

Information Sheet on Ramsar Wetlands (RIS) – 2006 version

Available for download from http://www.ramsar.org/ris/key_ris_index.htm.

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.
3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

Agu Leivits,

State Nature Conservation Centre
Pärnu-Viljandi Region
Pärnu tn. 62, Kilingi-Nõmme 86305,
agu.leivits@nigula.ee

FOR OFFICE USE ONLY.

DD MM YY

--	--	--

Designation date

--	--	--	--	--	--	--	--

Site Reference Number

2. Date this sheet was completed/updated:

08.11.2007

3. Country:

Estonia

4. Name of the Ramsar site:

The precise name of the designated site in one of the three official languages (English, French or Spanish) of the Convention. Alternative names, including in local language(s), should be given in parentheses after the precise name.

Nigula Nature Reserve

5. Designation of new Ramsar site or update of existing site:

This RIS is for (tick one box only):

- a) Designation of a new Ramsar site ; or
b) Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area

The Ramsar site boundary and site area are unchanged:

or

If the site boundary has changed:

i) the boundary has been delineated more accurately ; or

ii) the boundary has been extended ; or

iii) the boundary has been restricted**

and/or

If the site area has changed:

i) the area has been measured more accurately ; or

ii) the area has been extended ; or

iii) the area has been reduced**

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site:

Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) a hard copy (required for inclusion of site in the Ramsar List): ;

ii) an electronic format (e.g. a JPEG or ArcView image) ;

iii) a GIS file providing geo-referenced site boundary vectors and attribute tables ;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

8. Geographical coordinates (latitude/longitude, in degrees and minutes):

Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

58°00'N, 024°40'E

9. General location:

Include in which part of the country and which large administrative region(s) the site lies and the location of the nearest large town.

The site is located on Estonian-Latvian border in Pärnu County, 50 km southwest from Pärnu and 30 km south-west from Kilingi Nõmme (2,500 inhabitants), the centre of Saarde Municipality. Nigula

Ramsar site has borders on the south-east with Northern Bogs (Ziemelu purvi) Ramsar site (No 1385) in Latvia and on the east with Sookuninga Nature Reserve Ramsar site (will be designated in 2006) in Estonia. All three sites forming one ecological and hydrological integrity – the North-Livonian transboundary wetland complex with total area 17,575 ha.

10. Elevation: (in metres: average and/or maximum & minimum)
55 - 60 m

11. Area: (in hectares)
6398 ha

In January 2006 the new protection rules for Nigula Nature Reserve taking into account Natura 2000 requirements were approved. As a result the area of the nature reserve was enlarged from 4656 ha to 6398 ha. To simplify administrative and legal procedures it was decided in Estonia that in most cases the Ramsar borders and borders of protected area coincide (for Ramsar the non-wetland habitats of the reserves can be interpreted as buffer habitats).

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

Nigula Nature Reserve is an extensive wetland and forest complex. . 34% (2,191 ha) of the area are covered by mires, different forest habitat types (incl. wet forests) are covering 46% (2,065 ha) and agricultural lands (cereal crop fields and grasslands) 20% of the area (according to Estonian Base Map 1:10 000).

Core of the nature reserve, Nigula mire (2,342 ha) is a typical West-Estonian type plateau bog with a relatively open and flat central part divided into two separate units by a row of mineral islands. The site is important as a good representative of mire wetland types characteristic for Baltic Coast Bog Province and as a stop over site for several migration birds.

13. Ramsar Criteria:

Tick the box under each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11). All Criteria which apply should be ticked.

1 • 2 • 3 • 4 • 5 • 6 • 7 8 • 9

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Criterion 1:

- the site is a good representative of active raised bogs (7110 Annex I Habitat Directive), transition mires and quaking bogs (7140), bog woodland (91D0), Fennoscandian deciduous swamp woods (9080), and natural dystrophic lakes (3160) characteristic of the Boreal Biogeographical region. The mosaic wetland complex plays a substantial hydrological, biological and ecological role in the region, identified both as IBA and Natura 2000 site, as well as International level Core area in the Pan European Ecological Network. Nigula Bog is well known as a reference site for raised bog studies.

