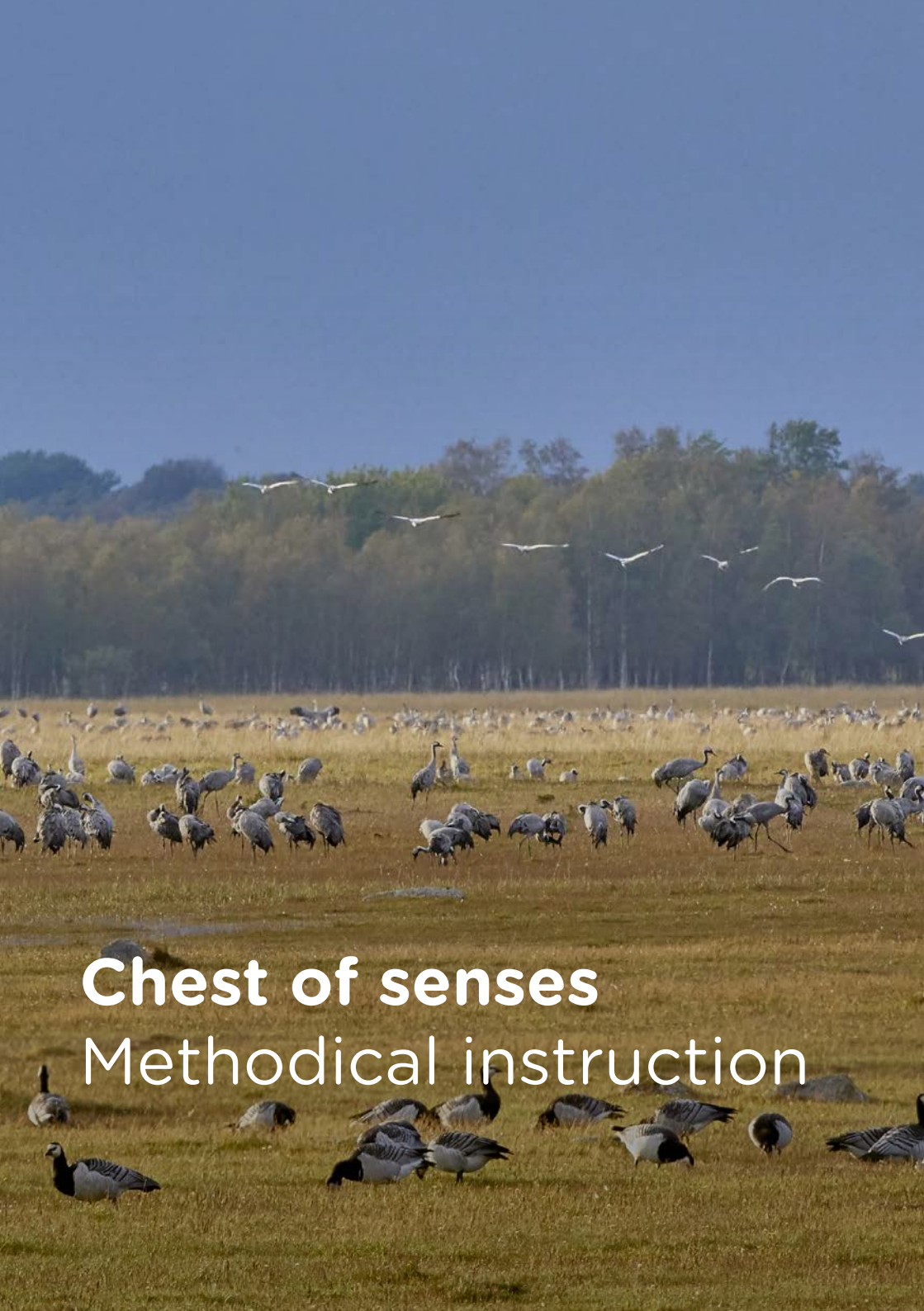

Chest of senses
Methodical instruction

The project is being implemented with support of the Central Baltic Programme 2014-2020. Project CB786 “Nature Access to All (NatAc)”, European Regional Development Fund.

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Funding: The Central Baltic Programme 2014-2020 of the European Regional Development Fund (www.centralbaltic.eu) and the Environmental Investment Centre (www.kik.ee)

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EUROPEAN UNION
European Regional Development Fund

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REPUBLIC OF ESTONIA
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The chest is a kit designed to talk about nature and introduce children and adults alike to the biotic communities of forests, bogs and coastal areas.

The study aid is prepared using the examples of Riisa bog, Puhtu fresh boreo-nemoral forest and Matsalu coastal landscapes. It supports instructors and teachers as they attempt to introduce these places or biotic communities in general.

Thanks to realistic sample materials, tactile picture cards and models, the study aid can target several senses. The chest of senses is suitable for people with impaired vision and hearing.

Educational trail
Preparation of educational trail

Before the start of the study visit, it is recommended that the children's instructors cover:

- the size of the group, the number of accompanying persons, activities and assignments
- a description of the special needs of the children participating in the educational trail (vision, hearing, mobility disability, particular behavioural characteristics, etc.)
- the intellectual capabilities and/or study programmes of the children coming on the educational trail
- the language (complexity of vocabulary and terminology; to what extent they will require explanations for the main terms; whether there is a need for a sign language interpreter) of the children participating in the educational trail
- the length of the hiking trail and any particular features that the children and accompanying persons should take into account
- aids
- the structure of the conversations and the lesson, particular features and goals

Introducing the study aid

The chest of senses can be introduced before it is used by the teacher or the children. It is best if the group leader introduces the chest to everyone simultaneously. The accompanying persons of the children can subsequently provide more detailed information.

Upon introducing the chest of senses:

• start by introducing the shape of the study aid (semi-sphere) and the general division (upper part and lower part)

• talk about the construction of the study aid and the specific division (five compartments and pockets each with specific contents)

• describe the marking on the study aid and its elements

• guide the tactile examination of the model, help find the resources, draw attention to the written information (in Braille, large text, audible information and information in sign language, images)

• if possible, involve the children in the introduction process. For example: a child facing a compartment can choose from the objects contained therein and explain to others what they are

The resources used in the chest of senses are lifelike in order to feel as real as possible to children with special needs.

Objects establish a general link but also enable so-called subtopics to be learned.

Elements of the study aid

• **Picture cards.** The image on the picture cards is both visual and has raised contours. The Estonian and Latin name of the object depicted on the picture is written in ordinary letters and in Braille in the top left corner of the card. The back of the picture card contains simplified facts (in ordinary letters) about the image depicted on the picture. It also includes a QR-code with information in sign language as well as information relating to nature sounds.

• **Scent jars.** Scent jars are marked with a sticker.

• **Pelt fragments.** Pelts are marked with a sticker.

• **Tracks.** Life-size tracks are marked with a sticker.

• **Replicas of bird eggs.** Replicas are marked with a sticker.

• **Model depicting the development of mires.** The model is marked with a sticker.

• **Beach findings.** The model is marked with a sticker.

• **Device for playing sounds.** To use the device, connect the speaker to a phone and scan the QR-code on the picture card to play the sound.

Educational trail

Enjoy your time together and in nature!

Treat a child with a disability the same as you would any other child who is simply gaining knowledge through other senses. Instructors act as mediators and the children are the ones acquiring experience. It is important to give them knowledge and experience. Allow them practicable independence and encourage them to try new activities.

The instructor of the study visit will carry out the nature hike according to the objective and the abilities of the group. The instructor will plan the activities for the lesson and if necessary also discuss the suitability thereof and any required modifications thereto with the teachers/accompanying persons. The positioning of the children during movements and study activities depends on the environment and the specific needs of every child (accompanying persons or children themselves can address this where required).

The introduction of the chest of senses should take place in a calm environment. It is convenient to use the chest without assistance provided that it is positioned on a stable surface such as a camping desk or the ground. It would be good if the children could sit or stand around the chest of senses. You should also take into account that some children may find sitting on the ground extremely uncomfortable or delimiting, whereas children may drop objects on the ground when forced to stand up.

An educational trail coupled with a chest of senses can be a mind-broadening activity even for children without disabilities.

What to keep in mind when teaching children with visual disabilities?

Make sure that any oral information given to the children is audible and that partially sighted persons can find a comfortable place and position (e.g. in a semi-circle in front of the instructor) to acquaint themselves with the resources.

It is best to sit at a desk to read Braille and view raised pictures. The chest of senses can also be used in natural science classes at schools to make them more varied and offer a more thorough take on the subject matter.

Blind people need time to acquaint themselves with the resources. A more detailed description should be provided of what exactly the hands of the blind person are examining. For this reason, it is more convenient to have several pieces of the same resource being examined or use a specific rhythm in group activities. If necessary, each person can be given the chance to examine the objects more thoroughly and calmly once the joint activities are over.

Since the intake of information and new experiences in unknown environments may be tiring for blind persons, it is recommended to take breaks or, for example, organise two hikes on the same subject – the first to provide an overall introduction and the second to cover the topic more thoroughly and reinforce the knowledge gained (where children are allowed to be more independent). It is important to make sure that not too much new information is delivered, as this would put a lot of strain on the memory function of blind children and they may confuse

different pieces of information if there are different impressions.

Attention. Nature education and immediate experience with nature places attentional demands on children with visual disabilities and requires a lot of focus. Listening to/hearing instructions in an unfamiliar environment or during movement may be impracticable. It is important to describe to the children exactly what they are experiencing (examining by hand, listening, smelling, tasting, etc.). Give them time to listen to, understand and analyse their surroundings.

Use of hands. Blind children use their other senses to collect information and can distinguish between the exact properties of objects by touch. Readiness to use hands or examine new things by touch may sometimes prove to be a complicated experience (due to touch sensitivity). Some people are afraid to experience new materials so encourage them to use their hands for exploration because developing sensory sensitivity helps blind people get a more versatile experience of the world. Describe what the child is currently touching.

Use of terms such as 'see' and 'look'. Feel free to use these words. They simply have a somewhat different meaning for people with visual disabilities.

Observable (visual) information. Children with residual vision are very limited in their ability to receive information through vision and it is also highly individual. It is primarily related to the size of their field of vision and their ability to use visibility. Children must be guided to pay attention to the characteristics of objects. Drawings should have contrasts and simplifications and place emphasis on important characteristics. In unknown environments, bright sunlight (light-sensitivity), shadows (trees, people, etc.), reflections (water surface, waves, laminated study materials, etc.) may all have an impact on children's vision. Allow children with visual disabilities to choose the distance and position from which they prefer to get acquainted with the object being examined.

Colours. In your descriptions, you can also use names of colours as this helps establish a general common information space. This allows blind people to develop an understanding of the usual colours of certain natural elements. At the same time, keep in mind that different partially sighted people may have different perceptions of colours.

Hearing and sounds. Take into consideration that we are surrounded by general background noise and specific sounds. Introduce new sounds and teach children to notice them. Unexpected sounds can sometimes be scary so warn them or point it out in advance, where possible. Make sure that the child gains the audio knowledge being shared. Save lengthier descriptions for when the group is standing and not walking. Choose an appropriate volume. Weather conditions (the wind, the rustle of trees, stormy sea) may also cause oral instructions to get lost. The number of accompanying people may also contribute as a noise factor. Give the children time to listen to, understand and analyse their surroundings or simply let them enjoy the silence and take a break.

Ground. Both hands and feet provide information through touch. Describe different types of soil and the materials you are walking over, e.g. moss, peat, pebbles, roots of trees, stumps, puddles, ice.

Pace and time management. Pick a suitable movement speed for the study visit. Safe movement across different surfaces sometimes requires a lot more time. Descriptions and the examination of objects also takes time.

Scents. Children with visual disabilities learn to recognise things and phenomena through their sense of smell, among other things. Describe new scents. If possible, establish a link between a specific aroma and its source (e.g. a plant and its scent, picture and uses).

Words to describe direction. Avoid using unclear expressions *here, there, this, that, come here, put it there,* etc. Instead, use specific concepts of direction such as *to the right, to the left, up, down, hip-level,* etc. Use these terms from the perspective of a blind person. Instruct and guide the finding of objects by talking or with a slight touch of the hand.

Terminology. People with visual disabilities can use terms whose actual meaning is unknown to them. Try to understand whether they comprehend the substance of the terminology used. Be brief, simple and precise when explaining new terms. When providing descriptions, it is preferable to establish connections with the child or a room or an object they are familiar with using measurements they understand.

Visual memory. People who have lost their sight or whose vision has declined during their lifetime may remember the shape and properties of items, meaning that they need less or different descriptions than those who were born blind.

