

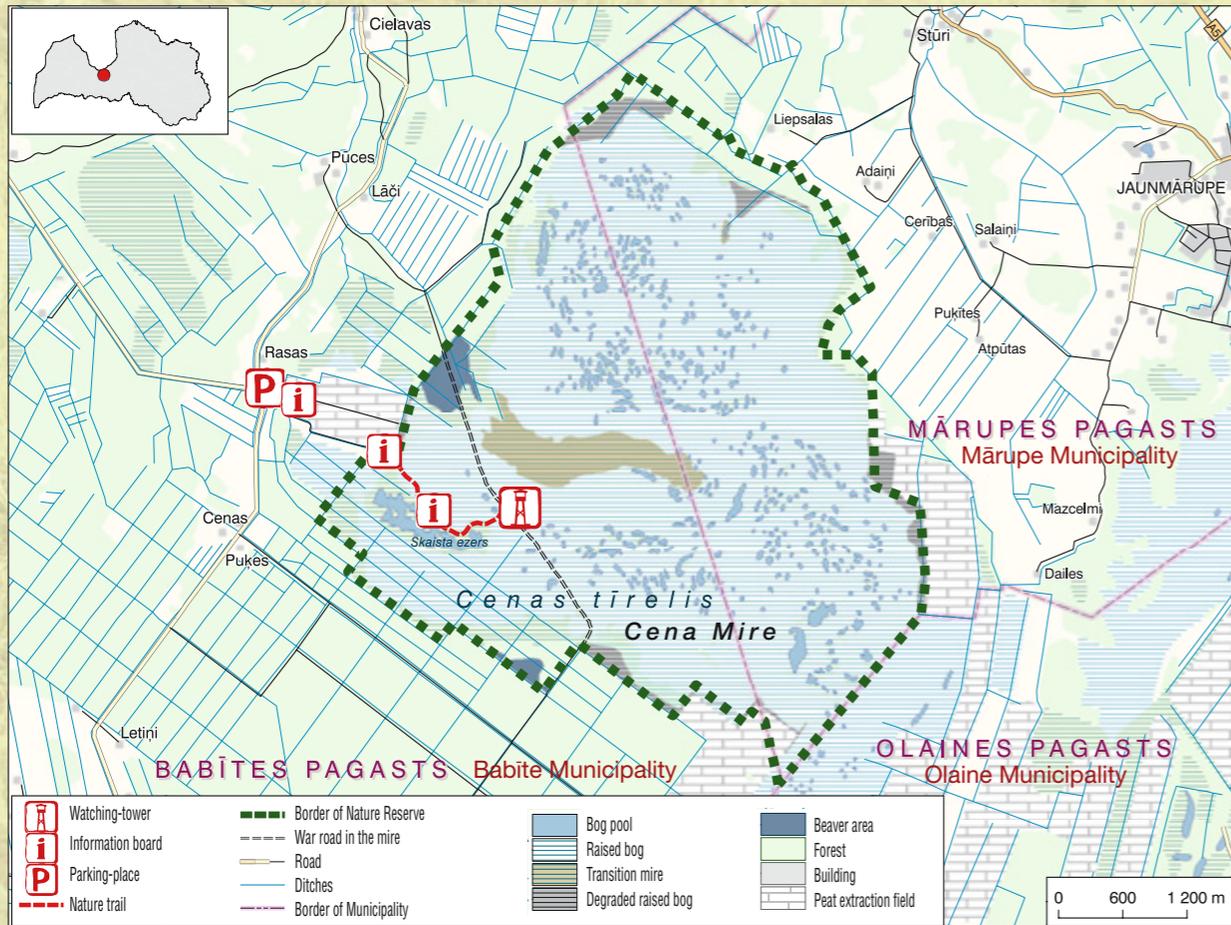


Especially
protected
nature
area

CENA MIRE

NATURE RESERVE





Location Mārupe and Babīte Municipalities, Rīga District

Established 1999

Total area 2133ha

Status

- **Especially protected nature area in Latvia – nature reserve.** Nature reserve is natural or changed by human activities area of land that includes especially protected plants, animals and habitats. Cena Mire is one of 273 nature reserves of Latvia.
- **included in European network of protected territories Natura 2000.** Natura 2000 is the European Union network of especially protected nature areas, where every member state participates with its system of protected nature areas. There are 336 Natura 2000 sites in Latvia; they cover 11.9 % of the territory of Latvia.

