Rivers with Limited Conservation Areas in Virumaa 1

The River Avijõgi, the River Tagajõgi,
the River Pada and the River Pühajõgi

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KESKKONNAAMET

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1. Introduction

This book offers a journey of the mind to the banks of four rivers in Virumaa, Estonia. The selection of rivers – Avijõgi, Tagajõgi with its tributary Pungerja, Pada and Pühajõgi – is preconditioned by the project *Development and implementation of management plans for riverine habitats in Natura 2000 areas of Ida-Virumaa, EE0044*, supported by the Norwegian financial mechanism 2004–2009. This project is primarily focused on the limited conservation areas of these rivers.

Rivers have been of great relevance in our history as movement routes, and the riverbanks as the first settlement sites, providing food and drinking water for the people on the shore. Fish have been caught since the beginning of time, and other activities have followed such as rafting and milling. Indeed, all the four observed rivers can still provide additional food and subsistence, although there are only memories left about the quondam rafting of logs on the Avijõgi and Tagajõgi, the stories about the adventurous work of these men are still exciting.

To a smaller or greater extent, fishing and forestry are still a source of subsistence today, but the water mills (apart from very few exceptions) are either in ruins or changed beyond recognition. The mills marked on the maps in this book are the ones mentioned in oral tradition and depicted on the topographical maps of Estonia and Russia.

For centuries, people have lived in the same rhythm as the river – the river was part of the local landscape and everyday life. Later, when anthropogenic load and water pollution had increased, tending to destroy the biota of the rivers in some places, conservation areas were created to pay more attention to the activities affecting the river and the biota therein.

A regulation adopted in 1928 stipulated that four weeks before Midsummer and four weeks after, all the dams on the rivers had to be lifted so that the water could move freely – this emptied the flood meadows of surplus water and guaranteed the migration of fish to spawning sites and the life of young fries.

Fish fauna is affected by accidents, as is the entire biota in the rivers. The Pühajõgi has been at the verge of severe pollution at least three times in the last four years, fortunately, the lethal substances did not reach the river, but this might not always be the case. Even small amounts of hazardous substances have a devastating environmental impact, and the more so as the untreated wastewater discharged in the river today contains other and more hazardous compounds than decades ago.

We attempt to have a wider perspective of the rivers in this book – watercourses connect all the people living in the catchment area: unthoughtful acts of one person could alter the life of very many. Having realised this connectedness, village movements have become more viable in seeing rivers as partners. Children from a number

of schools have increased their awareness by making environmental films about the rivers of Avijõgi, Pühajõgi and Tagajõgi.

Everything at our doorstep seems so natural and trivial and is taken for granted, losing its novelty in daily contact. People from the hilly and forested areas of South Estonia would perceive Virumaa as something new and striking. It is often believed that Virumaa (and particularly the eastern part, Ida-Virumaa) is only industrial landscapes and towns, with nothing picturesque. But there is, and how much! And it depends on every one of us as to what kind of living environment we leave to our future generations.

Dear reader/s, we would like to wish you good luck in (re)discovering your rivers!

We would like to express our gratitude, for their assistance and help, to Avinurme Local Lore Museum and Küllike Pärn, Iisaku Museum, Anne Nurgamaa, Aili Reiman, Eevi Ostrak, Urmas Talivee, Bruno Uustal, Helle Vaher, Olav Vallimäe, Heikki Luhamaa and the Estonian Fund for Nature.

Eva-Liis Tuvi and Anne-Ly Feršel

2. Rivers as arteries of landscapes

In 1937, Karl Johannes Terras, the then State Secretary (born in Vaivara, Ida-Virumaa), expressed his opinion, "Landowners can appreciate natural resources not only with regard to economic benefits but also as to how valuable are these resources in terms of science, beauty and the specificity of Estonian nature". Apart from such farmer's wisdom, the State Secretary also highlighted the need for nature protection authorities to provide explanations and develop cooperation in order to implement the noble ideas of nature conservation.

Organisers of nature protection are guided by the Nature Conservation Act that stipulates what is protected and how it is protected. Protection means conservation – the aim is to sustain the natural environment and to wisely use natural resources. Therefore, instead of the term *nature protection* we may use *nature conservation.* At times, requirements for conservation may be unpleasant, yet justified, since they are forward-looking.

Protected natural objects

In Estonia, pursuant to law, protected natural objects are divided into six groups:

- protected areas (national parks, nature reserves, protected landscapes),
- limited conservation areas,
- species protection sites,
- protected species and rocks,
- protected natural monuments and
- natural objects protected on local government level.

Objects under protection in Virumaa belong to the first group.

A limited conservation area (or special conservation area) is a relatively new notion in our nature protection. Limited conservation areas were first established in Estonia as of 2004 when we joined Natura 2000, the *pan-European network of nature* conservation sites. The network is based upon two directives of the European Union – the Birds Directive and the Habitats Directive. The annexes to the directives provide for the species and habitats which need special protection all over Europe. These species and habitats are under heightened attention due to their being rare or even threatened by extinction. Out of the 198 habitat types included in the Habitats Directive nearly one third (60) exist in Estonia. Most of them – from coastal habitats to raised bogs – are also present in Virumaa.

The pieces of the Oonurme boulder stand in the midst of a cornfield. *Photo: Anne-Ly Feršel.*

It is for the species and habitats of European interest that the limited conservation areas are established, aiming at preserving their environment. The focus is on particularly rare species and communities, or species as well as communities which are threatened by extinction. In the language of laws, the term *special conservation area* has a clear legal meaning: this is an area which is subjected to nature protection restrictions and where efforts are made to preserve such a status of biota and habitats, which guarantees the survival of both the environment and species. The restrictions serve the interests of nature and thus of people. This book provides information about four limited conservation areas associated with the rivers in Virumaa.

Laws protecting the bodies of water

Human activities, on bodies of water and on the banks thereof, are regulated by the Nature Conservation Act and the Water Act. The Nature Conservation Act sets out restrictions on activities on the shores and banks of water bodies in order to preserve natural biotic communities living on the shores and banks, to promote human settlement systems which consider the specific character of the shores and banks, to curb the potential harmful impact of human activity and to ensure unrestricted movement within and unrestricted access to the body of water.

Why is this needed? Unfortunately, at times, restrictions set by nature tend to be forgotten: for example, one may want to build a summer cottage so that he could jump into the water straight from the sauna. The location as such would not be bad at all, however, no consideration has been given to sewage disposal: pollution from the sauna goes directly into the body of water. Furthermore, during a water-rich season, the flooded river may move the house to another location or even destroy it.

Moving from the waterline towards land, on the banks, there are three distinguished zones: water protection zone, building exclusion zone and limited management zone. The range of a zone depends on the size of the body of water or its catchment area and each zone has a certain purpose. The Water Act defines a 4-metre (during flood a 2-metre) strip of a river bank as a shore path where everybody can walk. Public use means that a body of water is designated for everybody: for swimming, fishing, moving along the water, etc. Nevertheless, in certain cases, e.g. around water-power stations and in the vicinity of intake works, access for people is forbidden.

The purpose of a **water protection zone** is to protect water against pollution and the banks and shores of a water body against erosion. The water protection zone of the rivers covered in this book encompasses 10 metres of the (usual) boundary of a water body set out in the cadastral map. Restrictions regarding the water protection zone are set out in the Water Act: it is prohibited within the range of this zone to mine and build storage facilities for manure and manure stack; cutting may be carried out and plant protection products may only be used under authorisation from the Environmental Board. This authorisation or permission may not necessarily be needed for land improvement operations – for managing artificial recipients outside protected areas.

Construction of new buildings and other civil engineering works are prohibited **within the building exclusion zones** – 50 metres from the waterline. In this case certain derogations are provided for in the Nature Conservation Act, however, for each particular request to carry out construction works, these derogations must be specified by rural municipality governments or consulted upon with specialists of the Environmental Board. Where a forest grows on the banks of a river, the building exclusion zone stretches up to the end of the limited management zone.

Limited management zones cover water protection and building exclusion zones and reach as far as 100 m from the waterline. Land treatment by sewage sludge, establishment of burial sites, and construction of facilities prescribed for waste processing or storage, extraction of mineral resources and driving motor vehicles, outside the roads and paths prescribed for such purposes, are prohibited in limited management zones. Within the limited management zone of shores and banks, the area of a clearcut must not exceed two hectares.

People go to river banks mainly while fishing or during an intermediate stop while boating. Fishing principles are consolidated in the **Fishing Rules.** Requirements provided for in this legislation can be read from pocket instruction manuals meant for hobby fishermen, without the need to comprehend legal nuances. The most important elements one should know from the Fishing Rules are the following: which fish may be caught and when they may be caught, where and when is fishing prohibited, and what is the minimum size of the fish being caught. Additionally, the booklet provides information as to where and how to obtain the right to fish for recreation and how to purchase a fishing card. Fishing with simple hand lines is free of charge. A simple hand line consists of a rod, a fishing line of 1.5 of the length of the rod, and a single hook; the line may also be fitted with a weight and float, and natural bait is used for fishing.

Everyman's right grants us the permission to move freely in nature, on any landowner's lands in a way which does not cause damage or disorder. Everyman's right enables everybody to experience and enjoy nature; however, it imposes an obligation to preserve nature, and a responsibility to know and respect the law. Naturally – no one would like it when their property is damaged or when the forest is set on fire. The most frequent violations of everyman's right involve driving motor vehicles and making bonfires in places not prescribed for such purposes, as well as leaving rubbish in nature. Prepared bonfire sites are marked and equipped with relevant signs.

Rivers in the ecological network

The importance and indispensability of watercourses in landscapes have been well formulated by Heikki Luhamaa in a brochure, compiled by the Estonian Fund for Nature in the framework of the project "Restoration of the ecological conditions of the Männiku brook". Thus, the following description of the relevant causes and connections originates mainly from the above-mentioned publication.

There are more than 700 rivers and brooks in Estonia. Watercourses form an integral part of our landscapes: they shape the landscapes and, in turn, the landscapes mould the watercourses. This may lead to the formation of deep valleys (as on the River Pada and the River Pühajõgi) or floodplains with a meandering river (the River

Tagajõgi). Flow paths regulate the amount of water in the landscape: they either bring in additional water (floods) or carry it away (during droughty and arid years), thus modelling the hydrological regime of the ground. Watercourses connect landscapes and habitats acting as corridors of distribution for plants and animals (e.g. spawning migrations of migratory fish from the sea to rivers).

Communities in the riparian zone are a part of the river's ecosystem as well as a transition area between aquatic and terrestrial habitats. Natural scientists refer to these points of contact of different communities as **ecotones**. As a rule, riparian ecotones are rich in biota, comprising species from aquatic and terrestrial communities.

Variability supports biodiversity. Tree-trunks and thick branches having fallen into the water form additional habitats, offering shelter and protection and increasing the diversity of streambeds. Stones lying on the bottom of the streambed also enrich a habitat (however, there are few stones in streambeds arranged by people), facilitating the water current to sediment the benthic material, erode banks and shape the relief. Cavities in-between the roots constitute a suitable habitat for certain species, the most well-known of which is crayfish. The roots of trees reinforce and diversify the shores and banks. The sedimentation of flood-carried nutrients on the floodplain increases soil fertility, creating favourable conditions for bio-diverse communities (flood meadows). Likewise, changes in the hydrological regime, light and soil conditions also increase biodiversity.

The appearance of a river gives a hint of the species who could live in there. The more diverse and varied is the streambed, the larger is the number of species living in the river.

Apart from possible pollution, it is indeed the remains of plants, i.e. the organic matter, fallen into

Arrowhead (*Sagittaria sagittifolia)* is a common and easily recognisable aquatic plant: no other plant has such triangular stalks.
Photo: Anne-Ly Feršel.

Female chironomids release their eggs in the water and the larvae grow in the bottom of the body of water, feeding on benthic micro-organisms. *Photo: Henn Timm.*

the water from the bank, which forms an important basic segment of the food chain in fresh water rivers, serving as a feed for bacteria, protozoans and aquatic insects who, in turn, are the feed for larger organisms and predators living in the water, whereas the end of the food chain in the river would comprise salmon, otters or black storks.

Shady riparian forest stands protect the water environment from direct sunlight, contributing to keeping the water temperature low. During warm summer months, the coolness of the water is vital for many running water species. For example, salmon die when the water temperature remains over 24 degrees for more than a week. Diverse habitats of rivers are also suitable for the species that need oxygen-rich water, but not the shady water surface.

The status of the water body actually reflects the status of the surrounding landscape as the body of water would sensitively react to the changes in the riparian environment. Most of the water of our watercourses originates from the precipitation infiltrated through the soil. Thus, the penetrable soil affects the properties of the particular water body. In lime-rich areas, the water is hard and alkaline, while in lime deficient areas the lakes and rivers are with soft water, liable to acidification.

Anthropogenic impact. The use of land has an impact on the properties of water in the drainage basin. Rivers in Ida-Virumaa are significantly affected by discharged mine waters.

Clear-cutting in riparian forest stands and the cultivation of permanent grasslands increase the amount of nutrients in the water, causing eutrophication – an increase in the nutrition level of the body of water – which results in the vegetal invasion of water bodies. Still, a small amount of additional nutrients would not bring about major changes. However, if toxic compounds (e.g. fertilisers, pesticides or industrial effluents) get into the river in addition to substantial nutrient quantities, the ecosystem is not able to survive such an extreme change and a part of the biota will die. Indeed, it happened during the Soviet times that some rivers were more or less lifeless.

Plants growing on the river banks serve as an important filter, catching nutrients that are carried by surface water from the catchment basin towards the river. Where forest stands disappear on river banks, clear-water rivers may become tiny brooks with turbid water as a result of nutrients and soil particles – proliferating vegetation would

impede the flow. The biota of the forest stands on river banks is mostly very diverse: rare species of birds, moss and lichens can be found here. In addition to terrestrial species, several insects, which propagate in the water, need forested banks as their resting and feeding places.

A lot of aquatic animals are **indicators of the state of their environment**. For example, mayflies may be regarded as the biological measurers of water acidity since their different species tolerate different levels of the acidity of water. Ephemera danica and the beetles of the Elmidae family show that the water is alkaline and rich in oxygen.

The gammarus (*Amphipoda*), the crustaceans that spend all their life in the water, are sensitive to both acidity and pollution. They are essential as the feeding objects for fish, which is why we may presume, when finding them, that the water is clean and could be rich in fish.

Mussels and insect larvae, having dug themselves in, live in the sandy-gravelly, well permeable bottom of watercourses in a natural state. They are the central link of the food chain: feeding on plant particles fallen into the water, and serving as food for bigger animals. Without small insects and lobsters, there would be no fish in our rivers, or birds and mammals on the riverbanks.

Life in the constantly flowing water offers possibilities, while on the other hand, puts you to the test. The solutions may be very different. Various methods for catching food have developed in species with little ability to move.

Aquatic animals can be grouped according to their feeding methods. Fungi and bacteria are the first to soften the tree leaves that have fallen into the water, without directly decomposing them. Then scrapers start to act – for example the larvae of mayflies who feed on microscopic pieces peeled from the leaves. Grinders, such as stoneflies and the gammarus champ on bigger pieces for food. Plant

The largest of mayflies living in the River Avijõgi is the green drake (*Ephemera danica).* The photo shows the larvae, but the mature insects of the green drake fly above the water and the fish snap them from the air. Photo: Henn Timm.

particles and microscopic animals carried downstream during this process are screened out of the water by filterers – the larvae of caddisflies who use delicately designed trap webs for catching small prey animals carried by the current, while the larvae of blackfly catch food morsels from the water current by means of hair fan organs attached to their heads. The finest material is screened from the water by mussels. On the bottom, collectors, such as fries, look for morsels "fallen off from others' food table". Predators, which catch the above-mentioned creatures that feed on decay and herbivorous creatures, are found among both insects and fish.

Nature has invented different ways for staying put in the water, for the creatures living in watercourses. The bodies of the larvae of flat headed mayflies have no raised parts and they avoid the water current by pushing themselves against the bottom. The bodies of the larvae of the Baetidae have evolved into a very fine shape in order to reduce current resistance. The larvae of the blackfly attach to stones by little hooks placed as a garland at the top of the rear part of their body. In addition, they have a distinctive "safety-belt" – a small thread which can be pulled out of their abdomens and keeps them from being carried away by water flow in the situation where the main attachment would break.

Nevertheless, a lot of water dwellers are being carried downstream by the current. However, evolution has taught them that in the majority of cases, the most suitable place for living is the site where they have grown up. This is why a lot of species try to settle their offspring at their own place of birth. For most of them it means they need to migrate back upstream which is a serious problem for species with poor swimming abilities. Mayflies, once they are sexually mature, overcome the situation by getting out of the water and simply flying upstream to breed.

Habitats of precious fish and the river lamprey. Rivers rich in oxygen, and in a natural state, are essential for species such as the salmon, trout and the river lamprey. The sea trout and the salmon, as well as the river lamprey, become sexually mature in the sea, however, they return to spawn in the water body they were born in. In order to successfully breed, fish need cool water with rapid flow and rich in oxygen, animal food, and with a well aerated bottom of rough material for spawning. The larvae of the lamprey, the ammocoete feed on decay and algae. In autumn, roe is spawned in the benthic soil of the water body, and in spring fries are hatched. After a couple of years spent in the river, fish move to the sea from where they return to spawn, after many years when they are sexually mature. The larvae of the lamprey live in the river for up to five years. However, if in the bottom soil there is a lot of fine sediment that smothers the roe, the water includes little oxygen or warms up excessively in summer, breeding will fail. In addition, young fish need a lot of hiding-places where to be safe from birds and predatory fish.

If the obstacles slowing down the current cannot resist the power of water moving

towards the sea or a lake, the sediments would go on the move. Obstructions and obstacles are also created by people and by beavers. Man-made dams have to be demolished on salmon rivers, but the beaver would still continue with their activities – as skilful builders, they construct safe lodges with underwater entries. In order for the water level to remain stable, the beaver dams up water bodies, this would slow down the current and significantly change the living conditions of other species. Trees felled into the water increase the amount of dead wood in the streambed as the trees within the beaver-dammed areas would die and become habitats for insects, which, in turn, are suitable for the woodpecker to feed on.

Water bodies dredged and straightened by man are great places for the beaver to build dams and raise the water level: this is how the beaver has become enemy number one for land improvement. The beaver need not or cannot considerably dam up water bodies that flow in a natural streambed, which is why the beaver mostly has little impact on them.

Beavers in the upper courses of the River Pada have felled large aspens in the water, stopping the other trees carried by the stream. *Photo: Eva-Liis Tuvi.*

Other species associated with watercourses. Most plants cannot tolerate extreme changes in the water level, however, there are mosses such as sickle dichelyma moss and dichelyma moss, which have adapted to seasonal variations of water level in nature. Still, the mosses cannot survive in water bodies affected by man, where the water level ranges more dramatically or totally irregularly.

In the evening dusk, bats begin to catch their food above brooks as there are abundant insects flying above the water. They find a suitable resting place in the hollows of old broadleaved trees growing on the banks.

The water shrew, very similar to and a close relative of the common shrew, catches its food in the water. Water shrews are good swimmers and can stay under the water for up to 20 seconds. Similarly to beavers, water shrews live in dens which they access through a burrow under the water. Water shrews live in small groups, feeding on every animal they can overpower: water insects, crustaceans, tadpoles and fries.

Watercourses serve as important feeding areas for birds. In summer, a great number of species are active here. The dipper, well adapted to life on fast flowing clean water rivers, arrives from the north to feed on our rivers and brooks during winter months. The dipper hunts on rapids where it dives under the water and while walking on the bottom, searches for insect larvae.

Small brooks, rich in biota, are important feeding places for the black stork, a bird fearful of people. When ditches dry out in summer, black storks are forced to look for food for their young ones tens of kilometres away from their nests. This is often too difficult for the stork couple, and their nesting fails. One of the main reasons for the number of black storks steadily decreasing is indeed the lack of appropriate food brooks.

Out of 54 species of dragonflies in Estonia, nine prefer watercourses as their habitats. Four of them need water bodies with sheltered banks, fast flow and clean gravelly bottoms. Usually, the larvae of the dragonfly spend two years in the water, however, the development of the larvae of the species in cool rivers and brooks may even last for five years. Such a prolonged stage of larvae makes the species sensitive with regard to the changes in the body of water.

The term, **ecological status,** recurrently used in the description of rivers, denotes the overall assessment of a water body pursuant to different biological indicators (e.g. zoobenthos, vegetation, fish fauna). This overall assessment is not the sum total of different indicators and the calculation of the average as in school mathematics. Even if a certain indicator (e.g. the status of fish fauna) is poor, this may not have a decisive impact on the overall ecological status of the river, so that despite other good indicators, the ecological status would be categorised in a lower class. At the same time, certain conditions need to be fulfilled in order for the overall assessment of the ecological status of a water body to be good: the chemical status of the water must

be good, the body of water needs to function as an ecological system and, bearing in mind the diversity of fish fauna, the free movement of fish has to be guaranteed. The status of surface water (the water flowing in rivers) depends on the chemical and ecological status of the water body. The chemical status, in turn, depends on a number of various indicators.

People should take a responsible attitude with regard to their own action and other people's activities, as even a small change may develop into long-term degradation in the complex system of the river as an ecological system. It is appropriate to end the chapter with the words by Karl Johannes Terras, "May each Estonian love their homeland. May there be love for the nature of their homeland in each Estonian's heart – it is worth it."

Restored flood plain in the Kellassaare village. Reed tufts in the distance remind us of the flood meadow before maintenance. *Photo: Ants Animägi.*

The River Avijõgi

The River Avijõgi starts near the Muuga Manor in Lääne-Virumaa and flows into Lake Peipsi in Ida-Virumaa. The river is known under different names in the various places on its way: as Paasvere, Venevere, Avinurme and Lohusuu rivers.

The water precipitating on the watershed areas within the Northern Estonian lime plateau, infiltrates through the thin overburden, limestone pores and fissures, into the subsoil. By dissolving soft mantle rocks, the running water creates underground flowpaths – karst channels where moving water appears again as the springs that feed rivers. The Pandivere Upland is the most karsted area in Estonia. On Estonian lime plateaus there are hundreds of big karst springs, the most water-abundant ones (with the flow rate of 100 l/s and more) located on the foothill of the Pandivere Upland. The drinking water of nearly a half of the population of Estonia originates from Pandivere. In earlier times, the clean water-abundant springs of that region served as an essential precondition for the selection of the locations of distilleries.

A lot of rivers and brooks, including the River Avijõgi, start from the belt of springs around the slope of Pandivere.

The springs feed into the ponds in the manor park half a kilometre away towards the east-south-east direction from the main building of the Muuga estate, between the ruins of the distillery and an old communal granary. Here the River Avijõgi starts its journey as a small brook, collecting water from the springs behind the communal granary of the manor. The flow rate of individual springs ranges from 1 to 2 l/s and in total amounts to 47 l/s (20 l/s during arid times). The river collects additional water from the springs near the village of Muuga. To the east, in

The springs emanating from the clear-water pond behind the Muuga Manor are the source of the River Avijõgi.
Photo: Anne-Ly Feršel.

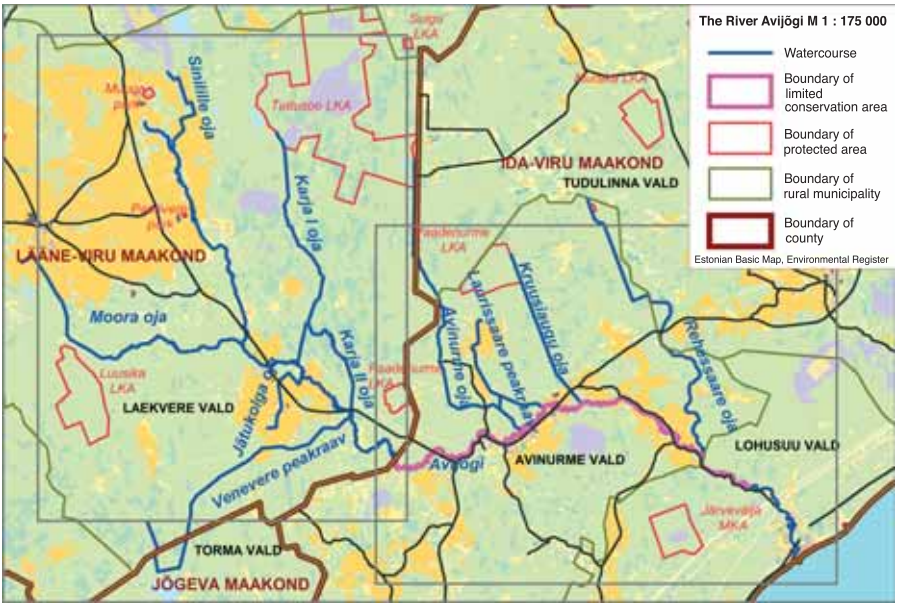
the ditches of land improvement sites, there are a lot of ascension and depression springs the flow rate of which is limited to a litre or two per second.

Before descending to the Alutaguse Lowland, the river collects a lot of additional water from the Paasvere springs which reach the surface on a valley slope near a village of the same name, on the right bank of the River Avijõgi. The total flow rate of the depression springs there is 10 l/s in summer.

THE RIVER AVIJÕGI:

- Belongs to the Peipsi sub-river basin of Eastern Estonian river basin district;
- Length: 55.7 km;
- Catchment area: 391 km^2;
- The following water bodies flow into the River Avijõgi (starting from the source): Sinilille brook (4.2 km), Moora brook (13 km), Karja I brook (10 km), Jätukolga brook (3.7 km), Karja II brook (5.2 km), Venevere main ditch (14 km), Avinurme brook (14 km), Laurissaare main ditch (5.9 km), Kruusiaugu brook (6.4 km) and Rehessaare brook (14 km);
- Absolute height of water level at the river source 94.5 m, and 30.1 m in the mouth;
- The fall is 64.4 m;
- Average gradient 1.34 m/km;
- Average depth 1–1.5 m;
- Flow speed in the upper course 0.3 m/s, and in the lower course 0.2 m/s;
- Average flow rate in the lower course 2.5–3.0 m^3/s, whereas the relevant maximum is up to 60 m^3/s;
- There are six isles of 0.4–0.5 m of altitude.

Sources: Environmental register; Järvekülg, 2001; Esimese seireringi …, 2009 (different reference sources provide different figures; here we are presenting the most recent ones).



The River Avijõgi with its tributaries.

From the edge of the Pandivere Upland through the woods of Alutaguse to Lake Peipsi

In it s upper course, the River Avijõgi flows on the eastern edge of the Pandivere Upland, and along the Alutaguse Lowland in the middle and lower courses. The gradient is relatively even within the entire length of the river, and higher than the average only within the section from Venevere to Kaasiksaare and from Avinurme to Vadi (Esimese seireringi..., 2009).

The Avijõgi river basin has a shape of a fan; veins of water – collecting ditches and main ditches for draining marshy soils – carry water into the main river and make the catchment quite large: nearly 400 square kilometres. From the right, Moora brook, Venevere main ditch and a lot of smaller veins of water bring their water into the River Avijõgi. The biggest ones among those added from the left are Karja I brook, Karja II brook, Avinurme brook, Laurissaare main ditch and Rehessaare brook.

For most of its journey, the River Avijõgi flows through a vast forest expanse. Various mixed forests cover approximately half of the catchment area. Arable lands surround the river mostly in the upper courses – on the slope of the Pandivere Upland

and, to some degree, in the area surrounding Avinurme (in total approximately 30 % of the catchment). The brushwoods, flood meadows and mires bordering the River Avijõgi and the veins of water that discharge into Avijõgi cover nearly 20 % of the catchment basin.

In most parts of the upper courses, the riverbed has been dredged and straightened while in the central and lower courses the river is mostly natural and curvy, meandering in places. The river banks are mainly "hemmed" with willows and alders. According to August Loopmann (1979), the width of the riverbed was in average 8 metres in the central course and 15 metres in the lower course. The river is shallow, its average depth being only 1–1.5 metres, the bottom of the river is mostly sandy-gravelly (Järvekülg, 2001).

The average width of the flood plain, within the entire length of the river, is 200 m. In narrower places, especially in the lower course of the river, the width of the flood plain ranges from 60 to 100 m; in the vicinity of Avinurme, in a segment of the river with slanting valley slopes it even exceeds 300 m (Järvet, 2007).

In the central and lower courses six small isles add colour to the river. These isles, formed of sand and gravel sediments, rise up to half a metre above the water surface and are covered in alder brush. The isles are mostly of 50–200 m in length and of 20–60 m in width; a rafting canal has been dug through a 800-metre long isle near the Iba farmstead in the village of Kaasikasaare (Järvet, 2007).

