode: EE0010116)

After:

- **Abundance of wintering bats:** 2019/2020 winter 237 bats; 2020/2021 winter 204 bats.
- **Abundance of wintering Pond Bats:** 2019/2020 winter 40 bats; 2020/2021 winter 41 bats.
- **Visitor load:** 2020/2021 when fences where in place, there was only two illegal visits by 5 persons.
- **Fences:** in total 450 m of welded panel metal fence with height of 1,5-1,7 m, around 6 entrance area (9 entrances in total); every area have at least one lockable gate (7 gates in total).
- **Security equipment:** in total 6 entrance area under surveillance with 4-7 security videocameras.
- **Awareness rising:** large information board with information in three languages at the edge of protected area; 7 small information plates on fences around 6 entrance area, with most important information in three languages.

Photos: Lauri Klein

Vääna-Posti (Natura 2000 sitecode: EE0010175)

Before:

- **Abundance of wintering bats:** 2017/2018 winter 571 bats; 2018/2019 winter 493 bats.
- **Abundance of wintering Pond Bats:** 2017/2018 winter 96 bats; 2018/2019 winter 78 bats.
- **Visitor load:** in 2018/2019 during the prohibited time (8 months) visited tunnel system about 140 persons and during the whole year 770 persons.
- **Fences:** before project there was 0 m of secure fence; it was possible to enter through 4 entrances without any barrier.
- **Security equipment:** before project none of the entrances were under security surveillance.
- **Awareness rising:** before project there was no large information boards; 3 small information plates existed, but they were either very worn and badly readable or broken.

Photos: Lauri Klein

Vääna-Posti (Natura 2000 sitecode: EE0010175)

After:

- **Abundance of wintering bats:** 2019/2020 winter 515 bats; 2020/2021 winter 426 bats.
- **Abundance of wintering Pond Bats:** 2019/2020 winter 100 bats; 2020/2021 winter 78 bats.
- **Visitor load:** 2019/2020 when fences where in place, there was only one illegal visit; 2020/2021 there was no any illegal visits counted.
- **Fences:** in total 220 m of welded panel metal fence with height of 1,5-1,7 m, around 4 entrances; every fenced area have at least one lockable gate.
- **Security equipment:** in total 4 entrances under surveillance with 5 security videocameras.
- **Awareness rising:** large information board with information in three languages at the largest entrance area; 6 small information plates on fences around 4 entrance area, with most important information in three languages.

Photo: Forus security camera

Photo: Lauri Klein

Vääna-Humala (Natura 2000 sitecode: EE0010125)

Before:

- **Abundance of wintering bats:**
2017/2018 winter 352 bats;
2018/2019 winter 332 bats.
- **Abundance of wintering Pond Bats:**
2017/2018 winter 33 bats;
2018/2019 winter 27 bats.
- **Visitor load:** in 2018/2019 during the whole year more than 1700 persons visited site.
- **Fences:** before project there was 0 m of secure fence, just symbolic log fence with broken signs; it was possible to enter through ca 12 entrances without any real barrier.
- **Security equipment:** before project none of the entrances were under security surveillance.
- **Awareness rising:** before project there was no large information boards; some small warning signs existed, but they were worn or broken.
- **Habitat quality:** There was strong draught through vertical shaft in the middle of the longest tunnel that caused temperature fall under zero and bats freezing to death.

Photos: Lauri Klein

Vääna-Humala (Natura 2000 sitecode: EE0010125)

After:

- **Abundance of wintering bats:** 2019/2020 winter 374 bats; 2020/2021 winter 377 bats.
- **Abundance of wintering Pond Bats:** 2019/2020 winter 20 bats; 2020/2021 winter 23 bats.
- **Visitor load:** 2019/2020 when fences where in place, there was about 3 illegal visit (7 persons in total); 2020/2021 there was no any illegal visits counted.
- **Fences:** in total 350 m of welded panel metal fence with height of 1,5-1,7 m, around 9 entrance area (in total 12 entrances); every fenced area have at least one lockable gate.
- **Security equipment:** in total 9 entrance area under surveillance with 13-14 security videocameras.
- **Awareness rising:** large information board with information in three languages at the edge of the protected area; 9 small information plates on fences around 9 entrance area, with most important information in three languages.
- **Habitat quality:** vertical shaft in the middle of the longest tunnel filled and draught avoided; access in the tunnel under the shaft kept through 6 m long security culvert with diameter of 1,4 m and closed mouths.