● **Internationally Important Bird Area (IBA).** Internationally Important Bird Areas are sites with a high number and diversity of bird species. They are crucially essential for the conservation of the bird populations and sometimes for the survival of the species at all. Such sites are identified as Important Bird Areas all over the world. There are 71 Internationally Important Bird Areas in Latvia.

The mire has developed 5,000-6,000 years ago

Habitats

- mires (88%), forests (11%), lake (1%)

Maximum depth of peat layer 5,75m



Photo: M. Pakalne
Raised bog vegetation.

The main nature values

- raised bog with a complex of pools and ridges
- transition mires
- 50 especially protected plant and animal species
- Cena Mire is an important resting place for Cranes, Bean and White-fronted Goose during their migration time.

Negative influence – previous drainage of the mire, peat extraction close to the border of the reserve

Management plan – developed by Latvian Fund for Nature for the time period 2005-2020. The main management activity is the prevention of mire desiccation by building of dams on the drained ditches. It is carried out within the framework of EC financed LIFE project “Implementation of Mire Habitat Management Plan for Latvia”.



Photo: M. Pakalne
Cranberries *Oxycoccus palustris* in Cena Mire.

Mire is an area of land surface that is constantly or periodically waterlogged, has characteristic flora and fauna and where active peat formation takes place. Mires are accumulators of water and they have an essential role in water circulation in the nature.

Development of mires may be of two kinds:

- by land paludification
- terrestrialisation of water bodies

Cena Mire has developed due to the land paludification, which could be caused by the rising of the groundwater about 5,000-6,000 years ago.

Mires types:

- **fen** – it is fed by the waters that are in contact with mineral soil, which has mineral substances necessary for plants dissolved in it. Historically it is the first stage of mire development.
- **transition mire** – this is an intermediate state between fen and raised bog.
- **raised bog** – water and nutrients are received exclusively from atmosphere precipitation.

In Cena Mire Nature Reserve raised bog vegetation (84%) dominates, notably smaller

Transition mire can be found in the central part of Cena Mire.

Photo: M. Pakalne



Photo: M. Pakalne

Raised bog covers the greatest part of Cena Mire.

area is covered by transition mire (3%). In the current stage of mire development there are no more fens in Cena Mire.

Previously, Cena Mire was the second largest mire in Latvia next to Teici Mire, and its area was about 9,000 ha. Now, due to economical activities (draining, peat extraction, agriculture) the area has decreased almost to 2,000 ha.

However, the remaining intact part is one of the most

beautiful mires in Latvia. In particular this mire, rich in pools and open areas, is esteemed by birds, which was one of the main reasons for the establishment of nature reserve.

Raised bog pools.

Photo: M. Pakalne



Photo: M. Pakalne

Heather *Calluna vulgaris* – common species on raised bog hummocks.



Photo: M. Pakalne

Round-leaved Sundew *Drosera rotundifolia* – symbol of intact raised bog.

Origin of Cena Mire can be associated with the Atlantic period and withdrawal of the Littorina Sea. In order to find out more about the history of the mire, studies were carried out, peat samples from various layers of the mire were analysed.

What can peat "tell" us?

- the composition of the peat in various depths shows the vegetation of both mire and the surroundings as it has been many thousand years ago
- it gives us idea about both the origin of mire and the ancient dwellings of people at the neighbourhood

Remains of plants and animals in the peat in the wet conditions almost totally decompose. Better preserved are macro-fossil of *Sphagnum* species and other bryophytes. However, only pollen and spores of plants have been preserved until nowadays completely, they can be observed in microscope and plants species can be identified. Stratigraphical analysis of Cena Mire revealed that its development was of the following kind:

- about 5,000-6,000 years ago fen vegetation started to develop in the depression of the relief where the level of the groundwater increased and the plants remains decayed
- about 4,200 years ago, with the climate change, fen and transition type vegetation was replaced by raised bog vegetation where *Sphagnum* species dominate, and raised bog formed. It still continues to develop nowadays.

The peat layer in an intact raised bog constantly grows - about 1 mm per year. Peat development in a raised bog occurs by decaying of the bottom part of *Sphagnum* species.

For almost 6 m thick peat layer to develop, as it is in Cena Mire, more than 4,000 thousand years were necessary!