Ecological status of the river

In the upper and central courses, the water of the River Avijõgi is pure, clear, light in colour, while being yellowish and slightly turbid in the lower courses. In the midsummer of 1994, the temperature of the water in the spring-rich upper courses was 11–12 °C, in the central course the temperature was 14–21 °C, and in the lower course more than 21 °C.

The river has been polluted in the upper courses by the Muuga settlement and farms, in the central course by the village of Pärniku, the small town of Avinurme and timber industry, and in the lower course by the Maetsma farms and the small town of Lohusuu.

Rainy autumn has raised the River Avijõgi from its banks. A view to the river from the post office. *Photo: Anne-Ly Feršel.*

Decaying animal barn from the times of the Avinurme kolkhoz is a reminiscence of bygone times. *Photo: Anne-Ly Feršel.*

BIOTA

- Plants: 39 vascular plant species; 8 moss species; algae intrinsic of pure-water watercourses;
- Invertebrates: 26 taxa in the upper course, 56 taxa in the lower course, incl. the larvae of the odonates which live only in pure watercourses;
- Fish and jawless fish: 19 species found in all times; 11 species found during monitored fishing in 2009;
- Crayfish: in 2008, the crayfish was found again in the river that had meanwhile lost its quondam richness in crayfish.

Biota rich in rare species

On its course, the River Avijõgi permeates extremely varied landscape and its ecological status is rather good than bad. This creates good conditions for the diverse biota of the river and its riparian areas. Among others even rare species can be found here.

Vegetation In the upper course, there is little vegetation and its composition is poor in species while in the central and lower courses vegetation abundant and rich in species. In the summer of 1994, a total of 39 vascular plant species were found in the river. Bent grass grows everywhere, and in many places, threadleaf crowfoot and water speedwell. The common mare's-tail, true forget-me-nots and reed canary-grass are also quite common.

The threadleaf crowfoot (*Ranunculus trichophyllus*) is a relative of the buttercup and it grows dispersedly in fluvial water and standing water. The plant may be annual (especially in the water bodies which dry out in summer) as well as multiannual. Growing up to 30–80 cm in length, threadleaf crowfoot does not have floating leaves; its underwater leaves are fine-divided and remind of garden dill. In the river, threadleaf crowfeet grow in larger bunches, their white buttercup-like blooms can be enjoyed from May to August. This plant hibernates in the form of seeds or as young plants. The species is also known as thread-leaf water-crowfoot.

The River Avijõgi is especially rich in mosses: altogether eight species have been found, the most common of which is the common water moss that spreads on stones.

Likewise, the yellow-green algae (*Vaucheria* spp.) and the green algae (*Cladophora glomerata)* also grow on stones. While examining samples, taken along from the field-works, under the microscope, it became evident that they contained a small amount of interesting green algae, *Ulothrix zonata,* that grows only in pure cool-water watercourses and species from the genera *Enteromorpha* and *Tetraspora* (Järvekülg, 2001).

Common freshwater shrimp (*Gammarus pulex*), the favourite food for a number of fish. *Photo: Henn Timm*.

Ulothrix zonata is a filament-shaped green algae that lives in cool-water watercourses. Being attached to stones, the set of algae reminds of a stack of hair floating in the water. A filament of algae is extremely fine – its diameter being less than 0.05 mm. *Ulothrix zonata* is a very important part of the aquatic ecosystem – the first segment of food chains as well as a producer of oxygen and a participant in natural self-purification. The presence of the *Ulothrix zonata* in the river allows for assessing the eutrophication of the water: when the water contains a lot of nutrients, *Ulothrix zonata* does not grow there.

In 1994, the fragile stonewort, with delicate rhizoids rarely found in Estonian rivers, grew in the central course of the River Avijõgi, however, after this, the stonewort has not been found in the River Avijõgi. Stonewort grows in freshwater bodies with calm, clear water, ranging from oligotrophic water bodies to those of average nutrient content. Stonewort would disappear as the quantity of nutrients increases. In addition to the fact that stonewort is externally similar to horsetail, relevant studies have also shown their biochemical and molecular closeness. Thus, the predecceors of terrestrial plants and those of the stonewort were related.

Invertebrates The research data of the zoobenthos of the River Avijõgi date back to 1994. Back then, the richness in species was relatively varied within different sections of the river. In the upper course, the total of 26 taxa were found, the most numerous of which was the common freshwater shrimp (*Gammarus pulex*) – the favourite food of the river trout. Downstream, the abundance of different species in the zoobenthos progressively increased – the total of 56 taxa were found in the lower course of the river.

During the monitoring of 2009, zoobenthos was studied in the central course of the River Avijõgi, within the sections of Kaasiksaare and Vadi. The total of 45 taxa were found in these two segments: 27 in Kaasiksaare and 44 on the ford of Vadi (Esimese seire-

Volckmar's water beetle (*Limnius volckmari*) *prefers flora-rich bodies of water. Photo: Henn Timm.*

The limited conservation area of the River Avijõgi is also aimed at protecting the habitat of the green club-tailed dragonfly (*Ophiogomphus cecilia*), a rare species in Europe. *Photo: Henn Timm.*

ringi ..., 2009). The prevalent species in Kaasiksaare was a beetle called Volckmar's water-beetle (*Limnius volckmari*), and, in the Vadi segment, the small squaregill mayflies *Caenis* sp. The Volckmar's water-beetle is a terete beetle with a small head and a small body (5 mm) that lives in water bodies rich in vegetation, hiding itself between plants and rocks.

The small squaregill mayflies *(caenidae)* are one of the smallest (up to 8 mm) in the order of the mayflies. Three fine tail filaments are the characteristic features of this group of biota. The fact that the small squaregill mayflies do not have wings distinguishes them from other mayflies. The name of the mayflies reflects the insects' very short life as an imago: the imagos of certain species live only for a few hours. The largest of mayflies living in the River Avijõgi is the green drake (*Ephemera danica)* of up to 25 mm of length: together with its tail filaments it may be as long as 40 mm.

The River Avijõgi is the habitat of the green club-tailed dragonfly (*Ophiogomphus cecilia*). The larvae of this up to 64-mm-long dragonfly exclusively prefer pure flowing water with tenuous vegetation with either a gravelly bottom or a bottom covered with a thin layer of mud as their habitat. The green club-tailed dragonfly is rather rare both in Estonia and in the rest of Europe, listed in Annexes II and IV of the Habitats Directive of the European Union (protected areas must be established in the habitats of such species), and in Estonia it is included – as a rare species – in category III of protected species.

Out of the molluscs, the thick shelled river mussel (*Unio crassus*), a species of category II, lives in the River Avijõgi.

Fish. Cool and pure water serves as a precondition for some quite demanding species of fish living in the River Avijõgi.

According to previous literature, 10 species of fish are known to live in the River Avijõgi. These are the river trout, the grayling, the pike, the eel, the roach, the dace, the chub, the bream, the burbot, and the perch (Järvekülg, 2001). The total of 50,000 pike fries were transferred in the river in 1960 and 23,000 one-year-old rainbow trouts were released in the district of Venevere between 1968 and 1969. Later on, the minnow, the riffle minnow, the stone loach, the nine-spined stickleback, the bullhead, and from among the jawless fish – the brook lamprey were added. During test catches, the bream and the dace that once used to live in the River Avijõgi could not be caught.

Bullheads (*Cottus gobio*) are nocturnal fish living in fast-flowing rapids of clean-water rivers. *Photo: Arvo Tuvikene*.

Eleven fish species were registered during the test catches of 2009. The status of fish fauna was assessed as very good in the upper course of the River Avijõgi, and as good in the middle and lower courses (Esimese seireringi ..., 2009).

From among the species of protected category II, the asp (*Aspius aspius),* from among the species of category III, the European bullhead *(Cottus gobio),* the grayling (*Thymallus thymallus),* the spined loach (*Cobitis taenia)* and the mud loach (*Misgurnus fossilis)* live in the River Avijõgi. The bullhead and the grayling prefer pure-water, cool and oxygen-rich rivers (with rapids).

The bullhead, a settled benthic fish species of up to 13 cm in length, loves pure-water torrential river sections with a gravelly or stony bottom. It is nocturnal and feeds on zoobenthos. The bullhead is very demanding regarding its habitat, so that an unfavourable river segment may turn out to be an insurmountable obstacle for it to expand its habitat: the fish would simply fail to go and find new suitable habitats. The brownish, blotchy or striped skin of the bullhead is covered with small spikes instead of scales. Due to its characteristic appearance (a big head, its eyes high on the top of the head) the

Crayfish used to be abundant in our water bodies, but are now endangered because of poaching and diseases. *Photo: Anne-Ly Feršel*.

bullhead has been given different dialectal names in Estonian (*härjapää, kivitrull, härjapäts* and *rontipea)*. The sexually mature fish is distinctive and conspicuous in spring when orange blotches appear on the male bullhead's body. The bullhead grows very slowly and it becomes sexually mature when it is at least two years old and 5 cm long. The male bullhead keeps watch on and ventilates its roe with its fins for three to four weeks.

Crayfish. According to oral heritage, the River Avijõgi used to be extremely abundant in crayfish up until the beginning of the 1890s. However, during 1893–1895 the crayfish died of a plague type of a disease. By the mid-1920s, the crayfish fauna had partially recovered, however, a new wave of crayfish plague (1932–1935) decreased their population again. However, prior to the third outbreak of crayfish plague in 1948, the river had again been rich in crayfish. At that time, little boys would go crayfishing early in the morning in order to sell the catch to the passengers of the Sonda–Mustvee train arriving in the station at noon. In the course of the fieldwork in 1988 and 1995, crayfish was not found in the River Avijõgi, however, in the summer of 2008, students of Avinurme Secondary School filmed and took photographs of the crayfish in the river.

Birds and mammals associated with the river. The osprey and the lesser spotted eagle, species of protected category I, come to feed on the river. The flying squirrel, a species of category I, the capercaillie, a species of category II, and the red-breasted flycatcher, a species of category III, occur sporadically in the forests in the vicinity of the river. As hay is not cut in the riverside flood meadows any more, brushwood has become prevalent in these areas, being a suitable habitat for beavers that have reshaped the river bed between Paasvere and Venevere with their dams.

Human habitation on the banks of the River Avijõgi

The first finds evidencing human activity in the vicinity of Avijõgi date from the Younger Stone Age. Permanent settlement emerged in the area and in particular on the riverside, evidently during the 15th–16th centuries. The river linked villages and farmsteads as the nearly non-passable marshy surface and large forests left those living further away from roads with scarce opportunities for mobility.

MAN-MADE FACILITIES ON RIVER AVIJÕGI

- Larger bridges: on the Jõhvi–Tartu road and in Lohusuu settlement, in Vadi, Maetsma, in Paadenurme crossroad in Avinurme, in Kõveriku village, in Kaasiksaare, Venevere (2), Ilistvere, Paasvere and Alekvere; an old stone railroad bridge in Avinurme;
- Watermills: in Paasvere, Sivi, Venevere (2), Kaasiksaare (2), Avinurme (2), Maetsma, Vadi (2), Separa and Lohusuu (5).

Up until World War I, **watermills** were abundant on the River Avijõgi. Hydropower was used to saw logs, grind grain, and for carding and spinning wool. The majority of watermills were erected at the end of the 19th century and at the beginning of the 20th century. In the upper courses of the river, watermills were mainly built by Elise Eduard Keller, the owner of the Venevere Manor, and in the lower courses, by the more active Estonian peasants. Old people remember that during the high waters in spring, when the fish came to spawn in the river, the dams were opened and the water was let free for the fish to move in the river.

After World War II, electric energy was used more often and the power of watermills was needed less: the buildings became derelict, dams fell apart.

Streams and ditches were built and straightened by way of land improvement, bringing about a more rapid lowering of the high waters of Avijõgi, and, consequently, the abundance of fish came to an end. Today, the ruins of old watermills stand as silent witnesses of the bygone times. In some places, the walls are still there, or the sites of dams, and, in some instances, only folktales remind us of the quondam mill.

Plans were made in 1982 to build an artificial lake in Avinurme, together with a dam, to increase the water level, however, due to several reasons all this remained unrealised.

A historical recollection of what used to be a beneficial enterprise in the past – log-rafting. Rafters on the River Avijõgi in the 1930s. *Photo from the collection of the Avinurme Museum*.

Timber rafting was practised on Avijõgi up until the 1950s. Peasants dragged the logs to riverbends in winter, and during the spring-time high waters, immediately after the breaking of ice, the logs were rafted to the river mouth in Lohusuu. Usually, the ice on the river breaks up at the beginning of April: the high water level would thereafter constantly increase on Avijõgi for 5–10 days, and even for 10–15 days when the melting of snow tends to be slow. The lowering of the high water level would commonly last for approximately 20 days and the flood would end by the beginning of June.

SETTLEMENTS ON THE RIVERBANK

(downstream from the river source)
Lääne-Virumaa
Laekvere rural municipality:
- Muuga village (in the river source);
- Alekvere village (on both riverbanks);
- Paasvere village (on both riverbanks);
- Arukse village (on both riverbanks);
- Venevere village (on both riverbanks);
- Kaasiksaare village (on both riverbanks);

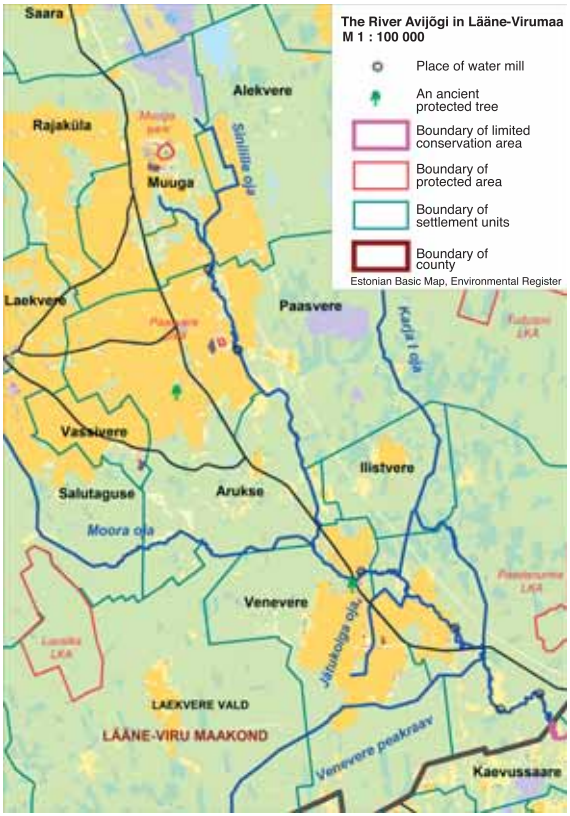
Ida-Virumaa
Avinurme rural municipality:
- Kaevussaare village (on both riverbanks);
- Kõveriku village (on both riverbanks);
- Avinurme small town (on both riverbanks);
- Maetsma village (on both riverbanks);
- Vadi village (on both riverbanks);

Lohusuu rural municipality:
- Separa village (on both riverbanks);
- Lohusuu small town (on both riverbanks).

Muuga village

The village of Muuga was first mentioned in 1526. During the Middle Ages, the monks established a cloister manor in the location, (hence the place-name derived from priest-monks – Muuga is a derivative of the Estonian word 'monk', the genitive of which is *munga*), governed by the St. Bridget Convent; the manor was transferred to the Swedish crown in 1581. During the Great Northern War, the troops of Karl XII were accommodated in the village in the winter of 1700.

One of the oldest schools in Simuna parish was opened here in 1786, and a kindergarten in 1934, under the guidance of the Muuga Housewives' Society. In 1939, there were 42 farmsteads in Muuga; and the number of local inhabitants in 2000 was 300.



The River Avijõgi, its tributaries, objects under nature conservation, old mill sites and riparian settlements in Lääne-Virumaa.

The construction of the Dutch-type tower mill in Muuga was ordered by the owner of the local manor, the famous portrait painter Carl Timoleon von Neff; the windmill operated up until 1935. The old limestone mill was rebuilt in 1969 into a mill-restaurant – being one first of the kind in the 1970s and 1980s, the place gained fame all over Estonia and Russia. Currently, there is a tavern operating in the building.

There is also a basic school and a sports building in Muuga, with premises for societies, handicraft-lovers, and a library, post office, youth centre and a sauna. The village people are active in the Society of Muuga Rural Women, an NGO, and in the hunting club "Linnuküti" (Lille, 2008).

Muuga is one of the few villages in the vicinity of Avijõgi where people are still involved in cattle-breeding: there are 780 bovine animals reared and 300 pigs annually sold in the village.

Muuga Manor. The new neo-renaissance manor house was also commissioned by Carl Timoleon von Neff during 1866–1872. The earlier wooden manor building has preserved until today, together with the bell-tower from 1872, the small gate-house from 1873 and other edifices.

The park surrounding the main building of the Muuga Manor is under nature protection.

In 1944, after the burning down of the former schoolhouse, the school in Muuga was moved to the manor building which, at the time, was in an extremely poor condition. The building was repaired, the ponds deepened in the park and young fish were released in the pond, under the initiative of the school principal.

The writer **Eduard Vilde** (1865–1933) is also associated with the Muuga Manor, as his father, Jüri Vilde, worked there as a granary-keeper. Vilde's well-known story, "My first rod-stripes" (*Minu esimesed triibulised*), is said to have been inspired by the event of rafting on the muddy and leech-rich manor pond in Muuga, and a fervent water-battle held together with his nephew, Eduard Bornhöhe, against the manor children.

At the times when water for the lords of the manor was fetched from the springs behind the communal granary in Muuga, the water was clean and clear, but now, after geological drilling, the springs are not as clean and are gradually overgrowing. *Photo: Anne-Ly Feršel*.

According to Kalju Kaldavee, who lives next to the old communal granary in Muuga, the ponds behind the manor had been dredged during the later period whereas before this, it was clearly visible how spring water bubbled upwards in the bottom of the pond. After the drilling works conducted by geologists in 1965, the springs lost their quondam power and now tend to dry up in a droughty summer. However, Kalju Kaldavee's grandmother – who served as a maid in the manor – had recollected that the drinking

water for the manor people was fetched from the spring behind the communal granary.

In earlier times, the starting point of River Avijõgi was thought to be the spring-rich area in the lands of Kõrtsivälja farmstead in the vicinity.

Alekvere village

Alekvere is a small village with households scattered within a wide area. The inhabitants – altogether 27 – are mainly retired people, some of them engaged in land cultivation, sheep-rearing and also growing trout for their own consumption in the spring-fed ponds. Farmlands are low-lying making it nearly impossible to cultivate them in a rainy year.

A stone burial, also called the Katevate mounds, is located in the lands of Alekvere village.

Paasvere village

The first written records of Paasvere village, with the size of 23 ploughlands at the time, originate from the Danish Census Book, stating that Paasvere was supposed to be the largest and oldest village in Simuna parish. Now, there are only some outbuildings left that evidence the quondam local knight manor, and the remnants of the foundation of the mansion. Likewise, there are only fallen walls witnessing the 16th–18th century assistant church that operated in the Paasvere chapel hill. The protected manor park is a village green for the local people.

In olden times, there used to be a flour producing watermill in the vicinity of the Paasvere bridge, in Möldre farmstead. Bricks were manufactured and a limekiln operated near the river. The River Avijõgi becomes sufficiently wider in Paasvere allowing to commence a canoe trip at the bridge in the high water period.

An archaeological monument, a **refuge** located in the Luussaare bog had been a shelter for the people of seven parishes during an ancient war, according to narrated history. The bog islands were used as a refuge particularly in 1703, when Russian troops looted, burnt and killed within nearly the entire parish. Still, the refugees had been supposedly captured, as human bones, decorations and other artefacts have been found on the island. In 1958, when ditches were excavated in the bog, a tree trunk path was discovered under the layer of moss in the vicinity of the old refuge (Lepasaar, 1996; see p. 89).

Karja stream I, the tributary of River Avijõgi starts in the Luussaare bog.

In the forest of Simuna parish, Paasvere rural municipality, Rahkla village, Järvelti farmstead, there is a rock with a large footprint, 28 cm long and 12 cm wide. It is said that this is the footprint of Kalevipoeg [Estonian national hero] *or that of the Devil, emerging as a result of the two chasing each other and running so fast that their soles were hot and melted an imprint in the boulder.*

ERA II 258, 56 (4) < Simuna, Paasvere rural municipality, Rahkla village – K. J. Õis < Anna Õis, born 1881. (1939).

Arukse village

A cardboard factory operated here from 1912 to 1925, with only a water tower preserved until today. The factory was established by Elise Eduard Keller, the owner of Venevere Manor. Raw sheet cardboard, with the measurements of 50 × 60 cm, was produced from pulp and thereafter transported to Türi to make paper. When the mill stopped working in Arukse, the machinery was moved to Türi (Ross, 2004).

Sivi village

In olden times, there used to be an inn and a mill near the bridge of Sivi village which is now merged with Venevere village. Likewise, the flats and the office of Arukse cardboard mill were located in Sivi, however, when the mill stopped working, the tenements were demolished and taken to Kullaaru Manor. However, one of these buildings is allegedly said to be still erect in Sivi.

Venevere village

The name of the village is thought to have originated from the Old-Believers who had lived here (*vene* means 'Russian' in Estonian), or from the specific boats – *vene* – used as a vehicle on the meandering River Avijõgi. The river was the connection route and thus, farms and villages were established on the riverbanks.

In 1912, the Venevere Manor incorporated nine villages and two inns, a dairy, a flour mill and a sawmill.

The issue of *Rahvaleht* newspaper from November 6, 1939, provides an overview of an interesting court case concerning the Venevere village and River Avijõgi. In 1928, two adjacent millers in Venevere had boasted about the capacity of their mills. According to one of them (Rudolf Treilman/Tooman), his mill could produce 10 poods (1 pood = 16 kg) of bread flour. As a counter-action, the other man (August Ruuben) had promised to produce 40 poods in one hour. The bet was made as follows: if Ruuben manages to mill 40 poods in an hour, he would get Treilman's watermill together with

the turbine and the dam, and if he failed, he would have to give his mill, together with the pipes and chimneys, to Ruuben. Ruuben was given a fortnight to fix and arrange his mill for the test assignment to start. The mill underwent thorough repairs and, in order not to lose the bet, the owner asked an experienced miller to come down from Tallinn. Ruuben indeed won the bet, however, the loser did not transfer the promised mill. The relevant court proceeding lasted for a long time (11 years): the case was heard at least four times and both men spent 1,000 kroons.

The artificial lake on the Avijõgi was cleaned and arranged in 2006, as an initiative of the educational and cultural society in Venevere. *Photo: Anne-Ly Feršel.*

The simple wooden mansion of the manor has perished, and the preserved outbuildings comprise the cattle-shed, stables for racing horses, almshouse, communal granary and the dairy. The majestic lime alley serves as a reminiscence of olden times. Up until 1939, Venevere was the rural municipality centre.

The flood, following the snowy winter of 1930/1931, took along two thousand logs in Venevere, brought to the banks of River Avijõgi for rafting. Moving down the stream, the logs were about to destroy the railway bridge in Avinurme. Although the attempts to stop the wood before the bridge were successful, the ice still broke the supporting pillars of the Avinurme bridge on Sonda–Mustvee railroad, leaving the rails dangling in the air above the river (Liloson, 2010).

Now, there is a village swing, volley-ball ground and a bandstand in the reconditioned park. The old cobblestone road leads to the mill bridge (across Avijõgi), made of hewn rubble stone. However, there are only remnants left of the mill once used to make meal for animal feed and saw logs. At the end of the 1930s, the mill supplied electricity for the owner and also for the local shop (Ross, 2004). The educational and cultural society in Venevere initiated the reconstruction of the mill dam, arranged the nearby river area and also cleaned the overgrown artificial lake. Now, it is a good place for anglers as the trout seems to like the new habitat.

The 5-km long **hiking trail**, currently under construction, is going to permeate

1.5 km along the banks of Avijõgi. The soldiers of the Engineer Company, participating in the military exercise "Spring Storm 2009" assisted in building a new footbridge across the river as part of the hiking trail. The bridge was completed in cooperation with three parties – the Defence Forces, Laekvere rural municipality, and the educational and cultural society in Venevere.

Regarding animal farming, there is a robotic cattle-shed for 70 dairy cows and heifers, and also a small-size timber industry in Venevere.

In the northern part of the village, where the Moora brook flows into the river, Avijõgi turns to the southeast and descends to Alutaguse lowland.

There is said to be an old war-time burial in Venevere, in the site of the Ansurahva [farm], *a funeral place from the times of Peter the Great. A Russian regiment had been in Venevere and they had revolted. They were all killed and buried in this place.*

ERA II 13, 530 (2) < Simuna parish, Paasvere settlement – Richard Viidebaum < August Staak, 42 years (1929).

A river used to run in the depression near the gates of the Moora Manor. A Russian had closed this river. Supposedly, the Russian had traded for oxen with the lord of the manor, but had not got the goods. When leaving, the Russian had been enraged and he had blocked the river.

ERA II 13, 514/5 (22) < Simuna parish, Paasvere rural municipality, Saarismäe farmstead – Richard Viidebaum < Madi Mätlik, 79 years (1929).

Kaasiksaare village

The village has evidently been named after birches (*kaasik* – 'birch-grove'), however, not far away from the village, there is a small pine forest where local people enjoy midsummer bonfires and sway on the swing. The fields are cultivated for own needs, only strawberries are grown for sale.

Usually, local people catch brown trout from the clear currents of Avijõgi, and sometimes they manage to pull out a pike or grayling. Springs discharge their water in the lower part of the valley-side near the Iba farmstead, and in the riverbed. The water of the spring-fed river is nice and cool for swimming, whereas in winter, the icy cover builds up only in bitter cold. In earlier times, there used to be two watermills in the village.

Venevere villagers went to the **Iba mill** to make rough flour from husked grain. The saw-frame of the watermill, probably made by a local smith, was still operable in the recent past, driven by a tractor engine. The owner is planning to restore the mill and re-launch the saw-frame by way of hydro-power. This is currently being impeded by the soft surface of riverbanks not tolerating the modern heavy-duty machinery.

The garden of Voogaste farmstead with unusual stones, trees, gnarls and ponds

filled with the water from the River Avijõgi is an enchanting landscape and was awarded a prize in the "Beautiful Estonian Homes" contest in 2007.

The Natura 2000 area (see p. 52) commences from the middle of Kaasiksaare village and extends down the stream, to the centre of Separa village. In Kaasiksaare village, large rocks have been piled in Avijõgi, thus forming an ecologically appropriate artificial dam, and rapids.

The ruins of the Iiba watermill are the silent witness of the glorious times of using hydropower. *Photo: Aili Reiman.*

In olden times, people used to see ghosts and spirits. On a Whitsunday night, next to Spirit Monday, the storyteller had gone to his father-in-law's place and from there, they had gone to catch crayfish with a bunch of others. The catch had been really good and big bags were full. Towards the end of the night, in the early hours, they had made their way back home. All of a sudden, they could see the granary-keeper coming straight towards them from the manor, wearing white trousers and a white jacket. The storyteller had a revolver with him and he had already taken this out. But the [approaching granary-keeper] *had not quite reached them, he had turned aside about 50 steps away and had disappeared in the Drowning Hole. And his face had definitely been that of the granary-keeper. Well, this time, they had all walked away from the place and no one could figure out what all this could have meant. Some of them had earlier suggested that one should not catch crayfish on a holy night, but now the crayfish were in their bags on their back, nothing to be done. But during this very summer, three people had drowned in this Drowning Hole: Kubja Tõnis* [the taskmaster]*, his maid and a farmhand. They had been making hay and the day had been quite hot. The girl had gone in the river and the taskmaster had told the farmhand to "go and get the maid wet". The farmhand had gone but they happened to get into this deep place called the Drowning Hole, and they had both sunk. When the taskmaster had seen this, he had immediately jumped in to help them, but the other two grabbed him so hard and all three drowned. It was too late by the time other people had gathered around and pulled them out. But Aida-Jaak – the granary keeper – had still been alive at the time when the others had seen him disappear in the river at Whitsunday night.*

ERA II 13, 537/40 (6) < Simuna parish, Venevere rural municipality, Iba village, Biltsi farmstead – Richard Viidebaum < Villem Bilts, 67 years (1929).