Addressing. If possible, use name tags for children as this will help instructors or new teachers address children with visual disabilities. Blind persons may not understand an impersonal form of address. If there are no name tags, gently touch the child's hand or shoulder to let them know

that they are being talked to as well as the direction of the person who is talking to them. Be sure to introduce yourself before the hike to establish a connection between the person and the voice.

Select your **objectives and preferences** for descriptions and explanations: what is important, what is less important, what to focus on for longer and what to draw attention to next time. Your descriptions help broaden the world and life experience of the children.

Feedback. Ask control questions to understand whether and how children with visual disabilities understood the subject.

Work ability. Children with visual disabilities may tire more easily as they use all their senses to process information. Take small breaks during the hike, offer the children a variety of things to do or divide the topics between several hikes. Drawing attention, focusing on a subject, memory and new emotions all take their toll on children with visual disabilities.

Do not leave a blind person **alone in an unfamiliar environment** – let them know who they can expect to come to continue the activities.

What to keep in mind when teaching children with hearing disabilities?

General recommendations

• Before the hike, be sure to familiarise yourself with the level of hearing loss of the pupils, their ways and means of communication (whether/to what extent they are able to hear speech, how well they know sign language and Estonian, what their level of speech is) and try to find the best way to communicate to ensure mutual understanding.

• Make sure that children with hearing aids have the best possible environment for using them: eliminate any background noise and/or choose the least noisy environment to speak if possible, speak with a loud and clear voice and avoid talking to several people at once.

• In the case of hearing loss, it is always important to see the face/mouth of the person you are talking to in order to get as much information as possible. It is recommended to seat or stand the pupils in a semicircle to allow them to see the instructor as well as other pupils and ensure they have an unobstructed view of the speaker, the sign language interpreter and everything happening.

• Be visible to all pupils at all times:

– make sure there is enough light and avoid reflections and light from behind you

– when addressing the whole group, always position yourself right in front of them (do not walk around while talking and do not talk while behind them) to make sure everyone has a good view of you (especially your face and mouth)

– keep enough distance from the pupils (being too far away or too close makes it difficult to receive visual information)

– avoid colourful clothes if possible (to reduce irritating factors)

• Before passing on your message/work order, make sure that you have the pupils' attention, less they fail to get the message (do not speak when you have asked them to do something or when the pupils are busy reading/watching/doing something).

• You can use a visible cue or a sign that can be felt through the body to get their attention (e.g. switching the light on and off, waving your hand, slamming your foot hard on the ground, knocking on a hard surface or patting on a pupil's shoulder).

• Before passing on the main message, it is recommended that you give a prior order (e.g. 'Look here! Pay attention!').

• If you plan on having the pupils take turns to talk, make sure the entire group can understand who is about to speak or use sign language. If necessary, direct other pupils' attention to the speaker (otherwise it is likely that the information they are sharing will go unnoticed). The easiest way to put the speaker in the spotlight is to point at them. However, depending on the situation and ways of communication, you might also say their name or use sign

language to say their name (this option is better when the instructor is responsible for introducing the speakers).

• Remember that pupils' background knowledge may be very limited due to their hearing disability and the black-out it entails. As a result, you may have to explain even basic everyday things.

• People with hearing disabilities mostly or largely rely on their eyesight to get information. They learn through vision and need as much visual material as possible to facilitate understanding/receive information.

• The mind of a deaf person works in a very specific way so be as straight forward, precise and direct in your expressions as possible (do not use euphemisms, be frank about what you mean).

• If you are using visual examples give them time to examine the materials and avoid speaking at the same time (in order to keep up with what is being said, people with hearing disabilities need to be able to see the speaker's mouth or the sign language interpreter – they cannot look at the example material at the same time).

• Remember that Estonian is a foreign language for deaf persons who use sign language and it is very difficult for them to learn it. This also means that the level with which deaf persons use and understand Estonian is much lower compared with their peers who can hear well.

When using oral speech:

- face the pupil when you speak
- speak in a natural and clear way (there is no need to exaggerate the movement of your mouth in an attempt to seem more pronounced, this will likely make it harder for the pupil to understand you)
- speak calmly, do not rush and do not slow down your speech too much
- use your normal tone of voice (there is no need to shout)
- make sure your face can be seen well – avoid lighting sources from behind you that reflect in the pupils' eyes and keep hair, moustache/beard, scarves, etc. from blocking the view
- be clear and specific when expressing your ideas
- you should speak for a limited amount of time and your sentences/ideas should have a clear outline – avoid gushing over the topic (i.e. do not talk too much) and long sentences that are difficult to understand
- avoid overusing certain words and formulaic language (e.g. *right... you see... if you please...*)
- do not change the subject unexpectedly
- consider the age and language skills of the target group, use vocabulary and syntax that the children can understand
- be expressive when talking, feel free to use facial expressions, gestures and body language as this will help the children better understand the message
- try to rephrase things when the pupils are unable to understand you

Tips for using the services of a sign language interpreter:

- speak directly to the pupils, not to the interpreter
- provide the interpreter with written materials on the topics/assignments to be covered well before the hike/class to ensure mutual understanding and optimal cooperation. This will allow the interpreter to prepare and pass on the information to the pupils in the best way possible
- let the interpreter know what you plan to do, when and how so that they can prepare
- to avoid any misunderstandings with the interpreter, read about the general working principles and specific features of interpreters
- remember that the interpreter only acts as a mediator of information, they are not assistant teachers, support persons or other help

Activities to support the use of the study aid

The objective of these assignments is to help pupils attribute meaning to what they have learned and associate their gained knowledge with the real world. The assignments put children in a situation where they are forced to speak up, act, listen and think along. Activities, discussions and games planned by the instructor are adapted based on the needs of group members. For example, you can use just one type of study element (picture cards) or you can use different elements (picture cards, pelts, scents, sounds, etc.). The assignments can be given before the start of the hiking trail, while on the trail or after completing the hike. Learning activities and descriptions of nature should be complemented with various assignments, activities and games.

1. Assignment No. 1 (what is it?): the person conducting the lesson introduces an object from nature or the chest of senses while on the hiking trail. The children will examine the object and each of them will describe it with a suitable adjective. The person conducting the lesson will highlight special features that have gone unnoticed. The goal of this assignment is to introduce different species and specify terms.

2. Assignment No. 2 (treasure hunt): children are asked to collect 3-5 interesting objects in small personal treasure bags. At the end of the hike, they examine their findings and share information. The goal of this assignment is to introduce different species and imprint the items in their mind.

3. Assignment No. 3 (notice the moment): the hiking group stops to feel and sense nature for 1-5 minutes. This is followed by a discussion (about the things they heard, felt, noticed) and an introduction of study elements from the chest of senses, where possible. The goal of this assignment is to sense the natural environment and introduce different species.

4. Assignment No. 4 (quiz): the person conducting the lesson presents questions corresponding to the level of the group. For example, about the descriptions of species. The questions may be presented with study elements (picture cards, scents, pelts, etc.). The addition of a competitive element can make this assignment more exciting: children who know the most correct answers get awarded with the title of the Forest Sage, for example. The assignment can be given before or after the lesson. The goal of this assignment is to introduce different species and biodiversity and reinforce the knowledge gained.

5. Assignment No. 5 (odd one out): the person conducting the lesson puts together a food chain in the pockets of the study aid by adding 1-2 species to the chain that do not fit in. The children must put the species in the food chain in the correct order and leave out any species that do not fit in. This assignment can be done in teams. The goal of this assignment is to introduce the ecosystem, its importance and connections between species.

6. Assignment No. 6 (grouping): the person conducting the lesson places different species in the pockets of the study aid. The children have to distribute the species based on the characteristics of the species, such as feeding: plants, herbivores, omnivores, etc. Species can also be grouped based on other characteristics. This assignment can also be done in teams. The goal of this assignment is to introduce different species.

7. Assignment No. 7 (finding pairs): the person conducting the lesson selects suitable pairs based on the characteristics of the species and then mixes all the species together. The children have to find suitable pairs from the collection of species. This assignment can be done in teams. The goal of this assignment is to introduce different species and the connections between species.

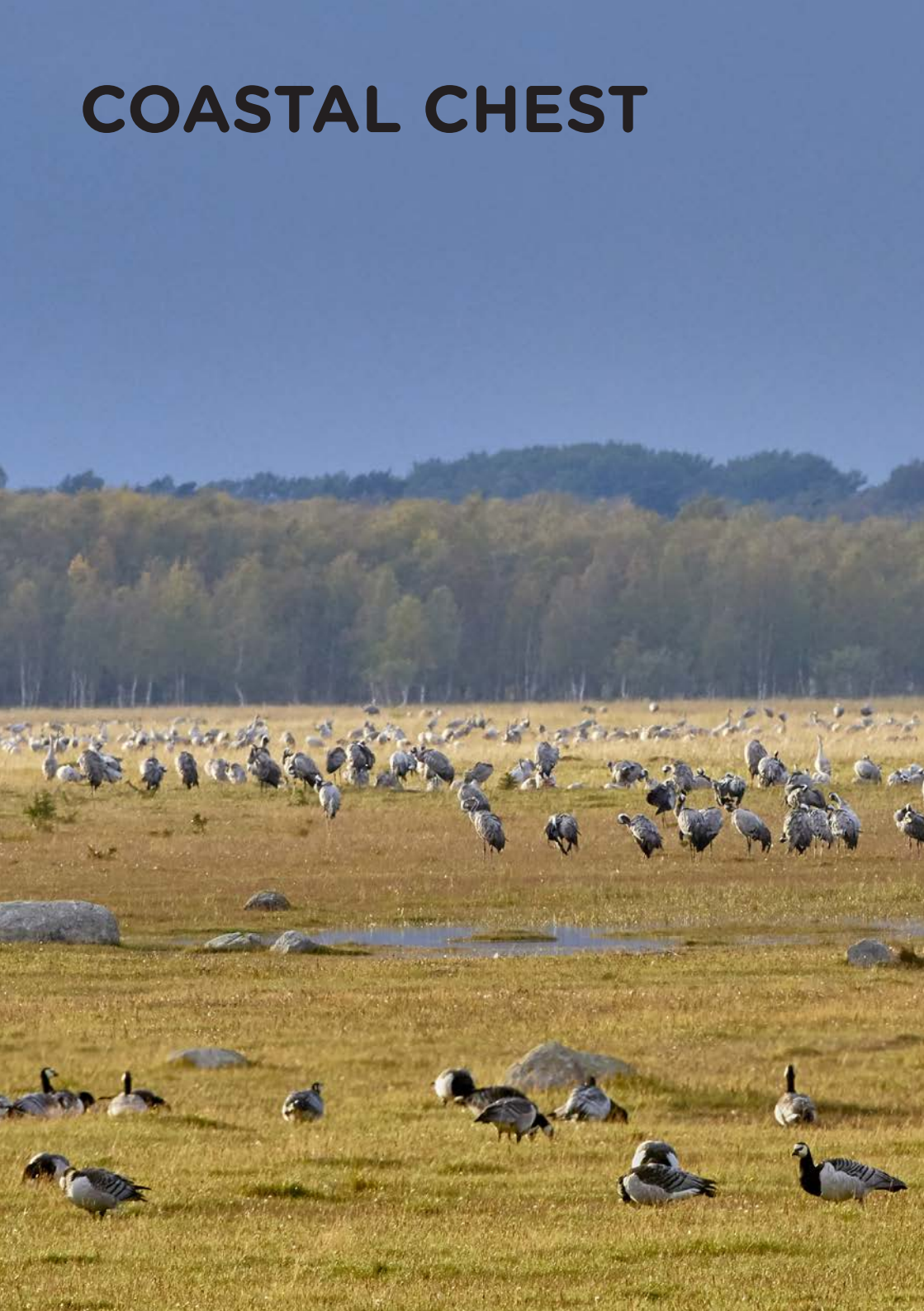
8. Assignment No. 8 (essence): children have to find something interesting or important about the nature of the place before the hike and then introduce it to others.

9. Assignment No. 9 (environment exploitation): children have to find 3-5 elements in the study aid that people may need for life. This is followed by a discussion on why people might need those things specifically, what they use them for and what happens when they fail to find any. Children may also bring other examples of the relationship between humans and nature. This assignment can be done in groups. The goal of the assignment is to show how people depend on the environment, introduce the benefits of the ecosystem and the need for nature conservation.