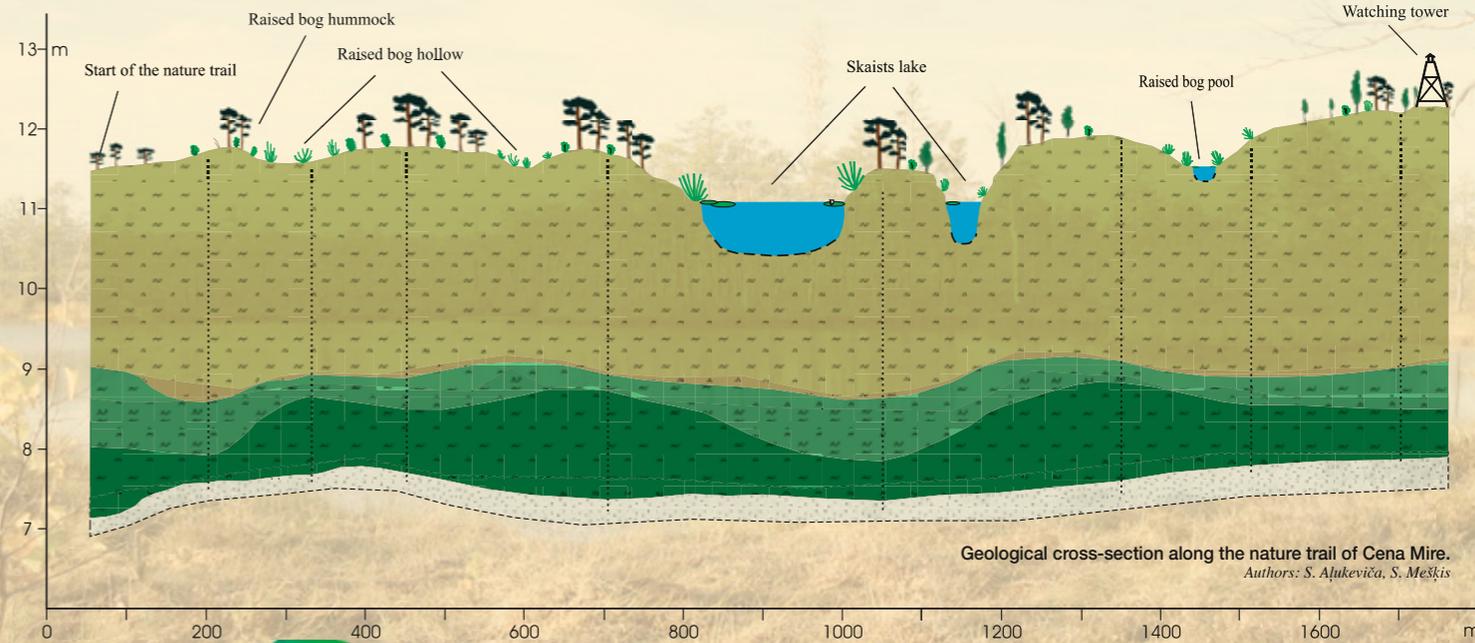
An intact raised bog "grows" constantly, and this process still continues nowadays. Peat layer increases every year, thus dome is usually formed

in raised bogs, which can be several meters higher than the surrounding. There are 2 domes in Cena Mire. The highest of them reaches 14 m height above these level, and it is 4-7 m higher than the edges of the bog.

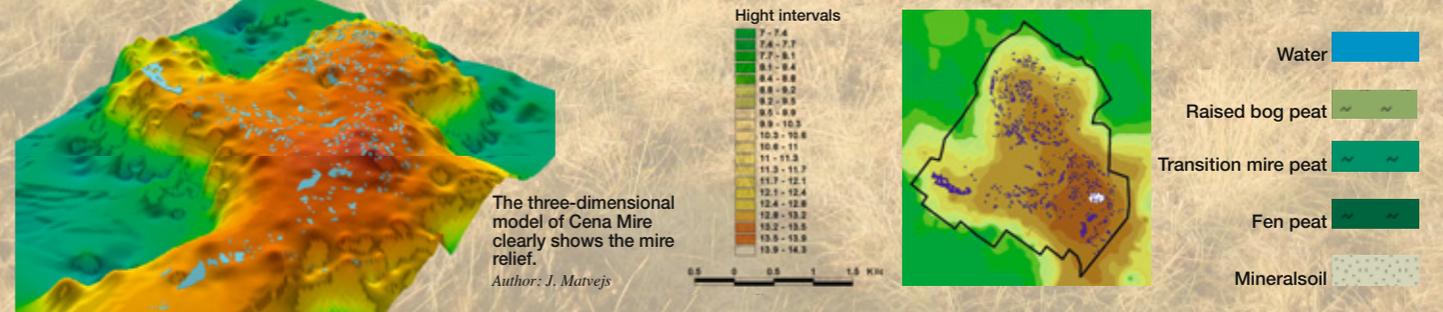
Palynological (pollen in the peat) and **paleobotanical** (remains of the plants in the peat) studies tell us when the first people started to live and established their dwelling places in the surroundings of Cena Mire. In the peat layer at the end of the Atlantic Age more than 4,800 years ago, the pollen of hemp, oats and other plants can be found, which together with increased amount of coal dust verify that in the close nearness of this territory the people of the Late Stone Age or Neolithic Era lived.