Photos: Lauri Klein

Trainings, Camps, Bat-Days, Bat-Nights and knowledge sharing

- **Voluntary camps:** 8 camps, more than 140 participants. 6 camps for cleaning wintering sites from trash (in total 25 tons of trash). Camp for closing illegal cavity in Vääna-Posti and camp for building wooden bat boxes in Soomaa.
- **Bat-Nights:** 24 Bat-Nights all over the Estonia. More than 700 persons trained on bats.
- **Training of nature guides:** 2 trainings with theory and practice. More than 40 nature guides trained all over the Estonia. Training material on bat biology was prepared for outdoor use and distributed to nature guides as well as for nature schools and centres around Estonia.
- **Bat-Days:** 3 Bat-Days for local stakeholders around project sites were held (for Piusa in 2019, for Vääna in 2019 and for Ülgase virtually in 2021. Every Bat-Day had at least 40 participants.
- **International knowledge sharing:** 3 times bat experts participated in EUROBATS AC meetings – 2018 in Tallinn, 2019 in Skopje and 2021 virtually. Experiences were shared also on training-trip into Netherlands.

Training of guides in Piusa. Photo: Lauri Klein

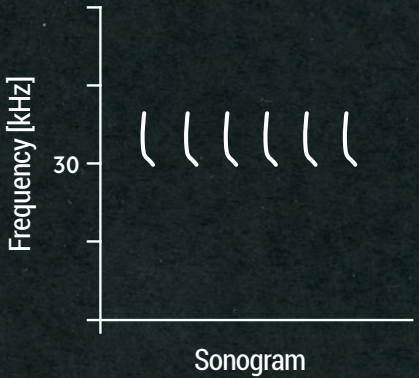
Voluntary camp in Vääna-Posti. Photo: Kirke Raidmets

Exhibitions and media

- **Exhibitions:** Interactive and multilingual exhibition „Terribly adorable bats" was opened in 2020 in the Estonian Museum of Natural History (EMNH) and it was open until the end of 2021. In the autumn-winter of 2020 EMNH organised a multilingual outdoor poster exhibition „Superpowerful Bat" in the central park of Tallinn and that exhibition started to travel around Estonia. Copy of that poster exhibition is permanently put up into Piusa Visitor Centre. EMNH also held a separate exhibition of Bat Photos.
- **Campaigns:** During the year 2020, in cooperation with Estonian Theriological Society was organised an awareness rising campaign „Bat – Animal of the Year 2020". About 1300 articles were published, among them about 130 directly linked to the project. Many times experts broadcasted in TV or radio. Estimated auditorium reached was close to 5,5 million. Among other events a very popular competition of bat bed-time stories was organised.
- **Bat-Camera:** Wintering Pond Bats in online way showing nature camera has been working in Piusa wintering site for two winters. In cooperation with portal looduskalender.ee there is set an internationally very popular web-forum attached to the online Pond Bat web camera. Bat-Camera streams have been watched more than 62 500 times.
- **Website:** Since the start of the project website in three languages is working at the url: elfond.ee/bats