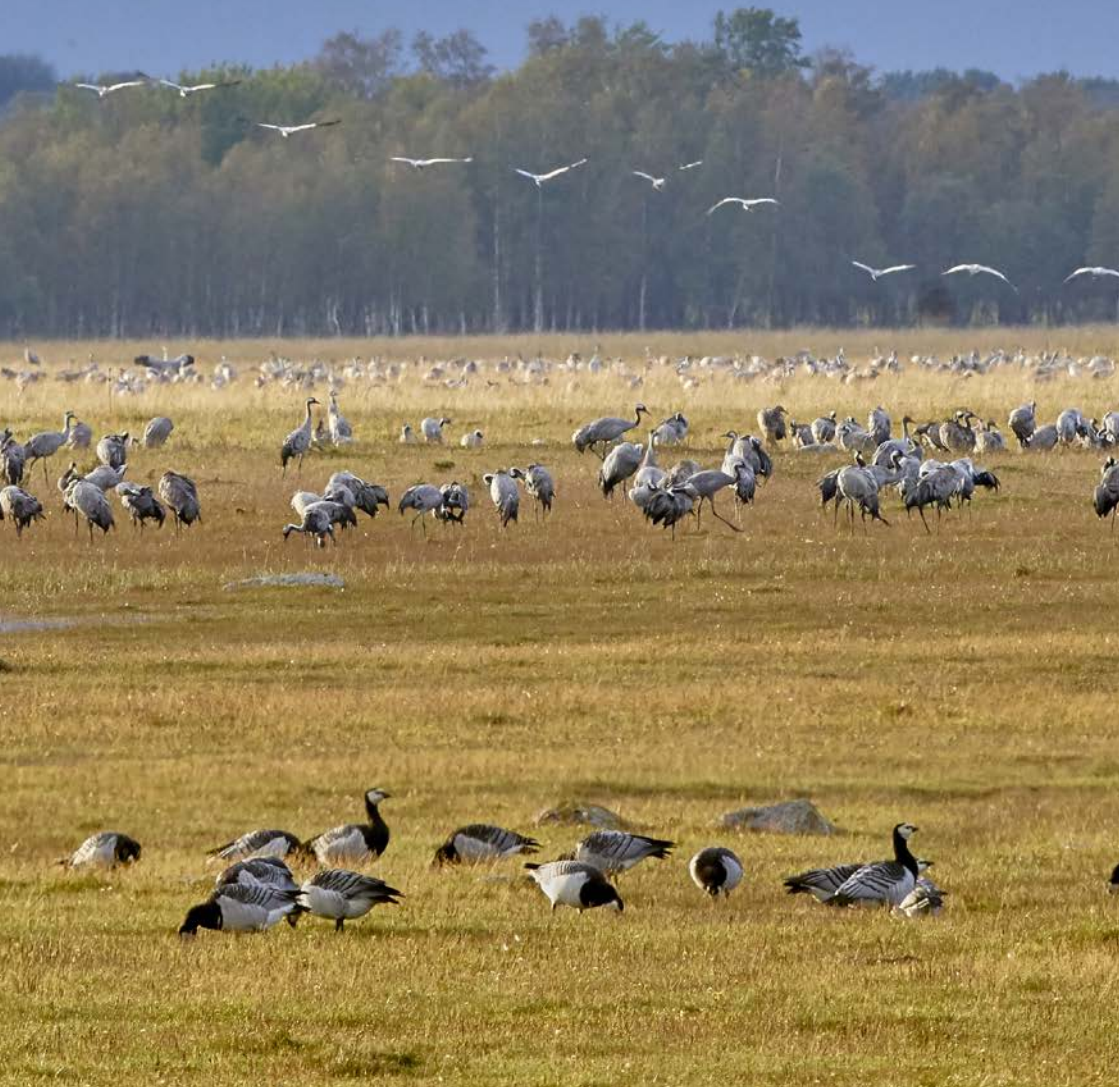
10. Assignment No. 10 (tree): children join hands and form a circle around the tree to measure its circumference. A fun assignment.

11. Assignment No. 11 (poisonous and edible): children will look for edible and poisonous plants from the forest. In the case of edible plants, it is a good idea to compare them with poisonous plants (e.g. ramson and lily of the valley, bird-cherry and alder buckthorn). The goal of this assignment is to introduce different species and provide practical information.

COASTAL CHEST



Important species in the coastal landscapes of Matsalu



Coastal meadows as ecosystems

Relation to the study assignments:

Assignment No. 7 (finding pairs)

Assignment No. 8 (essence)

Coastal meadows are semi-natural ecosystems where low coastal grasslands retain low plant growth through grazing and salty seawater. The hay-making and feeding activities of the gaggles of geese staying on coastal meadows during migration have played a part in the development and maintenance of coastal meadows.

Our neighbourhood is suited for coastal meadow plants that tolerate salinity and harsh winters. The mosaic combination of land and water areas creates a suitable habitat for numerous water and coastal birds.

Coastal meadows formed on soil that emerged from the post-ice age shallow sea are characteristic of Western Estonia.

Biotic communities of Matsalu

Relation to the study assignments:

Assignment No. 8 (essence)

Coastal meadows, floodplain meadows, reed beds and juniper bushes flanking Matsalu Bay make up a mosaic coastal landscape. The original terrain, the impact of the sea and rivers as well as human activity have all had an effect on the positioning of the different pieces of the mosaic.

This kind of a landscape is preferred by animals who have no problems moving between different habitats. For example, starling flocks like to feed on coastal meadows and spend the nights in reed beds. European hares also feed on coastal meadows but prefer juniper bushes for resting. Habitat preferences also depend on seasonal factors. White-tailed eagles gather on flood-meadows covered with high water during the spawning season but go hunting on coastal meadows when geese are migrating.

Cattle as a key species for coastal meadows

Aurochs are the ancestors of cattle and inhabited Europe for around a quarter of a million years. This species is now extinct. The last known specimen died in Poland in 1627. Aurochs also inhabited the territory of Estonia. The former name of Rakvere – Tarvanpää – also refers to the fact that the aurochs [*tarvas* in Estonian] once lived in these parts.

The first cattle were bred based on aurochs some 8000-10,000 years ago. Breeding still takes place today and has resulted in more than a thousand different breeds of cattle. Some of the breeds you can notice on the beaches of Matsalu are the Highland, Hereford and Charolais cattle.

Cattle are just as important in the ecological network of coastal meadows as aurochs and other big herbivores would have been in the distant past – they keep the grassland clear.

Examples of connections between species

Relation to the study assignments:

Assignment No. 5 (odd one out)

Assignment No. 7 (finding pairs)

Strawberry clover tolerates seawater and extensive grazing. The salinity of soil as well as the livestock feeding on the coastal meadow limit the growth of tall plantation, making life easier for ground-covering strawberry clover. Strawberry clover can disappear quickly if coastal meadows are overgrown with reed due to an increase in the level of nutrients in bay water. Strawberry clover is an important source of food for herbivorous animals and Anseriformes.

Coastal meadows become overgrown with **common reed** as soon as grazing or hay-making stops. This species is the most vigorous of all native grasses growing in Estonia and can form pure reed beds that contain no other species. Nonpoint source pollution from arable land has helped with the wider spread of reed. The pollution reaches the sea via trenches and rivers and boosts the level of nutrients therein. Large reed beds help clean river deltas and sea bays – the micro-organisms living on reed decay release some of the nitrogen that has been trapped in the mud back into the air in gas form.

The **common redshank** is symbolic to Estonian coastal meadows. It copes well with moderate grazing that also leaves some places with taller tufts where they can hide their nests. It needs to live close to water because it eats crustaceans and molluscs and mostly catches them from shallow waters or seaweed piles. In the event of danger, the common redshank functions as beach patrol, making loud noises to call on all birds nesting in the area to deter the intruder.

The **white-tailed eagle** is the largest bird of prey in Estonia and is at the top of the food chain in the ecological network of sea-coasts. It mostly preys on fish and birds and prefers to hunt in areas where prey is abundant. For example, as the population of great cormorants has increased, white-tailed eagles have begun hunting more in great cormorant colonies.

The dung beetle *Geotrupes stercorarius* is a beetle that feeds on dung. Its imagines and larvae have eaten the droppings of the aurochs and other large grass-eaters from ancient times. As the numbers of aurochs decreased and cattle took over, this beetle has come to inhabit cultural heritage landscapes. It has now been living in the proximity of humans for at least two millennia. Dung beetles play an important role in improving soil fertility as they carry dung into tunnels built in the soil.

A list of potential food chains

Relation to the study assignments:

Assignment No. 5 (odd one out)

strawberry clover -> cattle (dung) -> dung beetle -> fox (droppings) -> dung beetle

natterjack toad -> grass snake -> fox

three-spined stickleback -> northern pike -> white-tailed eagle

common reed -> European hare -> white-tailed eagle

cattle (blood) -> pale giant horse-fly

juniper (berries) -> field vole -> fox

Importance of coastal meadows

Material values

Relation to the study assignments:

Assignment No. 9 (environment exploitation)

Pasture and hayfield

Coastal meadows have historically been used for stock farming to provide both meat and milk for coastal residents. Today, the pasture and hayfields in coastal meadows are also important for other areas such as nature-based tourism. Grazing and hay-making support the preservation of important cultural heritage landscapes and keep the view to the sea open.

Seaweed

Storms and floods wash a considerable amount of seaweed to coastal meadows. Seaweed is an excellent organic fertilizer. Collecting seaweed was once more common, but this customary practice of coastal residents is still honoured today.

Ecological values

The biodiversity of coastal meadows

Coastal meadows are inhabited by plant and bird species that cannot find equivalent suitable living conditions anywhere else. Plants that grow here include halophilous species such as sea milkwort, seaside arrowgrass, sea plan-

tain, blackgrass, sea aster and common glasswort. Bird species that prefer coastal meadows include the southern dunlin and the pied avocet.

Coastal meadows are also important for rare species that need protecting, such as species in the orchid family, sword lily *Gladiolus imbricatus*, the lack-tailed godwit and the ruff.

Stops on the East Atlantic Flyway

Estonia is located on the East Atlantic Flyway. Every spring and autumn up to 5 million arctic water and coastal birds fly through Estonia. The centre of this important migration route is located in Western Estonia. This is because our coastal meadows are important resting and feeding sites for migratory birds. We also get a lot of migratory birds nesting here, such as black geese, geese and common cranes.

Spiritual values

Relation to the study assignments:

Assignment No. 3 (notice the moment)

Walks on the beach are a delight regardless of the weather. This is where the eye meets the horizon. The sight and sounds of the sea allow us to take a break from our day-to-day worries and focus on the beauty of being.

Breath-taking views of coastal meadows always include birds, the sight of which brings joy to the eyes of nature observers. Beaches in Western Estonia host bird enthusiasts across the world – bird migration brings people as well as birds.

Coastal meadows offer concerts of wonderful sea sounds The sounds of the beach have a healing effect. Records with such sounds are used in musical therapy but experiencing it in person is better still.

Reed and its role in our lives

Relation to the study assignments:

Assignment No. 9 (environment exploitation)

Over the years, vast reed fields have made us think of ways to make the best of reed. The possibilities are endless, from reed roofs to drinking straws.

Reed in construction

For about five hundred years, eye-catching reed roofs have been a staple feature of dwellings by the coast. Properly planned and constructed reed roofs last for a long time – around 50 years on the south-facing side of the house and even up to 100 years on the north-facing side. Not only do reed roofs provide protection from the rain and snow, they also prevent heat from escaping. With reed roofs there is no need to pay extra to insulate attics. In the summer, thick reed roofs keep out unwanted heat.

Reed matts are often used as a structural base when applying clay plaster indoors. When formed into slabs or bulk material, it can also be used to insulate external walls.

Reed as fuel and fuel for heating

Reed can be used as fuel for heating in the form of pellets or compressed balls. Reed can also be used to produce methane and ethanol.

Reed as foodstuff

Reed is a tasty snack for rabbits and aphids, but it is also edible for humans. Reed roots can be used to make flour products, young shoots are used in the spring in the same way as asparagus.

From pens to straws

Reed has endless uses. In Ancient Egypt, reed was used to make pens to scrape hieroglyphics into clay tablets. Today, reed is used to make straws as an eco-friendly alternative to plastic straws.

Other necessities have also been and are being made from reed. For example, reed inflorescence can be used as pillow and mattress filler and reed stems can be used to make lamp shades and purses. Estonian coastal residents have been known to make hanging Christmas ornaments out of reed.

Important species in the coastal landscapes of Matsalu

Relation to the study assignments:

Assignment No. 1 (what is it?)