Photo: S. Ajukeviča
Peat sampling in Cena Mire.



Geological cross-section along the nature trail of Cena Mire.
Authors: S. Ajukeviča, S. Meškis



The three-dimensional model of Cena Mire clearly shows the mire relief.
Author: J. Matvejs

In the raised bog three types of habitats can be distinguished:

- raised bog hummocks
- raised bog hollows
- raised bog pools

Bryophytes characteristic for bogs dominate in raised bogs and form a tight “carpet” – *Sphagnum* species, which is also called white moss, various dwarf shrubs, cotton-grass and sometimes have smaller or higher pines. Pines have obtained an appearance particular of „bog pines” – they are not high and with curved bole. Their appearance does not let us know their really reputable age – it can be more than 100 years! Numerous raised bog pools have a special value in Cena Mire. They can be found across all territory of the bog, and form labyrinths of pools, oftentimes difficult to pass.

There are hundreds of pools in Cena Mire, most admired by bird species.

Photo: M. Pakalne



- Intact raised bog is a priority protected habitat of European importance.

In many European countries, also in Latvia, **degraded raised bogs where natural regeneration is possible or takes place** can be found. As in Western Europe intact raised bogs have almost ceased to exist, a special attention is given to these bogs as well. Bog habitats are degraded in the surroundings of drained ditches in Cena Mire.

- Degraded raised bogs where natural regeneration is possible or takes place, are protected habitat of European importance.



Degraded raised bog vegetation – the typical *Sphagnum* cover has disappeared.

Photo: V. Baroniņa



Photo: M. Pakalne

The intact raised bog is one of the greatest values of Cena Mire Nature Reserve



Photo: M. Pakalne

Transition fen vegetation develops on the margins of the raised bog pools.

Transition mire vegetation occurs in the central part of Cena Mire. *Sphagnum* species occur there as well and are accompanied by other bryophytes characteristic for mire. Transition mire has developed also on the margins of the largest pools and Skaists Lake.

- Transition mire and quacking bogs is a protected habitat of European importance.

Forest is the best natural zone of protection for bogs. In the Cena Mire Nature Reserve they occupy a comparatively small area (11%). Pine forests dominate. Mostly they have developed as a result of drainage – as overgrowing of the mire. **Bog woodland** (6%) occurs occasionally. Different *Sphagnum* species, Marsh Tea *Ledum palustre* and Great Bilberry *Vaccinium uliginosum* dominate in the ground layer, also cloudberries *Rubus chamaemorus* can be found there.



Photo: M. Pakalne

In summer Marsh tea *Ledum palustre* smells dizzy.

- Though the bog woodland is of no rarity in Latvia, it, similarly like raised bogs, has become a priority protected habitat in Europe.

A great number of raised **bog pools** can be found in Cena Mire Nature Reserve. The largest of them is Skaists Lake (18.5 ha) but there are hundreds of smaller ones.

In total at least 95 % of nature reserve is taken up by specially protected habitats of European importance.



Photo: M. Pakalne

Skaists Lake is the largest of the raised bog pools.

Raised bog vegetation is not especially rich in plant species, however they are specialised for the wet habitats. In the raised bogs the main role is played by typical bog moss – *Sphagnum* species. In Cena Mire there are 11 *Sphagnum* species, but in total in whole there are 55 bryophyte species recognised. Most common is *Sphagnum magellanicum*, which mainly is reddish in colour. About 20 more species have adapted to wet environment – on hummocks mostly Hare’s-tail Cottongrass *Eriophorum vaginatum*, Heather *Calluna vulgaris*, Crowberry *Empetrum nigrum*, Bog-rosemary *Andromeda polypholia*, Cloudberry *Rubus chamaemorus*, but in hollows among hummocks cranberries *Oxycoccus palustris* and insectivorous plant – Round-leaved Sundew *Drosera rotundifolia* occur.



Photo: M. Pakalne

Hare’s-tail Cottongrass *Eriophorum vaginatum* – one of the most characteristic species of raised bogs.