Poster exhibition in Tallinn

Bat-Camera in Piusa caves.
Photos: Lauri Klein

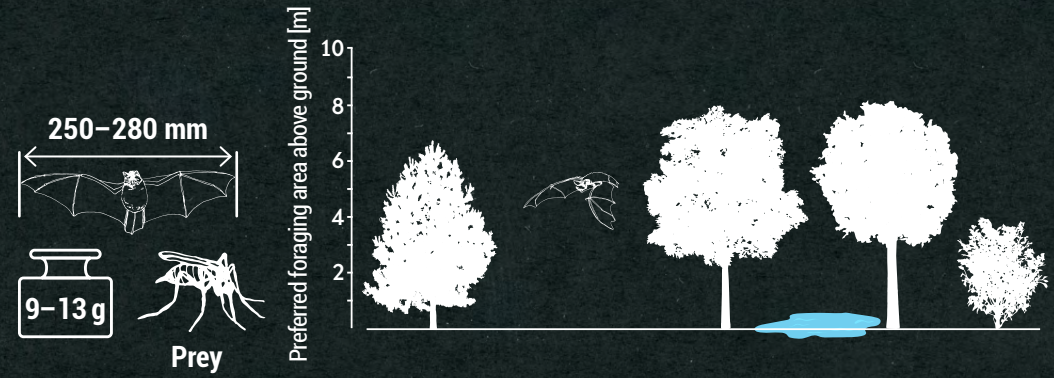


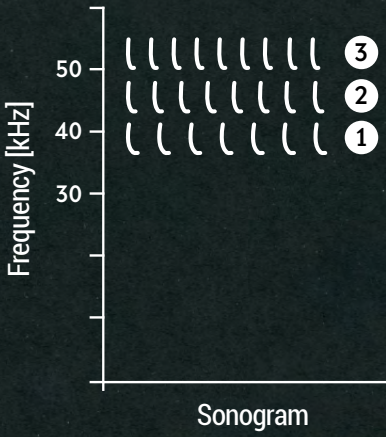
Northern bat

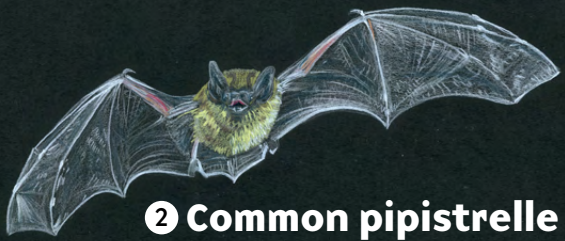
Eptesicus nilssonii

Description: The body of Northern bat is coated with dark brown or black hair with yellowish hair tips in the head and back region. The coat on the ventral side is yellowish-brown. Hair tips of the juveniles are greyish and remind particoloured bat. The face and wings are dark brown. Ears short and rounded with short and round tragus.

Echolocation calls: Looking at the sonogram, the sound impulses are in the shape of a hockey stick. Signals are mostly the loudest at 29-30 kHz. In the heterodyne detector the Norhern-bat sounds are uneven in rhythm. The sound pulse reaches approximately from 27 kHz to 45 kHz. Species can be found flying along the woodland edges and in the clearings.







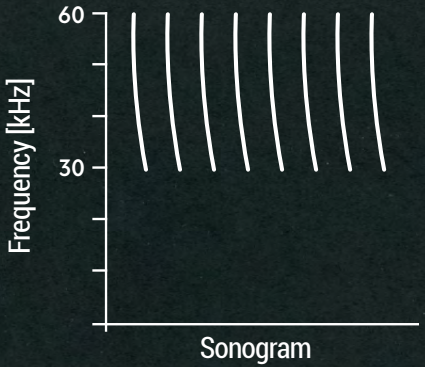
2 Common pipistrelle
Pipistrellus pipistrellus

3 Soprano pipistrelle
Pipistrellus pygmaeus

1 Nathusius' pipistrelle
Pipistrellus nathusii

Description: The Pipistrelles are amongst the Europe's smallest bat species. All three of them have short ears with a triangular shape and round tips. Their fur is brown or reddish-brown with a slightly lighter ventral side. Nathusius' bat is a bit bigger* than the other two species and has a darker coat. Distinguishing between species can be difficult and requires experience.

Echolocation calls: Looking at the sonogram, the sound impulses are in the shape of a hockey stick. All three species have distinct frequencies on which the sound is the loudest - Nathusius' pipistrelle 38-44 kHz, Common pipistrelle 46-47 kHz and Soprano pipistrelle 50-55 kHz. In the heterodyne detector, you can hear fast and rhythmic sounds. Species can be found flying along the woodland edges and in the clearings.