Assignment No. 2 (treasure hunt)

Assignment No. 4 (quiz)

Assignment No. 6 (grouping)

Assignment No. 7 (finding pairs)

Assignment No. 11 (poisonous and edible)

Coastal chest

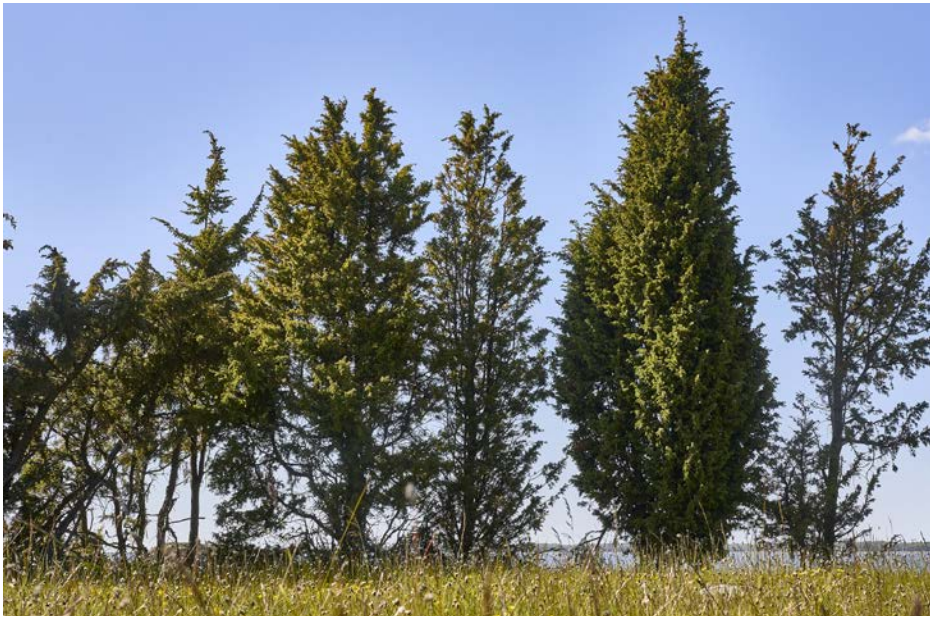
Important species in the coastal landscapes of Matsalu

Common juniper
Juniperus communis

European greenfinches, Bohemian waxwings, true thrushes, European robins and many other birds eat juniper berries. In botanical terms, its berries are actually cones because junipers are coniferous trees.

[Wiki] en.wikipedia.org/wiki/Juniperus_communis

[eE] elurikkus.ee/bie-hub/species/5314#overview?lang=en



Common reed
Phragmites australis

Reed is the tallest (grows tall) native grass growing in Estonia. In the best growing sites, reed can grow up to four metres tall.

[Wiki] en.wikipedia.org/wiki/Phragmites_australis

[eE] elurikkus.ee/bie-hub/species/6204#overview?lang=en

Strawberry clover
Trifolium fragiferum

Strawberry clover can be found on coastal beaches and can grow on land with high salinity. Due to this ability, strawberry clover has been used to breed plant breeds (species) that grow in saline soil.

[Wiki] en.wikipedia.org/wiki/Trifolium_fragiferum

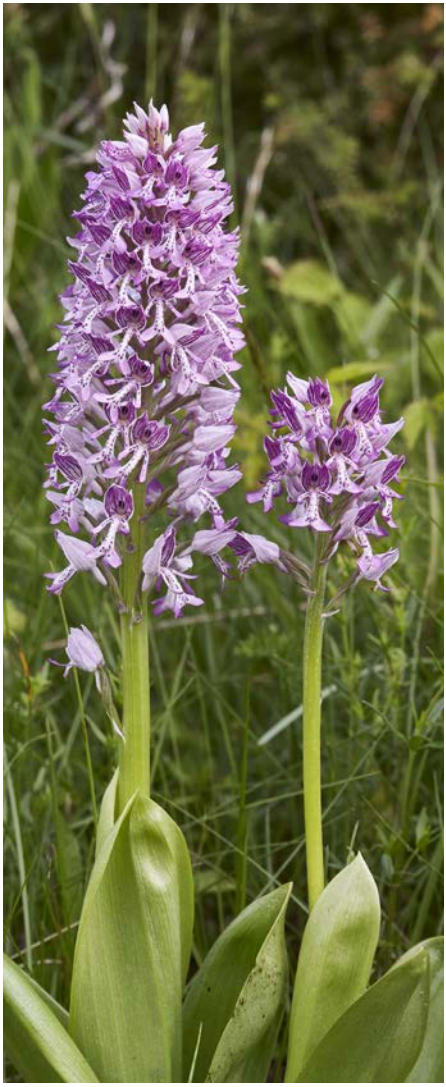
[eE] elurikkus.ee/bie-hub/species/7999?lang=en

Military orchid
Orchis militaris

Military orchid flowers look like a soldier wearing a large helmet. Its shape also inspired its scientific name: Orchis militaris.

[Wiki] en.wikipedia.org/wiki/Orchis_militaris

[eE] elurikkus.ee/biehubspecies/5999#overview?lang=en

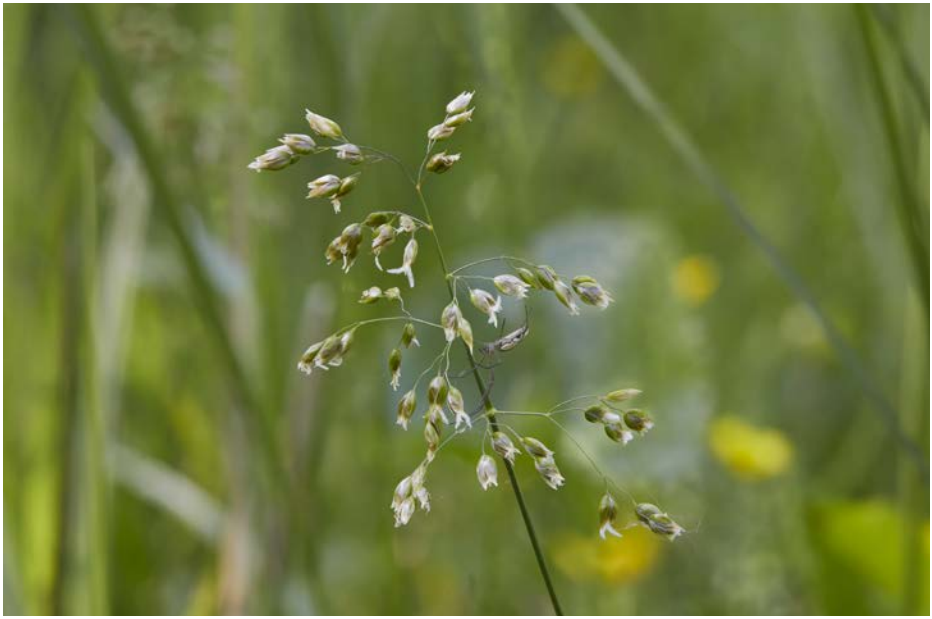


Sweet grass
Hierochloe odorata

Sweet grass contains coumarin (substance with hay aroma) that gives it a pleasant aroma (smell). Thanks to its smell, sweet grass is used in the perfume industry (for making perfumes) and in the production (making) of alcoholic drinks.

[Wiki] en.wikipedia.org/wiki/Hierochloe_odorata

[eE] elurikkus.ee/bie-hub/species/5142#overview?lang=en



Bladder wrack
Fucus vesiculosus

Bladder wrack is the largest and best-known (known by many) seaweed in Estonia. During stormy (windy) weather, waves wash this brown algae ashore. Many waders (birds who look for food by walking in shallow water or mud) look for food from bladder wrack on the beach.

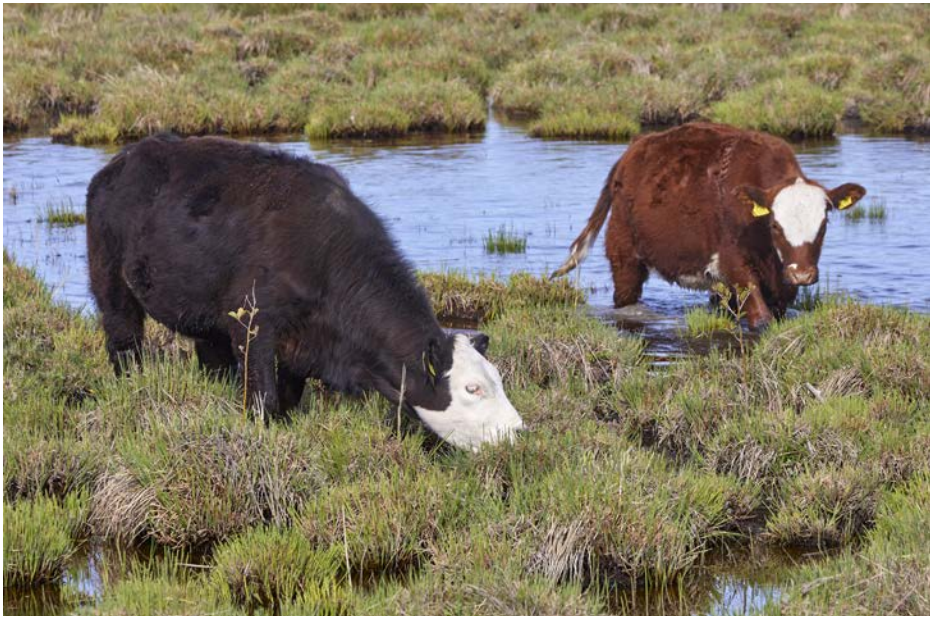
[Wiki] en.wikipedia.org/wiki/Fucus_vesiculosus

[eE] elurikkus.ee/bie-hub/species/192368#overview?lang=en

Cattle
Bos taurus

Grazing cattle (cows) helps maintain (keep) coastal meadows (grassland by the sea). Without maintenance, reed would dominate coastal meadows and the living conditions of meadow plants and animals would disappear.

[Wiki] en.wikipedia.org/wiki/Bos_taurus



Eurasian beaver
Castor fiber

The beaver always lives by a body of water. They swim and dive (swim underwater) very well. Beavers can change their living environment to make it more suitable by damming up (raising the water level) smaller rivers and ditches.

[Wiki] en.wikipedia.org/wiki/Castor_fiber

[eE] elurikkus.ee/bie-hub/species/43570?lang=en

European hare
Lepus europaeus

The European hare mostly eats plants as well as tree and shrub branches and twigs and bark in the winter. Hares also eat their own pellets because this allows them to recover more beneficial nutrients from the food.

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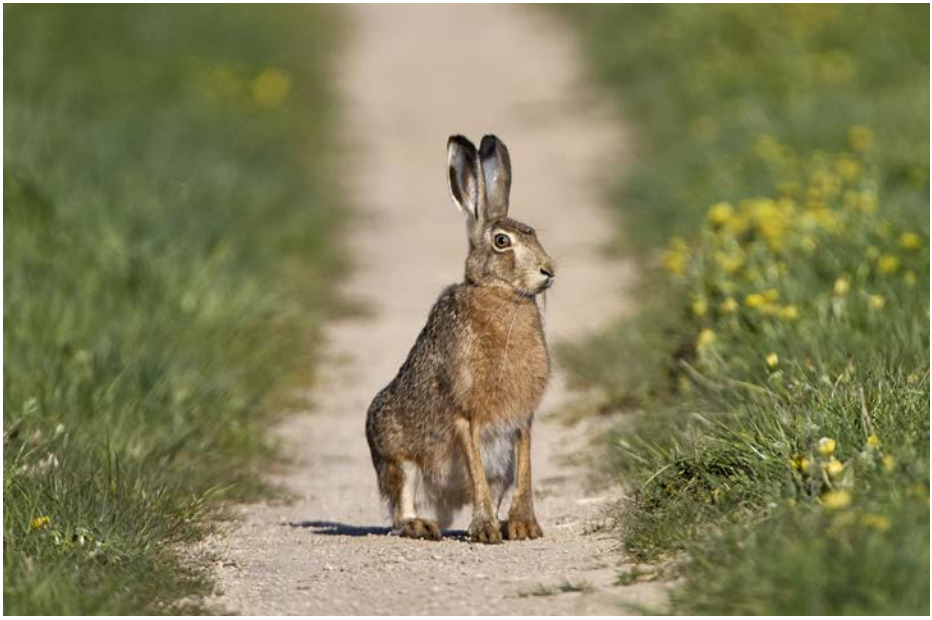
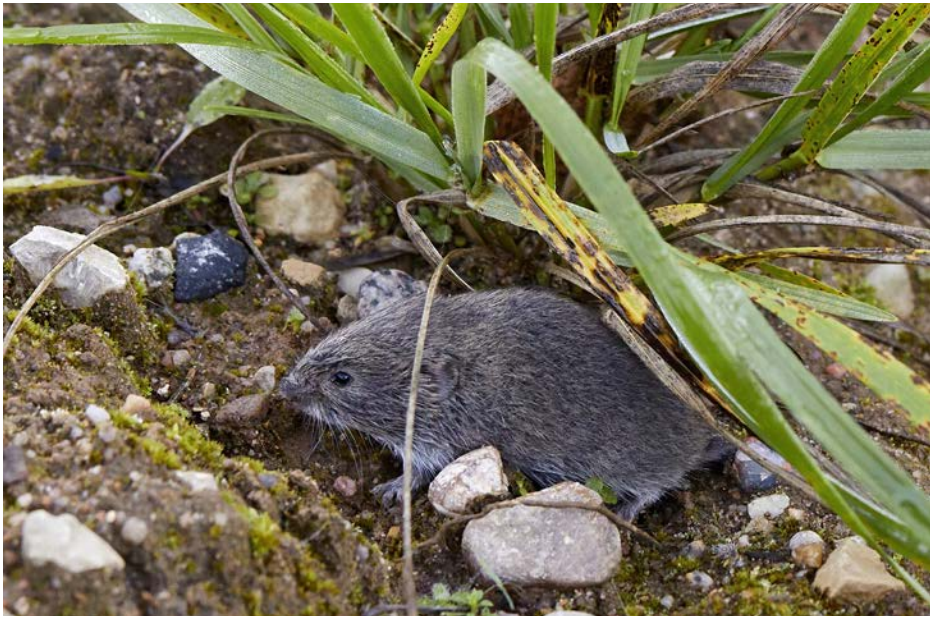


Field vole
Microtus agrestis

The field vole is the most common mammal in Estonia, but rarely seen by people. We usually see field voles in the clutches (claws) of birds of prey, caught in the beak of a white stork of between the teeth (mouth) of a fox.