Criterion 2:

– the site supports an appreciable assemblage of rare, vulnerable and endangered species of birds and plants, some of them occurring in great numbers or densities. It supports bird species of EU conservation interest, listed on Annex I of the EU Bird Directive: *Ciconia ciconia* (1-2 p), *Aquila*

pomarina (4-5 p) , *Accipiter gentiles* (1-2 p), *Pernis apivorus* (5-7 p), *Tetrao tetrix* (30-60 lekking males), *Bonasa bonasia* (40-50 p), *Grus grus* (5-7 p), *Crex crex* (50-60 males), *Pluvialis apricaria* (30-60 p), *Tringa glareola* (30-40 p), *Glaucidium passerinum* (4-5 p), *Strix uralensis* (7-10 p), *Aegolius funereus* (0-5 p), *Caprimulgus europaeus* (60-80 p), *Dendrocopos leucotos* (10 p), *Picoides tridactylus* (9-10 p), *Picus canus* (7-8 p), *Dryocopus martius* (8-10 p), *Ficedula parva* (80-100 p), *Lanius collurio* (10-20 p). The site supports populations of large mammals including *Canis lupus*, *Lynx lynx*, *Ursus arctos* and *Alces alces*. *Lutra lutra* is listed in the Annex II of the EU Habitats Directive.

Cinnia latifolia (II Annex of Habitat Directive) is growing in 4 places.

Recorded birds of the Bird directive Annex I include *Gallinago media*, *Pluvialis apricaria*, *Tringa glareola*, *Circus pygargus*, *Grus grus*, *Tetrao tetrix*, *Aquila chrysaetos*, *Falco peregrinus* and *Gavia arctica* as well as *Ciconia nigra*, *Strix uralensis* and *Dendrocopos leucotos* and *Picoides tridactylus*, *Crex crex*, *Aquila pomarina* and *Aquila clanga*.

Lutra lutra is listed in the Annex II of the EU Habitats Directive.

Criterion 3:

- the site supports populations of plant and animal species important for maintaining the biological diversity of the Boreal Biogeographical Region. The site supports a number of vulnerable and endangered species which are under protection and/or listed in the Red Data Book of Estonia. Highly endangered and strongly protected (I protection category) are *Pteromys volans* Flying Squirrel, *Ciconia ciconia* Black Stork, *Aquila pomarina*, Lesser-Spotted Eagle, *Lagopus lagopus* Willow Grouse, *Botrychium virginicum* Rattlesnake Fern (the largest population in Estonia), *Metzgeria conjugata* (only population in Estonia).

Also important are: Mosses: *Sphagnum* sp

Plants: *Corallorhiza trifida* Coralroot Orchid, *Cardamine bulbifera* European Bittercress, *Cinna latifolia* Slender Wood Reedgrass

Criterion 4:

- the site supports animal species at a critical stage in their life cycles being a refuge for animals with large habitat requirements such as *Canis lupus*, *Lynx lynx*, *Ursus arctos*.

Criterion 5:

- the site regularly supports substantial numbers of waterbirds (>20 000). Up to 30,000 – 40,000 geese (*Anser fabalis* & *A. albifrons*), at least 600-700 Cranes (*Grus grus*) and some hundreds of Whooper and Tundra Swans (*Cygnus cygnus* & *C. columbianus*) use the whole of the transboundary bogs complex as a staging post and feed in surrounding agricultural land during autumn migration.