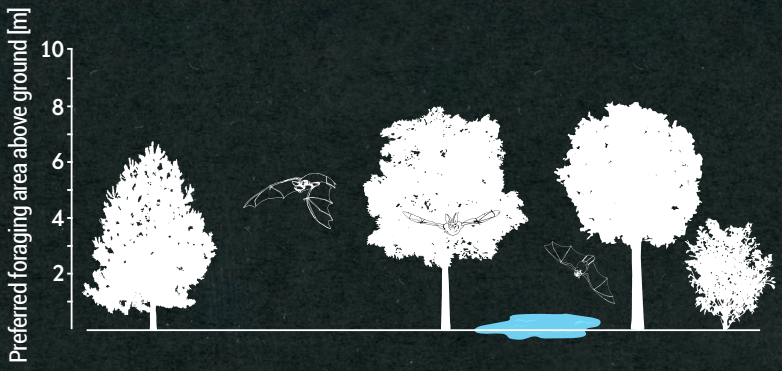


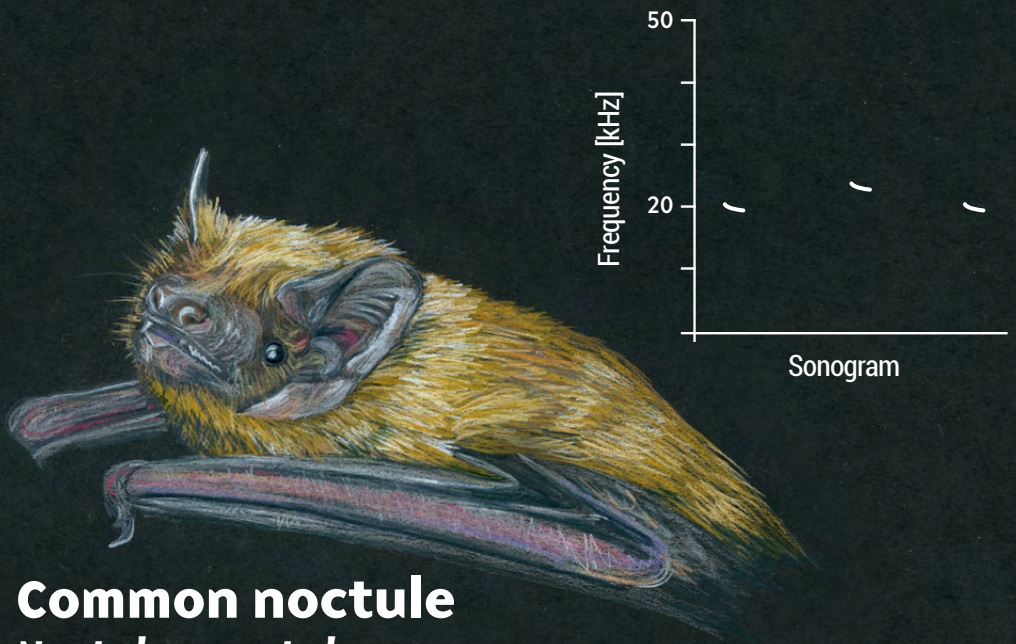
Brandt's bat
Myotis brandtii

Whiskered bat
Myotis mystacinus

Description: two small species of bats, of which Brandt's bat is a little bit bigger. Both have a dark brown fur, with a grey ventral side. The face and wing membranes are dark brown, juveniles are often even darker. Two species have both characteristically long ears with a narrow and long tragus.

Echolocation calls: Looking at the sonogram, the sound impulses are broadband, covering frequencies mostly between 25-90 kHz. Sound is equally loud between 30-60 kHz. The rhythm is fast and uniform. Species can be found flying in the woodlands and along the forest paths.