[eE] elurikkus.ee/bie-hub/species/77266#overview?lang=en

[Wiki] en.wikipedia.org/wiki/Microtus_agrestis

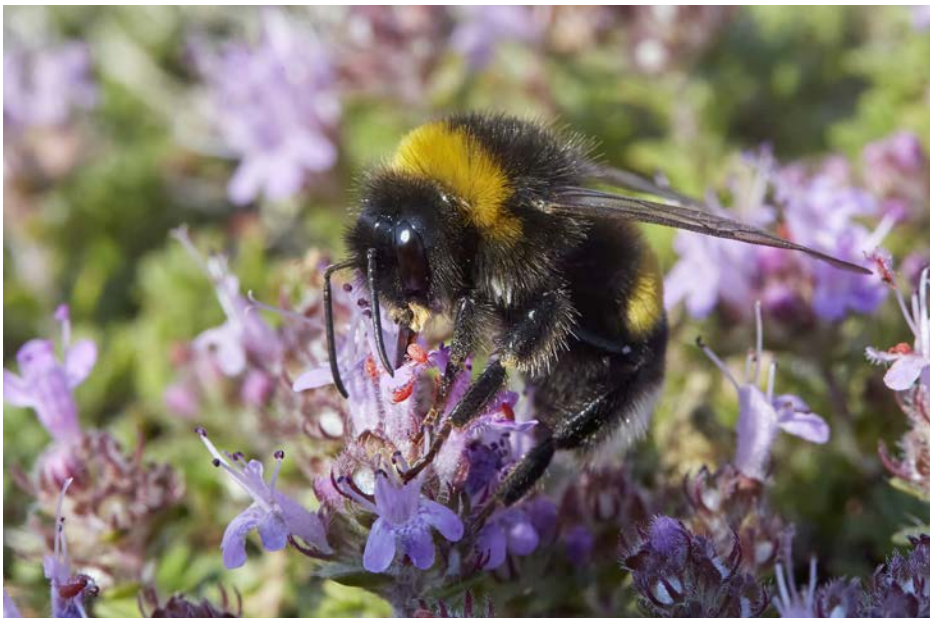


Early bumblebee
Bombus pratorum

Bumblebees, honey bees and solitary bees are the most important pollinators in nature. The activity of these insects is related to the prolificacy of plants. Pollinating insects are responsible for around 22 billion euros in annual proceeds to the European economy.

[eE] elurikkus.ee/bie-hub/species/40383?lang=en

[Wiki] en.wikipedia.org/wiki/Bombus_pratorum

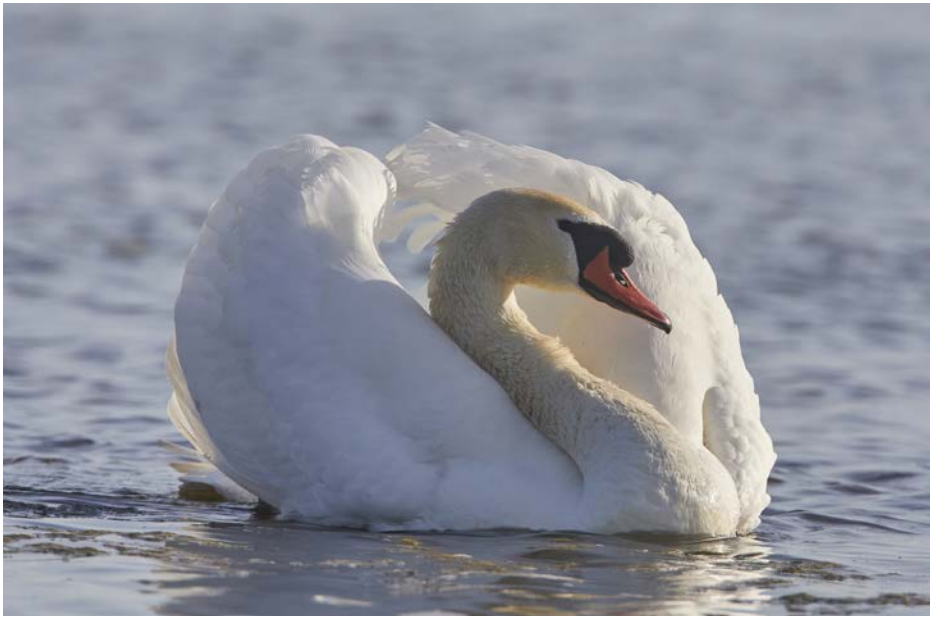


Mute swan
Cygnus olor

The mute swan is the largest bird in Estonia. This bird can weigh up to 14 kg. Due to its large weight (because they weigh a lot), swans need a long runway (long open space) on water or open land to take flight.

[Wiki] en.wikipedia.org/wiki/Cygnus_olor

[eE] elurikkus.ee/bie-hub/species/50715?lang=en



Natterjack toad
Epidalea calamita

The natterjack toad has a loud (strong sound) song that can be heard from around one kilometre away. Male frogs have a vocal sac under their chin to help with the sound levels.

[Wiki] en.wikipedia.org/wiki/Epidalea_calamita

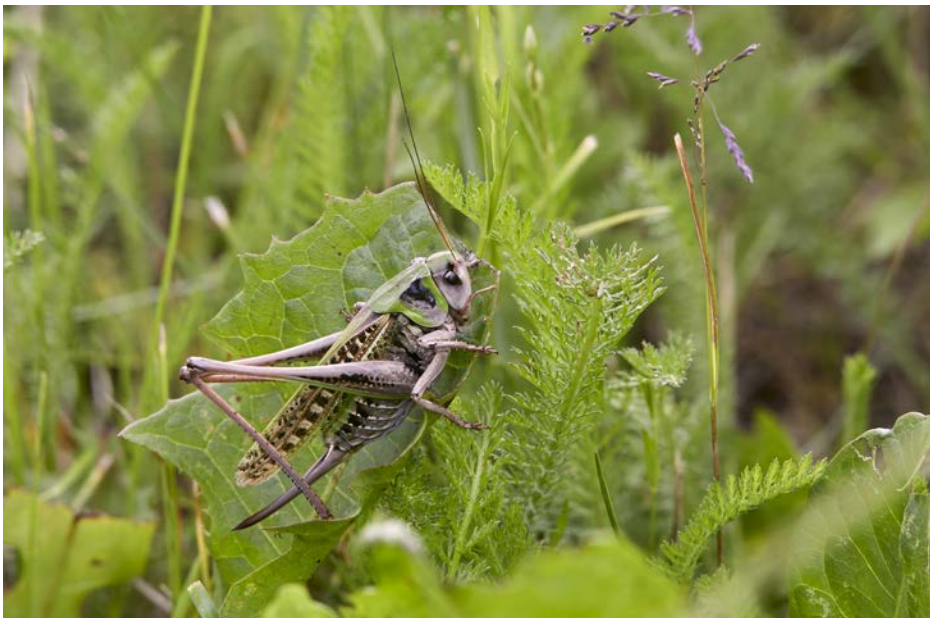
[eE] elurikkus.ee/bie-hub/species/41926#overview?lang=en

Wart-biter
Decticus verrucivorus

The chirping (sound) of wart-biters is reminiscent of the sound of a sewing machine (similar to the sound a sewing machine makes). Male wart-biters tend to sing more in the morning and during the day to attract females.

[eE] elurikkus.ee/bie-hub/species/51516?lang=en

[Wiki] en.wikipedia.org/wiki/Decticus_verrucivorus

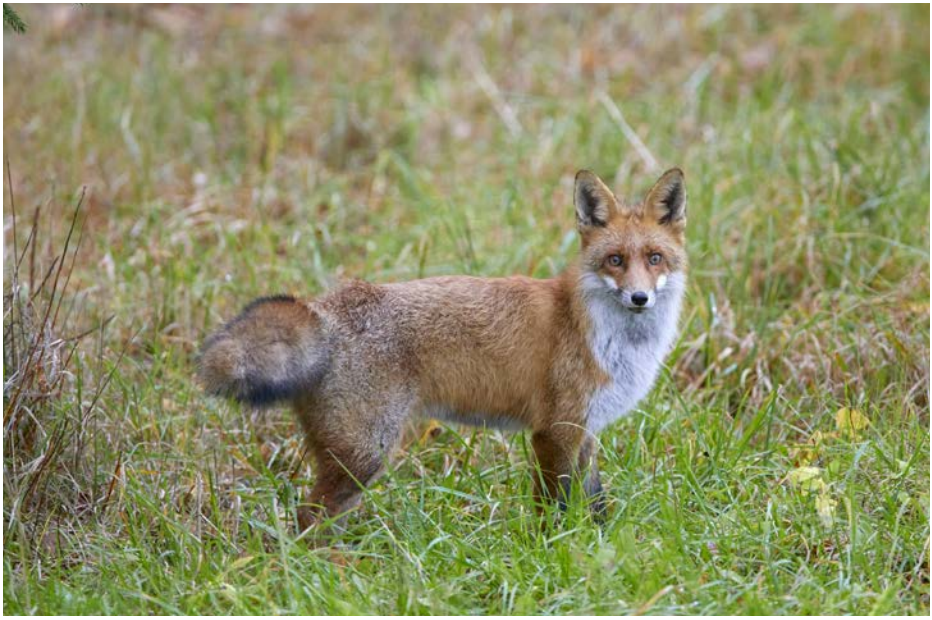


For or red fox
Vulpes vulpes

Foxes have excellent hearing. In the winter, they hear the squeaks (sounds) of mice even through thick snow. In the winter, the fox jumps high into the air and then drops (jumps) deep into the snow to catch prey (food).

[Wiki] en.wikipedia.org/wiki/Vulpes_vulpes

[eE] elurikkus.ee/bie-hub/species/109149?lang=en

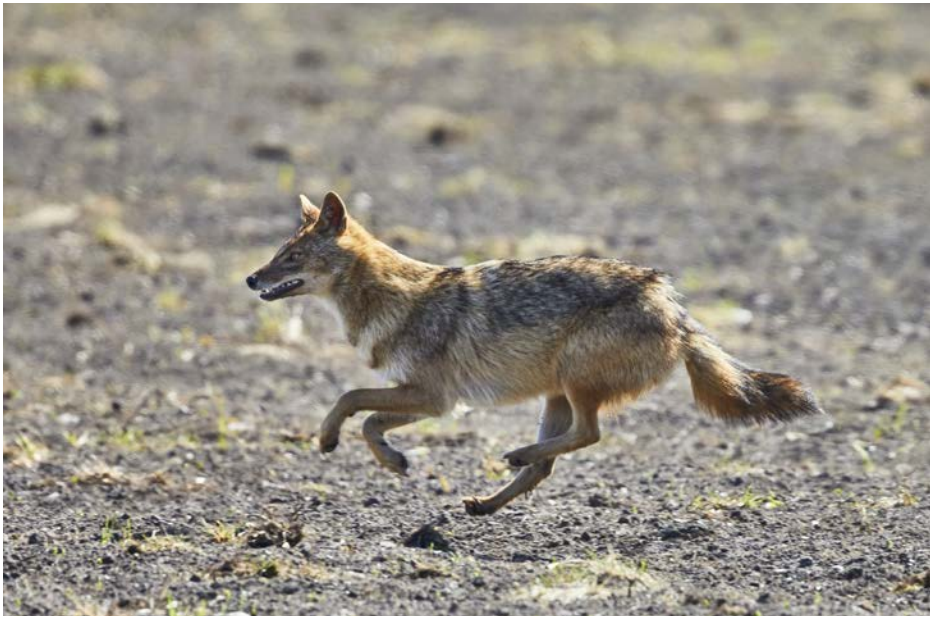


Golden jackal
Canis aureus

The golden jackal makes a howling sound (like a long ‘u’ vowel) before going hunting. They also start howling when they hear the sound of a plane flying or the signal of a ship.