Photo: M. Pakalne

Rannoch – rush *Scheuchzeria palustris* – can be found in wet hollows of raised bog and transitional fen vegetation.



Photo: M. Pakalne

The coloured carpet formed by *Sphagnum* species – *Sphagnum magellanicum* and *Sph. rubellum* usually are reddish...



Photo: M. Pakalne

.. but *Sphagnum cuspidatum* is greenish

- Cena Mire is one of the few mires in Latvia that include the characteristic species for East Latvia raised bogs – Leatherleaf *Chamaedaphne calyculata* and bog species characteristic for West Latvia – Deer Grass *Trichophorum cespitosum*. Such bogs, where simultaneously plants of both eastern and western flora can be met, are rare in Latvia.



Leatherleaf *Chamaedaphne calyculata*

Photo: M. Pakalne



Deer Grass *Trichophorum cespitosum*

Photo: V. Baronina

Specially protected and rare plant species

- Dwarf Birch *Betula nana* – relic of Postglacial Age. This small, up to 80 cm of height shrub grows in northern regions of the Earth and is characteristic of tundra. It can be found in eastern part of Latvia, in Cena Mire there is known only one habitat of this species.
- Deer Grass *Trichophorum cespitosum* – a characteristic bog species, of frequent occurrence in the mires of Kurzeme (Western Latvia).
- Bog Pouchwort *Calypogeia*



Photo: M. Pakalne

Golden Bog-moss *Sphagnum pulchrum* is a very rare species in Latvia, it can be found in the transition fen vegetation.



Photo: M. Pakalne

Dwarf Birch *Betula nana* – characteristic plant species of tundra, in Latvia it occurs on the southern border of its distribution area.



Photo: M. Pakalne

Spotted orchid *Dactylorhiza maculata* occasionally can be observed in transition mire vegetation.

sphagnicola – bryophyte that is found near the raised bog pools.

- Matchstick Flapwort *Odontoschisma denudatum* – typical bryophyte species of raised bogs and bog woodland.
- Golden Bog-moss *Sphagnum pulchrum* – a rare bryophyte species, in Cena Mire one of a few localities in Latvia.

Fungi

In total there are known about 60 fungus species from Agaricales in Cena Mire, however, the number might be greater, because the occurrence of mushrooms considerably depends on the climatical conditions.

- *Suillus flavidus* – especially protected mushroom species that is rare in other European countries as well.

The valuable raised bog habitats and the diversity of birds species occurring



Photo: I. Dāniele

Suillus flavidus – is rare not only in Latvia, but also in Europe



Russula paludosa – one of most beautiful russula species.

Photo: I. Dāniele

there was the reason for the establishment of Cena Mire Nature Reserve. The birds have been investigated here since 30-ies of the 20th century. In total about 70 bird species have been recognized in Cena Mire. There are records about 26 rare and specially protected bird species, which in various time periods could be found in Cena Mire, but of late 20 years there is information about 17 species.

Raised bogs are particularly important for bird species that:

White-fronted Goose *Anser albifrons*
Photo: J. Kuze



Bean Goose *Anser fabalis*
Photo: A. Petriņš



Crane *Grus grus*.
Photo: A. Petriņš



- For cranes Cena Mire is one of the largest nesting areas in Latvia – about 20-25 pairs occur there. The number of non-nesting cranes can reach even several hundreds. Most of the breeding cranes choose the area close to Skaists Lake or the raised bog pools. In the more open area where the transition mire vegetation has established cranes and geese gather during the migration time.



Eurasian Curlew *Numenius arquata* – characteristic species of mires, however, it's number in Cena Mire has decreased.
Photo: A.



European Golden Plover *Pluvialis apricaria* – is hardly noticeable in the coloured landscape of raised bog hummocks.
Photo: A. Avotiņš

- nest only in the raised bogs or the greatest part of population nests in mires. Such species are Wood Sandpiper *Tringa glareola*, European Golden Plover *Pluvialis apricaria*, Eurasian Curlew *Numenius arquata*, whimbrel *Numenius phaeopus*, etc. In Cena Mire Black Grouse *Tetrao tetrix* were found – more than 10 birds in 2-3 places.
- nest in the forests close to the raised bogs and feeds in the raised bogs – Black Stork *Ciconia nigra*, Osprey *Pandion haliaetus*, Short-toed Eagle *Circaetus gallicus*, etc. Stork and Ospreys sometimes can be seen flying over Cena Mire, but Short-toed Eagle now is very rare in Latvia though it once nested in Cena Mire.
- Cranes and Geese gather in flocks in the bogs before the migration to the wintering grounds, they rest and feed there. Bean Goose *Anser fabalis* and White-fronted Goose *A. albifrons* can be there in mixed flocks and the number of individuals can reach several thousands. **All these species with different conservation status are especially protected in Latvia and Europe.**