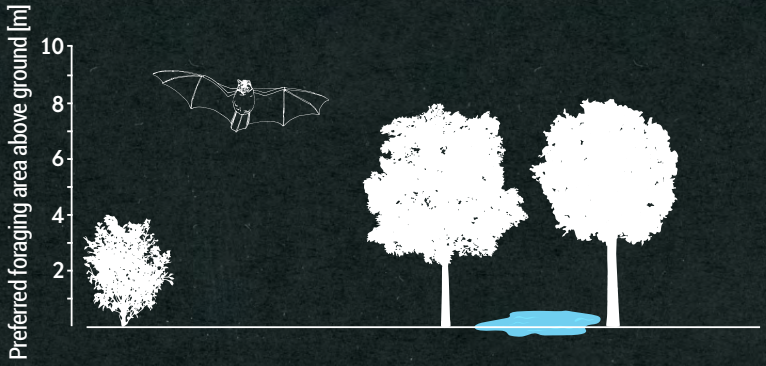


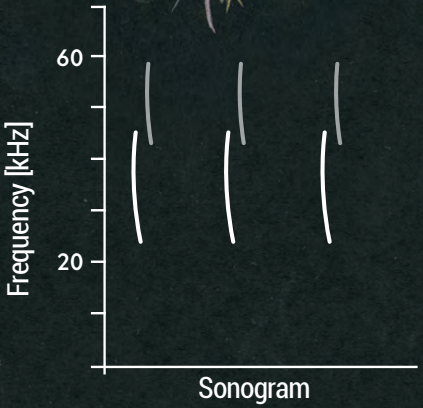
Common noctule

Nyctalus noctula

Description: Common noctule is the largest bat species found in Estonia. The fur is shiny and reddish-brown on the backside and paler on the ventral side. The face, ears and wing membranes are brown. Ears are short, broad and with round tips. Tragus has a distinctive mushroom shape.

Echolocation calls: echolocation calls the noctule are low compared to other bat species, being the loudest around 20 kHz. Species alternates between higher and lower frequency signals, making a distinct slow rhythm. The species can be found flying high above open habitats, forests and waterbodies.



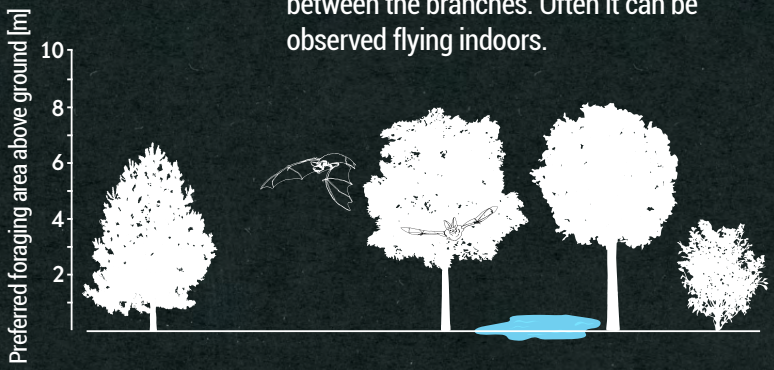


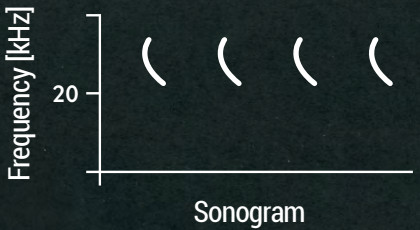
Brown long-eared bat

Plecotus auritus

Description: The fur of the brown long-eared bat is light brown and the ventral side is beige. The face of the bat is light and with a reddish tinge, the wing membranes and ears are brown. Because the length of the ears of the bat is ¾ of its body length, it is easily distinguishable from all other bat species in Estonia. When resting, the ears are contracted and curved backwards. This shows them a lot smaller.

Echolocation calls: Looking at the sonogram, the sound impulses are broadband, covering frequencies mostly between 25-65 kHz. The rhythm of the sound is uneven and the sound itself is quiet and soft. The species can be found flying around the tree canopies and between the branches. Often it can be observed flying indoors.