[Wiki] en.wikipedia.org/wiki/Canis_aureus

[eE] elurikkus.ee/bie-hub/species/43121?&lang=et#overview?lang=en

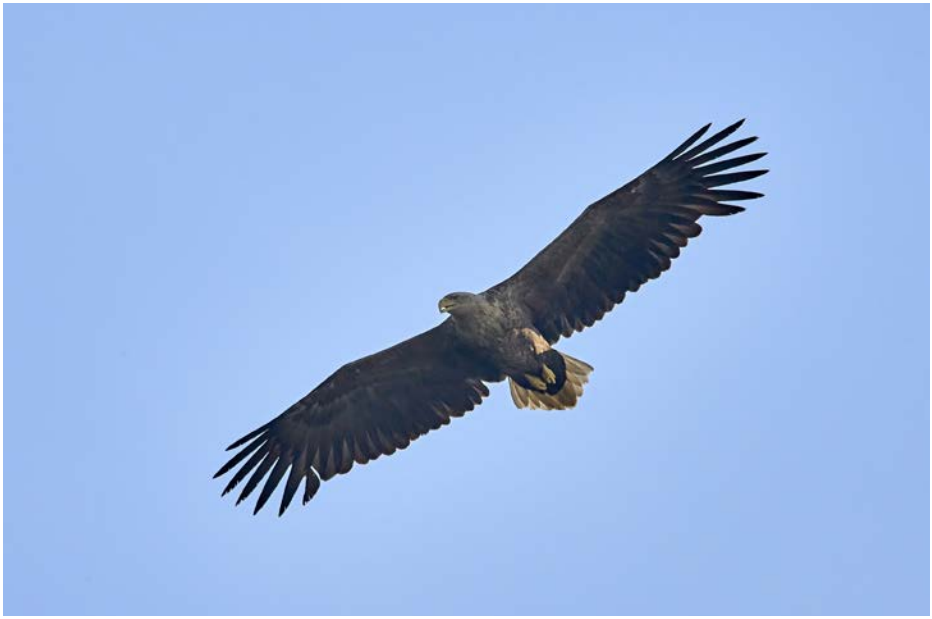


White-tailed eagle
Haliaeetus albicilla

The white-tailed eagle is the mightiest bird of prey in Estonia. It weighs 4-6 kg. They use the same nest for decades (tens of years) and it (the nest) can weigh around 1 ton.

[eE] elurikkus.ee/bie-hub/species/63009?lang=en

[Wiki] en.wikipedia.org/wiki/Haliaeetus_albicilla

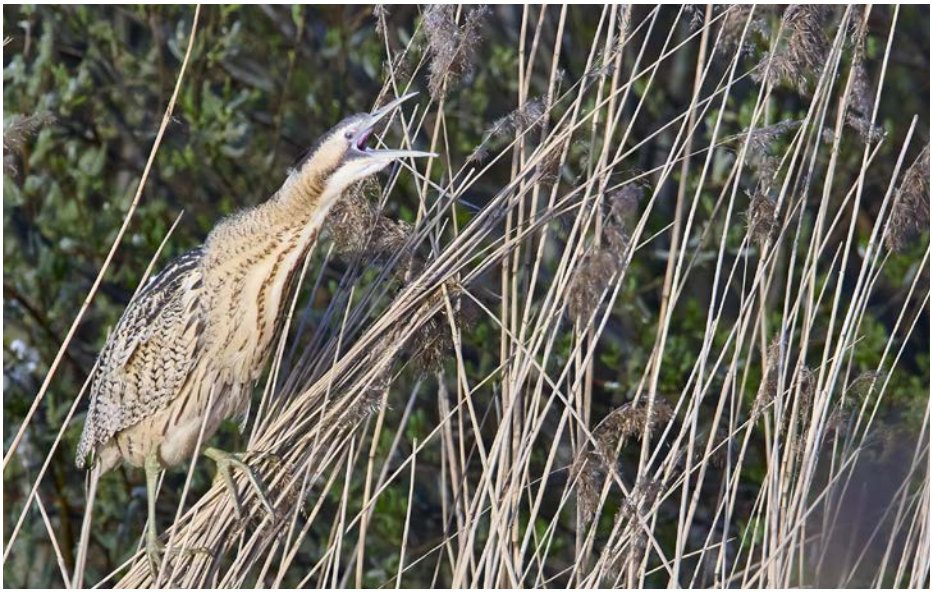


Eurasian bittern
Botaurus stellaris

Eurasian bitterns are good at hiding. Its feathers are patterned like reed beds (collection of reed) and it can place its neck side-by-side with reed. If it is windy outside, the Eurasian bittern will rock side to side just like reed in the wind.

[eE] elurikkus.ee/bie-hub/species/40612?lang=en

[Wiki] en.wikipedia.org/wiki/Botaurus_stellaris

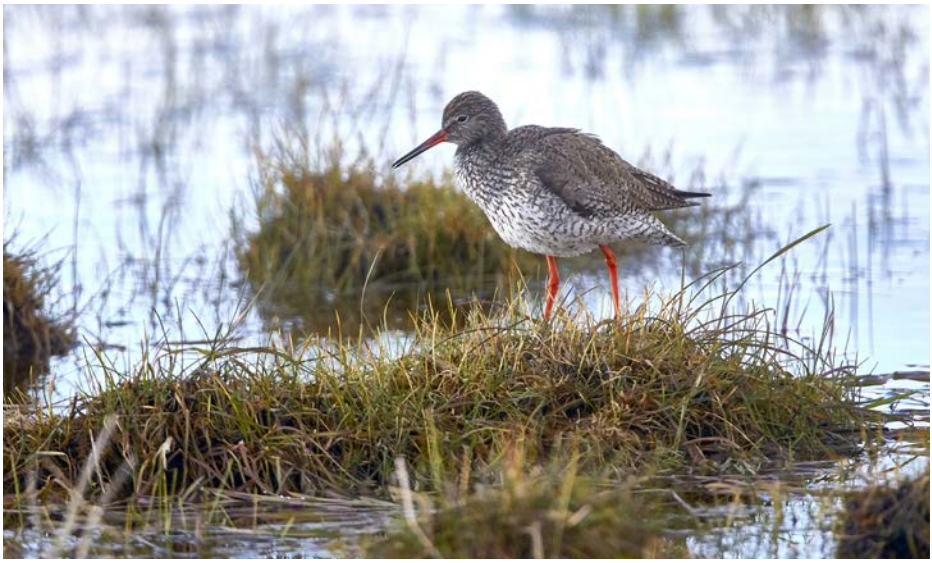


Common redshank
Tringa totanus

The common redshank monitors its surroundings closely during nesting season. They make a loud sound when someone approaches their nest. The common redshank will sit on top of a high rock or juniper, jounce (move back and forth) its body and keep an eye on whoever is approaching the nest.

[Wiki] en.wikipedia.org/wiki/Tringa_totanus

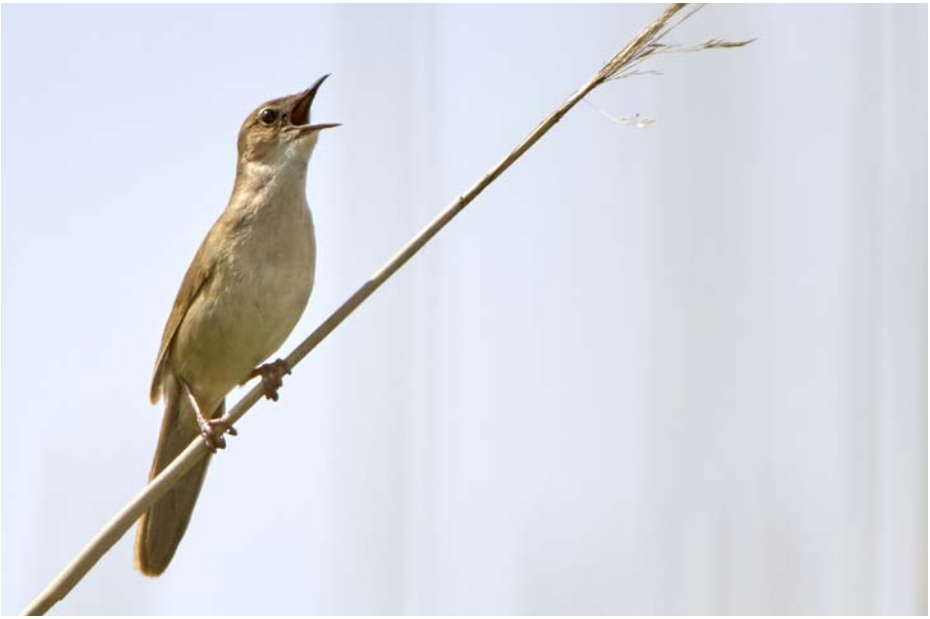
[eE] elurikkus.ee/bie-hub/species/107074?lang=en



Savi's warbler
Locustella luscinioides

Savi's warblers live in large reed beds (collections of reed). Its song is reminiscent of the sound of a cricket or a drill (similar to the sound made by crickets and drills).

[Wiki] en.wikipedia.org/wiki/Locustella_luscinioides

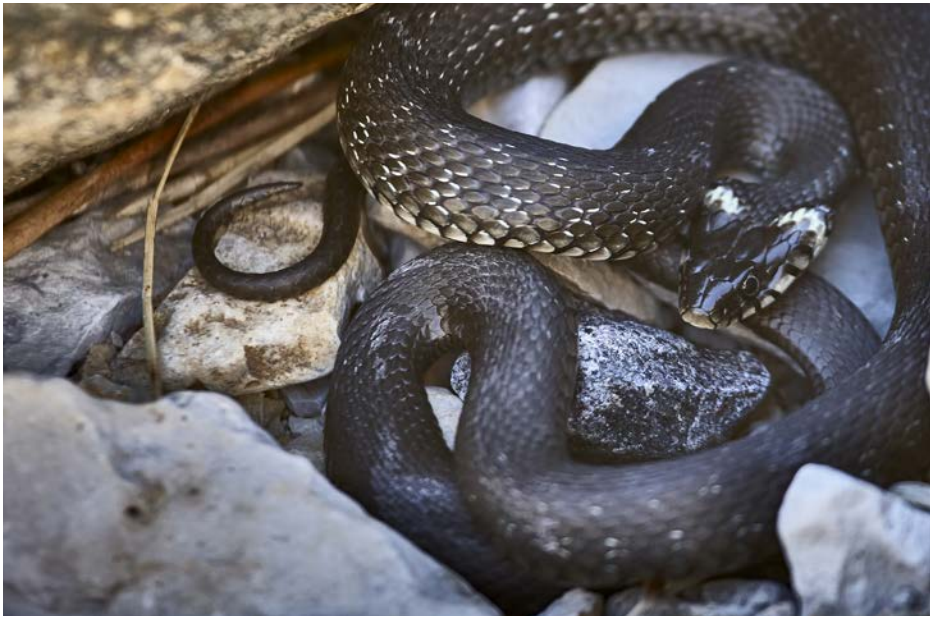


Grass snake
Natrix natrix

The grass snake likes to live by bodies of water. It is a good swimmer and can swim or dive (swim underwater) for dozens (20-30) of minutes when hunting (catching food).