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Boreal

The location of the Nigula Nature Reserve within the temperate climatic zone, in the transitional area between the boreal coniferous forest zone in the north and the nemoral broadleaved forest zone in the south contributes to natural diversity with features of both taiga and broadleaved forest.

b) biogeographic regionalisation scheme (include reference citation):

Regions of Europe serving the Habitats Directive of the European Community (Council Directive 92/43/EEC) and the Emerald network under the Bern Convention

According to the mire regionalisation scheme, the given wetland complex belongs to the Baltic Coastal Mire Province with characteristic dominance of open raised bogs with pool-hummock systems and vegetation characterised by presence of *Sphagnum magellanicum*, *S. fuscum*, *S. rubellum* associated with *Calluna vulgaris*, *Rubus chamaemorus*, *Andromeda polifolia*, *Oxycoccus palustris*, *Empetrum nigrum*. *Rhynchospora alba* and *Carex limosa* in bog hollows.

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

The site is situated on the south-western slope of the Sakala upland. The bedrock of the area is formed by Devonian sandstones. During the last glaciations, the territory was under the influence of two glacier lobes. The greater one moved along the depression of Baltic Sea, another, smaller - by Riga gulf depression.

The Quaternary deposits consist mainly of basal tills (light or heavy loam with admixture of gravel and greater stones). The thickness of deposits within the plain part of mire complex varies between 10 and 30 meters.

Erosion prevailed within the territory during all Pleistocene glaciations. The almost flat glacial plain landforms are mainly not covered by meltwater sediments. Erosional landforms are well developed due to relatively soft and well erodable bedrock (terrigenous formations of Middle and Upper Devonian).

The main feature of the plain is very gentle, almost isometric or slightly elongated shallow depressions, occupied by peat bogs. Depressions were created during last glaciations by glacial erosion – by heavy subglacial currents that flowed under very high hydrostatic pressure as well as by direct erosion action of moving glacier.

The territory lies in a region of very stable tectonics – landforms made by movement of the Earth's crust are absent and almost all elevations and depressions of the land are of glacial origin.

Prequaternary bedrock of the territory is built-up by terrigenous Middle Devonian Aruküla and Burtnieku formations. It consists of interlaying soft fine-grained sandstones, siltstones and clay with rare and uncommon interlayer and lenses of dolomite concretions.

Nigula mire is a part of peatland complex which is located along the Estonian-Latvian border and form a 19-20 km long 'mire zone belt'. Development of the mires, mainly bogs, is a result of terrestrialisation of the previous Ice Lake bed. The maximum depth of the peat layer reaches up to 7 metres in Rongu bog.

The Nigula mire complex is 9.5 km in length and 3.5 km wide and has an area of 2,342 ha. The mire can be divided into three parts. The western massive is the oldest of the three. It started to develop at the end of the preboreal climatic period (10,200 - 9,300 years ago). The younger northern and eastern massifs have been separated from it by four "bog-islands." Bogs were developed during paludification from two periglacial lakes.

Climate is transitional from maritime to more continental with precipitation of 730 mm per year, and mean temperatures of 17 °C in July and -6° C in February. The permanent snow cover with maximum snow depth of 25-30 cm lasts approximately 110 days.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

The wetland is located in the watershed of Salatsi, Lemme, Häädemeeste and Rannametsa Rivers and forms a part of a paludified inland lowland (Metsepole Lowland, 258 sq.km).

Landforms of glacial erosion determine the form of the landscape within the catchment area. Overall the landscape has a flat mosaic type pattern with orientation of elementary landscapes along the glacier movement. The difference of altitude within the wetland complex is 10 meters (50 -60 m

above the sea level). Small drumlins are characteristic for the region. Devonian sandstones are covered by morainic till and partly by lacustrine or marine sediments and peat. Soils are formed on glacial and melt water deposits on the sands deposited by Baltic Ice Lake, the Litorina and the Baltic Sea. Dystric Histosols, Carbic Podzols and Eutric Gleysols dominate. The area is densely forested and of low agricultural use. Land use within the wetland complex is characterized by forest cutting activities next to the outer borders of the protected area. Extensive and decreasing agricultural activities take place outside the protected area.