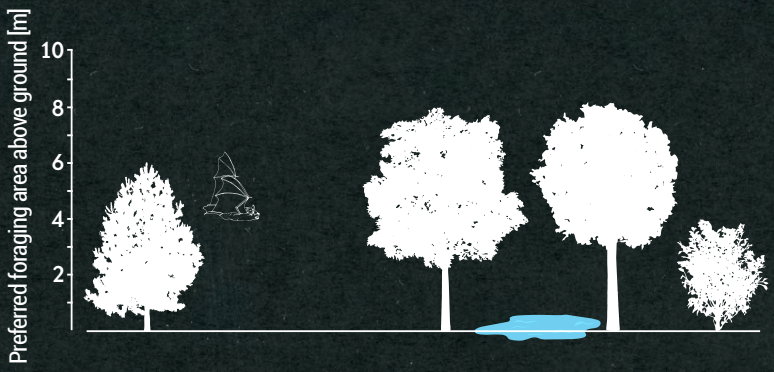


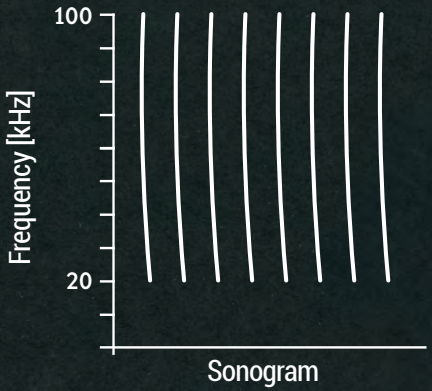
Parti-coloured bat

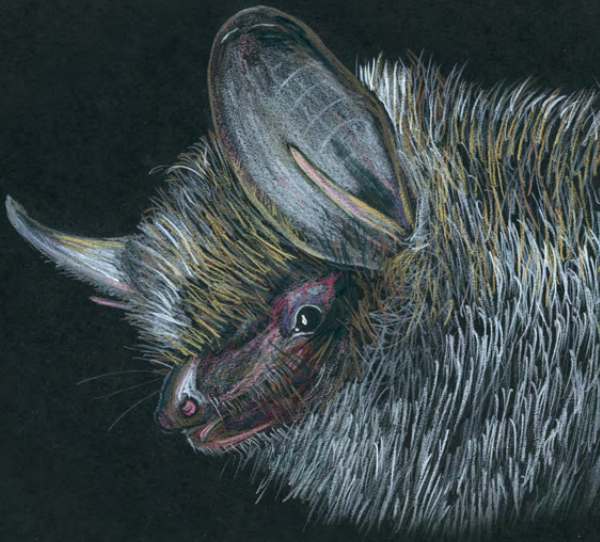
Vespertilio murinus

Description: The body of Parti-coloured bat is coated with dark brown or black hair with silver-gray hair tips in the head and back region. The face and wings are dark brown. Ears short and rounded with short and round tragus. Contrary to northern bat, parti-coloured bat's ear lobule reaches the corner of the mouth.

Echolocation calls: Looking at the sonogram, the sound impulses are in the shape of a hockey stick. Signals are mostly the loudest at 23-28 kHz. In the heterodyne detector the Parti-coloured bat sounds are rhythmic and slow. Species can be found flying along the woodland edges and in the clearings.