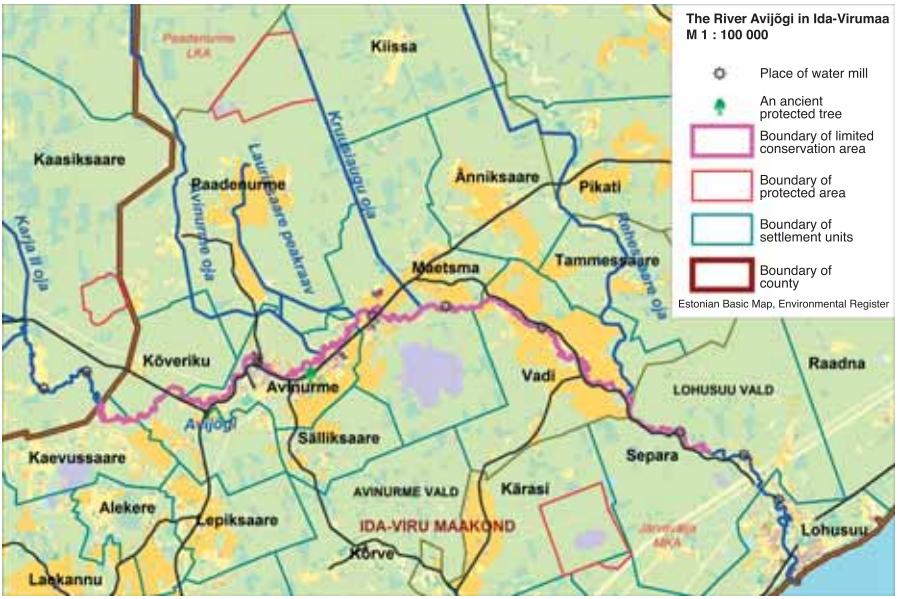
Põrna woollen mill was in the ownership of Jüri Ansip. People from the villages near Lake Peipsi used to take their wool bags to Põrna mill even at the end of the 1950s – they went to Tudulinna by car and walked further through small footpaths in the forest. One of such routes was called Villaveski ('woollen mill' in English) path. Depending on the awaiting load of work, people had to stay overnight in the mill, and sometimes even for several days. Later, the mill machinery was said to have been taken to Rakvere and thereafter to Hiiumaa island where the equipment had been in operation up until 1987.

Not all the mills are marked on the maps or mentioned in oral tradition. Still, this old dam in the river is an evidence of someone's entrepreneurial spirit. *Photo: Aili Reiman*.

The legendary Põrna pub on the riverbank was destroyed in the fire in 2005, with only the sauna remaining intact. An open-air festivity place was later built on the foundation of the former pub, a picnic and tenting site. This quiet picturesque place is good for fishing and bathing.

Kaevussaare village

The number of permanent villagers is 22, yet the scanty fields are cultivated by tenant farmers. Several farmsteads are used as summer cottages. The highest "hill" in the region, called Kõrgemäe ('High-hill' in English), is located in Kaevussaare village – a sledging and skiing site for children from Avinurme.



The Avijõgi, its tributaries, objects under nature conservation, old mill sites and the riparian settlements in Ida-Virumaa.

Kõveriku village

The village lies on the crossroad: a post station used to be here in old times, and later an eating and drinking place – Pärniku inn, offering refreshments for wanderers. This locality, the crossroad and the nearby village centre are still referred to as Pärniku. In 1920, Pärniku primary school was opened in the premises of the quondam inn, providing education up until 1975. The building was demolished after the school had moved out. However, a memorial stone now reminds of the school which used to operate in the former inn building. Nearby, there is a recreation site for wanderers and hikers, equipped with a large map of Ida-Virumaa County, a pavilion and ball-game grounds.

The name of the shop in the Pärniku crossroad – Maali's shop – is a nostalgic homage to the local lady, shop-Maali, who had successfully kept her business running here during the first independence period of the Republic of Estonia.

A winding road goes from Pärniku to the small town Avinurme.

Avinurme small town

Avinurme is a nearly five kilometres long small town with beautiful homes on the banks of the River Avijõgi. People lived here already during the Stone Age – this being proved by two stone axes found in the riverbank. Avinurme was first mentioned in 1599, in the 2nd Polish revision documents, when the area belonged to Roela Manor. The peasants were freed from quitrent "due to the distance from the manor and bad connection through the bog" and instead, had to pay financial rent to the manor – this was an exceptional case at the time, evidencing that the local people had to have an additional income. The support manor of the Laiuse estate was established here in 1666. The later state manor is reminisced by three protected lindens: their maximum height is 27 m and the circumference of the trunk 4 metres. The only manor building still erect today is the quondam communal granary, now totally different-looking and accommodating a care home.

According to narrated history, the site of the manor had initially been the abode of Kalevipoeg, the giant hero from Estonian folklore. He was believed to have sown an apronful of silver coins with the aim to harvest the yield and distribute this to the people of Avinurme. Having realised there were no sprouts, Kalevipoeg became bored and left the Avinurme area.

The future poet and Decabrist , **Wilhelm Ludvig von Küchelbecker**, was brought up in the Avinurme Manor from 1801 to 1811; he has perpetuated the River Avijõgi in his poem dedicated this to his brother:

...Oh, Avijõgi, sacred, fair!
You tunes still are with those
You used to embrace in olden times.
Now, while on my hasty journey,
You still sing as an enchanting fairytale
On the banks of yours
Where we used to play,
The budding place of our lives,
Where we quietly promised and knew
That only death can separate two brothers.

An extract from Wilhelm Ludvig von Küchelbecker's poem *To my Brother*.

Those coming from Kõveriku village are welcomed by the statue of Kalevipoeg, erected to commemorate the legend of how Avinurme got its name. In oral tradition, Avinurme placename is associated with the epic hero Kalevipoeg – the local people had complained about the lack of fish in the area, and the giant had pushed pikes upstream of the river, in such quantities that during the flood season, the meadows were full of fish – hence the name Avinurme (*avi* (in Estonian dialect) means 'pike';

Railway bridge in Avinurme. Now, there is a renovated museum-train displayed here, reminding us of the time golden times of narrow-gauge railways. The bridge and the train were renovated in 2001, as a joint initiative of the Avinurme Local Lore Museum and Avijõe Society. *Photo: Anne-Ly Feršel.*

nurm – 'meadow'). In spring, the flood plain is an excellent spawning bed for the pike. Might be that this was the reason why the river was named Avijõgi.

Sonda–Mustvee railway, a viable connection route for forest villages reached Avinurme in 1926. Quite often, particularly in spring and autumn, when roads were soft and muddy, the railway was the only operable conjunction traffic for villagers and timber transport, to take wooden vessels to the market or deliver goods. There were three rail-tracks and a branch line for sand wagons in the Avinurme station. Near the well, there used to be a steam-operating pump to equip the steam engines with water. In spring 1971, the narrow-gauge railway was closed down. Now, there is a renovated museum-train displayed on the stone railway bridge built in 1931, enabling a 100-metre-long trip upon request.

Woodwork has been the source of subsistence and reputation in Avinurme and the nearby forest villages throughout the course of time. Local people refer to the forest as green gold, and wooden vessels as instruments. As far back as centuries ago, forests

Those coming from Kõveriku village are welcomed by the statue of Kalevipoeg, erected to commemorate the legend of how Avinurme got its name. *Photo: Anne-Ly Feršel.*

have equipped local peasants with employment as low-lying fields could not provide for everything necessary.

It was not considered a theft to collect timber for wooden vessels from the forests of the state manor. The abundance of forests combined with the hard-working nature of Avinurme people have provided them with opportunities for living and subsistence in the distant past and also today. The produced wooden items – sleighs, shaft-bows, baskets, winnowing screens, tripod bread-making troughs, and beer-piggins for farms and saunas in the capital – had their unique features and differed by the manufacturing farmsteads and villages. Particular instruments, such as shepherd's trumpets were even exported to Finland.

As of 1870s, new avenues emerged as the manufacturing of cement barrels and barrel hoops for the cement factory in Kunda occurred to be a good source of income. In addition, the skilful men in Avinurme became proficient in making skis and sold this winter gear all over Estonia.

In more olden times, everyday utensils were also made of birch-bark: woven food-bags and salt cases in particular. According to the *Postimees* newspaper in 1932, there were 40 farmsteads manufacturing wooden utensils in the Avinurme area. In order to perpetuate the historic woodcraft tradition in Avinurme, there is a special wall in front of the church, with the date 1786 inscribed in the stone plate – the year when Heinrich Georg von Jannau, a parson in Laiuse, wrote about Avinurme barrel-makers, known all over the country, who, living in serfdom, were attempting to transfer to financial economy.

In olden times, barrels were used for preserving salted meat and butter but today – for herbs and flowers. *Photo: Anne-Ly Feršel*.

An annual fair introducing the local woodwork skills and cultural tradition is being held in Avinurme as of the year 2000. This folk feast, known also as the barrel fair, has gained fame all over the country, the same way as woodcrafters of Avinurme became famous many centuries ago.

Two water-mills have been operating in Avinurme:

Ansipi mill, the ruins of which are still partially visible, was located near the bridge heading towards the Paadenurme road. The bridge and the facilities – a linen factory, sawmill and flourmill (evidently not used for making sifted flour) – were supposedly burnt down in 1941.

Ansipi watermills were once located at the Paadenurme bridge in Avinurme.
Photo: Anne-Ly Feršel.

Uuetalu mill, on the left side of the road outside Avinurme, before the Maetsma bridge, was owned by August Kask and used for making simple flour and groats, equipped with a special machine. The mills used to operate on a seasonal basis – in spring and autumn. The dwelling house of the owners and the ruins of the dam are the only buildings still there today.

Avinurme church was completed in 1909, whereas the finances for the construction were mainly given by the members of the congregation. Today, the parsonage building from 1904 operates as a lifestyle centre (as of June 10, 2010), accommodating a tourist information centre, an outlet for selling local handicraft, rooms for woodwork and handicraft workshops, and a museum display.

A large part of Avinurme was destroyed in August 1941, during World War II; regarding the century-old edifices, only the buildings in the centre of the small town remained intact. Estonian soldiers, combating on both sides of the front, fought against each other in a battle held in Avinurme on September 20, 1944. To commemorate the battle, a memorial stone was placed in the parsonage park in 2004 as a tribute to the deceased, and in 2009, a memorial to those who had fought in the Avinurme battle was opened in the local cemetery.

The new cultural centre commenced its activities in 1999, in the same building with the rural municipality government, a swimming pool and a cafe. The secondary school in Avinurme was renovated in 2008.

The choirs and societies formed in villages many years ago – a brass band, female choir, male choir, summer theatre, folk dance groups for women and mixed pairs – have obtained an excellent level under the guidance of professional conductors and supervisors.

Maetsma village

In written records, Maetsma was first mentioned in 1599.

A four-grade primary school operated in the village during 1860–1928, until the schoolhouse burnt down. With regard to music life in the region, the first written data refer to song festivals, when E. A. Schulbach, the head teacher of Maetsma school, and also a conductor, sent a letter to the organising committee of the 2nd country-wide Song Festival. The brass band commenced with rehearsals at the school in 1884. The first society in the Avinurme rural municipality, *Vaprus* ('Courage') was registered in 1903.

The River Avijõgi has indeed affected the life in Maetsma village, similarly to other settlements on the riverbanks – felled timber was transported to Lohusuu on the water, through the Vadi village and large pine forests.

Kaunissaare mill was established by an entrepreneurial farm-owner who began to fell the forest to uphold his farmstead. Thereafter, he planned to build a flour and sawmill, and needed lime for the mortar. The raw material – limestone was available locally, and plenty of wood in the nearby large forests to be used for long-term incineration – thus, making it possible to build a lime-kiln. Kaunissaare mill produced simple flour, groats and hulled flour. Ernst Kollom was the miller as of 1937, and the last owner, before the mass deportations in March (1949), was Aleksander Kukk. The parts of the mill preserved until today comprise the two ends of the dam, the building itself, the canal and the widened dammed area in the river. During the kolkhoz period, the building was transformed into a sauna, and the canal into a swimming pool. Now, the inheritors have a summer cottage in the quondam mill.

Kukelinna refuge. In the middle of the Suursoo mire, southwards from the Maetsma village, there is a low sandy island, used as a refuge during major wars in the past. The inhabitants of several villages could find shelter there from conflict. Yet once, the enemies had discovered the refuge and killed all the people in the retreat, only a rooster remained alive – hence the name Kukelinna ('Rooster's town' in English). The Kukelinna refuge is an archaeological monument under national protection.

During the heyday of **woodwork,** coffins/chests and shingles were the main produce in Maetsma village. At the present time, there is a barrel production unit in the village,

in addition to the manufacturers of wooden furniture, shingles and also metal containers.

The village green is a get-together place with a large swing, the inhabitants study and record the history of the local area, conduct conventional village days, the events when several generations convene, involving the young and the old in the life of their home area.

Mihkel Jalakas, who became the owner of the farm at the age of 17, commissioned the bricklayers from the vicinity of Lake Peipsi to build the stone buildings of the mill. The site of the former dam is still visible in the water. *Photo: Aili Reiman*.

Vadi village

The village and the mill-site were first mentioned in written records in 1599. With regard to history, the village has been associated with the Votians who arrived in the area during the 10th–13th centuries. Similarly to the Votian language, the local people speak a dialect with a lot of *õ*-sounds (in standard Estonian, one should say *orav oli oksal*, however, the local people would say *õrav õli õksal* (Eng. 'a squirrel was on the branch')). The River Avijõgi flows through the village alongside the road.

In this location, there are some springs and brooks adding water to the River Avijõgi – one of them in the lands of the Nõmmenuka farmstead, and the other one, called Ämmaaugu (Eng. 'Mother-in-Law's Hole') – on the left bank of the Rehessaare brook which flows into the Avijõgi and has been dredged on a number of occasions so that in the dry season, there is enough water only in the sites of the springs. An old ford – the precursor of bridges is still being used in Vadi: tractors are sometimes driven across the ford to the other side of the River Avijõgi. Further away from Vadi, the river flows through a large pine forest to Separa village.

In olden times, fish barrels were the main items made in the Vadi village, in addition to wooden containers for sauerkraut, pickled cucumber and butter. Dealers bought the goods and sold them on with a rake-off profit.

Fords – places used to cross rivers before the construction of bridges – are still in use today, but not during the flood season. *Photo: Anne-Ly Feršel*.

The village green is a good place for different pastimes and activities. During the flood, however, it looks as a site for boat trips. *Photo: Anne-Ly Feršel*.

Vadi school, one of the first ones opened in the Avinurme area, was established in 1775 under the initiative of Johann Georg Eisen von Schwarzenberg (1717–1779), the minister of the Torma congregation. In 1834, the number of schoolchildren was 130; in 1930, the school was reorganised into a six-grade educational institution and closed down in 1963. The school edifice, built in 1888, is now under heritage protection and used as a village hall.

Cultural life. The village singing choir was formed in 1882, and the brass band in 1888, initiated by conductor Aleksander Sammelson, whereas the instrumentalists were the pupils of the Vadi school. The first festivity of the local amateur theatre actors took place in the Vadi schoolhouse in 1899, staging two pieces by the playwright Eisen: "Grandfather's tune" and "At your command, Mr. Lieutenant". The music and song society *Metsakaja* ('Echo of the Forest') was officially registered in 1903, and different courses – acting, dancing, cookery, handicraft, sewing, gardening and house-painting – were organised in its premises. The society also had its own library. After the destruction of the society building in 1944, social life was

continued in the schoolhouse until its activities faded out by 1967. Bearing in mind the continuity, a decision was made in 1997 to restore the music and song society *Metsakaja*, now involving a choir, amateur theatre group, dance troupe and circles for children.

Vadi mill, also called the Sildniku mill, used hydropower to make flour. Still, according to some sources, there had also been a sawmill operating as of 1909, apart from the flour-making unit. In August 1941, the Destruction Battalion set fire to both mills, leaving behind the stone ruins on the riverbank.

The old schoolhouse in the village of Vadi is under heritage protection. The building was restored as an initiative of the local people and is now used as a village hall. *Photo: Anne-Ly Feršel*.

A tenting and swimming place has been furbished in the rear of the schoolhouse, near the River Avijõgi, together with a site for playing, ballgames, swinging and bonfires – a song festival ground and a roofed area. Canoe, raft and boat trips are organised on the river during the flood season.

Vadi is the locality where the writer Heino Kiik spent his days as a young man.

Separa village

On the banks of the River Avijõgi, in the low sandy slope near the roadside, there are four Votian burial mounds from the 12th–13th centuries, called the Swedish barrows or Rootsikäpa.

According to the legend, two Swedish military units had encountered each other in a pitch-dark night during the Great Northern War, and, by mistake, the fight had begun. The soldiers perished during this combat are the ones buried in the mounds. Harri Moora, an archaeologist, has described these barrows when researching the Torma parish in 1921. The burial mounds had a circular base plan, which is destroyed by now, altering the shape and height of the barrows. The artefacts found in the ravished burial sites have been lost; among other finds there had also been stone cannon-balls and a fragment of a sword handle.

Burial mounds on the high bank of the River Avijõgi are silent witnesses of the fact that the river has been a movement route and a settlement site already in ancient times. *Photo: Anne-Ly Feršel*.

According to Osvald Raudsepp, the head teacher of Lohusuu school, there was another burial mound, yet also despoiled, further away in the forest (Nurgamaa, 2010).

The magnificent spruce in the Separa farmstead, perished by now, had been known far and wide as the witness of the battle from the times of the Great Northern War. Supposedly, a Swedish general is buried under this tree (Hiiemäe, 2006).

According to the recollections of local people, a flour and saw mill, owned by August Treier, had been operating in the vicinity of the Mulgi hydrological monitoring centre, on the left side of the road when coming from Avinurme.

Lohusuu small town

Lohusuu is built on a sandy plain – the quondam lake-bottom of Peipsi. Permeating through *Eestiküla* (Estonian village), the River Avijõgi flows into Lake Peipsi in the vicinity of *Veneküla* (Russian village). The archaeological finds – three bone fishing spears – discovered near Lohusuu prove that people were living here as early as during the Stone Age. Eestiküla in Lohusuu was first mentioned in written records in 1599, and Veneküla, the habitat of the followers of the Orthodox faith and Old-Believers, in 1811.

The postal road, connecting Russia with Western Europe, permeated through Lohusuu and was used by nearly all the crowned heads of Russia during recent centuries. The local post station for horse-drawn mail was further away in Ninasi. It is known that the military commander Alexander Suvorov had stayed overnight in the family house of Christian Masing (O. W. Masing's father), the parish clerk in Lohusuu.

The major flood of 1930/31 took a victim on the local road nearly a month after the retreat of the waters – a constable from Virumaa, August Kerge, and his companions were on their way from Tartu to Jõhvi on the night of May 12. As the spring flood had carried away the bridge made of reinforced concrete, a temporary bridge had been built for crossing the river, however, it could not bear the load and collapsed. The

Lohusuu village (Eestiküla in the forefront, Veneküla further away) and Lake Peipsi in the background. Photographed from the spire of the Lutheran church in Lohusuu, on July 2, 1928. *Photo from the collection of Leonid Mikhailov*.

car and the passengers fell into the river, onto the ruins of the former ferro-concrete bridge. August Kerge died in the accident and one of the three companions was seriously injured (Liloson, 2010).

The inhabitants of Lohusuu rural municipality are both Estonians and Russians – the latter are the descendants of the local Russians who have been living on the shores of Lake Peipsi for centuries. Thus, there are two strong-based and reciprocally supportive cultures in the area. However, despite such a juxtaposition, the two ethnic cultures have not taken over the specific features of their neighbours: the people of both villages have remained faithful to the customs and tradition of the ancestors, mixed marriages are very rare. Both villages, Eestiküla and Veneküla, have their own culture centres. In winter-time, people take a short cut from one village to another, along the ice-covered Avijõgi, as the shop, the rural municipality government and the bilingual basic school are all in Eestiküla. The school introduces and promotes the feasts and traditions of both ethnic groups, teaching the children to learn and respect other nationalities and cultures.

In Lohusuu Eestiküla, located on the western bank of the River Avijõgi, there is a pseudo-Gothic Lutheran church from the 19th century, a cemetery with original forged crosses, made by village smiths, and a chapel, reconstructed from an old communal granary. The river divides Lohusuu into two: the small town of Lohusuu, and the village on the other side of the river, which used to be the parsonage, with relevant outbuild-

Eestiküla village and the church spire on the other side of the river. In winter-time, ice-covered river provides a direct connection between the Eestiküla and Veneküla. *Photo: Anne-Ly Feršel*.

Across the river is the Orthodox *Church* of the *Baptism* of Our Lord in *Lohusuu* Veneküla, completed in 1898. *Photo: Anne-Ly Feršel*.

ings and farm-hands working in the parson's farm and not for the manor.

In 1723, the glass-painted portraits of the churchwardens were installed in the windows of the Lohusuu church, with their names on the pictures. Supposedly, these are the oldest identifiable portraits of Estonian peasants. After restoration, the copies made of the glass paintings will be put back in their place.

Veneküla in Lohusuu is located on the eastern bank of the river, on a small plot of land on the lakeshore of Peipsi. The place is a good example of typical village architecture of the Russians living in the vicinity of Lake Peipsi. There is an Orthodox church in Veneküla, and an Orthodox cemetery with an old chapel.

Fishing has always been an important occupation in Lohusuu. There is a fish port in the mouth of Avijõgi, and the production units of the currently largest enterprise AS Peipsi Trade Ltd.

However, fishing used to be and still is the main subsistence for the inhabitants of Veneküla. Franz Gotthilf Friedrich Aswerus wrote in 1785 that the river flowing into Lake Peipsi in Lohusuu is relatively rich in fish, full of roach, pike and bream in spring,

and perch and chub in summer. Aswerus also notes that a wide bridge goes across the river in Lohusuu.

Since 2003, the lakeshore culture society in Lohusuu has been organising summer-time fish fairs, the greatest tourist attraction in the rural municipality. Old fishing related customs are introduced in the special room furbished in the old schoolhouse in Lohusuu. The society also promotes the restoration of an old conventional water craft used on Lake Peipsi. Peipsi *lootsik*, a small, flat-bottom boat for fishing in river mouths and flood plains, was built in the summer of 2004, in cooperation with the River Emajõgi Barge Yard and the rural municipality government of Lohusuu.

Three mills. Those coming to Lohusuu from Avinurme would pass three Josua Aleksander's water-mills. The one closer to the road used to be a saw-mill and was still operating in 1954. On the other side of the river, there was a woollen mill for carding and teasing, weaving, dying and felting, and also a flour mill, both burnt down in 1941.

In 1904, the newspaper *Olevik* wrote about two board factories operating in Lohusuu, cutting the poorer quality logs, driven down along the river. The

Fish port in the river-mouth of the Avijõgi: the premises of the company Peipsi Grupp, and a place where local fishermen go on the lake. There is also a fish processing unit in the port. *Photo: Anne-Ly Feršel.*

Boats in the fish port in Lohusuu. *Photo: Anne-Ly Feršel*.

Busy traffic in the river-mouth of the Avijõgi: among other vessels, there are also the predecessors of the modern barge *Jõmmu.* Photographed by Ed. Pääro (around 1928). *Photo from the collection of Leonid Mikhailov.*

The river-mouth of the Avijõgi – an entrance to the expanses of Lake Peipsi and a place to come back to the home port. *Photo: Anne-Ly Feršel*.

Lohusuu small town at the beginning of the previous century (approx. 1926): a wooden bridge, sawmill and the Lutheran church. *Photo from the collection of Leonid Mikhailov.*

better logs were first taken to Vasknarva, along Lake Peipsi, then to Narva, and further abroad.

Josua Priidu's steam-powered sawmill, near the old bridge in Lohusuu, used to work up until 1939. Trellin's steam-driven sawmill, and a board-making unit, was operating in the river-mouth in Lohusuu, from 1890 to 1918.

Otto Wilhelm Masing (1763–1832) was born in the Lohusuu Eestiküla, to the family of a parish clerk. With his book, *Pühhapäwa Wahhe-luggemissed* (1818), he was the founder of Estonian-language popular science literature. The peasants' weekly, *Marahwa Näddala-Leht* issued by Masing

(1821–1823, 1825) was the first continuous Estonian-language newspaper (the very first Estonian newspaper, *Tarto maa rahwa Näddali-Leht*, was issued only for several months in 1806). Masing wrote a few reading-books for children, an arithmetic textbook and other schoolbooks. As his aim was to provide peasants with new knowledge and teach them to wisely organise their difficult life, he tried to write his books in the language spoken by people. O. W. Masing was also an innovator in the Estonian written language, introduced a lot of folksy material, new terms and attempted to converge orthography with pronunciation. One of his contributions was the use of the letter *õ* to denote a specific Estonian phoneme (see p. 113). The museum room of O. W. Masing is in the old building of Lohusuu Basic School, in the same venue with the fishing tradition workshop, the room for culture promoters and the temporary exhibition showing a new display of local life on a yearly basis.

In 2006, the Environmental Investment Centre provided financial support for the restoration and cleaning works in the lower courses of the River Avijõgi within the amount of nearly 2.5 million Estonian kroons. The undertaking was targeted at removing mud and fallen trees from the approximately three kilometres long riverbank. The remnants of the old concrete bridge, demolished during the war-time, gather debris, and these accumulations tended to form into islands of waste.

Protection of the River Avijõgi as a valuable habitat and key biotope

On its journey, the River Avijõgi permeates through very varied landscape, starting from the slope of Pandivere rich in springs, and finishing with the forest expanse on the Alutaguse Lowland. In order to preserve the river as a valuable habitat, the river has been subject to various protection arrangements.

THE MEASURES TAKEN TO PROTECT THE RIVER AVIJÕGI

- Limited management zones on both banks 100 m from the boundary of the water;
- Fully included in the list of the spawning areas and habitats of precious fish;
- Limited conservation area of the River Avijõgi (29 ha);

On the banks of the river (100 m from the boundary of water) any activity, that may affect the river and its biota, is prohibited.

From its source up to the mouth, the River Avijõgi is included in the list of spawning areas or habitats of the salmon, brown trout, salmon trout or grayling. Pursuant to a Regulation of the Minister of Environment it is forbidden to alter the hydrological regime of the river, to build new and reconstruct existing dams to the extent, which would raise the level of water or alter the natural bed of the water body. The Regulation has no impact on the existing hydro-constructions.

The **limited conservation area of the River Avijõgi** comprises the River Avijõgi from the centre of the village of Kaasiksaare to the centre of the Separa village, with its main part (27 ha) located in Ida-Virumaa and only two hectares in Lääne-Virumaa. The objective of the nature conservation area is to protect typical river and brook habitats and especially those of the European bullhead (*Cottus gobio*) and green gomphid (*Ophiogomphus cecilia*) in the River Avijõgi.

Who put the sign of the limited conservation area in the middle of the river? This sign is actually installed at the Maetsma bridge, but the flooded river seems to have expanded its possessions. *Photo: Anne-Ly Feršel.*

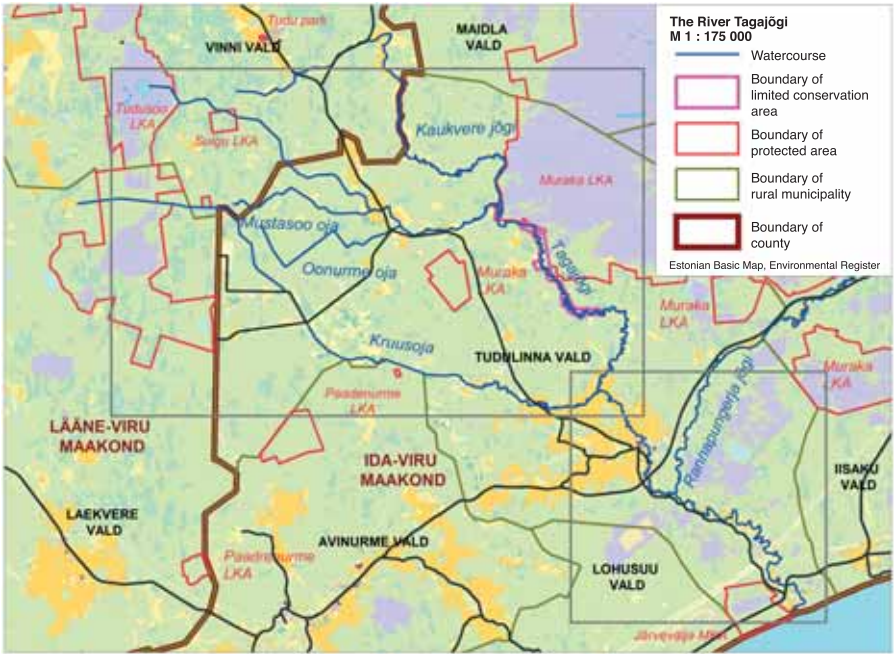
The River Tagajõgi together with the River Pungerja

The River Tagajõgi, which in its upper course is known as the River Liivoja, in the middle course as the River Mustasoo, and in the lower course as the River Tudulinna, starts from Lake Tudu in the Järvesoo mire, Vinni rural municipality (Lääne-Virumaa) and discharges into the River Rannapungerja (Ida-Virumaa). As the largest tributary, the River Tagajõgi flows into the right bank of the River Rannapungerja in the territory of the Tudulinna rural municipality, 12.7 kilometres before Lake Peipsi. The Tagajõgi obtains water from the Mustasoo, Oonurme and Kruusoja brooks on its right riverbank, and from the River Kaukvere which flows into the Tagajõgi on the left. On their journey, all these water courses flow through the settlements with similar names.