The climate in the region is a transition from maritime to the continental. The Baltic Sea has the strongest impact on the climate. The yearly average temperature is up from +5 to +6 degree. The average precipitation is 700 - 750 mm (mainly from April to October) and evaporation 420 mm per year. The wind comes mainly from south-east, in warm season the west or north-west winds are more dominant. The duration of snow cover has changed during in recent times considerably, 30 years ago the average was about 100 days, now it's almost 30 days less.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

The mire complex is located on the watershed of the several small rivers and plays an important role in the recharge and discharge of groundwater, and maintenance of water quality in southwest Estonia.

19. Wetland Types

a) presence:

Circle or underline the applicable codes for the wetland types of the Ramsar "Classification System for Wetland Type" present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp • Ts • U • Va • Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

b) dominance:

List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

U Xp Xf Tp W 9 M

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

Nigula Nature Reserve is an extensive wetland and forest complex with relict lake (~18 ha) in its eastern border. Peatlands (Nigula Mire) cover 37 % (2,342 ha) of territory of the Nigula Nature Reserve. Nigula mire is a typical West-Estonian type plateau bog with a relatively open and flat central part divided into two separate units by a row of mineral islands. The open hollow-rich bog comprises 55%, pool-rich bog 30% and dwarf shrub-rich pine bog 15% of the total mire area. Around 13% of the total bog area is made up of over 370 smaller or larger pools, comprising some 60 ha in total. The mineral "bog-islands" found in the mire are surrounded by a narrow strip of mesotrophic bog (fen). The bog is surrounded by mixed deciduous forest. Some broad-leaved forests (more than 100 ha) can also be found here.

Mire formation began as a result of infilling and overgrowing of a postglacial lake, first in the western and then in the eastern unit during Boreal period. The incline on the edges is most spectacular along the western edge of the bog, where the bog surface may rise up to three meters within twenty meters. In the eastern part, a good place to observe the rise is near the observation tower, where the slope is 1.5m per ten meters. The steep slopes are caused by the influence of climate, clayey ground and outflow of surface water.

At first view, the bog plateau resembles hummocky grassland, but in early summer the visitor can see fields of cotton-grass, and later the area is covered by the violet flowers of heather - a nice surprise on these wet grounds.

Peat mosses (*Sphagnum*) turn the bog into a sponge that retains the water from the rain and snow that fall on the bog. Twenty-four species of peat moss have been identified so far, the colourful variety of these mosses covers the hummocks as well as the edges of the dark bog pools. As a result of peat moss decomposition, a peat layer of up to eight meters has been formed. The age of the peat massifs is rather impressive considering the small annual increase of the peat layer (from 0.8 to 1.5 mm). The annual increase, however, has varied widely through the history of the bog, from 0.3 -0.7 mm in the beginning of the boreal climatic period to a maximum of 2.5 mm per year in the sub-boreal period (4800-2800 years ago). Since then, the yearly peat layer growth has decreased and today does not exceed 1.1 millimeters per year.

Signs of bog fires have been found during the peat studies. In the eastern part of the bog these signs lie at depths of 0.7, 1.7 and 1.8 meters and in the western part at depths of 4.3 and 4.7 meters. The oldest fires date back to the Atlantic climatic period 7800-4800 years ago.

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14, Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

The plant communities of the mires are typical for West-Estonian bogs (Baltic Coast Bog Province). Bog vegetation is characterised by presence of *Sphagnum magellanicum*, *S. fuscum*, *S. rubellum* on hummocks associated with *Calluna vulgaris*, *Rubus chamaemorus*, *Andromeda polifolia*, *Oxycoccus palustris*, and *Empetrum nigrum*. *Rhynchospora alba* and *Carex limosa* communities are found in bog hollows. In total 25 *Sphagnum* species have been found in Nigula. In addition to the peat moss, the Common Cranberry (*Oxycoccus palustris*) and in some places the Smaller Cranberry (*Oxycoccus microcarpus*) can be found, but a very characteristic species for the bogs are sundews. The most common is the Round-leaved Sundew (*Drosera rotundifolia*), the Great Sundew (*D. anglica*) is also rather common, but finding the third species - the Long-leaved Sundew (*D. intermedia*) demands patience. In some places Cotton Grass (*Eriophorum*) and Deer Grass (*Trichophorum*) give a grass-like cover to the bog.