[Wiki] en.wikipedia.org/wiki/Natrix_natrix

[eE] elurikkus.ee/bie-hub/species/79205?lang=en

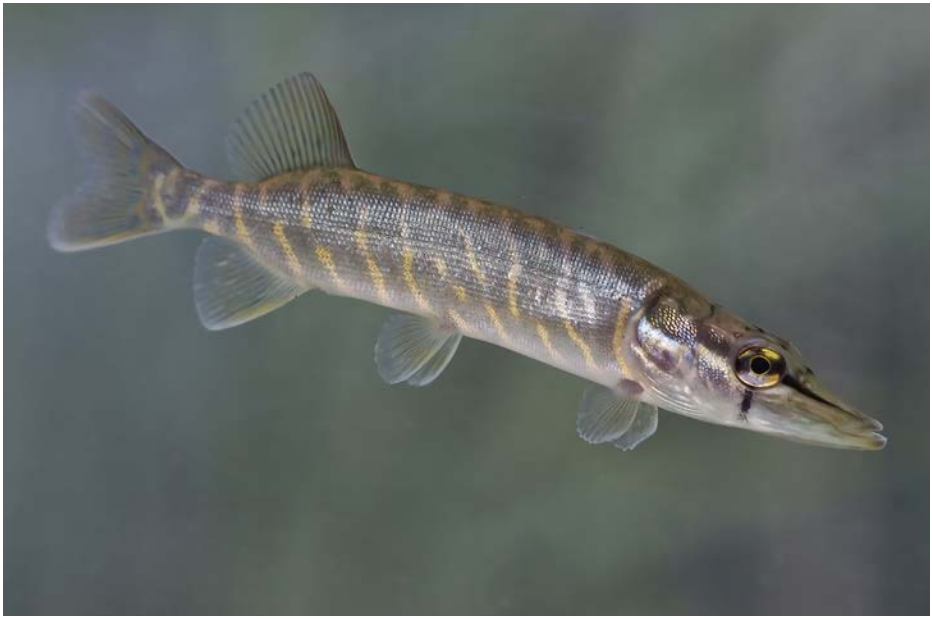


Northern pike
Esox lucius

The northern pike is the most widespread (common in many places) fish species in Estonia. It lives in streams, rivers, lakes and the sea. For example, there are a lot of northern pikes living in Väinameri.

[Wiki] en.wikipedia.org/wiki/Esox_lucius

[eE] elurikkus.ee/bie-hub/species/57980?lang=en



Weatherfish
Misgurnus fossilis

The weatherfish lives in the muddy bottoms of bodies of water. It copes well with oxygen deprivation (can manage well when there is little oxygen). It can also breathe through its intestine. It gulps the air from the surface, the air then goes through the intestine and is finally expelled from the anus.

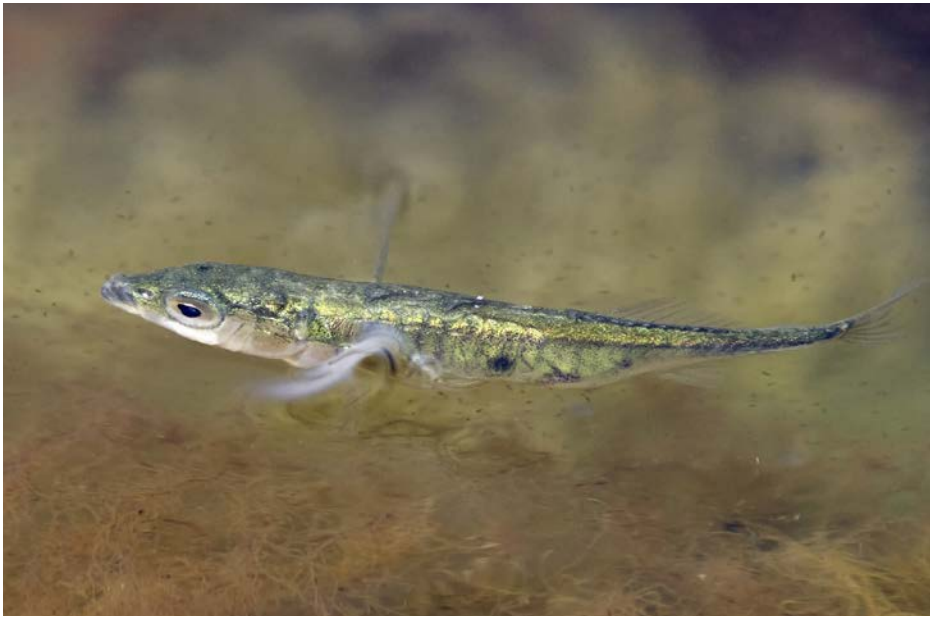
[Wiki] en.wikipedia.org/wiki/Misgurnus_fossilis

[eE] elurikkus.ee/bie-hub/species/77488#overview?lang=en

Three-spined stickleback
Gasterosteus aculeatus

The three-spined stickleback is a fish that lives in coastal waters (by the coast). It looks after its offspring (young). The male uses plant matter to build a nest in the sand. Several females deposit (lay) eggs in the nest. The male guards the eggs and the young.

[Wiki] en.wikipedia.org/wiki/Gasterosteus_aculeatus

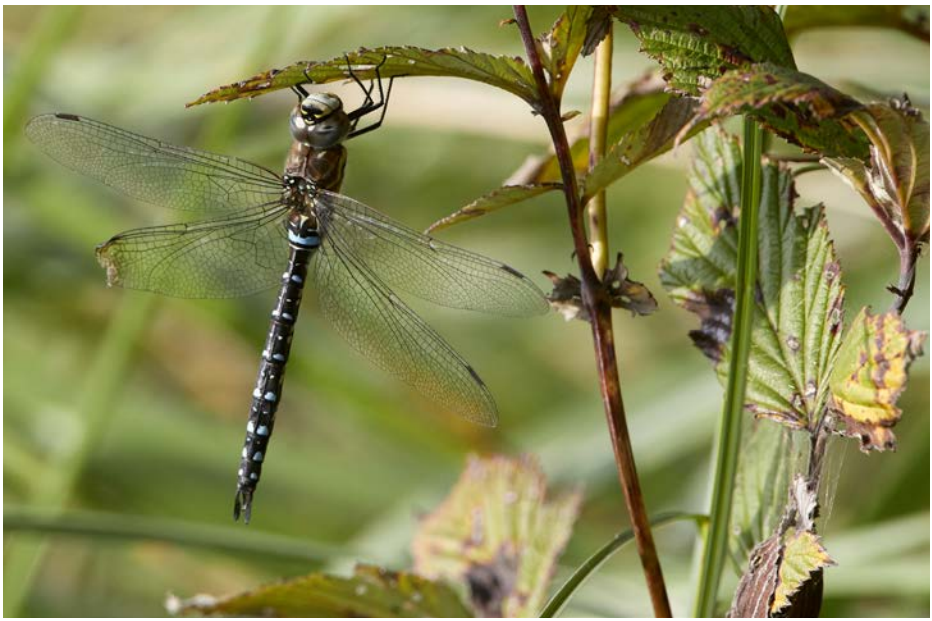


Migrant hawker
Aeshna mixta

The migrant hawker is a common species of dragonfly in Western Estonia. It can be seen at beaches from late summer to late autumn (end of summer until end of autumn). Migrant hawkers can also go on longer migration routes and therefore (for this reason) end up in the funnel traps (nets for catching birds) of bird observatories.

[eE] elurikkus.ee/bie-hub/species/31366#overview?lang=en

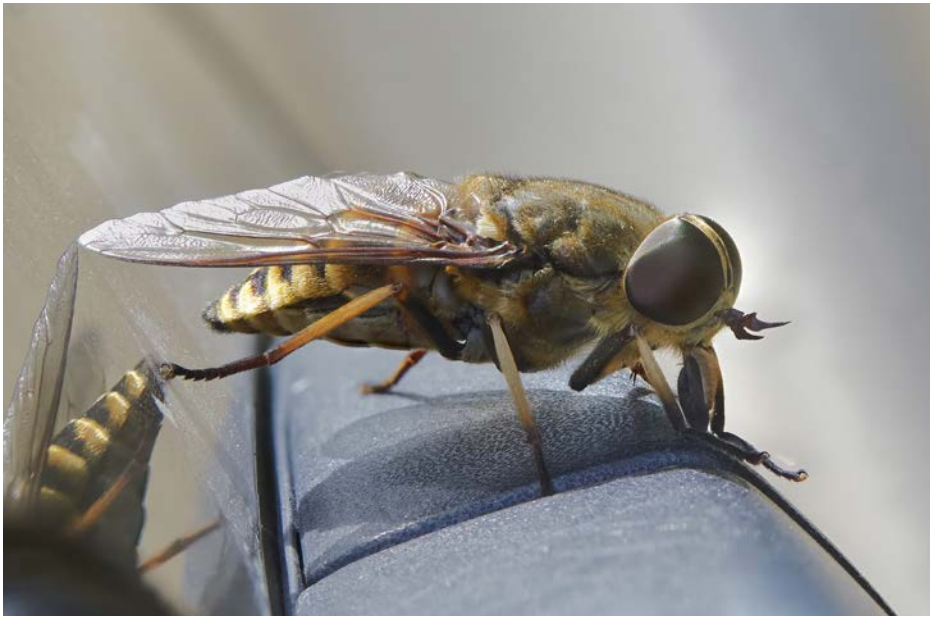
[Wiki] en.wikipedia.org/wiki/Aeshna_mixta



Pale giant horse-fly
Tabanus bovinus

The pale giant horse-fly is among the largest of the horse-flies. A female horse-fly can suck (eat) up to 200 mg of blood, the same amount that 70 mosquitos can suck. They need the blood to produce eggs. Male horse-flies only feed on (eat) plant juice or nectar.

et.wikipedia.org/wiki/Tabanidae

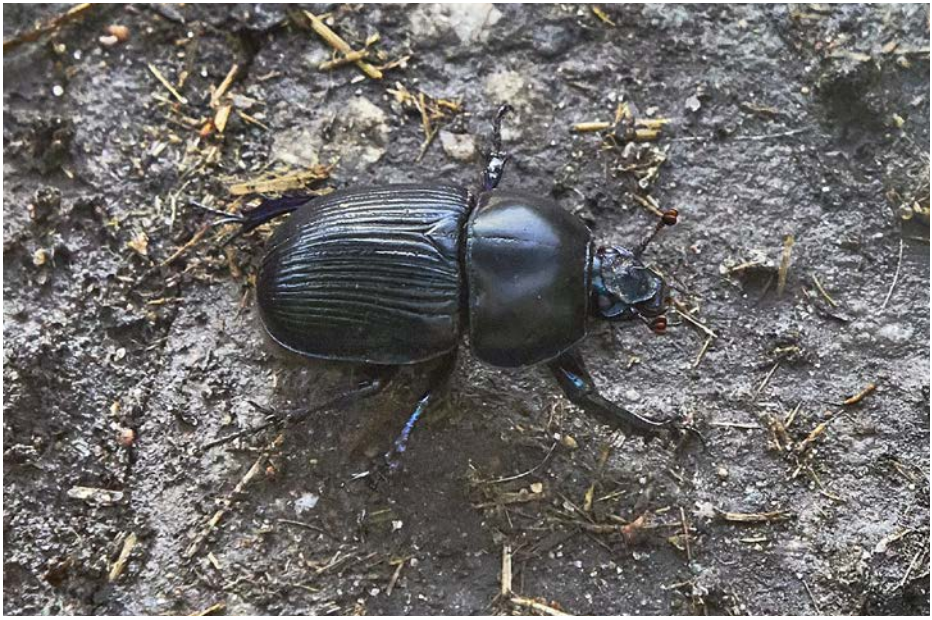


Dung beetle
Geotrupes stercorarius

The dung beetle Geotrupes stercorarius has lived with cattle breeding (raising) humans for around 2000 years. They dig deep tunnels (underground passages) under dung and carry (take) little balls made of dung into those tunnels. Females lay their eggs inside the dung and the larvae then eat the dung.