THE RIVER TAGAJÕGI

- belongs to the Viru sub-river basin district of Eastern Estonian river basin district;
- length: 43.6 km;
- catchment area: 256.6 km^2;
- the following water bodies discharge into the River Tagajõgi: Mustasoo brook (5.9 km), Oonurme brook (7 km), the River Kaukvere (19 km) and Kruusoja brook (28 km);
- absolute height of water level at the river source 81.2 m and in the river mouth 30.5 m;
- total fall of the river 50.7 m;
- average gradient 1.2 m/km;
- average flow rate in the lower courses 1.8–2.3 m^3/s, maximum flow rate 45–50 m^3/s and minimal 0.02–0.03 m^3/s;
- the width of the river bed in the middle course is an average of 4 m, and in the lower course 7 m;
- average depth of the river bed 0.4–0.7 m;
- average depth of the river valley in the middle course is 3 metres, and 5 metres in the lower course;
- the width of the flood plain is 150–300 metres.

Sources: Environmental register; Esimese seireringi …, 2009; Loopmann, 1979 (different reference sources provide different figures; the ones presented here are the most recent ones).



The River Tagajõgi with its tributaries and objects under nature conservation.

Through the forests of Alutaguse and village landscapes

Within its entire length, the Tagajõgi flows through the Alutaguse locality – and from its source in Järvesoo to the Oonurme village – as a dredged and straightened ditch through the bog and woodlands, and in the natural riverbed from the western edge of Oonurme to the eastern border of the village. Within a short section – where the Oonurme brook discharges into the Tagajõgi – the riverbed has been straightened, but in the lower courses, to the river-mouth, the river meanders in its natural curvy riverbed.

In the south-western edge of the Muraka bog, the River Tagajõgi receives the waters of the River Kaukvere, and thereafter flows further in a clearly formed valley, making full meanders. In the Tagajõe village, a dam has been built on the river, being an impediment in the migration of fish.

In the upper and middle courses, the Tagajõgi permeates through sparsely populated areas, mainly forests. In the lower courses, however, there are more arable lands and denser habitation.

The abundance of water in this more than 40 kilometres long river varies in different seasons: during the spring floods, the largest flow rate in the lower courses

can be up to 45–50 m^3/s, whereas in some years, the midsummer flow rate is merely 0.02–0.03 cubic metres per second. The water level in a dry and hot summer may decrease to an extent that in some places, the river would become partially dry. This is what happened in 1997, when the River Tagajõgi dried in the middle course – in the Oonurme locality, there were only some puddles left in the river bottom.

The flood usually starts in the middle of April and lasts until the second week in May. At that time, the river rises from the riverbed and expands onto the wide floodplain.

Kunturi farm. Further in the distance is the clearly formed valley of the River Tagajõgi in the autumn of 2001. *Photo: Eva-Liis Tuvi*.

The River Tagajõgi is with a relatively steep gradient – fifty metres from the source to the river mouth. Thus, although the average gradient is more than a metre per one kilometre, it is different in various river sections. The largest fall is in the upper courses of the river, from the source to the mouth of the River Kaukvere, and also in the lower courses, in the vicinity of Tudulinna, whereas in the middle courses of the river, from the inflow of the River Kaukvere to the mouth of the Kruusoja brook, the gradient is not very steep, only half a metre per kilometre (Esimese seireringi …, 2009), and even smaller within the limited conservation area.

The waters of the River Tagajõgi reach Lake Peipsi through the River Rannapungerja. The latter is therefore of relevance, particularly within its lower courses, from Tudulinna to Rannapungerja, where it is also known as the River Pungerja.

The River Rannapungerja, together with its tributaries, is the largest river flowing from the Alutaguse Lowland to Lake Peipsi.

Between Tudulinna and Rannapungerja, the river has formed a steep and meandering valley, and the curvy road on the riverbank follows the course in some places. In the lower courses, the river valley extends to more than half a kilometre, with a depth of more than ten metres: this is the largest valley in North Estonia, eroded in the Quaternary sedimentation. In the bottom of the valley, the river flows in full meanders.

Prevailingly, the flood plain consists of fine sands comprising layers of organic substance, including tree leaves and branches. Even the trunks of trees are covered with sand, forming, in some places, a separate stratification of alluvial deposits and varved clay. There are abundant oaks among the buried trees.

In olden times, the Rannapungerja used to be an important river for rafting logs from the Alutaguse forests to Lake Peipsi. During the inter-war time, there was a harbour in Rannapungerja, a communication point for the Alutaguse people with the external world.

The River Rannapungerja in the village of Lemmaku. *Photo: Anne-Ly Feršel*.

Ecological status of the river

The water of the River Tagajõgi is dark and rich in humic substances. In the dry summer of 1997, the water in the upper courses was of greyish colour and slightly turbid; somewhat yellowish and clear in the middle courses, and in the lower courses – yellowish and semi-turbid. In midsummer, the water in the entire river was cool or temperately warm 16.3–18.5 ºC (Järvekülg, 2001).

The main polluters of the river are the small town of Tudulinna and the forestry enterprises on both riversides. Earlier (at the time of Soviet state farms), the water of the Tagajõgi was also polluted by Tudulinna dairy farm and pigsties, and the cattle farm in Oonurme village. Between the villages of Mõisaküla and Ojaküla, there used to be a refuse disposal site, closed down by now.

During the monitoring in 2009, hydro-chemical and hydro-physical parameters of the river were evaluated to be very good and good (Esimese seireringi ..., 2009).

The drainage water, pumped out of the *Estonia* mine is directed to the River Rannapungerja via the Jõuga main ditch. There is reason to believe that after closing down the mine, the amount of water in the river would decrease. The River Rannapungerja

and Lake Peipsi were polluted with phenols during the fire-fighting works in the *Estonia* mine at the end of 1988.

Some of the mine drainage water of the Viru mine reaches the upper courses of the Rannapungerja through the Raudi canal. High concentration of suspended solids in mine water has raised the level of the river-bottom and the river floods over the banks, paludifying the grasslands in the vicinity of Väike-Pungerja (Surva, 2005). In order to avoid the floods in the future, the oil-shale company Eesti Põlevkivi and the rural municipality of Mäetaguse cleaned the alluvial sedimentation in two river sections of the Rannapungerja, and cleared the area of beaver dams in 2007 (Sokman, 2007).

Biota in the river and on the shores of the Tagajõgi

The biota of the River Tagajõgi has been studied more thoroughly in the 1980s and 1990s (Järvekülg, 2001), and during the recent monitoring of the limited conservation area (Esimese seireringi ..., 2009).

BIOTA

- Vascular plants: 17 species;
- Zoobenthos: 20 taxa in the upper course (1997); 38 taxa in the middle course (2009), with the common freshwater shrimp as the prevalent species;
- Fish: 11 species in 1988 and 1997: pike, roach, chub, ide, minnow, stone loach, spined loach, burbot, perch, ruff, bullhead; 11 (12) species in 2007 and 2009: pike, roach, dace, chub, minnow, stone loach, spined loach, burbot, nine-spined stickleback, perch, bullhead (brook lamprey);
- Crayfish: has not been found recently;
- Birds: capercaillie, black grouse, common crane, osprey, lesser spotted eagle, black stork;
- Mammals: otter, beaver, muskrat, flying squirrel, wolf, brown bear.

The popular Estonian names of the flowering rush (*Butomus umbellatus)* refer to their similarity with bulrush and mermaids as the whitish-pink blossoms are just as luring. *Photo: Anne-Ly Feršel*.

Aquatic vegetation is affected by the scarcity of water in the upper and middle courses of the River Tagajõgi. Altogether, 17 species of vascular plants were found in three river sections. In the upper and middle courses, there were larger communities of the flowering rush, slender tufted-sedge, water horsetail, common clubrush, water-starwort, plicate sweet-grass and greater water parsnip. In addition, there are a lot of yellow water-lilies – also in the lower courses of the river where there are generally few plants. With regard to algae, there were mainly the species of "filthy algae" found in the middle courses, primarily these of the blue-green algae *Oscillatoria* and filamentous algae *Spirogyra*. There were also abundant microalgae from among the green algae, and less diatoms.

The popular Estonian names of the flowering rush (*Butomus umbellatus)* refer to their similarity to the bulrush, and to the umbel-shaped luring pink blossoms with red stripes. The length of the leaves depends on the depth of the water: plants with nearly one-metre-long tapelike leaves have been found in rapidly flowing rivers. Usually, the flowering rush prefers to grow in nutrient-rich shore water of less than half a metre deep. This entomophilous plant blossoms from June to August, and mainly propagates by way of vegetative reproduction. Namely – the rhizome buds called bulblets develop into new plants, which remain attached to the mother plant for some time. The dried rhizome of the flowering rush has been a survival remedy in case of famines – it was ground into flour which supposedly tasted similar to unhulled wheat flour. This is why in Siberia, the plant is called Yakutian bread. The animals, on the other hand, do not eat the plant very much. Skilful hands can weave the flowering rush into baskets and mats, however, it is necessary to bear in mind that the plant does not tolerate mowing (Reier, 2001; Luigelill, 1998).

Zoobenthos. In July 1988, the benthic invertebrates in the upper and middle courses of the river were small in numbers and with moderate biomass, with the fingernail clam (*Sphaerium rivicola*) as the most conspicuous species. In the upper course, in the Oonurme river section, the zoobenthos was scanty (20 taxa), extremely poor in individuals and with moderate biomass. The most prevalent species with regard to

the biomass: fingernail clam and the variety of the freshwater snail (*Galba palustris* v. *corvus*). The most dominant species, with regard to the number of individuals, were the common freshwater shrimp and the larvae of the non-biting midges (*Chironomidae*). The middle course of the river was slightly richer in benthic invertebrates (31 taxa), and with medium biomass, yet with low population density. The prevalent species, in numbers and biomass, were the fingernail clam, and the larvae of the caddis flies family (*Limnephilus* sp.).

According to the results of the monitoring in 2009, the consolidated status of the large invertebrates, within the Ojaküla and Tudulinna section of the River Tagajõgi, was assessed to be very good. The total of 38 taxa were found in the middle course in Ojaküla, and 37 taxa in the lower course, within the section of the Tudulinna bridge, including the rare species in Europe, thick-shelled river mussel (*Unio crassus*). The predominant species in the middle course of the river was common freshwater shrimp (*Gammarus pulex*), a nearly one-centimetre-long arthropod with a crooked body. The Estonian name *jõe-kirpvähk* ('river flea crayfish') depicts how the freshwater shrimps swim on their side, and move on with jumps. Similarly to crayfish, they have shells. The species of gammarus prefer rapidly flowing water courses rich in oxygen, and they are significant as decomposers – eating dead organisms (Urbas, 1998). Common freshwater shrimps are an important part of fish food, and as the main food for the river trout of certain age. The colour of the flesh of river trout depends on the share of common freshwater shrimp in their food: the more pinkish colour the meat, the larger are the amounts of common freshwater shrimp eaten by the trout.

In the lower course of the River Tagajõgi, near the Tudulinna bridge, the blackfly (*Simuliidae)*forms the most abundant group. These little flying bloodsuckers (females) can be seen in riversides from early spring till autumn. As single individuals are extremely small – usually less than 5 mm – they become visible in swarms. The larvae of the blackfly are up to one centimetre long, attached to the rocks or plants in the water.

The thick-shelled river mussel (*Unio crassus)* primarily lives in water bodies with medium or rapid flow and sandy or gravelly bottom, and can be differentiated from other river mussels (with a more oval shell)

The larvae of the blackfly *(Simulidae).* The larvae of these annoying bloodsuckers live in large colonies in the running water as they are sensitive to oxygen deficiency.
Photo: Henn Timm.

Thick-shelled river mussels (*Unio crassus*) are sensitive to pollution, sedimentation and changes in the water level. Their name refers to the fact that their shell is thicker than in other species. The photo depicts a young specimen. *Photo: Henn Timm*.

by its more round-shaped shell and slightly angular rear part. The acidity of water in the habitat determines the size of the body: in slightly alkaline or neutral water, the thick-shelled river mussel would grow up to 6–7 cm long, whereas in poorer living conditions (in slightly acidulous waters), the growth would be limited to merely 4–5 centimetres.

This species is sensitive to intense sediment load, droughty years and the pollution carried to the river would also limit the abundance of the thick-shelled river mussel. Fish have an important role in the development cycle of the mussel as the larvae parasites on the fish for approximately about one month. The average life span of the thick-shelled river mussels is 15–39 years, although an individual of up to 90 years of age was found in the River Vigala. In spring and summer, the thick-shelled river mussels live in the water of 0.3–0.8 metres deep, and move to deeper areas in autumn (Timm, 2007).

Fish. Due to scarcity of springs and substantial land improvement works, the upper and middle courses of the River Tagajõgi have become extremely waterless in dry summers and lost their former fishery-related value. As a result, a valuable fish species – grayling – has disappeared from the river.

During the test catches in 1988 and 1997, a total of 11 species were caught in Oonurme (in the middle course of the river), and in the Tudulinna section (in the lower course): pike, roach, chub, ide, minnow, stone loach, spined loach, burbot, perch, ruff, bullhead.

During the later period, the monitoring fishing was done in the Pasti section in the middle course and in the vicinity of Tudulinna, in the lower course of the river (2007), and yet in another six river sections – Oonurme, Pasti in two locations, Raja-Jaani, Tudulinna in two locations (2009; however, as the test catches in 2009 were done during high water level, the obtained data might not be exhaustive).

The following species were caught during the recent test catches: pike, roach, dace,

chub, minnow, stone loach, spined loach, burbot, nine-spined stickleback, perch, bullhead; and brook lamprey is also probably present in the river.

Stone loach (*Barbatula barbatula*) is a benthic fish with settled lifestyle, obtaining their name in Estonian (*trulling*) after their body shape (*truljas*=plump). The stone loach lives in rivers with rapid flow and rocky bottom, and is relatively tolerant about living conditions. The fish can cope with oxygen deficit in the water, and with weak to moderate organic pollution, even managing to survive in dry summers when the rivers decline into puddles. They have three pairs of barbels around the mouth, and brown spots on the scale-less yellowish skin. The length of the fish is up to 12 centimetres. The spawning period lasts from April to August, in different portions, and the roe is taken care of by the male (Järvekülg, 2001; Miller, Loates, 2006).

The evaluation of the status of the fish fauna, in the monitored sections of the River Tagajõgi, was assessed to be good according to the monitored catches.

Crayfish. At the end of the 19th century, the River Tagajõgi was extremely rich in crayfish, yet a decline in the abundance of crayfish was recorded in the vicinity of Tudulinna, probably caused by the activities of otters. In addition, the death of the crayfish was noticed in the river in 1916 and 1929, the causes remained unclear. At the end of the 1930s, the river was again rich in crayfish: approximately 40,000 crayfish were caught every year in the Tagajõgi (incl. the Roostoja brook and the River Alajõgi). However, during 1939–1940, crayfish pest was spreading in the area, starting from the lower courses and moving against the stream. In 1953, the local people had again spotted crayfish in river, but a new crayfish pest attack happened in the 1960s, and in recent times, there are no records of observing crayfish in the river.

Birds and mammals. Beavers came to the River Tagajõgi in 1979, and as the steep riverbanks were a good place for the animals to dig lodges, their numbers increased quickly (Lepassaar, 1989).

The muskrats also inhabited the River Tagajõgi in the 1970s and were at first propagating well. But then, in the next decade, the water level in the frozen river lowered significantly, and an air space was formed under the ice cover and the river, which also became covered with ice after some time. During a major thaw, the space between the two ice layers was filled with water and the muskrats got caught therein and perished. During recent times, muskrats have not been seen on the River Tagajõgi, yet there are plenty of American minks living in the area who, as small predators, have contributed to the disappearance of muskrats. The muskrats are probably still present only in the flood meadows of the River Narva (oral records from Aare Aalja).

The indigenous species of the Alutaguse area – flying squirrel, capercaillie, black grouse, common crane, osprey, lesser spotted eagle, black stork, wolf, brown bear and otter – live on the riverbanks of the Tagajõgi and in the vicinity.

Human habitation on the banks of the River Tagajõgi

During the 14th–16th centuries, the vicinity of the Tagajõgi and Rannapungerja rivers was the eastern border area of Alutaguse: small settlements were established in the region – people came from the east and from the internal parts of Virumaa, and the majority of the settlers here originated from the Rakvere area as the lands in the Rannapungerja river district, and the lakeshore of Peipsi within the river-mouth were the property of the Rakvere stronghold. The main movement route went along the rivers of Rannapungerja and Tagajõgi, from the lakeshore of Peipsi and to Viru-Jaagupi and back.

However, population density in the region remained low for a long time, as the groundwater level was high in the region. On the map, compiled by Ludwig August Mellin in 1796, the rivers of Tagajõgi and Pungerja are depicted as the River Simuna (*Simonis*), and a watermill is marked on the site of Tudulinna.

The Tagajõgi was an important rafting river in earlier times, with several sawmills operating on the riverbanks. In the more recent period, nearly all the riparian farmsteads used to have their own watermills, with only the ruins left today, or merely the site of the dam. A lot of farms on the riverbanks used water-wheels and turbines as engines to power machines. Kunturi watermill used a turbine instead of the water-wheel. The banks of the river were raised in order to have more water collected behind the dam to provide the mill with a sufficient amount of water. Eevi Ostrak remembers that each river-bend, meadow and deep place in the river had its name, reflecting real life: *Savi auk* ('Clay hole'), *Kala auk* ('Fish hole'), *Põdra auk* ('Elk's hole'), *Ristikään* ('Cross bend') (a large cross had been erected there to commemorate the drowned rafter). It often happened that the river was called according to the name of the farm, for example the River Võrnureie.

In summer, the river was the place to do the laundry, and, to some extent, as a sauna. Riverside farmsteads had their own bathing sites or swimming holes – there were deeper places in the river, yet the water level could still be quite low, reaching merely the beltline of the swimmer. These swimming holes were also named according the nearby farm: Kivistiku, Pondri, Sohvri, etc. Saveru swimming hole was earlier used by the entire village. Juhi swimming hole was used by several farms – when the children went swimming they would whistle for the kids across the river to join them. One of the deepest and the most loved place, particularly during hay-making, was the Mardi swimming hole.

When going to work further away from home, or to make hay, for example, people did not take drinking water with them but instead used the river water. Fishing is still popular among the local people but in earlier times, it was customary to catch fish for daily meals. In spring-time, in the hatching season for the roach, the riverbanks

were filled with anglers: roach were used to make dried salted fish, soup and cutlets. Children liked to turn around the stones in the river bottom to find crayfish, although older people did not always approve of this and warned the children not to be caught in the claws of crayfish.

Bridges on the River Tagajõgi and its influents and streams are usually called the same way as the local farm or village, e.g. Viilipoja, Pikanõmme or Ilvese bridges. A lot of bridges have also been built by farm-owners for their own need.

A neglected farm on the banks of the River Tagajõgi, in the former Ojaküla (now Tagajõe) village. *Photo: Anne-Ly Feršel*.

The bridge of Kunturi farmstead (in Oonurme village) was used for accessing the hayfield and forest on the other side of the river; and the bridge in Raja-Jaani farm was the connection between the old and the new farmstead.

Smaller bridges tended to be lower and more seasonal in earlier times – they were removed before the breaking of ice and were put back in their place afterwards. It did happen sometimes that the high waters carried the bridge away, or the bridge submerged under the flood could not be used. If this happened, the children were happy as they did not have to go to the school across the river.

According to the recollections of Johannes Vanasilla, the owner of the Vanasilla farmstead, the bridge near their farm was taken away before the breaking of ice and was later re-installed. This was done up until 1941, when a new and higher bridge was built, which unfortunately burnt down the same year, in the tumult of war. A new bridge was built after this, with a bench to sit on. And the construction of yet another bridge commenced in 1957, this time by the road administration. In spring, the logs were ramped into the bottom of the river when there was still the ice-cover on, but the powerful breaking up of the ice threatened to take all this work down the stream. Still, the logs stayed put and the bridge was completed. The bridge underwent a major reconstruction in 1972, but has collapsed now. Johannes Vanasilla is of the opinion that an average lifespan of a bridge would be about 15 years.

In winter time, the ice-covered river was used as a horse path in earlier times, allowing the taking of shortcuts and causing less trouble. In summer, the river was crossed by stepping across larger rocks and using the fords. Tonditõke footpath, to cross the

river in the vicinity of the Vanasilla farm, was made of large rocks. Nowadays, the ice has scattered the rocks and stones of the quondam river crossing.

People in Alutaguse have fought against **water surplus** since the 19th century. A winter in the middle of the 1920 was very snowy and the spring started with heavy precipitation. The breaking of ice destroyed quite a few of the bridges. People in the Oonurme area moved around on rafts and the fields were inaccessible even at the time of the blossoming of the bird cherry. Thus, a letter was written to the Ministry of Forestry to get help and assistance in getting rid of the high waters. The ministry commenced with the survey of the River Tagajõgi and its influents– this was the preparatory phase for the dredging and straightening of the river in the summer of 1927, and the digging of land amelioration ditches. Professional ditch-diggers arrived and they were accommodated in farms working in the sections given by the taskmaster. There were actually not enough sleeping places in the threshing-floors of the farms as there were very many men doing the job. Several temporary shops were opened for the men to purchase sugar, salt, herring, cigarettes, matches, soap, work clothes and tools, in addition to the foodstuff bought from farms.

As the riverbanks were steep in some places, the work had to be done in pairs: one of the men was standing in the water and brought out mud whereas the other one lifted it up on the river shore. The clear waters of the Tagajõgi turned obscure because of clay and mud, and the river inhabitants tried to escape down the stream.

This way, the river that used to be extremely curvy and rich in water in earlier times was straightened and the water level decreased unbelievably quickly. People said that after some time, it was merely a small rivulet on the gravelly bottom, where the locals went to gather crayfish and fish left on the dry river bottom.

More ardent farmers had their farmlands surveyed in order to improve their fields and forest lands by digging ditches. So, when there was time left from other undertakings, ditches were excavated and – the surplus water that been there for centuries ran bubbling to the River Tagajõgi. The outcome of this amelioration was already visible in a couple of years' time – better grain yield and greener pasturelands. People in Oonurme were happy and praised: "It used to be a mud-hole, and now, it's the best field-land ever." At the moment, it is still possible to see the old nearly overgrown riverbed with standing water, and the straight ditch, the current streambed of the Tagajõgi, near the Raja farmsteads, where beef animals are raised.

Ditching was particularly thriving after World War II. In the middle of the 1950s, the upper course of the river was dredged: the curves were straightened and high embankments were piled on the shores. The former water-field disappeared. The Antsu brook, used for fishing and swimming in earlier times, is now filled with water only during flooding.

In older times, riparian hayfields were flooded after heavy rain, and the hay-makers

could catch and throw small pikes with their rakes. Sometimes, such a flood would take along the hay or destroy the haycocks. According the Johannes Vanaselja's memories, 1948 and 1957 were the years of the last great floods. During the 1950s, the children of Tudulinna school went to see the breaking up of ice together with the classmates: the river pushed the large piles of hummocked ice to the Matsu backwater. Daredevils went to ride on the blocks of ice in spring.

Bold people from Tudulinna, enjoying the impressive sight of breaking ice, hanging onto the suspension bridge. *Photo: Väino Urb*.

Each farm had plots of land stretching to the river. Hay was cut on the gently sloping riverbanks up to the water boundary. However, during the collectivisation period, the banks of the river were gradually covered with brush-wood; this process was accelerated by the general decrease in the water level. Ditching resulted in the lowering of the ground water level, in particular after the last dredging of the river and when commencing with the amelioration of the forest. Thereafter, it was necessary to also dredge the wells.

During recent times, beavers have caused flooding as they build dams and thus close the land improvement ditches and culverts.

During World War II, several people of the locality were involved in the fortification works of the Rannapungerja–Tudulinna–Tagajõe frontline. The riverbank had to be excavated, so that the newly formed steep shores would make it impossible for the tanks to go across.

In 2007, the pupils of the Iisaku High School made a documentary *The Possibility of Life at the River Tagajõgi,* with support provided by the Environmental Investment Centre.

Log rafting. The River Rannapungerja and its tributaries used to be the important rafting rivers in North-East Estonia: the forest trees felled in winter were taken out of the deep forests in spring.

The logs, dragged by horses, were taken to the riverside in winter to wait for the breaking of ice. This was a well-paid job, and men from far-away forest villages and farms engaged in taking logs out of the woods. As the spring came nearer, the piles of logs were getting higher and higher, and when the ice had disappeared, the rafting commenced.

This was done by the local men, and, in addition, by the men of coastal villages of Lake Peipsi, sometimes even 12-year-old youngsters. In the locality of the Iisaku and Narva rivers, skilful rafters were referred to as *onesin*s (Moora, 1964), and as they came to work on the banks of the Tagajõgi, this term also became widespread here.

When the ice started to move, the taskmaster formed the rafters into groups and they moved up the stream, to the log piles where the piles were pushed into free water – usually, these were six-metre-long pine and spruce logs, but the aspen was also profitable, used as raw material for the match factory.

The dealers marked the ends of their logs before rafting, ticking different indents with chisels or using oil paint for this purpose. While in earlier times, the logs of each purchaser were rafted separately, it might happen that the water level lowered very quickly and some of the logs remained on the riverbank, and thus, this idea was discarded. The logs were let loose down the stream and were caught in Rannapungerja, at the "river-gate", before reaching Lake Peipsi. There, the timber was sorted according to the marking thereon. Sometimes, two logs were tied together to raft on them down the stream.

At that time, the riverbanks were hustling and bustling, with many people. Young men – the rafters – lit up the eyes of local maidens and provided income to the riverside farms: the rafters were sold foodstuffs and given accommodation. One of the stopping places was near the Muraka bog, where the Kruusoja brook flows into the Tagajõgi, as this was the office (*kontor* in Estonian), hence the name of the farm – Kunturi. The salary was 2–5 kroons a day, depending on the skilfulness and experience of the rafter (as a comparison – one kilogram of sugar cost 27 cents at the time).

Preparations had to be made prior to rafting – long guidance logs were attached to river-curves and the banks of ditches, from the wider part of the trunk, leaving the top of the log drift down the stream. Such gliders made it impossible for the rafted logs to get stuck in the banks. Where necessary, boat-hooks or *pogra*s were used from the shore to push the logs – this boat-hook and an axe were the main personal tools for each rafter – to help the logs back into the flowing water.

The most experienced men worked in the rapids, as they had to loosen the jams of logs stuck behind the stones and rocks. This was a dangerous job and pre-necessitated special skills. Once the logs were released, the men, standing on top of the logs, moved down the rapid by keeping the logs together with the strength of their legs. In some occasions, the trip ended in the ice-cold water, and the worst situation was when the rafter got stuck in the logs – this meant the end of the job and a lot of concerns to get well again, as there were no health insurance benefits in case of accidents.

The dams on the rivers were lifted at the time of rafting. High water table lasted from two weeks to one month. The owners of the mills operating on the River Tagajõgi were not interested in opening the dams as the mills could not work during this period.

To solve this problem, the rafters bought the water from the millers.

When all the logs had been rafted down the stream, the workmen gathered in the river mouth – a specific river-gate was made in Rannapungerja by pulling strong ropes across the river, and the logs bulked in front of the gate were linked together with spruce branches to form a planked footpath or *saapan*. It needed a lot of skill to make a *saapan*, and not everyman managed to do this. The *saapan* stretched to the middle of the river and was up to six metres wide, a good place to catch the logs with a boat-hook and direct them to the riverside where the logs were set into rafts or *plott*s. Then, the rafts were connected into a long row of rafts (*konka*), and a steamship or engine-powered hauling vessel dragged these along the coast of Lake Peipsi to Narva or Tartu. Approximately 2000–3000 logs were attached to the rear of the ship by way of a triple rope. The transport of the logs had to take place in quiet weather as it would have taken a lot of time and effort to collect the logs dispersed in the waves.

Before the introduction of hauling vessels, horses were used to drag the log-rafts along the shore to Vasknarva, with an estimation of 200–250 logs per one horse.

The remnants of logs – good material as firewood – were collected from the water, in the vicinity of the river mouth of Rannapungerja, even in summer-time. Once the springtime fieldwork was completed, men came to Rannapungerja from inland villages

Veneküla and the Orthodox church in Lohusuu, rafting on the River Avijõgi. Picture taken approximately in 1924. *Photo from the collection of Leonid Mikhailov*.