Forests around the bogs comprise variety of different types. Deciduous (including broad-leaved) forests grow on rich soil ground and mixed forests on poor soils. There can be found nowadays relatively small wet alder swamp forest patches, which were very typical for the region before extensive forest drainage in 1960-70's. Although forests occupy more than 50 % of reserve area the forest habitat types (except bog woodlands) meeting criteria of Habitats Directive are not widespread and are rather fragmented. One larger meadow complex is locating between the bogs on island of mineral land.

Totally, 448 vascular plants are found, rare plant species, including *Corallorhiza trifida* and *Cardamine bulbifera*, occur mainly in forests on mineral "bog islands." Some Fungi found there - *Grifola frondosa*, *Polyporus tuberaster* and *Inonotopsis subiculosus* - are included in the Red Data Book of Europe. *Cinnia latifolia* (II Annex of Habitat Directive) is growing in 4 places. *Botrychium virginianum*, extremely rare in Estonia, was found here in 2001.

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Biogeographically the Nigula nature reserve is an extension of NE-SW directed belt of natural landscapes called as Intermediate Estonia. Species typical for natural landscapes are relatively common in the region. Compared with other parts of Estonia there are more species with southern (hemiboreal) distribution and compared with Latvia more northern (boreal) species can be found in North Livonia. The landscape consists of a mosaic of wetlands, forests and agricultural land with low human settlement densities offering good habitats for large mammals including top carnivores like Brown Bear, Grey Wolf and Lynx. Dense networks of watercourse are favourable habitats for aquatic mammals (Beavers, Otters, Polecat). In some old-growth aspen forest fragments still rare Flying Squirrel can be found.

202 bird species have been recorded. The birds are clearly the most outstanding part of the bog fauna. The bird life of the area has been thoroughly studied for decades. Since 1952, at least 50 species have been documented as nesting in the area, half of them being present every year. Specific bog-breeding species for Estonia are the Great Grey Shrike (*Lanius excubitor*), Golden Plover (*Pluvialis apricaria*) and Whimbrel (*Numenius phaeopus*). During the last decades the Peregrine Falcon (*Falco peregrinus*) and Willow Grouse (*Lagopus lagopus*) have disappeared from the bog, but the general species diversity has been increasing, mainly due to the immigration of species from other habitats. So the Redshank (*Tringa totanus*) and Common Gull (*Larus canus*) have "moved in" from coastal meadows and are now typical breeders in the bogs.

Small permanent and temporary water bodies are favourite spawning sites for Common Toad and frogs (Grass Frog, Moor Frog, Pool Frog).

Area is also rich in different invertebrate species including notable butterflies and moths as well dragonflies.

Birds recorded in the mire include: *Gallinago media* (3-5 pairs), *Pluvialis apricaria* (40-60 pairs), *Tringa glareola* (30-40 pairs), *Numenius phaeopus* (1-10 pairs), *Lanius excubitor* (3-5 pairs), *Circus pygargus* (1-2 pairs), *Grus grus* (5-6 pairs), *Tetrao tetrix* (50-80 lekking males) and *Lagopus lagopus* (1-3 pairs). It is also a feeding area for *Aquila chrysaetos*, *Falco peregrinus* and *Gavia arctica*.

The area is also an important breeding site for several rare and vulnerable bird species typical for old-growth forests like *Ciconia nigra* Black Stork, Goshawk, Hazel Hen, Owls (Ural Owl, Pygmy Owl), Woodpeckers (White-Backed, Tree-toed, Gray-headed) and Red-Breasted Flycatcher.