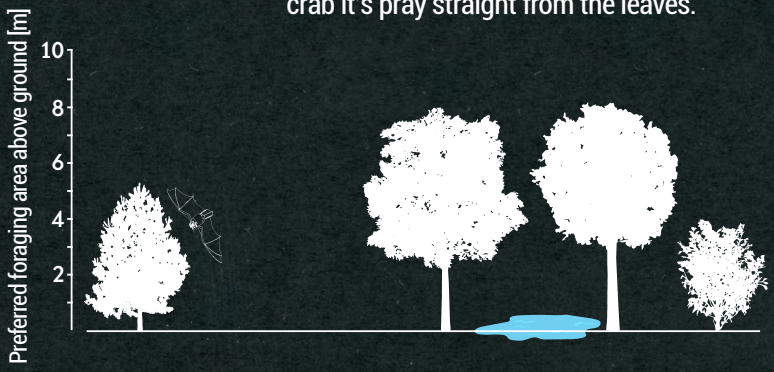
Natterer's bat

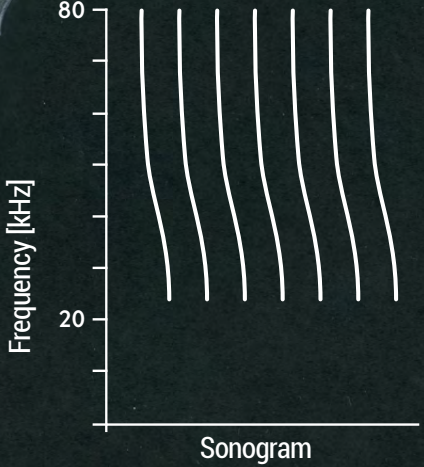
Myotis nattereri

Description: The fur on the back of the bat is greyish-brown and the ventral side is greyish-white. The transition from fur on the back to ventral side is clear-cut. The face is pinkish and usually hairless. The ears and wing membranes are greyish brown and quite light. The ears are long and reach past the end of the nose when bent forward.

The tragus is longer than half of the length of the ear and slightly curved.

Echolocation calls: Looking at the sonogram, the sound impulses look like long bars and cover frequencies from 100 to 22 kHz. The rhythm is uneven and very rapid, but quiet and soft sounding. Unlike many of the other species, Natterer's bat often flies very close to the vegetation and can crab it's pray straight from the leaves.



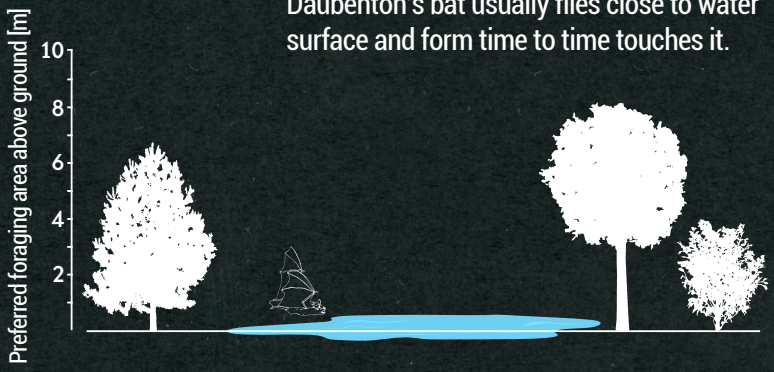


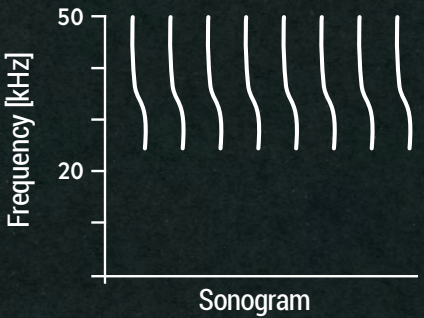
Daubenton's bat

Myotis daubentonii

Description: The fur on the back of the bat is greyish-brown and the ventral side is light grey of whiteish. The transition from fur on the back to ventral side is clear-cut. The face is pinkish or reddish-brown, faces of young animals are usually a little darker. The ears and wind membranes are brown but inner parts of the ear are usually lighter than outside. The ears are short and have a round tip.

Echolocation calls: Looking at the sonogram, the sound impulses look like long curved bars and cover frequencies from 80 to 25 kHz. In the middle of the impulse there is a slight curve. The sound has a rapid rhythm and listening to a heterodyne detector sound like a fast crackle. Daubenton's bat usually flies close to water surface and form time to time touches it.





Pond bat

Myotis dasycneme

Description: The biggest of the Myotis species living in Estonia. The fur on the back of the bat is greyish-brown and the ventral side is light grey of whiteish. The transition from fur on the back to ventral side is clear-cut. The face is pinkish or reddish-brown, faces of young animals are usually a little darker. The ears and wind membranes are brown. The ears are relatively long, but the tragus is short for a Myotis bat.

Echolocation calls: Looking at the sonogram, the sound impulses look like long curved bars and cover frequencies from 50 to 25 kHz. In the middle of the impulse, at around 35 kHz, there is a strong curve. The rhythm of the sound is uneven and listening to a heterodyne detector sounds as a loud and sharp crackle. Pond bat usually flies close to water surface but can also be seen fluing higher.