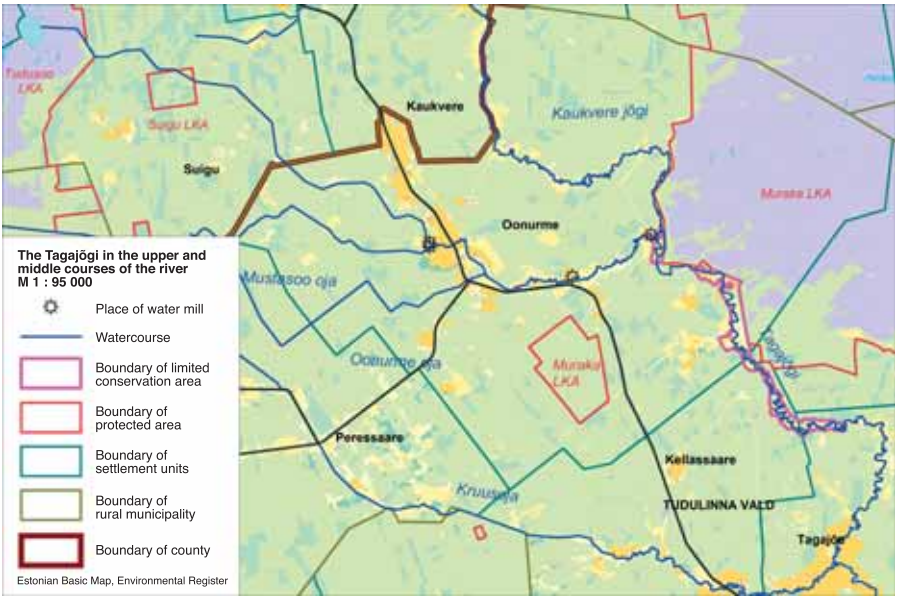
to do this well-paid job. The timber was pulled out of the water with a horse dragging a harnessed log-sledge: the horse was walked backwards to the river, and the logs were tied to the sledge. By encouraging the horse, nearly one solid cubic metre of wood at a time was pulled out along the nearly flat shore, this amount of firewood cost 50 kopecks in Tsarist times. The logs were then piled on the riverbank, and as the river law was valid within this nearly 20 metres long strip of land, no one could prohibit the men working there, neither the manor nor the farm-owners. The logs were sawn into two, loaded in a wagon and then pulled into the lake with horses to be reloaded on wide, low-draught barges transporting the firewood mainly to Tartu.

The rafting activity decreased significantly after the completion of the Sonda–Mustvee railway, and finally faded away.

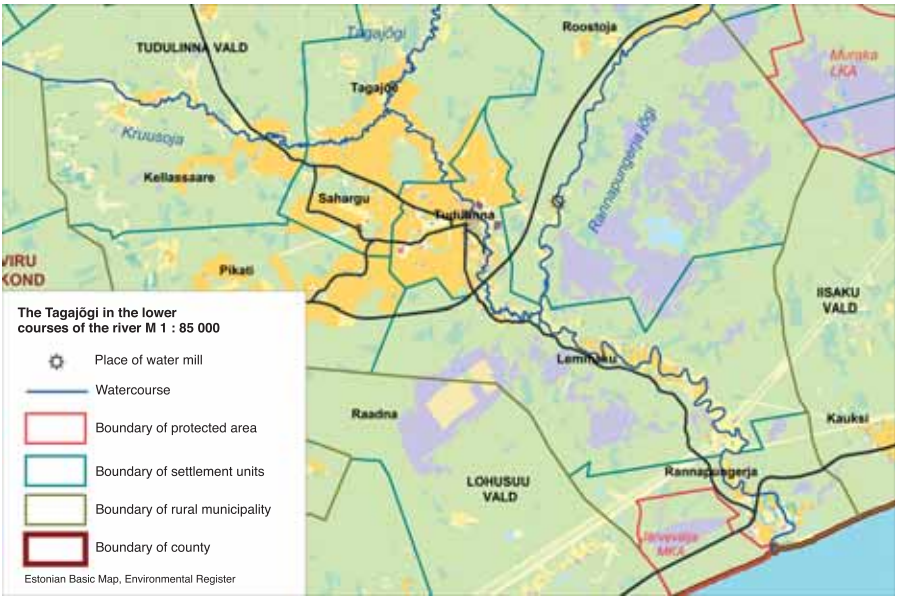
SETTLEMENTS ON THE BANKS OF THE RIVERS TAGAJÕGI AND PUNGERJA

(downstream from the river source)
Lääne-Virumaa
Vinni rural municipality:
- Suigu village (on the right riverbank);

Ida-Virumaa
Tudulinna rural municipality:
- Oonurme village (on both sides of the river);
- Kellassaare village (on the right riverbank);
- Tagajõe village (on both sides of the river)
- Tudulinna small town (on both sides of the river);
- Lemmaku village (on both sides of the river);
- Rannapungerja village (on both sides of the river).



The Tagajõgi, its tributaries, objects under nature conservation, old mill sites and riparian settlements in the upper and middle courses of the river.



The Tagajõgi, its tributaries, objects under nature conservation, old mill sites and the riparian settlements in the lower courses of the river.

Suigu village

The name of the village is associated with the journeys of the national hero Kalevipoeg, when he moved towards Narva: in the vicinity of Suigu, the hero fell asleep or felt sleepy (*suikus*) and was already sleeping in Tudu (*tuduma* = to sleep).

Kalevipoeg had gone to Narva through Tudu. He had felt sleepy in Suigu, and had fallen asleep near a rock in Tudu, where he had slept. Hence the names: Suigu – to fall asleep, Tudu – to sleep. The boulder is near the Palasi–Tudu road, on the right side of the highway, about 100 metres away on the field. The boulder is oblong, with a lower place on its top, similar to a sleeping-bed of a human being. The head-side is higher. The length of the rock is approx. 5 m, width approx. 3 m, height in the more elevated part 2.5 m and in the lower part 1 m.

EKRK I 4, 159/161 (7) < Kiviõli region, Tudu village council (Viru-Jaagupi, Roela rural municipality) – A. Rõõm (1952)

Lake Tudu, the source of the River Tagajõgi, has earlier also been called Lake Suigu, according to the name of the village. Lake Tudu is a typical dystrophic bog-lake: with the surface of 26 hectares and up to five metres deep. There are no fish living in the lake, although people say that dark and bony pikes have been caught in the lake.

Peat islets, lifted by marsh gas, can be spotted floating on the lake from time to time, as they break up and sink to the bottom again in the course of time. The local people believe that there is a creature *Nässu* living in the lake, who comes to the surface occasionally and scares the swimmers. Indeed, dark chunks of peat are scary as it is not possible to notice them until you bump into one such *Nässu*.

The River Tagajõgi starts from Lake Tudu. *Photo: Ain Saapar.*

According to local oral tradition, a fairy had been living in the lake, who had been driven out from the Tudu sacred grove or from Roela. The grove fairy had helped people in catching fish yet expected praise in return. The lake, together with the fairy, is believed to have come to the Suigu village from some other place. In Viru-Jaagupi, the local people have said that treasures had been buried in Lake Tudu during wartimes.

Old people say that when a storm is coming, the gulls would fly from Lake Peipsi to Lake Tudu.

For a number of years, triathlon contests have been held in the vicinity of Lake Tudu, starting with a swimming race in the lake, followed by a running event through the bog and ending with a cycling activity in the Tudu park. In 2009, the contest took place for the 21st time.

On the lakeshore, there is a hiking cottage with a hearth, a bonfire site and a swimming pier, yet the sauna, highly appreciated by the hikers, is not there any longer.

The lands of the Suigu village encompass two nature reserves: Tudusoo and Suigu (see p. 89).

River Tagajõgi and Tamme-Suigu road. *Photo: Ain Saapar*.

Oonurme village

This remote forest village (*Hogenurm*) near the River Tagajõgi was first mentioned in historical records in 1501.

In 1501, a monk of the Muuga Manor found a secret winter-sledge road, and when walking along this path, he got to a nearby forest village. The villagers said that the name of the villages was Nurmeküla ('Meadow-village'*), but the monk, not understanding the vernacular enough, had written down the name Hogenorme* (Lepasaar, 1991).

During later periods, the written version of the village was altered: up until 1891, the name was *Onorme*, and the today's form, Oonurme, was taken into use in 1919.

The Devil had been running around the area of Alutaguse and swearing: "Marshes and bogs all around you, whether you go straight or make a detour! Only moss, marsh water, horseflies and swarms of mosquitoes. Not a single higher spot where you could lie down and rest." But then, the Devil had reached the banks of the River Tagajõgi. He was really surprised to see the riverbanks rise into meadows and he called out in wonder: "Oh-nurme! Here's a stream and I can finally have a rest!" He could barely sit down when he was deep asleep, snoring... But the birds remembered the Devil's exclamation in their own language – and Oonurme is the place name now! (Lepasaar, 1991).

Another story about the origin of the place name is as follows:

The schematic map at the schoolhouse gives a good overview of the Oonurme village. *Photo: Aili Reiman*.

At the time of Noah, when there was the Flood and not a single dry slope anywhere, the Devil had been running around in the forests, fearing to be drowned. Then, all of a sudden, the Devil had seen a higher dry spot in front of him and shouted with joy: "Oh, nurm!" and since then, this place was called Oonurme.

ERA II 249, 275 (3) < Iisaku parish, Tudulinna rural municipality, Oonurme village – D. Maasik < from a village boy (1939)

The dairy manor in Oonurme was separated from the Moora Manor at the end of the 17th century, and belonged to the Knorrings, among them Baron Egolf von Knorring, the state councillor.

Even in old age, Baron Knorring had come to see his possessions and subjects, defying the poor road conditions. According to oral records, he had supported the dredging of the river in order to dry the pasturelands, and had allocated money to build a direct road connection between Oonurme and Virunurme. However, this road was never built. In the 19th century, the manor was purchased by Georg von Wege, who started to sell the rented farms into freehold for the peasants. All the manor buildings have perished by today.

A village school in Oonurme commenced operation in 1836.

The stone grave, known as Kalmuväli ('Grave-field') dates from the first half of the 1st millennium and the beginning of the 2nd millennium. Kalmuväli is located in the field of the Jaagora farmstead (previous owner Johannes Laasberg), on the right bank of the River Oonurme – 140 metres from the place where a small brook flows into the river. The site of the burrows is bumpy and with plenty of rocks. Large and strong human bones were revealed when a hole was dug in the area to make charcoal, and bones have also been washed out by water. The grave is built of larger rocks and soil, being nearly level with the ground. The landowner, having dreamt about a treasure trove hidden in Kalmuväli, had gone to excavate the grave, yet he found only bones of dead people, rusty arrow-ends, a handle of a sword and a large crossbow-shaped brooch (Nurgamaa, 2010a).

In oral tradition, references have been made to the Hiieväli ('Sacred grove field') in Oonurme.

Hiieväli was located near the Educational Society of Oonurme, 145 metres towards the village, on the left side of the road, on the lands of the Valteri farmstead, 166 m in length, 158 m in width, and is now made into a field. In olden times, the sacred grove had been there. "A treasure pot was said to have been hidden in there, and it was sometimes shown to some people in their dream, but the diggers had not found anything. Only Toomas Nõmberg, the master of the Adra farm had found a sword there, with a rusty handle. He had sharpened it and used it for cutting straw. Later, he had wanted to make it into a knife but the sword broke during hitting."

AI 16:1 <Antiquarian-topographic list of the Iisaku parish – A. Peterson

Schoolteacher Mölder had found a simple stone axe in the River Oonurme, within the lands of the Treiali farmstead (Nurgamaa, 2010).

The village used to be several kilometres long in older times: with oblong threshing-barn dwelling on both sides of the road, on higher ridges, on the boundary of fields and forests. The majority of these former large farms have perished by now. The village also encompassed the scattered farms in the forests. During the prime time of the Republic of Estonia, there were 88 farmsteads with 500 inhabitants in the Oonurme village. As the local soils are poor and there are plenty of natural grasslands, cattle-breeding was the main subsistence of the large farms in the village.

In winter-time, the peasants of Oonurme and Tudulinna transported vodka in concerted action: the barrels were taken to the Viru winter road via Virunurme, and from there to St. Petersburg.

The following societies were operating in Oonurme in the 1920s: educational and farmers' society, dairy association, singing and brass-band society and the string orchestra, acting groups, women's society *Linda* and sobriety union *Tungal*. The sports group focused on wrestling, producing several top athletes in the Virumaa area, among them Aleksander Kulikov, who later earned his living by boxing in Europe and was the champion of free-style wrestling in England, in the heavyweight category.

The Sonda–Mustvee railway reached Oonurme during the first years of the Republic of Estonia, and the bumpy log-road was rebuilt into an up-to-date gravel road. A new schoolhouse was erected in the village centre in 1926, with approximately 70–100 pupils attending this elementary school. In the new society building, there was an assembly hall with 300 seats. Likewise, a dairy facility was launched and the societies of fire-fighters and peat-extractors were established. There were five shops in the village, three windmills and four water-mills. A steam-operating flour mill, sawmill and a workshop for processing timber were constructed in the later period. Pasti mill, in the vicinity of a tar-kiln-hole, was engaged in felting woollen cloth. According to the memories of people, there had been another mill near the stone grave in Oonurme – as proof of this fact querns have been found in this site.

During the Soviet time, Oonurme was the centre of the village council up until

1960. Currently, there are nearly 80 inhabitants in this small sparsely populated forest village, known as good singers and enjoying active lifestyle. The choir of local people comes together as of 1999, formed by the reputed conductor Ants Üleoja, who was born here in the Raja-Jüri (Rajasoone) farmstead. Another local farm, Raja-Jaani, is the birthplace of Rein Rajamägi, a soloist in the Estonian National Male Choir.

The joint singing days in Oonurme are known far and wide. The schoolhouse, built in 1926, is now reconstructed into a village centre, accommodating the library, a display room providing an insight in the Muraka bog and local nature, cosy facilities for different gatherings and reunions. The building in the former schoolyard is furnished for hunters, with a risen peat bed for plants and a seated area outside the house. Opposite the village centre, there is a spacious party ground with a stage, this site is also used for tenting. Likewise, there are recreational sites and a hiking trail arranged in the Muraka bog.

In the village green, there is a monument commemorating those perished and repressed during the Soviet occupation.

The Oonurme boulder, a couple of hundred metres away from the left bank of the River Tagajõgi, has split into two: 4.4 × 3.6 × 2.2 m, with the circumference of 14.5 metres, and 5.1 × 2.9 × 2.8 m, with the circumference of 10.8 metres.

According to oral narrated history, the boulder in Oonurme was supposedly halved by lightning, or the Devil himself. Besides, the fissure in the large stone has been the sacrificial place to hope for continuous good fortune in growing grain.

The old mill of the Kunturi farm has not been operating for a long time. In 2007, there was very little water in the river. *Photo: Aili Reiman*.

Kunturi farm, one of the stopping places and offices of the rafters, is located near the inflow of the Kruusoja brook (see also p. 63, 66). The farm had its own water mill on the river.

Up until the 1960s, Kunturi forest-keeper's premises were a favourable place for catching crayfish. However, townsmen, not knowing the local circumstances, did not manage to catch any crayfish, only the otters had been splashing in the water all night. Then the forest keeper had

told the men to catch crayfish in daylight, from among abundant yellow water-lilies, as at night, the crayfish stayed in their dens due to the abundance of otters.

Muraka marshland and Muraka nature reserve (see p. 90) extends in the vicinity of Oonurme and the next two villages on the riverbank, Kellassaare and Tagajõe. On both sides of the river, there is the Tagajõe limited conservation area (see p. 90).

Muraka bog and the neighbourhood have been vividly described in a number of books by a local nature man Juhan Lepasaar, here follows an excerpt by him (Lepasaar, 1996):

The expanses of the Muraka bog, the ruffle of the Alutaguse forest, quiet flow of the waters of the Tagajõgi, dome-shaped hills of Saarevälja in Mäetaguse – this is nature's unique and admirable creation. And from there, from the higher ridges, dome-shaped hills and rising riverbanks, we get to the people. Throughout times, their hard work has changed the riverside into beautiful meadows, ploughed the ridges into fields, fixing their life and will here, between the powerful forest and the large Muraka mire. Bold and strong people have inhabited the bog islands and the far ends of the forests of Tagajõe.

Altogether, there were 14 farmsteads on the Muraka bog islands and the nearby woods. In olden times, life was striving in the edges of the large bog, and sometimes also in the middle of it. St. Mary's Day (*heinamaarjapäev*) on the 2nd of July was celebrated as a major festivity, even at the beginning of the 20th century, so that people would not go to work but convene on the eve of the festive day at the Muraka bog, taking along food, bags and baskets, spending night at the bonfire or in the nearby farms. The main gathering places were the Võhkassaare and Mäurassaare farms, Kasiksaare dance hill and the Rauasalgu bog islands. The dance-grounds of the local young people were filled with music and laughter on the night before the picking of cloudberries, and the celebration sometimes lasted until the morning. The berry-pickers would come back by mid-morning to avoid the day-time heat in the bog.

Now, the majority of these farms are abandoned, with only old trees or single ruins witnessing the sites. It was mostly during the Second World War and the following decades when people left their homes. Today, there are less than twenty permanent inhabitants living near the Muraka bog.

Kellassaare village

There are two old farmsteads in the Kellassaare village, on the banks of the River Tagajõgi: Saaremetsa and Kõrgenõmme (Tagajõe). A part of the Tagajõe limited conservation area stretches to the edge of the village (see p. 90).

Well-maintained flood meadow in the Kellassaare village. *Photo: Ants Animägi*.

A narrow river meandering through the flood meadows of the Tagajõe village. *Photo: Anne-Ly Feršel*.

Here, the Kruusoja brook flows into the River Tagajõgi. The village has obtained its name from water courses: Tagajõe village (official administrative unit), but on some maps, also marked as Ojaküla. *Photo: Anne-Ly Feršel*.

Tagajõe village

In older times, the dairy manor of the Tudulinna Manor used to be in the Tagajõe village, and the pasturelands behind the village were the grazing place for castrated fatlings, with the cowsheds for young cattle built in the village.

The following plots are located on the banks of the River Tagajõgi: Elsa landownership (former Tagajõe farmstead), Võrnureie (only meadows are left from the former farmstead), Sarapuu (formerly, this was Tagavälja farm), Vanasilla (ancient farmstead); downstream from the inflow of the Kruusoja brook there are ancient farmsteads of Kivistiku and Sarra, and also the Nurgamäe and Roosimäe farms.

Tudulinna small town

Written records of Tudulinna (*Tuddolin*) date from 1583. Prior to 1700, Tudulinna belonged to the Rakvere Manor, and up until 1866, the small town was part of the Viru-Jaagupi parish; during the later period, Tudulinna belonged within the Iisaku parish.

Tudulinna Manor. At the beginning of the 19th century, Tudulinna was reformed into a separate manor, and the building works commenced in 1804. The estate was

a one-storey wooden building on the river-bank, the rear view opening to the river. Added to this were the governor's house, stables of driving horses, coach house, storage rooms and the rubble-stone cattle-shed. The distillery was built behind the governor's house. There was a smithy on the crossroad of Tagajõe and Roostoja routes, and a large threshing barn in the vicinity. The gardener's house was a bit further away.

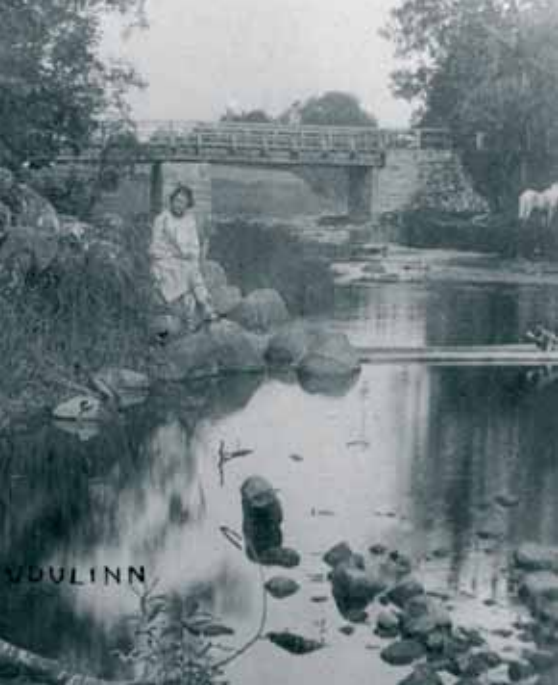
A park with well-arranged footpaths was designed on the opposite bank of the river, accessible across a slight arch bridge connecting the green area with the manor courtyard. The trees in the park were planted in free-style groups of birches, spruces and larches. In 1900, the main building burnt down and the family of the manor-owner left Tudulinna (Nurgamaa, 2010).

The oxen in Tudulinna were taken along the only higher path – Ärjarada ('Oxen trail') – to Iissaare, on the edge of the Muraka bog, to eat juicy grass. Elsa Karp remembers that prior to World War I, there had been 9 windmills and 5 water-mills in Tudulinna, whereas the only one preserved until today is the windmill of Möldri Kaarli (without wings and under heritage protection).

The church was built in Tudulinna in 1766. The original wooden edifice was renewed and enlarged in 1863. During the 1930s, a part of the congregation refused to listen to the sermons of pastor Voldemar Kuljus and went to the prayer house of the Brethren congregation. As a result of the religious argument, the true

A summer-time view of the River Tagajõgi in Tudulinna. *Photo: Mai-Liis Feršel*.

The old manor bridge in Tudulinna collapsed at the end of the summer of 1975, when a Kirovets K 150 tractor, of the then agricultural cooperative, was heading to the Tudulinna peat bog near the Süvajõe farmstead to pile peat. At that time, the Avinurme–Iisaku road passed though the small town of Tudulinna and across the old bridge. *Photo: Mango Maasik*.



Manor bridge in Tudulinna. *Photo from the collection of the Tudulinna local lore room*.

The old church in Tudulinna, built in 1766, renewed and enlarged in 1863, operated as a gristmill during the times of the state farm. Now, the old church is taken under heritage conservation. *Photo: Anne-Ly Feršel*.

believers built a new church (with the bell-tower facing the east) next to the old one, the construction was completed in 1939, this was the newest Lutheran church in Estonia up until 1990. During the Soviet occupation, the tower of the old wooden church was demolished, all the church requisites were taken away and the building was later reconstructed into a gristmill of the state farm. Currently, the old church is under heritage protection, and has not been restored.

Education, work and social life. Tudulinna school, opened in 1845, is still operating as a basic school today. Tudulinna rural municipality was formed in 1866, people in the region have been active in their social life, establishing the singing and acting society in 1845, singing choir in 1870, the Consumer's Association of Tudulinna (1914), Credit and Savings Cooperative, etc. During the first years of the Republic of Estonia, there was a village pub here, and a local newspaper, *Tudulinna Hääl* (Voice of Tudulinna) was issued.

Paula Padrik, the soloist of the Opera Theatre Estonia was born and bred in Tudulinna.

As the soils were poor, people of the nearby areas had to find additional subsistence by making wooden items, burning lime, making tar, bricks and clay vessels, but first and foremost, the inhabitants of Tudulinna were famous for manufacturing spinning wheels, horse sledges and chairs. The local men were also engaged in selling forest materials, and they rafted the logs to Lake Peipsi

along the River Rannapungerja.

The local rural municipality has always been rich in forests, and during the Soviet time, it was divided into four forest management districts.

A picturesque view of the village opens from the Linnamäe hill: the houses along the streets are nicely apart from the outbuildings, some of the dwellings are even two-storied; windmills, cultivated fields, gardens and the meandering river can be seen here and there, and all this is bordered with a large forest. This is a description given in the compilation *Wirumaa* (Rosenberg, 1924), a book on the past and present of the county, published in 1924.

In 1935, the local physician initiated the construction of the power plant in Tudulinna. The plan first envisaged the station be built on the River Tagajõgi, near the dairy society building, as an electric generator was already operating in the facility, supplying the X-ray cabinet of Tudulinna with much needed electricity. The doctor's novel idea was realised only in 1946–1947 when a small hydro-power station (with the capacity of up to 100 kW) was built on the River Roostoja (Rannapungerja), at the Särjetõkke rapids, as a campaign and joint effort of the Young Communist League; the designers of the power plant were the students of the Tallinn Polytechnical University. The facility was launched in 1950 and operated for ten years, supplying the Tudulinna area with electricity, and later, after increasing the power output, also the town of Mustvee. The station finished working when oil shale-based energy was

Spring-time flood waters still rushing down the dam of the hydro-power plant in Tudulinna. *Photo: Anne-Ly Feršel*.

After the construction of the hydro-power plant in Särjetõkke, the Roostoja brook remains relatively dry during the low season. *Photo: Anne-Ly Feršel*.

introduced in the forest village. In 1998, the old dam was reinforced and a new power plant was constructed, with total capacity of 150 kW, launched in 1999.

The village society in Rannapungerja has planned to create a hiking trail, with sites for recreation and bonfires, en route the Rannapungerja–Tudulinna power plant.

In the small village cemetery in Tudulinna, it is possible to see the simple forged crosses made by the village smiths in the 18th–19th centuries, evidencing great mastery. There are also unique examples – a cross in the joint grave of a mother and child, where a smaller cross curves out of the larger cross, and the twin crosses of married couples, and others.

The statue of a resting soldier – the monument to the Estonian War of Independence (sculptor Voldemar Mellik), erected in 1923 and demolished in 1940, was hidden during the occupation time, buried in the ground in the graveyard. The monument was dug out and restored in 1990, from donations of people.

The local people are interested in local lore studies and they would like to expand the activities of the Tudulinna Singing and Acting Society by way of displays and active promotion of the locality. Plans have been made to adapt the old church, windmill and the hydro-power plant for tourism purposes and to put up signs for the Tagajõe hiking trail.

Tudulinna Linnamägi (hill-fort), two kilometres to the east from the old chapel, has been repeatedly mentioned in earlier records. The relative elevation of the hill-fort is 25 metres, rising 70 metres above sea level. Baron Ludwig August Mellin has described the hill and the kettle-hole thereon at the end of the 19th century, using the data obtained from the local pastor. The abyss in the centre of the hill-fort had been so deep that the old birches growing in there were not to be seen. Because of this abyss, pastor J. E. Rauch had considered the hill-fort to be an extinguished volcano. According to Jaan Jung, however, this hill "had been excavated very steeply, forming steep embankments on both sides".

There are plenty of folk tales about the hill-fort – according to one, the national hero Kalevipoeg had wanted to build a town and the Tudulinna hill-fort was the construction material he had piled. The town was never completed as the part built during the day had collapsed at night.

According to another version, the town had indeed been completed on the hill-fort, but had sunk under the ground all of a sudden. Then it was said that the town went to sleep (*tuduma* in Estonian) – hence the place name Tudulinna.

There had been a large forest, with very wealthy people living in there. In the middle of the forest there had been a hill. People were not content with the small huts and they started building a town on top of the hill, a large and fancy town. What was built during the day had been demolished by the sorcerers of Peipsi. Somehow, with the help of witchcraft, the people managed to scare away the sorcerers from their nightly visits. The town

was completed. But then it happened that the sorcerers heard about the witchcraft from an old woman. The town was nearly ready when one night, the sorcerers got an antidote from the witch, and then they came to the town and raised their hand to swear eternal mischief on the town. They could hardly raise their hands when the town had sunk under the ground with a terrible noise. Everyone had gathered at the edge of the hole, mourning their handiwork. Someone had said: "Tudu, linn!" (sleep, town!). *Since then, this country place was called Tudulinna, which became the name we use today.*

ERA II 70, 402 (5)

Beaver dams cause floods in the Roostoja village. *Photo: Anne-Ly Feršel.*

According to a third folk tale, a man had come to the hill-fort of Tudulinna in olden times, and his name had been Tuuto. He had built a fence around the buildings, arranged the dwelling into a cosy one and then people had said that Tuuto was living as if in a town. And later, the people had called the place *Tuuto linn* ('Tuuto's town') which gradually evolved into Tudulinna.

1895, archaeological excavations were conducted at the Tudulinna hill-fort, under the guidance of Sergei Bogoyavlenskii, an archaeologist from Moscow, and Baron Stackelberg. The small-scale excavations did not bring to daylight any finds referring to the quondam stronghold, although in 1894, during the construction of the triangulation tower on the hill-fort, the earth revealed an arrow-end, a piece of a knife, a bronze brooch, Swedish money, etc. For local people, Linnamägi is the entire hill, within the length of approximately one kilometre towards the south-west direction, although the actual hill-fort was once located only on the southern end of the mount (Nurgamaa, 2010).

The River Tagajõgi, flowing through Tudulinna, discharges into the River Rannapungerja. The place where the two rivers, Tagajõgi and Rannpungerja (known under the name of Roostoja in its upper and middle courses) become into one is called the Roiu river-branch, according to the nearby Roiu farmstead. The Roostoja village on the riverside is the birthplace of Estonian folklorist Mall Hiiemäe.

Only one the protected limes in Lemmaku is still there. *Photo: Janar Aleksandrov*.