In the forests: *Ciconia nigra* (1-2 pairs), *Strix uralensis* (5-8 pairs) and *Dendrocopos leucotos* (9-10 pairs) and *Picoides tritactyla* (5-6 pairs).

Spotted Eagles are good indicators of the status of semi-open landscapes. Species belonging to the Arctic (Willow Grouse, Golden Plover, Wood Sandpiper) find breeding places in the large bogs.

White Storks and Corncrakes are common in landscapes with meadows. Agricultural crop fields are important staging places for migratory water birds (Tundra and Whooper Swans, Bean and White-fronted Geese, and Cranes). The surrounding agricultural land: *Crex crex* (20-30 pairs), *Aquila pomarina* (5-6 pairs) and *Aquila clanga* (0-1 pairs).

Mammals living mainly in the marginal parts of the mire include *Ursus arctos*, *Canis lupus*, *Alces alces*, *Lynx lynx* and *Lutra lutra*.

23. Social and cultural values:

a) Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

“The mire has very good possibilities for environmental education and excursions as there is a 6.8 km footpath going through different mire biotopes and bog island. The bog has been stationary research area of investigating the production of *Oxycoccus palustris* in different paludification successions. Nigula is the only long-term monitoring site for mire birds in Estonia; since 1968 breeding bird counts have been organised there every spring.”

Mires and peatland forests are important areas for traditional berry-picking (*Vaccinum uliginosum*, *Oxycoccus palustris* and *Rubus chamaemorus*) and small-scale hunting (allowed only for the purpose of regulating numbers of game animals).

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning?

If Yes, tick the box and describe this importance under one or more of the following categories:

- i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:
- ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

The Nigula Nature Reserve has a significant cultural historical importance. There are remains from ancient times, war routes, small scale battle grounds, burials are found in the mires and its close edges.

From later periods there are lots of farms (large old "vaku" farms - special right farms in the period of slavery) and also smaller farms from later period (border-guarding farms and farms distributed to Estonian independence war heroes), next to farms there are also closely involved traditional management objects like peat milling areas, berry picking and small scale hunting areas and also winter-routes to easier connections over bog.

As a periphery border-area there are also great amount of war and resistance objects like hides, battle grounds and execution places.

- iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:
- iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

As well as several cultural-historical objects in and around the wetlands there is significant non-material cultural heritage about wetlands. The area is known for its "evil" legends that involve spirits, devils, ghosts and witches with the mires. Also the contacts of different cultures (Estonians, Latvians and Livonians) are visible in the area (place names etc).

24. Land tenure/ownership:

a) within the Ramsar site:

About 80 % of the reserve area is owned by State (5,116 ha), the rest (1,282 ha) is private.

b) in the surrounding area:

Surrounding agricultural areas are owned mainly by private owners, but surrounding forest and mire areas is owned mainly by State.

25. Current land (including water) use:

a) within the Ramsar site:

research and monitoring, conservation education and ecotourism. Due to the remote location the area is sparsely inhabited, the other main uses are tied to forestry, picking of berries and mushrooms, small-scale hunting - all at comparatively low intensities. small-scale forestry

b) in the surroundings/catchment:

Forest cutting intensity in the surroundings of the nature reserve has increased as well hunting pressure on the borders of the nature reserve. A typical feature for the borderland is low intensity and continually decreasing agriculture influencing especially management of wet semi-natural meadows (pastures for cattle, hay making). Seasonal berry and mushroom picking are traditional land-use activity for the peatlands.