About some bird species only valuable historical data has been

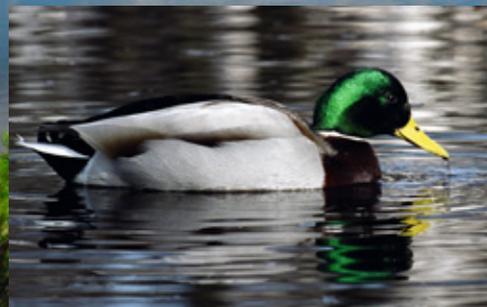


Wood Sandpiper *Tringa glareola* – in its most typical position – observing the surroundings from the top of small bog pine.
Photo: A. Petriņš

Raised bog pools and islands are the areas with the largest concentration of bird species. It is connected with good feeding, resting and nesting possibilities on the islands as they can feel less threatened. It is a safe shelter for Mallard *Anas platyrhynchos*, Tufted Duck *Aythya fuligula*, Golden eye *Bucephala clangula* as well as the largest part of cranes breed there.

Raised bog pool.

Photo: M. Pakalne



Mallard *Anas platyrhynchos*

Photo: A. Petriņš



Tufted Duck *Aythya fuligula*

Photo: J. Kuze



Golden eye *Bucephala clangula*

Photo: J. Kuze

preserved. Due to economical use of bogs, land melioration, agricultural chemicalization, changes in climate, and other intrusion several bog species not only in Cena Mire, but also in Latvian old mires can be found:

- Willow Grouse *Lagopus lagopus*, Black-throated Diver *Gavia arctica* and Red-throated Diver *G. stellata*, Merlin *Falco columbarius* and Peregrine Falcon *F. peregrinus*



Willow Grouse *Lagopus lagopus* – as the nesting species has probably disappeared from Latvian mires. In 1939 it was found last in Cena Mire.

Merlin *Falco Falco columbarius* – even not a long time ago has been nesting in Latvian mires; 2-3 pairs were known in Cena Mire. Since 1974 as the nesting species it has not been observed anymore.

Black-throated Diver *Gavia arctica* – previously (1953) it was nesting in Cena Mire. At present it is known only in few Latvian mires.

Illustrations: www.latvijasdaba.lv



Photo: A. Petriņš

The crane chick can still be safe about his future – the number of cranes in Latvia and in Europe has a tendency to increase, similarly like in Cena Mire.

Invertebrate fauna, among the insect fauna as well, like for in Cena Mire is not diverse, because the main part of the reserve is taken up by vast, quite homogenous habitat – raised bog. Mostly there can be recognized:

- dragonflies,
- butterflies
- beetles.

Specially protected and rare species

- Emperor Dragonfly *Anax imperator* – the rarest of 11 species that can be found in Cena Mire
- Eastern White-faced Darter *Leucorrhinia albifrons* – can be met near the largest pools and Skaists Lake
- Large White-faced Darter *L. pectoralis* – it cannot be found every year, however, habitats are very suitable for it
- Ground Beetle *Carabus nitens* – typical bog species, which once has been recognized in Cena Mire

There is no mammal species for which raised bog is the only habitat.

Photo: V. Spungis
Silver – studded Blue *Plebeius argus* feeds on the blossom of Bog-rosemary.



Photo: M. Kalniņš
Eastern White-faced Darter *Leucorrhinia albifrons*.



Photo: V. Spungis
Small Pearl-bordered Fritillary *Clossiana selene* – characteristic species of raised bogs.



Photo: V. Spungis
Large White-faced Darter *L. pectoralis*



Photo: A. Klepers
Beavers *Castor fiber* has come to Cena Mire together with the establishment of drainage system.

However, mires are necessary for these species as a path of migration or buffer zone around their dwelling site. Since Cena Mire is located in a comparatively populated area, the following animals can find a shelter there:

- Roe Deer *Capreola capreolus*, Wild Boar *Sus scrofa*, Elk *Alces alces*, Red Deer *Cervus elaphus*
- small mammals – Shrews *Sorex* spp., Voles *Microtus* spp., etc.
- Eurasian Beaver *Castor fiber* (protected species in Europe), otter *Lutra lutra* (protected both in Latvia and Europe). Beaver has invaded after establishment of drainage ditches – the borders of raised bogs are suitable for it because there is good nutrition base. Otter uses the flood created by beavers.