Lemmaku village

Lemmaku village is located on the banks of the River Rannapungerja (Pungerja), downstream of the river mouth of the Tagajõgi. The village has a long history: the local iron smelting site dates from the second half of the 1st millennium.

Lemmaku burial mounds, in the vicinity of the Rannapungerja–Tudulinna–Rakvere road, on the lands of the Kivistiku farmstead, are thought to be of the same age – there are seven barrows from the 6th –7th centuries, nearly half a metre high and 6.5–8 metres wide. As some of the burial mounds are destroyed, there is no certainty with regard to the initial measurements. According to oral tradition, this had been an old burial site from the Swedish rule.

During the archaeological excavations of the Lemmaku barrows in June 1983 and 1984, under the supervision of Priit Ligi and Mare Aun, the remnants of a burnt cross-beam construction (probably a house for the deceased) were discovered, but no datable finds. In Jaan Jung's opinion, these were the stone graves from the Iron Age, *"standing on the right side of the river, to the west from Rannapungerja, and 100 steps away from the road. They are said to be 4 feet high and with a width around 6 fathoms. They look like the barrows that are also marked on the Swedish map"* (Jung, 1910). The ancient settlement site, or the burial mound in Lemmaku, was probably located on the lands of the Treiali farmstead, on the right bank of the River Rannapungerja. Later, there was a brick plant in this place, and according to folk tales, human shinbones that had come out of the ground during the construction work, had been picked up and buried in the graveyard in Tudulinna. According to the local farm-owner Treimann, a certain white substance, and a wedge had come out of the ground during the construction of the brick factory, but it was thrown away as no one knew what it was meant for. Treimann had found a stone axe without an eye, and flints in the river near the site of the brick factory, but these are lost by now (Nurgamaa, 2010).

Lemmaku school was founded in 1850 and was referred to, in the documents of the knighthood, as Earl Stackelberg's private school. It is known that the school had still been operating in 1940, but the local people do not remember the time it was closed down.

Fish feast, or the holiday of the fishermen of Lemmaku was celebrated on *paastumaarjapäev,* the St. Mary's Day on March 25, and it was a tradition to eat dried pike, preserved from the previous catching season. This was believed to guarantee a good catch during the new season as "*on this day, the pike would turn its head from the lake to the river, to start migrating*" (Rüütel, 1992).

Dried pike is prepared as follows: the largest pike caught in spring is cut on top of the back and the guts are taken out, then the pike is left in salt for three-four days. Thereafter, the pike is nailed on the wall – in the shade under the eaves – until it becomes totally dry. The dry and hard pike is either preserved in the pantry or barn until next spring. On St. Mary's Day, the fish is boiled, cleaned of the scales and prepared in lard sauce, served with boiled potatoes and accompanying drink, St. Mary's blush (vodka, which is made red with berries).

Fishing on the River Rannapungerja, Lemmaku village. *Photo: Anne-Ly Feršel*.

When rye was in blossom, the men in Lemmaku could not sleep any more: the bream came up the stream to spawn! There was a local saying for this time of the year: *"Elk's lip, bear's paw, otter's tail and bream's navel – no one can resist this taste and everyone's mouth would be dripping with saliva"*. In olden times, it was considered great fortune to catch an otter as it was then possible to boast of having a collar or hat made of otter skin.

Lemmaku village is located on both sides of the river, next to the Rakvere–Rannapungerja road. There is no proper bridge in Lemmaku, thus the only possibility to cross the river is in Rannapungerja. The local development plan envisages the restoration of the Lemmaku or Jaruska bridge. Today, there are 16 families working and living in

the village all the year round, and in addition, there is a camp for children and youth, and 20 summer cottages. The village society wants to furnish public swimming and bathing places at the river. The Eurovelo cycling track permeates through the village.

Two old intertwined larches used to grow on the riverbank, now there is only of them left and taken under nature conservation.

Rannapungerja village

This is the last inhabited area on the journey of the River Tagajõgi to Lake Peipsi. Rannapungerja was first mentioned as the ancillary manor of the Pagari Manor in 1534. The main building of the manor is a one-storey log-building with a gable roof. There was no park surrounding the manor, only single oaks and maples growing in the vicinity. The edifice, built in the second half of the 19th century, underwent a thorough reconstruction in 1969 and was thereafter used as an apartment house; all the outbuildings have perished (Nurgamaa, 2008a).

The old settlement site was discovered on the right bank of the River Rannapungerja, on the western side of the river meander, approximately 200–300 metres up the stream from the bridge on the Tartu–Jõhvi road. The mound is positioned in the triangle between the river, Tartu–Jõhvi road and the Tudulinna road. The archaeological test diggings, conducted by Tanel Moora and Lembit Jaanits, revealed shards of clay vessels, and a thick darker layer immediately under the surface, whereas this stratification was sporadically destroyed in the construction of the road and the high voltage substation. A flint shaving has been found near the substation (Nurgamaa, 2010).

River-mouth of the Rannapungerja in spring. The reed-bed and lush aquatic plants presuppose the inflow of nutrients (pollutants). *Photo: Anne-Ly Feršel.*

The underground grave is located near the river mouth, on the right riverbank, dating from the 15th–17th centuries. This graveyard was mentioned by Jaan Jung, and Aleksei Peterson has described the burial site,

Fishermen's huts in the river-mouth of the Rannapungerja. This natural riverbank is a suitable landing place for boats and yachts. Further away, in the pine forest, there is an underground cemetery. *Photo: Anne-Ly Feršel*.

stating that the local people called the place Kalmemännik ('Grave pine forest'). In 1926, there had been a wooden cross in the middle of the graveyard, which allows the suggestion that the site was used for burials even in the later period.

Oral history narrates about a rifle-full of gold and a stoup of silver in the grave, and those who were shown the treasures in their dreams had also gone to search them. Most probably, this graveyard is one of the village cemeteries of the later period, from the15th – 18th centuries, although people were buried here also in the 19th century. In war-time, a large trench was dug along the cemetery, whereas fractions of human bones can still be found on the edges of the holes and the defence embankment. It is indeed likely that the nearby summer cottages are built on the burial site.

The church register of Tudulinna states the following about the cemetery:

Elderly peasants say that in olden times, there was a /.../ place in Rannapungerja where they had earlier buried their dead. This little hill near Peipsi, where the River Tudulinna flows into Lake Peipsi; this site was still revered as a scared place only some years ago, and people would probably still go to see these graves. Both the Russians and some members of our congregation are said to gather there from time to time, they pray and put food and drinks on the graves, which is later picked up by the poor. My predecessor, provost Wetterstrandt had a lot of trouble before the people were ready to bury their deceased in the hallowed ground of the graveyard; some graves were secretly opened and the dead were again taken to these graves, and they had to be again dug out and taken to the graveyard,

following the orders of the manor. I can find confirmation to the above-mentioned facts in a visitation protocol from 1698. (Tudulinna church register, a copy of this preserved in the Iisaku pastorate; Nurgamaa, 2010a)

Postal road. The postal route St. Petersburg–Narva–Tartu–Riga, officially opened in 1714, permeated through Rannapungerja after the Great Northern War. The construction of horse-driven mail roads commenced after 1710, when the territory of Estonia was merged with the Russian Empire. Postal stations offered shelter to the travellers and an opportunity for the state officials to travel by way of exchanging the horses. The construction of the postal station commenced in 1733; earlier, the station had been in the Kauksi village. Initially, the main building of the postal station was a small wooden one-storied edifice. In 1808, the convent of the Livonian knighthood decided to build a new postal station and a dwelling for the coachmen in Rannapungerja, yet the construction started only in 1825. During the 19th century, the local postal station comprised the main building, hay-barn, shed, horse stables, granary, and stables with grazing grounds. In addition, there was also a vegetable garden of several hectares, and a pasture area for horses – 8.7 hectares of enclosed fertile paddock. The number of coach horses kept in Rannapungerja was up to 66 (in other postal stations between Narva and Riga, there were about 30–40 horses, and in side-routes, up to ten horses) (Nurgamaa, 2008a). The postal stations lost their significance after the opening of railway lines: the station in Rannapungerja was closed in 1877, and at the end of the 19th century, the building was used as a forest-keeper's house. The main building and the outbuildings have perished by today, and the accommodation facility for coachmen in Rannapungerja crossroad, which used to be under heritage conservation, has been demolished.

In 1944, the retreating Germans had pushed the fleet of Lake Peipsi to the river-mouth in Rannapungerja and sunk the ships which are believed to be still lying there, buried under the sand. The sites of trenches and foxholes from World War II are still visible in the strip of land between the river-mouth and the lake. During the Soviet times, plans were made to build three five-storey recreational facilities, a club, restaurant, service workshops, a motor site and a life-boat station in Rannapungerja, but all this remained undone. Rannapungerja is the home of Tiit Tralla, a tenor, oratorio singer and a specialist in voice placing.

Summer holiday village. At present, Rannapungerja is a village with a small number of permanent inhabitants, viable and active primarily in summer-time: there are 17 all-the-year-round households in the village, 30 summer cottages and two boat societies – the long buildings of the boat-owners, with piers and hoisting equipment are stretching along the riverbank. The river curve near the road is the launching place for scooters and boats. In earlier years, there was an operating waterway to Tartu in summer, and there are plans to restore the route in the future.

It is known that in 1940, the mixed choir of the Tudulinna Singing and Acting Society participated in the IV Song Festival of Tartumaa, on board a ship leaving from the port in Rannapungerja. Likewise, in the 1960s, the local port was a halting place of the tourist pleasure boat *Lermontov*: the ship harboured in the evening, the passengers enjoyed the party at the dancing ground near the lighthouse and stayed overnight on board the ship. In the morning, before the departure, the sounds of the brass-band swaddled the village.

Nowadays, it is possible to go canoeing, boating and to ride other water vehicles in Rannapungerja, and to enjoy angling. The old oxbow has been abundant with white water lilies in recent decades.

The villagers of Lemmaku and Rannapungerja intend to erect a joint village hall in the future, and to create an attractive environment on the beach for holiday-makers.

The vicinity of the Rannapungerja lighthouse was rearranged during 2007–2008 (financed by the Environmental Investment Centre), reinforcing the foundation of the beacon and the slopes of the sand dunes, an observation platform and stairs were built for the visitors – to alleviate the impact of winds and human activity on the shoreline dunes and make preparations for building a pier in the river-mouth of the Rannapungerja.

A steamship in the river-mouth of the Rannapungerja. Picture taken approximately in 1925. *Photo from the collection of Leonid Mikhailov*.

A view to the Rannapungerja from Lake Peipsi. A lighthouse on the higher ground on the left, and on the right, in the river-mouth – a barge for carrying timber. Picture taken approximately in 1928. *Photo from the collection of Leonid Mikhailov*.

The lighthouse in Rannapungerja was erected in 1937, and the base for the new breakwater was established in 2006. *Photo: Anne-Ly Feršel*.

Järvevälja landscape protection area has been established to safeguard the quondam sand dunes of Lake Peipsi which are now covered with forests (see also p. 91).

Protection of the River Tagajõgi and the landscapes in the vicinity

Within the majority of its course, the Tagajõgi flows through the forests of Alutaguse – thus the catchment area comprises the landscapes, habitats and communities, which are conspicuous at the national level. In order to keep these areas from unfavourable changes, nature conservation requirements are valid within a relatively large proportion of the catchment area.

THE MEASURES TAKEN TO PROTECT THE RIVER TAGAJÕGI

- Limited management zone on both riverbanks 100 m from the boundary of water;
- Tudusoo nature reserve (4,724 ha);
- Suigu nature reserve (82 ha);
- Tagajõe limited conservation area (142.6 ha);
- Muraka nature reserve (13,984 ha), is also included in the Ramsar list of wetlands of international importance;
- Järvevälja landscape protection area (582 ha).

Activities that might affect the river and the biota therein are forbidden on the riverbanks within 100 metres from the boundary of water.

Tudusoo nature reserve (4,724 ha) encompasses Lake Tudu and several marshlands (Punasoo, Tudu Järvesoo, Luussaare mire). These protected areas, initially created in the 1970s to safeguard protected species (incl. the brown bear), have been amalgamated into a landscape protection area and thereafter into the nature reserve, the main value of which is the extensive mire landscape, the lake, forest communities and diverse biota. Tudusoo nature reserve was severely damaged in the storm of 2001, however, the forests are now recovering from the damage without human intervention and this is an interesting research object for scientists and an exciting scene for interested persons.

According to a legend, the Punasoo mire ('Red mire') had got its name after the red blood colour – the wolves had killed the horse of the national hero Kalevipoeg. In the middle of the Luussaare mire, there is the Luusaare bog island, a refuge for people in the past against wars and epidemics (see also p. 31). The island was accessible along a tree trunk path – through the gates of Luusaar – revealed in the course of land improvement works. It is believed that the path had been hidden in the mire since the construction, to keep this secret route hidden from strangers' eyes. In 1870, the following had been found on the island: a large cauldron, iron slag, pearls, coins, remnants of a stove and human bones (the latter were the source for naming the island – Luusaar ('Bone island'). According to Mihkel Veske, these finds are from earlier times, prior to the Great Northern War (Lepasaar, 1996).

Suigu nature reserve (82 ha), used to be the nature reserve of the primeval forest, and actually comprises two separate plots, one in the vicinity of the Tagajõgi, and the other on the banks of the Kruusoja brook. The aim of the nature reserve is to safeguard the virgin forest, the habitat of rare species (flying squirrel and black stork) and

protected lichens (lung lichen) and mosses. Unfortunately, a large part of the forest stands of this nature reserve were destroyed in the storm of 2001.

Tagajõe limited conservation area (142.6 ha) has been established to protect the flood meadows. The limited conservation area, wherein the river flows slowly, comprises two separate parts of the flood plain.

Flood meadows in the river valley within the Muraka nature reserve and in the vicinity are not very wide-spread – if the hay on the flood meadows is not regularly cut, the brushwood would take over and the vistas to the river valley become overgrown and the landscape loses its value. This is the reason why the flood meadows of the Tagajõgi were taken under protection as heritage landscapes and Natura 2000 sites. The limited conservation area of Tagajõe comprises approximately 75 hectares of semi-natural communities which are being taken care of. Those taking care of semi-natural grasslands and communities are entitled to receive financial support as of 2001: this year, support was provided for the maintenance of 20.3 hectares of meadows on the left riverbank of the Tagajõgi (next to the Muraka nature reserve). However, as there are 36.55 hectares of flood meadows also on the right bank of the River Tagajõgi, the application for maintenance support, submitted to the Agricultural Registers and Information Board in 2008, was targeted at the entire area, on both sides of the river, encompassing 63,4 hectares.

Annual hay-cutting is the customary method for maintaining flood meadows, whereas the hay has to be collected and taken away. All this should be done after Midsummer when the majority of birds have already nested and the offspring of larger mammals in these habitats (roe deer, brown hares, elks) have grown bigger.

Muraka nature reserve (13,984 ha, see also p. 75) is a large marshland bordered by rivers: the River Ojamaa from the north, and the Tudulinna and Härjaoja brooks from the south; the River Tagajõgi (and the River Kaukvere) from the south-west, and the River Roostoja (or River Rannapungerja) from the south-east.

This extensive area of land and wetlands comprises many communities and habitats (mires in different development stages, the lake, forests and meadows). The old forests in the Muraka nature reserve are the habitats of the flying squirrel, insects and beetles which are rare in Europe – *Boros schneideri,* a beetle living under dead pine bark, and *Cucujus cinnaberinus*, not to speak about rare Orchidaceae and mosses. Eagles are still nesting in the bog islands. As the bird fauna in the Muraka nature reserve is extremely abundant, this site is one of the most valuable bird areas in Estonia and also included in the Ramsar list of wetlands of international importance.

One part of the Muraka nature reserve – Ratva bog – is one of the oldest conservation sites in Estonia, taken under protection in 1938, as a bog reserve for eagles. A recent film about Estonian eagles shows historical pictures of the Ratva bog and nature, taken in the last century. Within the middle course of the river, the valley of the Tagajõgi

permeates through the Muraka nature reserve on the south-western edge of the area.

Järvevälja landscape protection area (582 ha, in three separate plots) was created in 1967 to preserve the sand dunes, rare species and their habitats on the northern shore of Lake Peipsi. The field of sand dunes comprises old fixed dunes and also younger dunes which are partially of loose sand. The old fixed sand drift, along which permeated the former postal road, is located to the north from the Jõhvi–Tartu road, stretching 1.5 kilometres in length and 150 metres in width. The height of single dunes can be up to 7–9 metres. Younger dunes are up to 6 metres high, in the immediate vicinity of the lakeshore of Peipsi – there are up to 14 juxtaposed sand dunes, with a width of 20–30 metres. The sand drifts, usually covered with heath forests, have formed as a result of the receding waters of Lake Peipsi.

The separate plots of the landscape protection are meant to safeguard the rare species and plant communities.

Tagajõe limited conservation area in the Kellassaare village. *Photo: Ants Animägi*.

The River Pada

The River Pada, which in its lower course is also known as the River Unukse, starts from the north-eastern foothill of the Pandivere Upland, near Jäägaru (3 km towards the south-east from Kabala railway station) and discharges into the Gulf of Finland on the coast of Aseri.

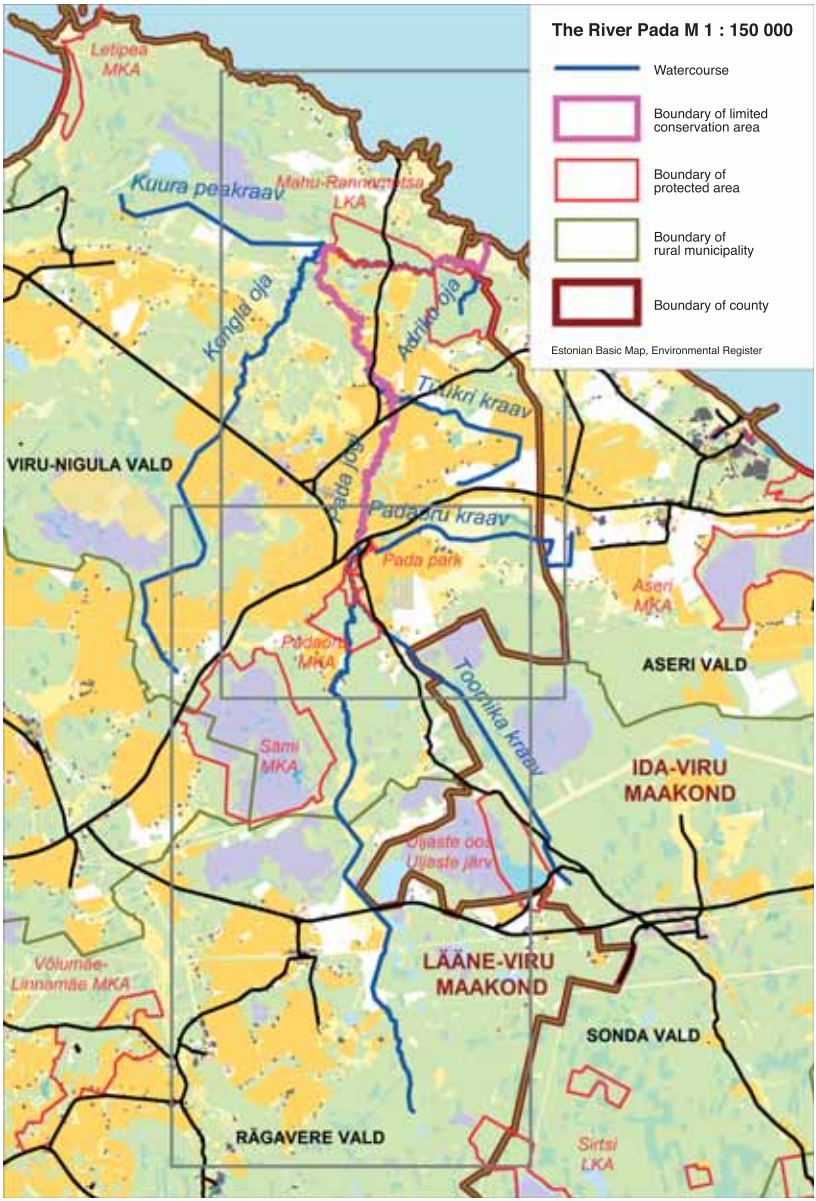
THE RIVER PADA

- belongs to the Viru sub-river basin district of Eastern Estonian river basin district;
- length: 39.5 km;
- catchment: according to calculations 191.1 km^2;
- the following water bodies discharge into the River Pada: Toomika ditch (8.9 km), Padaoru ditch (7.9 km), Tüükri ditch (5.5 km), Kongla brook (15.2 km), Kuura main ditch (5.5 km), Adriku brook (1.3 km);
- the average gradient of the river in the central and upper courses is 2.07 m/km, the highest gradient is 6 m/km;
- according to calculations, the annual average flow rate is 2–3 m^3/s, the maximum annual flow rate is 30–40 m^3/s, the minimum annual flow rate ranges from 0.15 to 0.2 m^3/s;
- waterfalls in affluent valleys: Linnamäe waterfall (cascade) Padaoru ditch, Lähteoru waterfall on the Tüükri main ditch;
- major springs: Koila Linnamäe spring (3–4 l/s), Läht(e)oru spring, Samma silmaallikas 'Eye spring') (1–5 l/s), Roosteallikas spring (more than 1 l/s).

Sources: Environmental register; Alekand, 2009; Esimese seireringi …, 2009 (different sources propose different figures; here we are presenting the most recent ones).

The river's journey on the limestone plain, and breaking through the limestone cliff

The River Pada collects its water from an area of approximately 200 km^2. Two brooks and several main ditches bring additional water to the main river: starting from the source – Toomika ditch, Padaoru ditch and Tüükri ditch flow into the river from



The River Pada and its tributaries, objects under nature conservation.

Different levels of the terrain in the valley of the River Pada: hayfields on the lower terrace and arable lands on the higher ground. *Photo: Eva-Liis Tuvi*.

the right, followed by Kongla brook, the longest affluent of the River Pada, and Kuura main ditch, with an altered streambed, from the left; and the last one, merely a kilometre before the sea, Adriku brook discharges from the right.

For most of its journey, the River Pada flows from south to north, making a big curve in the direction of north-west in its lower course. It is only at the last kilometre before discharge that the river heads again towards the north, and, after descending on the sea plain, the direction is eastward. In this location, the outcrops of blue clay can be seen on the riverbanks.

The upper course of the river has been straightened several times. The topographical map of Estonia of the 1930s shows that the river flows in its natural bed from Viru-Kabala, however, according to the present map, the meandering river commences from the Aasa farmhouse in the village of Samma. Despite the deepening and straightening, the River Pada is included in the water management plan as a natural water body (Ida-Eesti …, 2009).

The gradient of the River Pada is substantial – nearly 2 m/km in the central and lower courses (Alekand, 2009), and up to 6 m/km between the villages of Samma and Koila. Gauge posts have never been installed in the river, which is why no exact hydrological data is available and flow rates have been calculated on the basis of the data of the River Purtse and the River Kunda: the annual average flow rate is 2–3 m^3/s, the maximum annual flow rate is 30–40 m^3/s, and the minimum annual flow rate is only 0.15–0.2 m^3/s (Esimese seireringi …, 2009).

For the most part of its journey, the River Pada permeates the Viru (North-Eastern) plateau, flowing through forests, brushwood meadows and cultivated pastures which are still in use, sprawling on the once newly reclaimed lands. Starting from the village of Samma, however, arable fields can be seen on the riverbanks.

Although the river's substrate area is small and its flow rate modest, it has eroded

for itself a valley with the depth of up to 40 metres, into old Ordovician rocks, and 300–400 metres in length; sludge carried by the glacier sheet can be found in the upper part of its slopes and on its terraces. In the narrow valley in the village of Pada there is room only for small wedges of meadows and woods. Within the landscape conservation area of Padaorg, flooded and other types of meadows are supplemented by diverse forest stands – from spruce forests, the habitats of the sorrel and hepatica, to soggy flood plain woods and wooded mires.

The valley is narrow, but the river might be quite wide. A view of the River Pada from the Viru-Nigula–Aseri road, towards the Koila mill. *Photo: Eva-Liis Tuvi*.

The main valley and the affluent side valleys are particularly scenic and expressive in the middle courses of the river. Between the Samma and Koila villages, where the valley is the deepest, the river drops 15 metres within a 2.5 kilometre section. The Tallinn–Narva road permeates through this magnificent valley, where the western edge is steep (30°), and the eastern slope slanting, the width of the flood plain is seldom more than 70 metres. Another interesting feature about the River Pada is the fact that abundant springs emanate from the left slope of the valley, yet the water veins flowing into the river come from the right.

Karst – the intrinsic feature of limestone areas – reveals itself in the valley of the River Pada at the Samma village: part of the water (and in a dry summer, all of the water), absorbs into the ground from the riverbed, flowing there for about half a kilometre in a tectonic fissure. A group of skinholes has also been described in the fields of the Samma village in the 1950s, but today they are not visible any more.

Karst phenomena are also evident in the vicinity of the Viru-Nigula small town: there is a low depression of south-west–north-east direction near Verioja stream, dredged during land improvement works. Prior to flowing into the River Pada, the waters of Verioja stream imbibe into a trough and then into dolines.

Towards the north from Tallinn–Narva road, the valley intersects with a tectonic fault, yet does not change its direction.

Downstream from Koila, the depth of the valley decreases by four to six metres, whereas the flood plain remains to be 100–200 metres wide. The valley steepens again in the vicinity of Unukse, reaching up to ten metres in the mouth of the Kongla stream flowing in the bottom of the deep V-shaped valley: here the River Pada breaks through the abruptly falling sea cliff consisting of Cambrian deposits. On the coastal plain, the estuary of the river disappears into the reed stand.

The scenic beauty of the landscape on the banks of the River Pada has also been highlighted in the thematic plans, the guidance documents of local settlement system: different parts of the region are defined as landscapes of national significance in Lääne-Virumaa: Sämi–Kuristiku, Malla–Iila–Kutsala–Padaorg and Letipea–Mahu, and, in addition, quite a few of other scenic road sections. In the Ida-Virumaa side, the vicinity of Kalvi is the officially approved precious landscape.

Waterfalls and springs

The River Pada, although descending from the North-Estonian klint, does not drop as a waterfall in the main valley, similarly to the River Pühajõgi. Geologists (Saadre, Suuroja, 2003) explain this with the fact that the escarpments of the waterfall have retreated and flattened in the course of time: it is only the torrential river sections in the bottom of the canyon valley that reveal the traces of the quondam waterfalls. Still, two waterfalls descend into the River Pada.

Linnamäe waterfall (cascade) is the best known of the two, and is also referred to as Kohina or Padaoru waterfall, in the location where the Kohina stream (Padaoru ditch, Padaoru brook), descends into a 20 metres deep Padaorg valley. During 5,000 years, the receding waterfall has left behind a more than a 100 metres long and 10 metres wide V-shaped valley. Prior to descending into the Padaorg valley, there is one 2.5 m high waterfall and, upstream from there, another dozen of lower terraced erosions (0.2–0.5 m high) within the nearly 100 metres long section of the stream, hence the name cascade. During dry times, it is possible to see the giant's cauldron, i.e. the hollow created by floods, in the bottom of the stream, and called Kohinaauk by the local people. The name Kohina indeed comes from the sound of the stream (=murmur). Linnamäe waterfall is also of significance for the geologists: it is a typical outcrop of the Mid-Ordovician Volkhov Pada stages. According to oral tradition, limestone taken from the wall of this canyon has been used in building the Pada Manor: the construction material was delivered to the building site in a human chain.

Lähteoru waterfall can be observed during the high waters in Koila, in the Tüükri main ditch, when the cascade runs down from the limestone escarpment (Eesti geoloogiline ..., 2007).

The Kohina brook (Padaoru ditch) flowing in a steep streambed in-between the rocks. *Photo: Eva-Liis Tuvi*.

Linnamäe or Kohina waterfall has obtained its name after the hill-fort in the vicinity and the murmur of the falling water. *Photo: Eva-Liis Tuvi*.

Koila Linnamäe spring (in the Koila hill-fort), also referred to as Silma-allikas ('Eye-spring'), Terviseveeallikas ('Healing water spring'), Hiieallikas ('Sacred grove spring') and Püha-allikas ('Holy spring') is one of the two springs emanating in the vicinity of the Koila hill-fort. This spring opens in the beginning of the narrow and deep side valley of the Pada primeval valley, with a flow rate of 3–4 l/s. In olden times, the spring was a sacrificial site, and in the 19th century people came to wash their eyes here and take away the healing water. It is the starting point of the stream flowing to the River Pada. Since 1964, the spring is under national protection as an archaeological monument.

Lähteoru waterfall on the Tüükri main ditch. *Photo: Ene Ehrenpreis*.