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

a) within the Ramsar site:

Direct influence of existing drainage ditches, overgrowing of mires with trees (climate change, surrounding drainage, atmospheric pollution), uncontrolled tourism, disturbance, trampling and trash disposal, lack of appropriate management and restoration of different habitats (meadows, mire edges, drained peatland forests), interrupted ecological integrity of mire (destruction of mire edge habitats) and wet forest landscape (drainage, fragmentations, plantations).

b) in the surrounding area:

Intensive forest drainage took place in the margins of the mire complex in 1960-70's. Nowadays the influence of deep forest ditches is evident in peatland forest stands. Intensive forest cutting in forests around protected area is recognized as important threat both to ecosystem integrity as well as possible implications for hydrological processes.

Migrating Geese and Cranes, as well as waders breeding in nutrient poor bog habitat and large herbivores mammals are dependent upon agricultural land outside the wetlands for feeding. Many agricultural lands outside the wetland complex have become overgrown with bushes as a consequence of the continuing agricultural recession. This has directly impacted the availability of food for staging migratory birds.

27. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate):

Ia ; Ib ; II ; III ; IV ; V ; VI

c) Does an officially approved management plan exist; and is it being implemented?:

The management plan (2002-2005) is implemented.

d) Describe any other current management practices:

In 1957 the Nigula Nature Reserve (2,730 ha including a bog area of 2,040 ha) was established. One of the reasons of establishing this nature reserve was to create possibilities for scientific research of forest and bog landscapes, which were less influenced by people. In the years 1970-1990 the surrounding areas of Nigula Bog were also recognised as important for nature conservation. New

protection rules were approved in 1995, the territory of the reserve was enlarged to 4,656 ha. Since 1997 Nigula Nature Reserve has been listed as a Wetland of International Importance under the Ramsar Convention. Since 1 May 2004, Nigula nature reserve has been designated as a Natura 2000 area: a pSCI and as part of larger SPA (Põhja-Liivima) forming 34 % of its size. During 2004-2005, the new protection rules for Nigula Nature Reserve have been compiled taking into account Natura 2000 requirements. The new protection rules for Nigula Nature Reserve were approved of by the Estonian Governmental Regulation No. 24 of 27 January 2006, published in *Rügi Teataja* I, 2006, 6, 36 (<https://www.riigiteataja.ee/ert/act.jsp?id=987763>). The area of nature reserve was enlarged to 6,398 ha which includes a mire complex of 2,342 ha. During the years 1996 – 2005 the staff of the nature reserve initiated different projects also for transboundary cooperation with Latvia.

BirdLife International identified the site as an Important Bird Area in 1989.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

Since 1996, work is being carried out with Estonian and Latvian authorities and NGOs to prepare a cross-border protection area of the entire mire complex including Nigula and the neighbouring bogs to the east (Kodaja and Rongu), large areas of which are Latvian territory, including the North-Vidzeme Biosphere Reserve. A joint transboundary Master Plan for conservation of the transboundary wetland complex and its surrounding is currently being developed in frame of transboundary project “*Integrated Wetland and Forest Management in the Transborder area of North Livonia*”, financed by PIN/Matra fund (The Netherlands). More information: <http://www.north-livonia.org>

29. Current scientific research and facilities:

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

There is a field station (Nigula Centre) with office, research facilities and accommodation for up to 10 visitors at distance of only some hundred of meters from the bog in Vana-Järve. . Scientific research has been carried out in three main directions (1) long-term monitoring of mire bird numbers (Nigula is the only long-term monitoring site for mire birds in Estonia; since 1968, breeding bird counts have been organised there every spring), (2) study of the productivity of mire plants such as *Oxycoccus palustris* and *Sphagnum* spp., (3) research on the dynamics of contact between forest and mire communities. Bird stations in Kabli and Häädemeste-Pulgoja are also part of the Nigula facilities. The small Ruunasoo bog (160 ha) is valuable as a well studied and relatively simple model system for the investigation of mire massif development in relation with paleohydrology and paleoecology. The reserve is used for the practical training of university students.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