[Wiki] en.wikipedia.org/wiki/Geotrupes_stercorarius

[eE] elurikkus.ee/bie-hub/species/61698#overview?lang=en



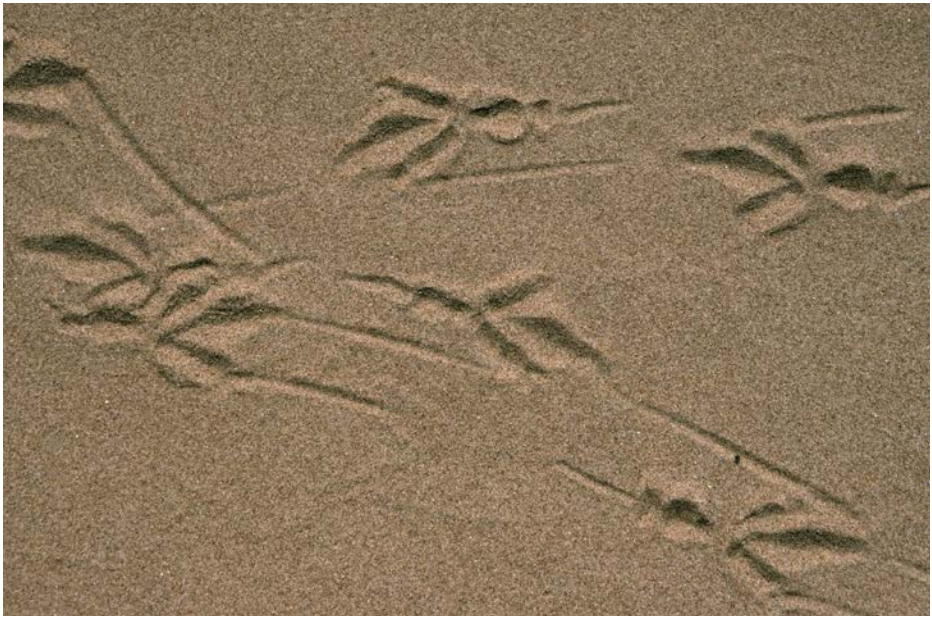
Sand

Sand is a sediment (substance that gathers in a pile) that consists of particles of around one millimetre in size. Sand is formed when rocks weather (break apart). In Estonia, sand is mostly (most often) formed of quartz (quartz – a hard rock).

[Wiki] et.wikipedia.org/wiki/Liiv

[Eesti Loodus] www.eestiloodus.ee/artikkel4354_4314.html

[Mineraalid, kivimid, maavarad] kivid.info/24



Clay

Clay is a sediment (substance that gathers in a pile) that consists of particles of around one micrometre (= 0.001 millimetres) in size. Clay is formed when rocks weather (break apart). In Estonia, clay is mainly (most of it) formed of feldspar. When moisture (water) is added, clay becomes pliable (it can be modelled and shaped), it solidifies (turns hard) when it dries and hardens (turns into rock) when fired.

[Wiki] et.wikipedia.org/wiki/Savi

[Mineraalid, kivimid, maavarad] kivid.info/22

Beach pebbles

Beach pebbles are a sediment (substance that gathers in a pile) comprised of flat (oblate) rounded (that have turned into a round shape) limestone. Storms create beach ridges (piles of rocks) consisting of pebbles. Terns and oystercatchers (birds) will occasionally nest on beach ridges.

[Wiki] et.wikipedia.org/wiki/Klibu

Ashore shells

In some places, the waves wash (bring) ashore shells (a formation around the body that consists of liming material) of Bivalvia that used to live in the bottom of the sea. There are usually four species of Bivalvia in the Baltic Sea: common cockles, blue mussels, Baltic macomas and soft-shell clams. Bivalvia filter (clean) water as they feed, making them nature's water cleaners. They are eaten by fish and diving ducks.

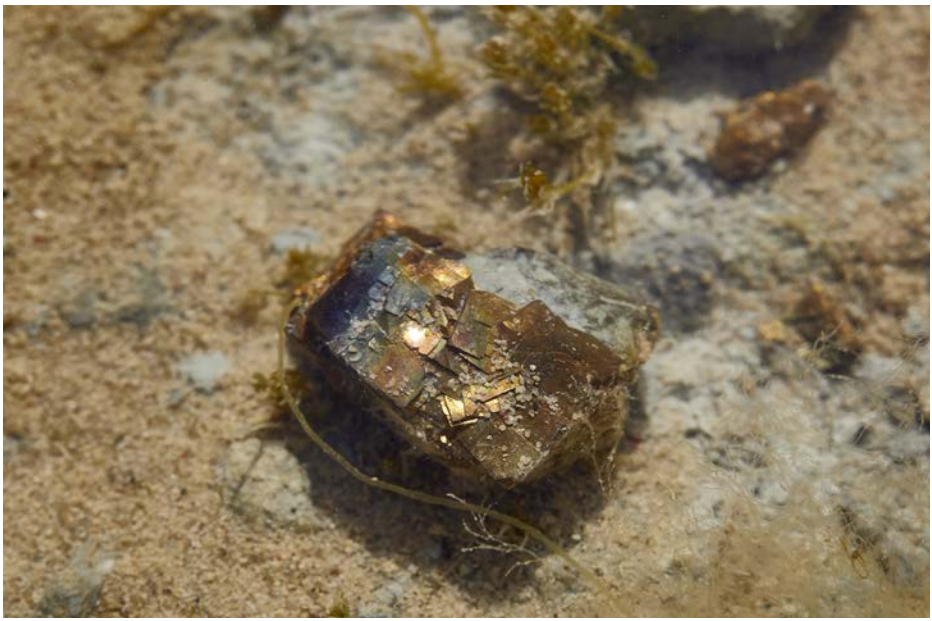
[EE] entsyklopeedia.ee/artikkel/karbid2

Pyrite

Pyrite is known by its common name (well-known name) fool's gold. It consists of sulphur and iron (FES2). Larger pyrite crystals can be found in clayey (containing clay) Early Ordovician and Silurian rocks.

[Wiki] et.wikipedia.org/wiki/P%C3%BCriit

[Mineraalid, kivimid, maavarad] kivid.info/290



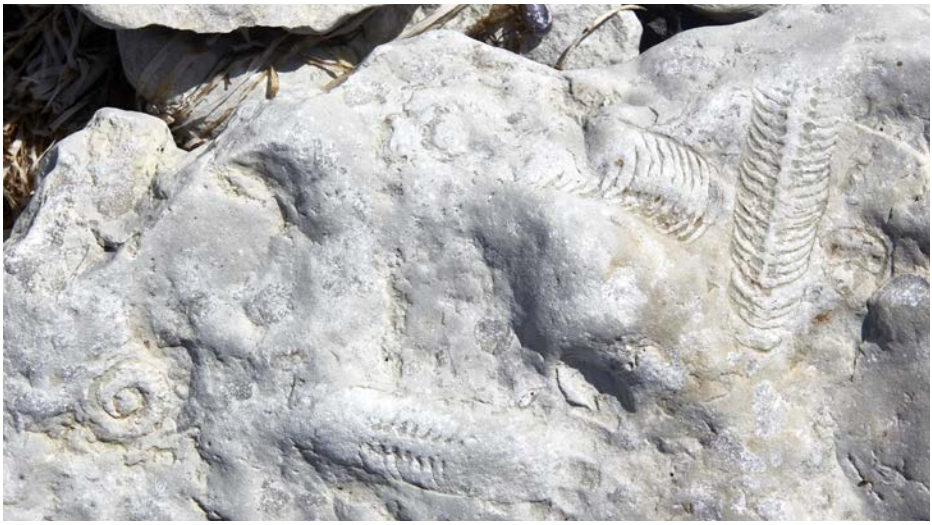
Fossils

A fossil is any preserved remains (parts that have remained) of any once-living thing (plants, animals). Such remains are usually the harder parts of ancient (very old) organisms (plants, animals) such as shells, bones, teeth, pollen, carbonised (burnt to coal, burnt black) plants. On the photo you can see trilobites (an extinct arthropod) and a snail that have been imprinted (left their shape) in limestone.

[Wiki] et.wikipedia.org/wiki/Kivistis

[Paemuuseum] www.paemuuseum.ee/paekivi/kivistised/

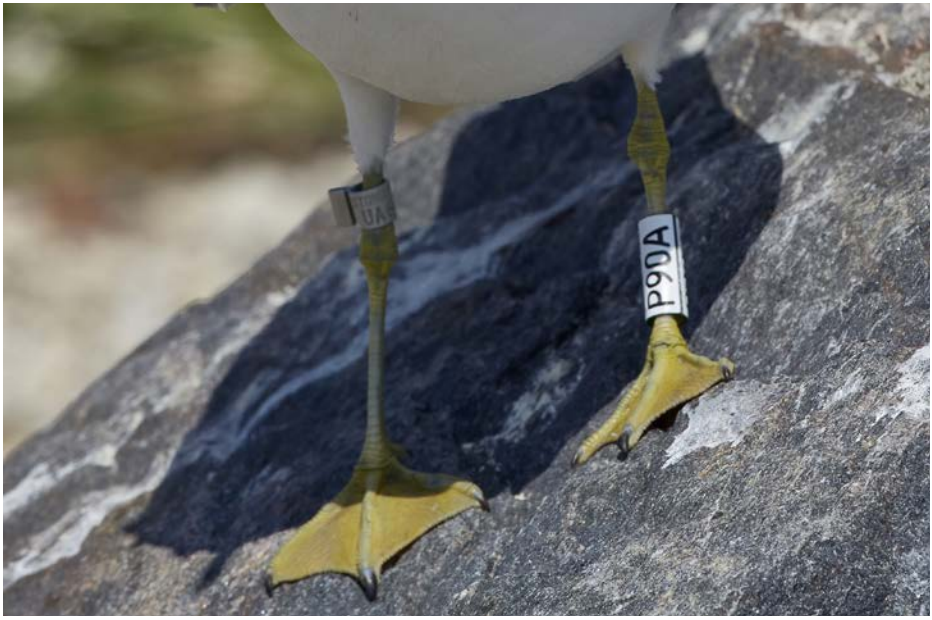
[Fossiilid] fossiilid.info/page/28



Bird ringing

Bird ringing (putting rings/bands/tags on the legs of birds) has been practiced in Estonia for 110 years. As of 1970, the birds ringed in Estonia carry the text ESTONIA MATSALU. Around 5 million birds have been ringed in Estonia and 100,000 birds have been trapped that have already been ringed.

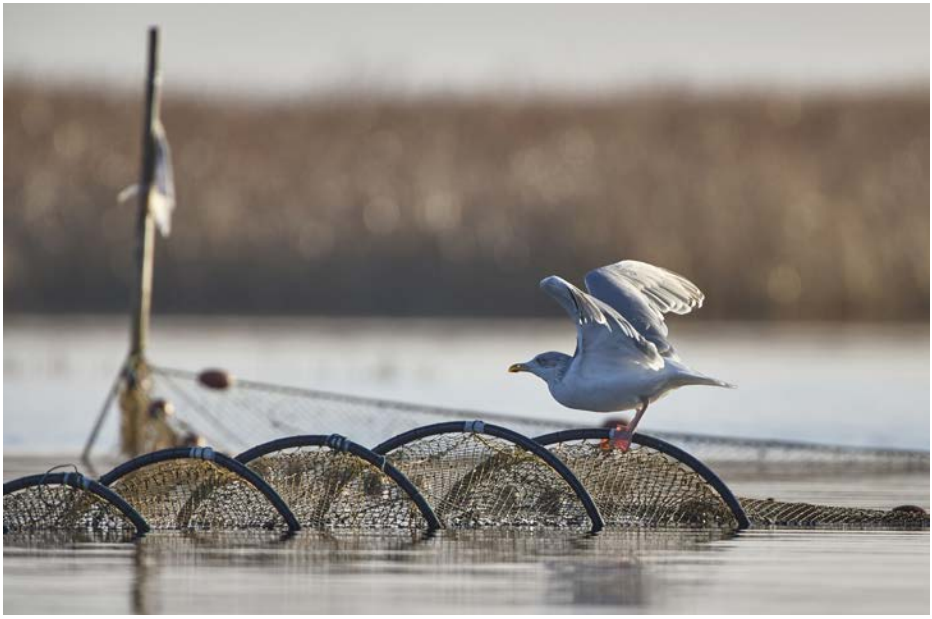
[Eesti Loodus] eestiloodus.horisont.ee/artikkel3607_3590.html



Fishing nets

A fishing net is a tool used to catch fish that surrounds the fish or traps them in an entangling net. In the past, fishing nets were made by hand using linen or cotton thread. A special netting needle [ui in Estonian] (tool for knitting nets) was used for hand-knitting. Today, fishing nets are manufactured in factories and made of synthetic fibres (threads). Net threads are of varying thickness, and mesh (net opening) size also varies.

[Wiki] et.wikipedia.org/wiki/Kalavõrk



Common juniper				
Common reed				
Strawberry clover				
Military orchid				
Sweet grass				
Bladder wrack				
Cattle				
Eurasian beaver				
European hare				
Field vole				
Early bumblebee				
Mute swan				
Natterjack toad				
Wart-biter				
For or red fox				
Golden jackal				
White-tailed eagle				

Eurasian bittern				
Common redshank				
Savi's warbler				
Grass snake				
Northern pike				
Weatherfish				
Three-spined stickle-back				
Migrant hawker				
Pale giant horse-fly				
Dung beetle				
Sand				
Clay				
Beach pebbles				
Ashore shells				
Pyrite				
Fossils				
Bird ringing				
Fishing nets