One of the two springs in the village of Samma – Silmaallikas, the one which is more difficult to be found. *Photo: Ene Ehrenpreis*.

Läht(e)oru spring is in the vicinity of the Koila hill-fort, on the western side of the hill. Similarly to the spring described above, this one is also referred to as Hiieallikas, Silmaallikas, Püha-allikas, Ohvriallikas ('Sacred grove spring', 'Eye-spring', 'Holy spring', 'Sacrificial spring') (Eesti geoloogiline ... 2007). The water of the Läht(e)oru spring has been used to heal several illnesses, particularly ophthalmological ones.

Ohwri- or Pühahallikas near Koila, also called as Lähtoru spring. According to folk tales, this had been a holy place. And the bones of people came out of the ground in there.

Jung III: 132 Viru-Nigula 54 (Joh. Sõster, school teacher)

200 m to the south of the Karu farm in Koila village, 50 m to the west of the road taking from Koila to Aasupealse, the field ends with a high slope (into a marshland). On this bank, a spring flows out from under the stones, and it is called Lähtoru spring. According to schoolteacher Klaus, bones had been found there and the site is considered sacred (many people know nothing about the fact that it was considered sacred, including the farm-owner Tümus himself).

Topographical archive of the Institute of History 1932: 90

Samma silmaallikas ('Samma eye-spring') (Parandusveeallikas, 'Healing water spring', Raviallikas 'Healing spring') – a metre-wide shallow waterhole, surrounded

A much-used footpath leading from the sacred grove to the Samma Roosteallika spring, named after its iron-rich waters (=Rusty spring). Remnants of a cave sauna have been found in the vicinity. *Photo: Eva-Liis Tuvi*.

with stones – opens up on the slope of the riverbank of nearly ten metres steep, near the Samma sacred grove. The water emanating from the spring (1–5 l/s) flows along the approximately tw metres wide streambed of limestone shingle to the river a couple of dozens of metres away. Silmaallikas spring is currently an archaeological monument.

The spring called **Roosteallikas** (flow rate of more than 1 l/s) also emanating from the Pada riverbank, is named thus because of iron-rich water (Roosteallikas = Rusty spring).

Vastapäeva spring in the field between the Samma sacred grove and Sae bridge. *Photo: Ene Ehrenpreis.*

There is abundant water in the Roosteallikas. The remnants of an old shaft well, visible in the spring, evidence that this has been a water-fetching place in earlier times, too. A lot of people come to the spring, washing their eyes, taking the healing water with them and dropping coins in the water.

Remnants of a former cave-sauna have been discovered above the Roosteallikas spring, on the left brink of the primeval valley.

Ahto Kaasik< Mahu parish, Samma village (2002)

One of the local karst springs, on the edge of a field, upstream from the Roosteallikas, is known as the **Vastapäeva spring.**

Ecological status of the river

According to the draft water management plan (Ida-Eesti …, 2009) the status of the River Pada is good: on the basis of the monitoring of hydro-chemical and hydrophysical indicators in the autumn of 2009, two sections of the river were ascertained to fall within the quality class "very good" or "good", and only pursuant to the total phosphorus indicator, the quality estimation is "poor", due to wastewater discharged in the river (Esimese seireringi ... , 2009). According the permit for the special use of water, the wastewater of the Viru-Nigula treatment facility is discharged into the River Pada, and, pursuant to the pollution permit, the brewery Nigula Õlu in Unukse village was also allowed to discharge its wastewater into the River Pada up until 2007.

The water from the Varudi peat extraction field also reaches the river through the Kongla stream.

The biota has so far not been studied enough

The River Pada has been defined as an essential spawning river of sea trout (Kangur *et. al*., 2006). Salmon have also been observed in the river.

BIOTA

- Protected invertebrates: shelled river mussel, green gomphid;
- Fish and jawless fish: 5 species according to the 2009 monitored fishing data (sea and river trout, stone loach, burbot, nine-spined stickleback); and presumably another 4 species (river and brook lamprey, salmon, pike and minnow).

The pea clams (*Pisidium* sp.). *Photo: Henn Timm.*

The status of large **invertebrates** was estimated as good in the Orgu section and as very good in the Padaorg section, during the 2009 monitoring of the River Pada (Esimese seireringi ..., 2009). The total of 25 taxa of **benthic invertebrates** were registered in the middle courses, and 21 on the lower courses. The prevailing species in Padaorg was the common freshwater shrimp, followed by pea clams. The most prevalent species in the lower courses of the river was the large dark olive (*Baetis rhodani*).

The pea clams (*Pisidium* sp.) are small, 3–10 mm long, yellowish-brown mussels resembling a miniature pea.

The large dark olive (*Baetis rhodani*) is considered the most common of the species living in the watercourses of Estonia and its larvae are fast swimmers, up to 12 mm long, and with three tail threads. Staying in the larvae phase for several years, they serve as an essential food for fish. The existence of large dark olives and caddisflies in a water body in general shows that the water is indeed clean. As a dun, the large dark olive has two tail threads of 10–18 mm long, and its body length is 8–12 mm. The nymphs are of greenish colour, and the duns of brownish tone.

In 2009, the green gomphid (*Ophiogomphus cecilia)* was observed on the river shore – a relatively rare species in Estonia and also in Europe – this species is listed in Annexes II and IV of the Habitats Directive of the European Union (protected

areas must be established in the habitats of such species), and in Estonia it is included – as a rare species – in category III of protected species.

Within the section between Samma and Pada hill-fort, the thick shelled river mussel (*Unio crassus*) lives in the River Pada.

The data with regard to **fish fauna** has been collected from recreational fishermen and monitoring catches. Six species of fish have been caught in the River Pada during the earlier monitoring events: brook lamprey, river lamprey, sea trout, river trout, chub and stone loach (Ida-Viru kuue … 2010). During the monitoring catch in the autumn of 2009, the following species were spotted: sea trout, river trout, stone loach, burbot and nine-spined stickleback. However, the researchers of fish do not exclude the possibility of river and brook lamprey, salmon, pike and minnow living in the river. Pursuant to the outcome of such monitoring catches, the status of fish fauna in the river is estimated to be bad to poor. More species were caught in the upper courses, and thus the status of fish fauna was better.

Oxbows are interesting habitats, living an independent life during the dry season. The traces between the duckweed evidence buoyant life, despite superficial calmness. *Photo: Eva-Liis Tuvi*.

River lamprey (*Lampetra fluviatilis*) is a creature with a snake-like body and without scales, with a suction funnel with teeth instead of a mouth. The colour of the species varies from bronze to black, its sides are more grey and the stomach is whitish, the fins brown. Lampreys are often dealt with together with fish, the reason is evidently their external similarity, migrating lifestyle and, last but not least, the fact that people eat lampreys as fish.

The river lamprey stays in the sea for the most of its life and comes to the rivers only for spawning. In autumn, the lampreys move to the rivers and brooks which flow

River lampreys (*Lampetra fluviatilis*) are migrating Cyclostomata, with a large jawless sucking mouth. River lamprey may be a real delicatessen when prepared properly, although not everyone might like their taste. *Photo: Nikolai Laanetu*.

into the sea, and stay there for the winter. They move up the stream at night-time, and in order to rest in the water flow, they anchor themselves against the rocks with a suction funnel. When winter comes, the migration would slow down as hibernating river lampreys would not feed in winter. The spawning period commences after the breaking up of ice, usually at the beginning of May, when the water temperature is steady at +9.5 ºC. In order to spawn, the lampreys have to be 17–49 cm long and weigh 20–195 grams. Male species tend to be slightly shorter than the female ones.

Suitable spawning sites for lampreys are rapid-flowing, rocky rivers and brooks with gravelly or sandy bottom. The species of both sexes take part in building the nest. The life of an adult lamprey ends in the river as they die after spawning. It takes a couple of weeks for the larva to appear from roe, and they would live in the river for three-four years, feeding on the benthic sediments in summer. Then, the metamorphosis period lasts for a couple of months and the young lamprey would thereafter flow into the sea where they live as parasites for up to three years – they attach themselves to fish and feed on their body liquids. The lampreys also feed on dead fish and decaying meat.

Beside the species of river lamprey, there are also brook lampreys (*Lampetra planeri*), 10–16 cm long, living in streams and rivers.

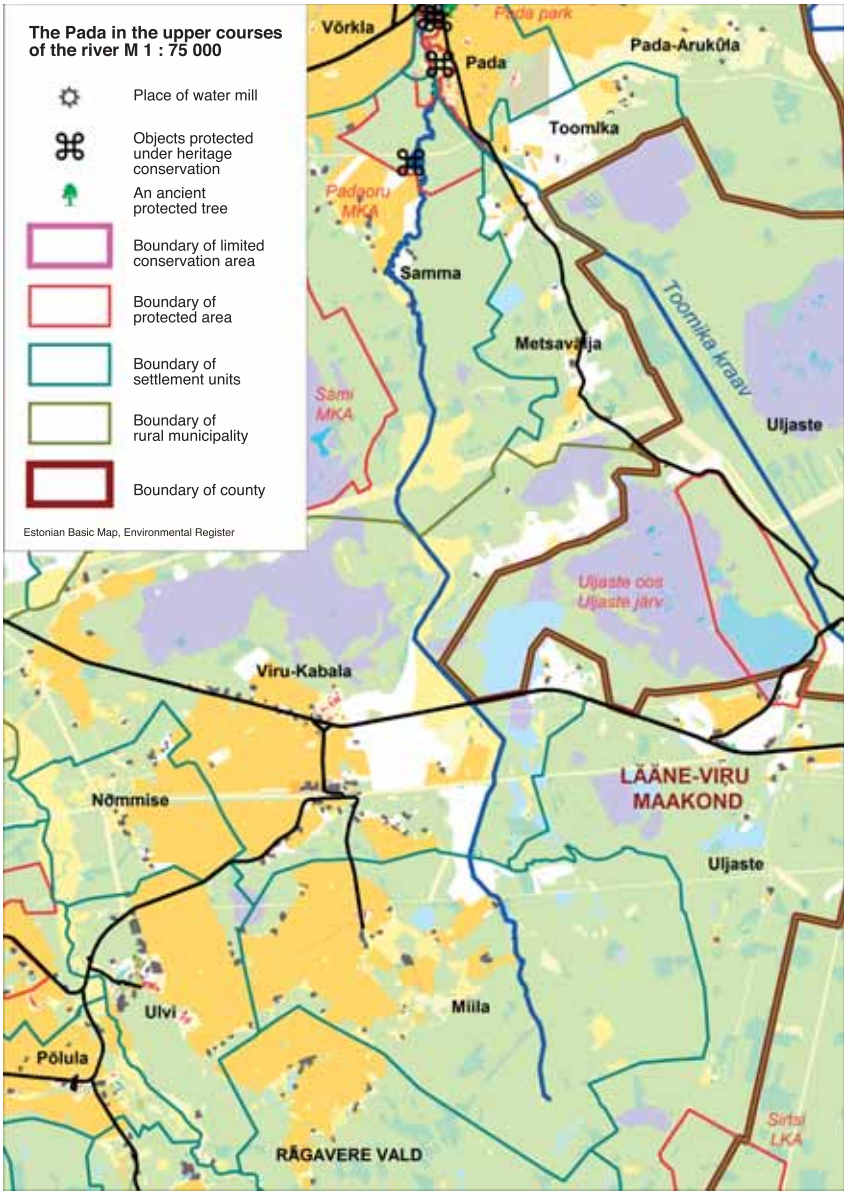
Human habitation on the banks of the River Pada

The river permeates through an ancient habitation area, which has been the cultural landscape for centuries. The energy of flow has been utilised in mills already in olden times – according to oral history, there had been altogether ten mills on the River Pada, whereas six of them are depicted on the plan devised during the years 1930–1939: starting from the upper courses, the mills are as follows: Pada, Aasu, Koila, Kubja-Hansu, Tuularu and Lauriveski. In addition, there are certain place-names revealing the quondam site of a mill – Altveski (*veski* = mill) and Pealtveski (currently Vanaveski). During the 1930s, a sawmill had been operating at the Tõnisson's or Lokutaja mill, launched at the beginning of the 19th century, however, the facility is not shown on the quondam plans.

The substantial book, *Wirumaa* (on the past and present of Viru County) (Rosenberg, 1924), states that because of the low waters in summer, the mills could not work without prior collection of water. The artificial lake of Pada mill is still visible in nature and on the map. However, other mill-sites are reminisced only by the quondam dams: some of them still in a working order together with the buildings, whereas some have become an obstacle in the migration of fish, and some have fallen in the oblivion, with only a few people remembering the mill-site.

MAN-MADE FACILITIES ON THE RIVER PADA

- Larger bridges: railway bridge near Viru-Kabala, a bridge on Viru-Kabala–Sonda road, on Samma–Voorse road, Tallinna–Narva road, Viru-Nigula–Kalvi road, two bridges on Unukse–Mahu road, Pärnaküla bridge;
- Watermills (10 according to oral history, 6 depicted on the plans dating from the 1930s) Pada, Aasu, Koila, Kubja-Hansu, Tuularu, Lauriveski; and according to place-names Altveski and Pealtveski (Vanaveski).



The Pada, its tributaries, objects under nature conservation and riparian settlements in the upper courses of the river.

SETTLEMENTS ON THE RIVERBANK

(downstream from the river source)
Lääne-Virumaa
Rägavere rural municipality:
  Miila village (on both riverbanks);
  Viru-Kabala village (on both riverbanks);
Viru-Nigula rural municipality:
    Samma village (on both riverbanks);
    Pada village (on both riverbanks);
    Tüükri village (on the right side of the river);
    Viru-Nigula small town (on the left riverbank);
    Aasukalda village (on both riverbanks);
    Koila village (on both riverbanks);
    Unukse village (on both riverbanks);
    Pärna village (on both riverbanks);
    Mahu village (on the left riverbank);
    Kalvi village (on both riverbanks)
Ida-Virumaa
Aseri rural municipality:
Kalvi village (on the right side of the river).

Miila village

The name of Miila village comes from the Estonian words *müümima* or *müümama* ('smoulder'), referring to the incineration of wood coal. The village on the upper courses of the River Pada was first mentioned in the Danish Census Book in 1241 (*Milola*).

This karst area is the starting point of the River Pada, making it difficult to find the exact river source – the springs in the mire hayfields are usually marked as such. There are several dolines in the village, imbibing water during floods. In earlier times, children used to raft on the local seasonally formed lakes.

The River Pada starts from the Miila village. Energetic villagers have established an NGO Miila Hiiemägi to promote local culture. The logo of the NGO reflects the symbols of the village – a sacred grove hill and smouldering fire.

Stone walls around the Samma sacred grove. Those wanting to enter the area need to knock in order to let the grove know they are coming. *Photo: Eva-Liis Tuvi*.

In 2005, the villagers founded an NGO Miila Hiiemägi and as a result of joint work, there is now a village green with a swing, and soon also a social house. The logo of the NGO reflects the symbols of the village – a sacred grove hill erected above a wood coal fire.

Viru-Kabala village

The quondam Kabala Manor, situated in the lands of today's village, was a support manor of the Pada estate. Currently, local life is promoted by the NGO Viru-Kabala Society. The Kabala library, established already in 1924 by the local Society of Music and Literature, is the only official institution in the village.

Samma village

Samma village is located in an area of ancient habitation: there is an old settlement place on the left bank of the River Pada, and a sacrificial stone in the vicinity of the Aasa farmstead. This is also the site of Samma Tammealuse sacred grove, once of central importance in the Mahu parish, with only one tree, an approximately 70-year-old oak growing on the spot, an old stump (probably the remnants of a quondam sacred oak) still visible under the tree. In 1988, Helmut Elstrok, the local lore researcher of Viru-Nigula, suggested an idea to restore the Samma grove and as a result, 150 young oak-trees were planted on the upper part of the flat valley slope next year. The access to the sacred grove is through the gates, and those wanting to enter the area need to knock in order to let the grove know they are coming. There is a bonfire site and a swing in the grove, surrounded, on one side, by a stone fence.

There are several stories narrated about the quondam large and old oak-tree.

In Samma, there was an oak, planted during the Great Northern War. A lot of gold

and treasures were buried under the tree at the time of the Swedish rule. The Germans had cut down the oak-tree. No-one would know now where it is.

RKM II 261, 136 < Viru-Nigula parish, Padaorg, Eha Tulp, 51 years (1969)

The old oak was big and hollow inside. It was struck by a lightning during Estonia's independence period [1918–1940] *and the tree burnt down. But the new oak grows in the place of the old one. The bump underneath there is the stump of the old oak-tree.*

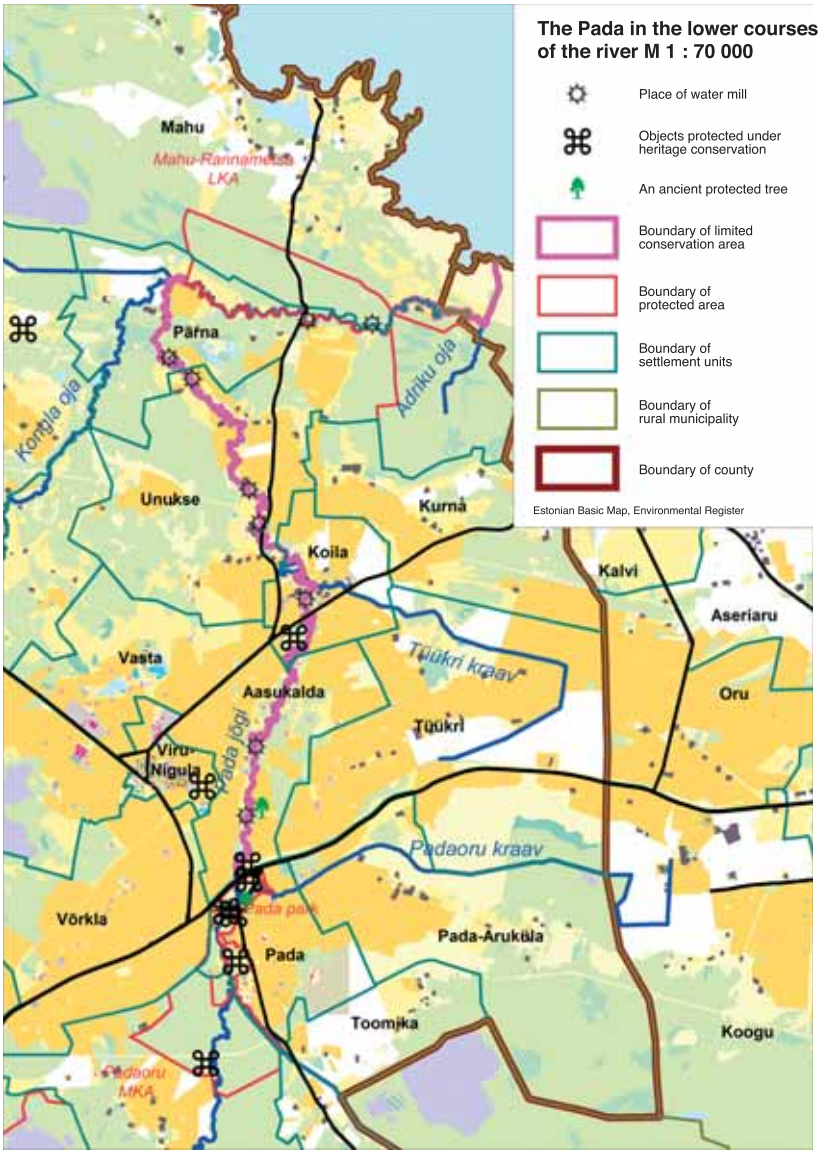
Ahto Kaasik < Mahu parish, Samma village < Eino Aarik, 60 years, born and lived in the Vahepõllu farmstead, Mäepealse village (2002).

Samma Manor had belonged to the Pada estate. The first record of the (Samma) manor dates from 1583. The main building was constructed in different periods, mainly during the 18th century, yet now, there are only ruins left of this; the granary and the stables-coach house have been rebuilt.

The lord of the Samma Manor, von Samson, intended to build a sawmill on the River Pada, however, nature had its own ways, and it was impossible to dam the river. Still, the failed endeavour was perpetuated in the name of winter road – Samma sae ('Samma saw') – passing the quondam dam and heading towards Kabala. Instead of the watermill, the manor acquired a windmill and a steam-operating starch factory, the first of the kind in the area.

Gas pipeline crossing the River Pada in the Samma village. This technical facility can also improve the sense of balance and provide a shortcut. *Photo: Piret Ehrenpreis*.

When the floods have destroyed the bridge, there is no need to start from scratch: nature has come to help, forming a base for the bridge from a crooked tree. *Photo: Ene Ehrenpreis*.



The Pada, its tributaries, objects under nature conservation and riparian settlements in the middle and lower courses of the river.

Pada village

Pada village (*Padagas*) has been mentioned in the Danish Census Book in 1421 as one of the largest villages in Virumaa – with 40 ploughlands (Elstrok, 1999). There are two hill-forts in the village lands.

***Suur linnamägi*, i.e. the larger hill-fort** (Pada I hillfort) was a naturally well-protected site, surrounded in the west by the River Pada. In the eastern and southern sides, the steep natural valley kept away enemies, and only the northern edge was without any natural protection. The earlier descriptions reveal that on the northern side of the hill-fort, there used to be a ditch-like depression which was deepened in order to obtain soil to form a rampart. It is believed that in older times, there used to be a small stronghold, a fore-fort near the hill-fort.

During the 7th to 10th centuries, there was an ancient settlement site on the hill-fort, reminisced by the excavated remnants of stoves and the foundations of walls made of stone. The hill was used as a hill-fort during the 11th to 13th centuries, surrounded at the time with a circular embankment of 1–2(3) metres high and fortified with dry masonry both inside and outside and with a gateway on the eastern side (this gateway was partially restored in 1986–1987). The surface of the entire courtyard encompassed 11 000 m^2.

In later times, the hill has also been used as a gravel quarry, a site for foxholes, cross-country motor racing; an artificial valley for the road was excavated on the northern side of the hill. In 1986, an underground

Pada larger hill-fort. *Photo: Eva-Liis Tuvi*.

The gateway of the Pada hill-fort was restored during 1986–1987. *Photo: Eva-Liis Tuvi*.

cemetery was discovered opposite the hill-fort (on the other side of the Sonda–Pada road, with nearly 170 skeleton-finds and abundant contributions (Elstrok, 1999).

***Väike linnamägi* i.e. the smaller hill-fort** (Pada II hill-fort) is located near the Padaoru (Pada valley) mill and was also used as a stronghold during the 7th to 10th centuries. The charcoal layer preserved underneath the embankment dates from the end of the 1st millennium BC.

In the north and west, this hill-fort is embraced by the Padaorg valley with an artificial lake therein. The eastern hill-slope is steep. The hill-fort was surrounded by a more than two-metres-high embankment, with a limestone dry masonry wall supporting the external part and log-houses inside of the wall. The cultural stratification of the hill-fort has been destroyed as a result of land cultivation during later times.

One of the hill-forts is believed to have cellars for hiding gold and vodka barrels in war-time, and the quondam "Baron of Pada" had forbidden the digging of these out (Rüütel, 1992).

Pada Manor (*Paddas*) was first mentioned in 1505. The manor used to be one of the largest in Estonia: besides the nearby lands, support and dairy farms, the Pada Manor also possessed Lake Uljaste and a lot of forests. The manor complex comprised the mansion (main building), governor's house, greenhouse, granary, stables, coach house, herd castle, dairy, vodka distillery and cellar, and mills. The manor was in the ownership of the quondam Polish governor Earl Moritz Kotzebue (son of the playwright August Kotzebue). The outstanding architectural manor ensemble has been in ruins since the 1917 revolution.

The surrounding landscape with the primeval valley and river had been skilfully utilised in the design of the manor. The vicinity of the river made it possible to breed fish in the ponds (perished by now), the location was also suitable for a dairy and mills.

The mills. The Pada(oru) water mill, was probably built at the beginning of the 19th century, and, after reconstruction during the second half of the century, as of 1855, was used as a Swiss-style summer cottage for the estate-owner's family – the balcony around the building offered a picturesque view of the primeval valley. During the first years of the independent republic it also operated as a sawmill. In the later period, the building was again used as a mill up until the 1970s. Thereafter, the mill burnt down and is currently in ruins. In addition, the Pada Manor comprised the Vanaveski flour mill in Aasukalda village, and the Aasu mill (flour and sawmill) in Aasuvälja village. There, the sawmill was still working up until the mid-20th century.

Nõiakivi memorial stone, the reminder of **Kongla Anne witch trial** in the Pada Manor, in 1640, was opened on the northern side of the Viru-Nigula churchyard in 1990, as an initiative of the Heritage Society. The memorial stone, located in the square between the churchyard and the community centre, was to remember Kongla Anne, the last witch knowingly burnt in Estonia, yet it is also a homage to all dissenters.

The forked-up Pada pine opposite the hill-fort. When getting to Viru-Nigula from Sonda, there are sights on both sides of the road – the hill-fort on the left and the pine-tree on the right. *Photo: Eva-Liis Tuvi*.

Pada park was established on the slopes of the primeval valley in the 1770s. The design of the free-style park has skilfully utilised the landscape elements – the valleys and the river in particular. There are many decorative elements, pavilions, lawn areas, bridges and meandering paths in the park. In addition to abundant entertaining sites, a script-patterned stone and the spring of the Lady-of-the-Manor, there was also a grotto, an unusual phenomenon in the parks of North-Estonia. With regard to its style, the Pada park has been regarded as one of the most picturesque natural parks in North Estonia. Peter August Friedrich von Manteuffel, the baron with crazy ideas, is believed to have launched his aircraft from the balcony of the manor house located up high on the slope of the primeval valley.

The park (with the current surface of 55 ha) is under nature protection as of 1971.

Pada (Padaoru) school was opened in 1864. A new schoolhouse, built in the village in 1900, also functioned as a courthouse. The singing choir of the Educational Society and a brass band rehearsed in the schoolhouse. The school was closed down in 1963, and a memorial stone is installed on the site of the first school building, next to the larger hill-fort.

Padaoru pine-tree (Peetri pine or Ulmi pine) grows on the right slope of the Pada valley. In 1997, the two-forked ancient tree was measured to be 14 metres high and

Wind generators transforming wind into kilowatts on the fields of the Tüükri village. Some years ago, this was the largest windpark in Estonia. *Photo: Eva-Liis Tuvi*.

the circumference, under the branching was 520 cm (Relve, 2003). According to the drilling test, the tree is approximately 400 years old. The pine-tree was taken under nature protection as early as in 1939, when its height was 12 metres and the circumference of the trunk 4.45 metres.

Tüükri village

A large windmill park towers in the territory of this village (about one kilometre to the east of the Pada valley), in the vicinity of the Tallinn–Narva road.

Viru-Nigula small town

Viru-Nigula small town was a parish centre in the past and is now a rural municipality centre. Despite the fact that Viru-Nigula is not situated upon the River Pada, it does have connections with the river in cultural history. The ancient village in the region, prior to the establishment of the church, was Hageda, referred to in the Danish Census Books as *Akedolae* (Elstrok, 1999).

The ruins of St. Mary's Chapel (**(Sõja-)Maarja kabel** i.e. War-Maarja Chapel), half a kilometre eastwards from Viru-Nigula, date from the second half of the 13th century. The chapel stands in ruins since the time of the Great Northern War, with only the western gable and the foundation of the choir room preserved until today. With its base plan of an isosceles cross, the chapel was a unique one in the architecture of the Baltic countries. Presumably, the building was erected by the Russians after a glorious battle over the Germans and Danes in 1268. The military theme is also reflected in the name of the chapel and the area in between the chapel and the graveyard – the

karst depression and three skinholes absorbing the reddish-brown waters of iron-rich Verioja stream (*Verioja* = Blood stream).

St. Mary's Chapel is associated with pagan sacrificial rites for better fertility and healing of animals, and with pilgrimages of people hoping to improve their hearing and vision. Written records from the 17th and 18th centuries evidence that *maausk* (Estonian native religion) was practised in the immediate vicinity: in the nearby Iila village where sacrifices were brought to trees and the sacrificial stone in the sacred grove even as late as in the 1890s (Rüütel, 1992).

The Catholic custom of pilgrimages has now been revived, and a sermon is held at the chapel on *heinamaarjapäev* (St. Mary's Day) on July 2.

Viru-Nigula Church was the first stone church in Virumaa, whereas the foundation of the sacral building dates from the 13th century (EELK Viru-Nigula ..., 2009). This three-naved hall church, named in the honour of St. Nicholas, the patron saint of the sailors, has been burnt down on several occasions and restored again. In the churchyard, there are stone crosses from the 17th century. The parsonage with outbuildings and a wheel-well have preserved until today. The church and the churchyard are architectural monuments under national protection.