The wetland has very good possibilities for environmental education and excursions. The Nigula Centre offers facilities for this. There is a nature trail established in 1973-1974 including 2 observation towers. However, the excursions to the Nature Reserve are restricted, especially during the bird breeding season. A continuous nature education programme for local children BogLife is conducted in the area. Several information booklets about Nigula Nature Reserve have been published. Also a demonstration site for mire edge restoration was established in 2005. The website is available.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Traditionally visitors (3000-5000 visitors per year) use mostly the nature trail (6.8 km long with 2 towers) in Nigula Nature Reserve. A demonstration area for grazing with an endangered cattle breed (Estonian Native Cattle) has been established in Kaubaru estate in 2005 and a tower for crane

watching in Pikksaare meadow in 2004. The nature reserve is well known by wildlife tourists and nature photographers. Recommendations for future tourism development have been worked out for wider region called North-Livonia. The valuable wet forest massive (Nigula forest) will be not opened for tourism.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc.
Territorial: Pärnu County, Häädemeeste & Saarde Parish.

Functional.: Pärnu-Viljandi Region of the State Nature Conservation Centre/Ministry of Environment, Pärnu Environmental Department /Ministry of Environment, State Forest Management Centre

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Pärnu-Viljandi Region of the State Nature Conservation Centre (SNCC)
Director of Pärnu-Viljandi Region of SNCC: Mr. Enn Vilbaste

State Nature Conservation Centre
Pärnu-Viljandi Region
Pärnu tn. 62, Kilingi-Nõmme 86305,
agu.leivits@nigula.ee

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

Aber J.S., Aaviksoo, K., Karofeld, E. & Aber S.W. 2002. Patterns in Estonian bogs as depicted in color kite aerial photographs. *Suo* 53 (1), pp. 1-15

Eesti Punane Raamat. 1998. Eesti Teaduste Akadeemia Looduskaitse Komisjon, Tartu, 150 pp.

Ilomets, M. 1982. The productivity of Sphagnum communities and the rate of peat accumulation in Estonian bogs. - In: Estonian contributions to the IBP No. 9, pp. 102-116, Tallinn.

Irdt, A. , Vilbaste, A. 1974. Bird Fauna of the Nigula peat bog. - In: Estonian wetlands and their

life. Estonian contributions to the IBP No. 7, pp. 214-219, Tallinn.

Kalamees, A. (ed.) 2000. Important Bird Areas in Estonia. – Eesti Loodusfoto, Tartu, 114 pp.

Karofeld, E. Formation and development of microtopography on Estonian raised bogs. Tallinn Pedagogical University, Dissertations on Natural Sciences 2. 1999, 56 pp. + App.

Kink, H. 1996. Eesti kaitsealad – geoloogia ja vesi. TA Kirjastus, Tallinn.

Leivits, A. 1990. Long-term dynamics of the breeding bird community in the Nigula mire: a 20-

year study in south-western Estonia. -In: Bird censuses and atlas studies. Proc. 11th International

Conference on Bird Censuses and Atlas Work, pp. 249-431, Prague.

Leivits, A., Klein, A., Kuus, A., Sakala, A., Vilbaste, E., Aunins, A., Avotins, A., Kazubernis, J. 1998. Nesting birds in bog areas of Estonian-Latvian border region, their dynamics and nature conservation value. – In: T. Kukk (ed.) XXI Eesti Looduseuurijate Päev. Edela-Eesti loodus. Teaduste Akadeemia Kirjastus, Tartu-Tallinn. p. 97-106.

Lode, E., Heisnoo, K., Endjärv, E., Mincāne (Grinberga), A., Lúce,I., Chinis, U. and Vilumaa, K. 2005. Integrated Wetland and Forest Management in the Transborder area of North Livonia. Water management and hydrology . Final report. – Institute of Ecology, TLU, Tallinn. 141 pp.

http://www.north-livonia.org/report/report_hydro_final.pdf

Please return to: **Ramsar Convention Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**

Telephone: +41 22 999 0170 • Fax: +41 22 999 0169 • e-mail: ramsar@ramsar.org