- in the forests surrounding the margins of raised bogs regularly dwell some wolves *Canis lupus*, occasionally stays lynx *Lynx lynx*. Wolves and lynxes are under protection in all Europe, but in Latvia they are specially protected species, with restricted use.
- bats use the wide territory of mires and numerous pools for their search for food. Northern bat *Eptesicus nilssonii* is found there. All bats in Latvia are protected species.

Cena Mire is located on the watershed between Lielupe and Daugava Rivers. At present waters from the domes of the raised bog run towards the

Flooding created by the beavers in the western part of the mire.
Photo: V. Pilāts

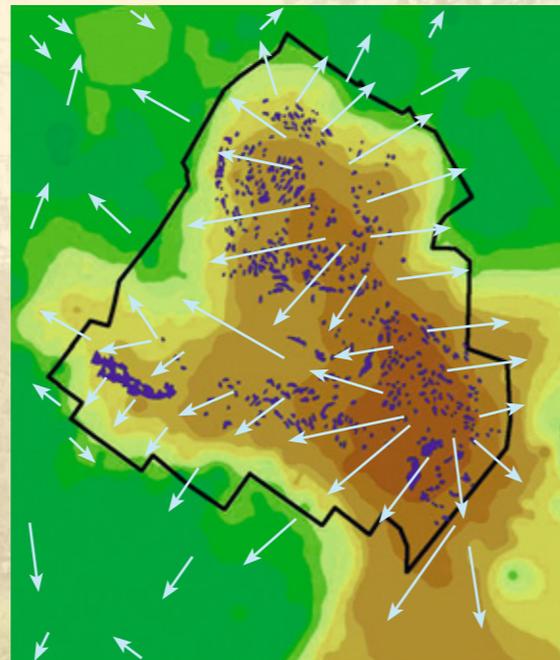


margins of the raised bog, reach the drainage ditches and then flow off in the Misa, Nerīna, Dzilnupe and Cena Rivers. Once Cena Mire occupied much wider territory – there were favourable preconditions for the mire development. The large drainage ditches limited the expansion of mire. The total length of melioration ditches in Cena Mire is 24.5 km. In the peat of undrained raised bog the percentage of water is 95%, which is the main premise for its growth.

Raised bogs are stocks of mineral deposit – peat – thus it is within the horizon of economical activities of mankind since the beginning of the 20th century. The drainage of Cena Mire



Contour ditch around the mire
Photo: M. Pakalne



Water flow directions in Cena Mire.
Author: A. Indriksons

was started in 1933 by establishing an open melioration net. In 1940 industrial extraction of peat was initiated.

The natural habitats in Cena Mire are influenced by:

- drainage of the raised bog for peat extraction.
- peat extraction in the direct nearness of the reserve. Formerly peat was intensively used both as fuel and bedding. Lately peat from Latvia mostly is being exported abroad, because raised bogs in Western Europe are greatly exploited and now can rarely be seen as specially



Peat extraction near the border of Cena Mire Nature Reserve.
Photo: M. Pakalne



Influence of previous fire in the bog.
Photo: M. Pakalne

- protected and sometimes renewable biotopes.
- peat fires – natural vegetation of the raised bog changes.

What happens if a mire is drained?

When drainage ditches have been dug in the bog, the natural mire habitats degrade:

- water through drainage ditches flows away, and the hydrological

- conditions of the mire change
- water level in the pools and lakes lowers, and overgrowing of mires with pine increases
- the main producers of peat and dominant mire vegetation – *Sphagnum* species – disappear
- the coverage of heather and other dwarf shrubs increase, pines and Downy Birch grows increasingly – the landscape of open bog, which is the most appropriate for birds, disappears
- compaction of the bog surface takes place (15-20%) – if it exceeds 1m, it is the amount of peat that has formed at least 1,000 years
- the capacity of water decreases
- the possibility of fire hazard increases

Can a degraded bog be restored?

In countries, where bog has been excavated, now great efforts are taken to restore them. There are attempts to restore the hydrologic conditions of the mire, even *Sphagnum* species are replanted. However, it is generally known



Photo: M. Pakalne
Previously, there was a raised bog that has been overgrown with the pine forest.

that a total regeneration of a degraded raised bog into natural is not possible anymore. But what if a part of the bog is degraded or badly influenced by drainage and the process still continues? In this case it is possible to reduce the negative impact of drainage in a degraded bog. For that reason:

- dams are built on melioration ditches in bogs – in order to reduce the effect of the drainage and to change favourably the degraded



Photo: M. Pakalne
Sometimes filling-in of ditches occurs naturally...



..but most often the ditches continue to function degrading the surrounding mire habitats.
Photo: V. Baroniņa

- vegetation of the bog
- in countries, where bog woodlands are rare, the restoration of the hydrological conditions in the forests is carried out, or even transformation of drained forests into raised bogs

In the degraded parts of the bog in Cena Mire dams are being built. Experience shows that in some years positive changes in the hydrology of the bog take place. The negative impact of drainage is expected to decrease within ten years, and it will be observed in the vegetation of the bog – coverage of dwarf shrub will diminish, cover of *Sphagnum* species will regenerate, cranberries and other species of plants and animals characteristic for bogs will be there.

In Cena Mire the hydrological monitoring is carried out (long-term



Photo: V. Baroniņa
Building of peat dams on drainage ditches on the raised bog margin.

observations) – groundwater level observation wells are laid to observe the changes in the hydrologic conditions and how they affect the vegetation of the mire.

Cena Mire is crossed by a road, which was constructed in the bog during the World War I. In winter of 1916/1917 in the near surroundings of mire fierce battles between German troops and the 12th army of tsarist Russia (including voluntary regiment of Latvian Riflemen) took place. In the



Photo: M. Pakalne
Groundwater level observation wells.

history these battles are known as Christmas battles and have gained a notable significance not only in the history of Latvia, but also of Europe as one of the fiercest battles of World War I (1914-1918).

The surroundings of Cena Mire almost up to Russian Ložmetēju hills since the autumn of 1915 served as the base place for bodies of Tsarist army. Cena Mire is crossed by so-called Novgorod road, but near Maztīreļa Mire is crossed by Ložmetēju or Purvaroad. These war roads ensured supplies for Tsarist army. In Cena Mire itself military operations did not happen. War roads in mires were especially laid by fortifying the sides with logs and filling the middle part with soil, thus in both sides small ditches were formed along the road and additionally drained the road. As cheap, widely available and effective material for road fastening served bound sheaves of branches. The road was covered with them in several layers and then showered with ground.

These simple war roads can be noticed in the nature still nowadays. In the mire they are particularly interesting and observable because they form as if planted avenues – plants and trees not characteristic for bogs have increasingly grown in the dried sides of the roads.

To observe better and to become acquainted of the raised bog – plants and animals trail is set up in Cena Mire. In order to use the 6 m high watching tower near the

In a territory of nature reserve, take into consideration:

- it is advisable to use the mire boardwalk.



Photo: V. Baroniņa
The World War I road in the mire can be recognized by the "alley of trees".



Movement of hospital team during the World War I.
Materials of Latvian War Museum

Be careful near the pools! To step off the trail into the raised bog can be dangerous!

- you will see the species of bog plants near the trail.
- from the watching tower birds can be best observed in April and May as well as in October before migration.
- in the transition mire not far from the watching tower there is **seasonally restricted area**. In order not to disturb birds and in the same time to observe them better from the watching tower, no visitors are allowed there from 1st of April till 1st of November.
- in the nature reserve it is **prohibited to make a fire!** In the driest places peat is very inflammable – a match or cigarette can make the peat burn for months in the depth of several metres.
- within the nature reserve hunting of birds and beaver is prohibited
- do not pollute the lake and the pools, the surroundings and the isles! It is the safest shelter for bird nesting – do not disturb them!
- the more silent you will be in the mire, the more you will see and hear!

CONTACT INFORMATION

Territory is managed by "Rīga Forest Agency"

- A. Briāna Str. 7, Rīga LV-1001, www.mezaagentura.lv

The administration is organized by:

- Mārupe Municipality Council
Daugavas Str. 29
Mārupe Municipality,
Rīga District, LV-2167, www.marupe.lv
- Babīte Municipality Council
Centra Str. 4, p/o Piņķi, Rīga District, LV-2107, www.babite.lv

Information:



Photo: V. Baroniņa

More information about mire inhabitants can be obtained during the walk along the nature trail and the visit of watching tower. Let's go for an exciting excursion to the mire!



Photo: V. Baroniņa

- Olaine Museum of History and Arts
Zemgale Str. 33, Olaine, LV-2144, www.muzeji.lv
- Latvian Fund for Nature
Raiņa Blvd. 31-6, Rīga, LV-1050, www.ldf.lv

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Skaists Lake in winter.

Photo: M. Pakalne



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