In olden times, there used to be deep hole, *Hädaorg* ('dale of misery') next to the Viru-Nigula Church – according to folk tales, people suffering from plague had gone to edge of hole, dropped themselves down and died. Later, the hole was filled up but the name remained in use.

In the parsonage, the kitchen is equipped with an archaic mantle chimney, preserved in the authentic manner, and the cellar is vaulted. As of 1986, the building accommodated the local lore museum, governed by the Foundation Virumaa Muuseumid during 2002–2008. In 2009, the museum building was given back to the rural municipality.

Friedrich Gustav Arvelius (1753–1806), the author of the first Estonian-language storybook, grew up in the parsonage, and the pastor and linguist **Otto Wilhelm Masing** (1763–1832) worked there for two decades. It was here where he wrote his famous allegoric poem *Päts*, better known today as the anthem of Pärnumaa (*Vändra metsas Pärnumaal* ('In the Vändra Forest in Pärnumaa')). Masing arrived in Viru-Nigula in 1795 and published his first book, *ABD ehk Luggemise-Ramat Lastele* ('ABD or the Reading Book for Children') the same year (see also p. 51).

One of the innovations widely utilised in agriculture during the Soviet times originates from the vicinity – as of 1963, the local fields, infertile and full of stones, were limed with the dust-ash of oil shale (Joonuks, 1979). This new method quickly became wide-spread in Estonia and elsewhere in the Soviet Union.

Aasukalda village

The so-called Viking settlement is located in the territory of Aasukalda village – on the left bank of the River Pada, northwards from the Tallinn–Narva road. Towards the southern direction, this extensive ancient settlement ranged up to the Pada I hill-fort. Sites of houses and remnants of stoves have been found in the excavated area, the majority of the finds are from the (7th) 8th–10th centuries.

Pada oru pine, or the Vanaveski pine-tree is about a kilometre northwards from the Viking settlement. Two ancient pines, with similar names and close to each other (see also Padaoru or Peetri pine or Ulmi pine in the territory of Pada village, p. 111) cause quite a lot of confusion. Gustav Vilbaste (1939) writes about the Pada oru or the Vanaveski pine: "It is said about the pine that the Swedish King Carl XII had drunk coffee under the tree during the Great Northern War, and the pine had been just as large back then as it is now."

Vanaveski pine-tree – one of the two old pines in Pada, in the Aasukalda village. The names of the two neighbouring trees might be confusing, but the shapes are significantly different. *Photo: Andres Ehrenpreis.*

Koila village

Koila (*Kokael*) is mentioned in the Danish Census Book as a large village with 40 ploughlands (farms). There are two sacrificial springs in the territory of this random-clustered village (one in the Koila hill-fort and the other – Läht(e)oru spring, (see also: springs on p. 98) and 11 sacrificial stones. The original names of farms (Kärneri ('gardener') and Varsavare ('guardian of foals') reflected the occupations of the owners in the Kalvi Manor, as the entire village belonged to this manor.

Koila hill-fort (100 metres long, more than 50 metres wide and up to 20 metres high) on the left bank of the river is located on

Koila mill in spring, probably during the 1910s. *Photo from the collection of the Viru-Nigula local lore museum*.

The building of the Koila mill today. *Photo: Eva-Liis Tuvi*.

the edge of a longer ridge and is separated from the rest of hill by way of an earthwork and a ditch. On the other side, the stronghold is surrounded by a low and barely visible rampart, with cellars dug therein in the course of time, and where people had been looking for treasures. In olden times, the River Pada, flowing directly under the slope of the hill, had been a protective element, but now the riverbed is further away from the hill (Rosenberg, 1924).

There is a low limestone dyke on the edge of the hill-fort, and, in a short distance, three sacrificial stones, with indents. Archaeological excavations have revealed abundant bones; on the basis of the finds, it has been ascertained that the stronghold emerged during the last centuries of the 1st millennium BC, and was intermittently used up until the middle of the next millenniums, thus for more than 500 years. The northern-edge rampart has been used as a burial site during the 15th–16th centuries. The two hill-forts, Pada and Koila, have also been utilised as a pasture for cattle during the 1930s.

Koila mill was built by the Kalvi Manor. During the first years of collectivisation (in the middle of the previous century), prior to the installation of electricity lines, the mill produced electric energy. The owner of the mill was a well-known bee-keeper in his time, and bees are still kept near the mill even today.

Koila village school was established in 1843. In 1890, the rural municipality of Kalvi built a new schoolhouse in the Koila village, the school operated here up until 1963.

In the 13th century, the local vassal, Helmold Lode, had plans to build a town in Koila, yet the endeavour failed due to inheritance problems.

Unukse village

Unukse (knighthood) manor (*Unnuks*) was founded at the end of the 18th century when it was separated from the Koogu Manor. Later, Unukse was the support manor of the Vasta Manor. The main building was completed in the 19th century.

The quondam grandiose distillery (1883) of the Vasta (Unukse) Manor operated in the later period as a dairy and, more recently (1977–2006) as Nigula brewery, producing non-pasteurised beer (Nigula beer), instead of the popular Soviet-time beer, *Zhiguli*, and also the wallop called Mahu. On December 20, 2009, the rescue team extinguished the fire in the former brewery. On the base map, the location is titled as Rüütlimõisa.

Mills. Unukse mill was a small plain flour mill near the distillery. Half a kilometre from here, towards the sea, was the only woollen mill of the region, whereas the first owner of the mill was the tenant farmer of the Unukse Manor, named Mägi (the name is depicted on the mill building), but the mill was actually known as Böckler's or Kubja-Hansu's mill.

A good child has many names: Mägi's or Böckler's or Kubja-Hansu's mill, built by a Mägi-named tenant farmer of the Unukse Manor. Now, the place is called Kubja-Hansu. *Photo: Eva-Liis Tuvi*.

Only the remnant walls and the canal are left of the quondam Tuularu mill which used to be equipped with a saw frame, threshing machine and peat-crushing appliance. Tõnisson's or Lokutaja's mill was built by the Kalvi Manor at the beginning of the 19th century; in the 1930s there was also a saw-frame in the mill. During the next decade, when the miller was deported to Siberia as a kulak, the small mill (one of the best-organised ones and precise in work and deadlines) decayed. Currently, plans have been made to reconstruct it as an outbuilding of the Padaveski

recreational facility, with roofed spaces and swimming pier (Padaveski …, 2009).

Pärna (Perna) village

The name of the village comes from the Pärn family whose forefather established here the first freehold farm in Virumaa in the 1650s (Elstrok, 1999). The sacrificial site in the village lands is known by several names: Taara and Hiie-oakwood, Tammenumm, Põltsamaa oakwood (according to Peltsema, Põltsamaa farm), Koumardi sacred grove (according to Komardi, Kõumardi farm). There are written records of the sacrificial rite of a black rooster in this site.

In Pärna village, the Kongla stream flows into the River Pada and in olden times there were two watermills here. The owner of one of them was not very careful and the mill decayed. The other one, **Lauriveski mill**, built by the Kalvi Manor at the end of the 18th century and beginning of the 19th century got its name after the owners, the Laur family. Initially, the milling was done with the help of the water-wheel and later, with a turbine which even produced electricity for the villages in the vicinity. Today, the mill is in ruins.

Across the river from Lauriveski, there is the former Veskilauri farmstead, the birthplace of Artur Vahter, a musician (Elstrok, 1999).

Doing laundry near the Lokuta farm (1911). In old times, Lokutaja mill used to be one of the best-organised and precise ones regarding work and deadlines. *Photo from the collection of the Viru-Nigula local lore museum*.

Limited conservation area of the River Pada in the village of Pärna – named after the family of the first freehold farm-owners. *Photo: Eva-Liis Tuvi*.

Mahu village

Mahu (*Mahoholm*) meant a hillock. The village was first mentioned in the Danish Census Book in 1241. The current Mahu village comprises the quondam villages of Lahe, Mahu, Neeme and Männikküla.

Here, the first farmsteads were bought in full ownership in 1873. The village school operated here during 1871–1952.

Great captains have brought fame to the Mahu village: August Gustavson (teacher and director of nautical schools in Käsmu and Tallinn, honorary citizen of Tsarist Russia, author of several textbooks) Eduard and Mihkel Kägi, Arnold Nordmann, Gustav Klauks and Evald Laager.

Mahu is also the home place of Ervin Sulger, the triple jump record holder from the 1950s (Raikna, 2003).

Friendly trading. In earlier times, this coastal village (which also gave a name to Mahu parish) was actually known under the name of Kaupsaare, as the port here, an important destiny of friendly trading, was named this way. Before World War II, friendly fairs were organised in coastal villages (Mahu Village Society, 2009): twice a year – prior to Midsummer and Michaelmas – the inhabitants of Virumaa and Finnish islanders exchanged their goods at the fair. Salted Baltic herring was traded for grain, potatoes, meat, flax and other commodities. People from the islands came to such fairs with whole families and traded their goods with familiar farm-owners. In this way Finnish and Estonian families created long-term mutual relationships, hence the notion, – friendly trading.

Kaupsaare port was an important trade exchange site as early as in the 18th century – manor-owners sent their grain to Reval (Tallinn) and Narva, and distilled vodka to St. Petersburg and Finland. Potatoes were an essential commodity during the later period, but it was also profitable to sell apples.

The Winter War (30th November 1939–13th March 1940) deprived the Finns from their home islands, and friendly trading died away. The Soviet occupation put a total end to the tradition of coastal trading and sea-going on the Estonian side. Now, the society of the Finnish Tytarsaari island has started to revive this form of trading.

The Baltic herring was caught in spring, at the end of April and beginning of May, by way of an interesting method – the fisherman-specialist was walking on the steep limestone coast and watched the sea, his trained eye could spot the movement of shoals and he directed the fishermen's boats on the sea to go to the right place. According to Friedrich Immanuel Arwelius, the provost of Alutaguse, it was possible to catch up to 300 cartful of fish with one lucky straw (one cartful was considered to contain 10,000 Baltic herrings).

Seashore in Mahu or Kaupsaare was an important destiny of friendly trading for the people of Virumaa and Finnish Tytarsaari islanders. *Photo: Anne-Ly Feršel.*

There is an ancient anchor-place on the Mahu cape. This was also the location of the manor-cellars, now in ruins. During the 1930, bootlegged vodka was smuggled on the Mahu coast. People say that the richness of the majority of nearby manors, Kalvi and others was actually obtained from illegal vodka.

Mahu Village Society, founded in 2003, takes care of the village and the revival of local traditions. The society has designed the village flag and displayed an exhibition about the history of the village, renovated the community house building and conducts cooperation with the Tytarsaari Society.

The Reed Festival, organised every second year, with the active support of the village society, took place for the fourth time in 2009, where the interested people could take part in a training prior to the festival and learn to use reed (in making woven items, clothes, reed mats as ecological building material, in addition to bricks and clay plaster, etc.). The contest of floating vehicles made of reed was organised for the first time.

Ancient lights. Flares were used in pre-historic times to indicate to the seafarers a safe route to a port or shore. In modern times, bonfires are lit on the shores of the Baltic Sea to highlight the unity of the people living on the seashore, remind us of their history and cultural heritage and commemorate those who have lost their life in the sea.

The tradition of ancient lights was revived in Finland in 1992: every year, on the last day of August bonfires are lit at 21.30 on the shores of Finland, Aland, Sweden, Latvia, Lithuania, Poland, Germany and Denmark, and for quite some years, also in the coastal villages of Estonia (Muinastulede öö, 2009).

In 2009, Mahu village was awarded the title of being the most beautiful village in Lääne-Virumaa.

Kalvi village

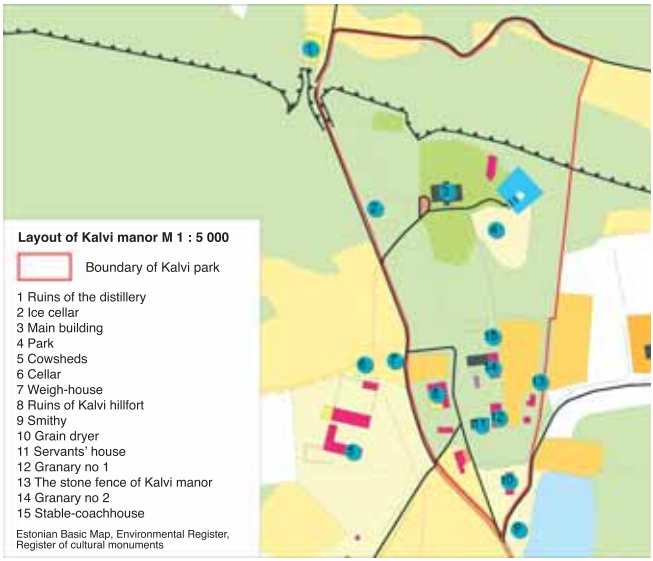
In its lower courses, the River Pada flows through the lands of Kalvi village.

The vassal-stronghold in Kalvi (the castle, outbuilding and the manor) was first mentioned in 1485, when Hans Lode, the manor-owner had pledged the castle to the bishop of Tallinn. The name of village, however, is a derivative of the Kalff family, the lords of the manor in the 16th century.

The earlier name of the **Kalvi Manor** was *Poeddes*, *Pöddes*. In the 18th century, an early classicist limestone manor house was built on the eastern wing of the medieval castle.

In 1775, Friedrich Gustav Arvelius (1753–1806) began to work as a private tutor in the family of the Kalvi manor-owner, Klaus, Gustav Essen. F. G. Arvelius had studied theology and philosophy in the University of Leipzig, and his father, Friedrich Immanuel Arwelius, worked as a pastor in Viru-Nigula, hence the pen-name of the writer – Sembard (the bard of the Sämi, i.e. Kunda River). F. G. Arvelius has perpetuated himself in Estonian literary history with folk books *Üks Kaunis Jutto- ja Õppetusse-Ramat* ('A Nice Book of Stories and Teaching') and *Ramma Josepi Hädda ja Abbi Ramat* ('Ramma Josep's Advice Book') (Kaur, 2010).

At the turn of the 19th/20th century, Kalvi was a magnificent manor complex comprising 11 stone buildings and 2 wooden facilities (Abner *et. al.*, 2007). In 1910, the manor was damaged in a fire. The old baron had boasted after the fire: "Even my hat will be disbursed!" During the period 1912–1914, Baron Nikolai von Stackelberg ordered the construction of an English-style castle with four corner towers. The construction material used in the neo-Gothic building was naturally split granite, thus making it a unique edifice in Estonia (Abner *et. al.*, 2007).



The buildings and the park of the Kalvi Manor.

After World War II, the building was used as a health promotion facility of the oil shale industry. In 1993, the manor was given back to the last owners of

the manor of the pre-war times, and they sold it to a Danish company. In 2002, Kalvi Manor was renovated as a luxurious hotel (Kalvi Manor...).

The hayfields in the mouth of the River Pada were taken into use by Baron Nikolai von Stackelberg as marsh meadows, and the peasants cutting the hay had to give two thirds to the manor and could themselves have the remaining third (Oras, manuscript).

The former weighting-house, located towards the west from the stronghold, is currently the venue of an information point (see also the map).

Reedy shoreline is characteristic of the Kalvi area. *Photo: Anne-Ly Feršel.*

The restored manor buildings comprise the smithy, granary (now an exhibition hall), animal barn (now an office and a canteen).

Slightly towards the south from the manor centre, in the former Kelu village, are the ruins of the farm-hands' houses of the Kalvi Manor. Four families had lived in each house, with an animal shed at the end of the family room. At first, the families were given one bushel-land of fields at their disposal, and later, a bit more.

The earlier design of the **manor park in Kalvi** was linked to the ruins of the stronghold and the mansion. The new park, created in the 20th century, encompasses the edge of the cliff in the east-west direction, utilising the natural values of the region: the steep limestone coast, the shore, forests and the river. In the immediate vicinity of the castle, the park is of regular style, with alleys and squares in the front and rear of the edifice. The front square is spacious, with a circular walking path, and a fountain in the middle. The rear side, with a pool and numerous fountains, is bordered by semi-closed areas of trees on the side. In the free-style park further away from the castle there is a pond with an island. The ten-hectare park was taken under nature protection in 1965.

Vikkuri ridge is a stone field in the sea, extending to several hundreds of metres in the west from Kalvi. According to oral history, Kalevipoeg, the Estonian national hero, when making trips to Finland, used to rest on the islands of the Gulf of Finland. And, in order to shorten his route, he had decided to build a bridge – three armfuls of boulders dropped into the sea were enough to form the ridge. According to another version, Kalevipoeg's apron strings had broken and the rocks had fallen on his toes whereafter he had discarded the idea of making a bridge.

Indeed, there are other legends about the Vikkuri stone field, involving the Devil who, while building the bridge, had noticed a light in the window of a house in the Iila

Vikkuri loo – the bridge that remained uncompleted by the Devil or the national hero Kalevipoeg. *Photo: Anne-Ly Feršel*.

village (towards the west from the River Pada), and wanted to throw a rock into the window, but the apron strings had loosened and the rocks had fallen down. Or, it might have been the rooster of the Kaupsaare (Mahu) inn who had started to crow and the rocks slipped down.

The boulder discussed in the folk tales about the Devil is also known as a sacrificial stone, and is located in a brushwood-covered bog in the Iila village, a neighbouring settlement of the Pärna village, 400 metres to the north from Anton Mäe's farm. This boulder is also known as **Ellukivi** – having obtained its name from a woman called Ellu, who had lost her way in a snow storm and frozen to death at the boulder. Children who were not growing well were taken to the boulder in olden times, at the time of the new moon, to accelerate their gaining in health (Rüütel, 1992).

Protection of the River Pada and the landscapes in the vicinity

The River Pada is under protection within its middle and lower courses, whereas the protection status is different in different places: limited conservation area, nature reserve, landscape protection area, etc. The prohibition of any activity that might affect the river or the biota therein, within 100 metres from the water border is valid within the entire length of the river.

THE MEASURES TAKEN TO PROTECT THE RIVER PADA

- Limited management zone within the entire length of the river on both banks 100 m from the boundary of water;
- Included in the list of the spawning beds and the habitats of precious fish from the Viru-Kabala–Sonda road bridge until the river mouth;
- Limited conservation area of the River Pada (within 15 km of the length of the river, 15.8 ha);
- Padaoru landscape protection area (177 ha) from Samma village to the Tallinn–Narva road;
- Mahu–Rannametsa nature reserve (410 ha) in the lower courses of the river;
- Sämi landscape protection area in the vicinity, in Samma village (941 ha).

Spawning bed and habitat of precious fish. Within the section from Viru-Kabala–Sonda road bridge to the river-mouth, the River Pada is listed as the spawning bed and habitat of salmon, river trout, sea trout and grayling. In this part of the river, it is forbidden to build new dams and reconstruct the existing ones within the extent that might increase the water level and alter the natural bed and hydrological regime of the body of water.

Limited conservation area of the River Pada comprises the 15-km section in the middle and lower courses of the river (15.8 ha), with an aim to protect the rivers and brooks as habitats and also the river lamprey.

Padaoru landscape protection area (177 ha) encompasses the most expressive part of the River Pada , the valley and riverbanks (from the Samma village to the Tallinn–Narva road).

The aim is to protect and introduce the river within its middle courses, the forest communities bordering the river and the valuable heritage in the vicinity.

The River Pada permeates through the **Mahu–Rannametsa nature reserve** (411 ha) prior to flowing into the sea. Besides the river and the streams, the protection also covers precious forest communities (floodplain forests, wooded mires, old natural forests and broad-leaved forests), the habitats of rare animal species.

Those with a special fishing permit may catch fish in the River Pada, yet not during the prohibited season or undersized fish. Fishing is prohibited all the year round within the section of 100 metres downstream the dams. In 2009, the Environmental Board launched the environmental impact assessment in order to get rid of the obstacles in the migration of fish at Rannametsa and Pada mills. Plans have been made to build

fish ladders or demolish the Rannametsa dam. Pada mill is a heritage conservation area and the destruction of the dam would also damage the building.

Sämi landscape protection area (941 ha) in the Samma village is about half a kilometre away from the River Pada and is to mainly protect the mire communities (bog, transitional fen, floating mire), dystrophic lake and old wooded mires, the habitats of rare plant and animal species.

The sign of the River Pada limited conservation area in the Pärna village informs that this is a particularly valuable river section. *Photo: Eva-Liis Tuvi*.

The River Pühajõgi

In Estonia, there are three water courses called Pühajõgi: besides the currently described river in Ida-Virumaa, there is another one on Saaremaa island, and the largest river in Estonia – the River Võhandu – is in some locations of South-Estonia referred to as Pühajõgi. In Virumaa, the River Pühajõgi has been depicted in different ways in the course of history: the topographical map of Russia (1945–1952) and the books from the 1960s refer to the Rausvere River, commencing from the edge of the Kurtna kame, as the upper course of the Pühajõgi River. And the much older maps (1-verst map from 1891–1912) and the ones today show that the upper course of the River Pühajõgi is the river called Edise (Ädise) which starts from the area near the sea, between Saka and Kukruse – in the village of Amula. On its journey from the source to the Gulf of Finland, the waters of the Rausvere and Vasavere rivers flow in Pühajõgi from the right, and, from the left, the Mägara brook. Besides the latter, two main ditches – Kohtla-Järve and Tammiku – bring their water into the Gulf of Finland by way of the River Pühajõgi. The River Pühajõgi flows into the Gulf of Finland (Pühajõe).

There are different opinions with regard to the origin of the awe-inspiring name of the river (Pühajõgi=Sacred river) – according to one, because of the sacred and sacrificial sites on its banks (a sacred grove, Aluoja sacrificial spring), and the other opinion – this is the name of the ancient border river of Estonians and Votians – plague had been afraid of this water body and could not cross the river. It is also believed that the river became sacred because of Christian baptising conducted therein. According to the least known interpretation, the river had obtained its name from a church noted in the chronicle of the Russian Church (Tensmann, 1931).

The water of the holy river has been used many times throughout history, for ophthalmological diseases and in healing other health problems. Old maids hoped to get married when they whisked themselves with water of the River Pühajõgi, having climbed on the trees near the riverbank. According to some records, this whisking had to be done during a full moon, and, according to another, is was necessary to use a silver or pine whisk. Young maidens went swimming in the river on Thursday evenings in summer, to obtain irresistible magical power.

THE RIVER PÜHAJÕGI

- belongs to the Viru sub-river basin of Eastern Estonian river basin district;
- length: 36.4 km;
- catchment area: 220 km^2;
- the following water bodies flow in the River Pühajõgi: the River Rausvere (Raudsvere) – 7.6 km, the River Vasavere (Voka) – 15.5 km and Mägara brook (Aluoja, Härjaoja, Sepaoja) – 14 km; Kohtla-Järve and Tammiku ditches;
- absolute height of water level at the river source 52.5 m;
- average gradient 1.88 m/km, and during the last three kilometres 6.2 m/km;
- flow speed in the upper course 0.1 m/s, and in the lower course 1 m/s;
- flow rate in the upper course 0,008m^3/s, and in the lower course up to 0,9 m^3/s.

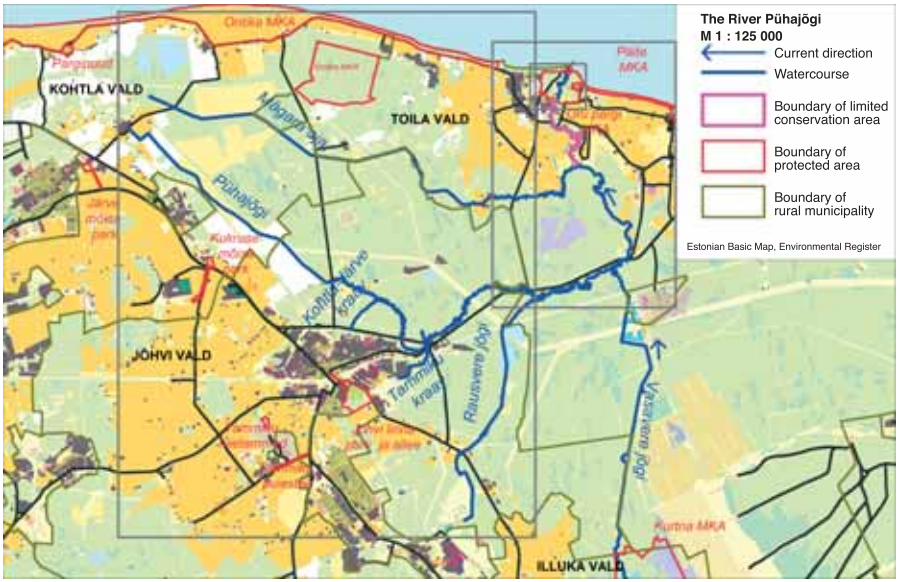
Sources: Environmental register; Järvekülg, 2001; Esimese seireringi …, 2009 (different reference sources provide different figures; the ones presented here are the most recent ones).

A long journey from the vicinity to the sea

From a bird's-eye view, the Pühajõgi slightly reminds us of a slanting U-letter or an upside-down shaft bow. Prior to flowing into the sea, the river descends from the North-Estonian plateau to the coastal shallows, whereas in-between these two towers the North-Estonian limestone cliff, i.e. the klint.

Cliff depressions of river valleys diversify the limestone shore and the Saka–Ontika–Toila cliff. The streambed of the River Pühajõgi is eroded in the old coomb, dating from the last Ice Age (two million years ago), and filled with a later layer of crumbling, easily flushable sedimentations. The river starts from about three kilometres away from the sea, yet the river-course back to the sea is more than ten times longer. As the ground rises slightly higher towards the limestone cliff, the river heads towards the south-east direction in its upper course. The river changes its course due to the moraine ridge (79 m) on the plateau which descends towards the east, and near the town of Jõhvi, the river makes a deep curve to the south and then turns towards the sea.

On its route, the River Pühajõgi permeates through different landscapes where nature and human influence have formed a streambed of different width and depth, thus the varied indicators of flow rates and flow speed of the river.



The Pühajõgi and its tributaries in Ida-Virumaa.

In the upper course, the river flows in a narrow and shallow straightened riverbed through the Kukruse mire, fields and cultivated pasturelands. In this section, the flow speed is usually only 0.1 m/s and the flow rate 8 l/s.

After the Kotinuka bridge, the river continues its journey in the natural bed of 4–8 metres wide, sporadically in the willow-shrub-wood covered flood meadows and through the forest. The majority of the riverside forests are wet paludified woodlands of bridewort, and nemoral forests with goutweed as the prevailing plant species. The flow speed in this section is 0.2 m/s and

The valley of the River Pühajõgi used to be more open and clear in olden times, so that the church in the Pühajõe village was visible far and away. *Photo from album "Odamees" in 1928. Photo from the collection of Virumaa Muuseumid RMF 949:74.*

The rapids under the bridge in Voka are an excellent habitat for the species who love cool and running water. *Photo: Eva-Liis Tuvi*.

the flow rate as much as 40–100 l/s.

Starting from the mouth of the River Rausvere, the flow rate is already up to 870 l/s. In the vicinity of the Voka crossroad, the river has broadened up to ten metres, with a depth of up to one metre. Depending on the riverbed, the flow speed is 0.3–1.5 m/s, being particularly fast flowing in the 50-metres-long rapids downstream of the bridge.

In the lower course (the last four kilometres), the River Pühajõgi meanders in a more than 40 metres deep and 50–200 metres wide steep-sloped valley, flows through the Oru park and discharges into the Gulf of Finland in the coastal shallow. Klint forests can be found in the steep valley-sides, with the intrinsic species of these woodlands, perennial honesty (*Lunaria rediviva*, category III of protected species).

According to the survey *Wirumaa* (Rosenberg, 1924), the lower course of the River Pühajõgi, with its steep valley and green banks, is one of the most scenic river landscapes in North-Virumaa. The beauty of the site is also valued today: in the thematic plan of the locality, this region is defined as the valuable landscape of Toila–Voka.

Within these last kilometres, the river is mostly ten metres wide and 0.8 metres deep, whereas the flow speed is extremely torrential – mostly 1 m/s, due to the substantial gradient (up to 6.2 m/km) and abundant rapids, and the flow rate is up to 900 l/s.

The average annual flow rate, measured in the gauging section (4.1 km from the river mouth, in the current limited conservation area) of the hydrometric station operating in the Pühajõe village during 1946–1963, was 1,790 l/s. This was the time when mine drainage water was directed to the River Pühajõgi, whereas the relevance thereof has decreased by now in connection with the closure of the mines.

The meandering of the Mägara brook (also known as Aluoja, Härjaoja and Sepaoja), which discharges into the Pühajõgi from the left, is almost parallel with the main river within the majority of its course. As with the Pühajõgi, it is the heightened edge of the limestone cliff that is an obstacle for the Mägara brook to flow directly towards the sea within its lower and middle courses. The brook is well-known for its 700 metres long and up to ten metres deep canyon and cascade.

Aluoja cascade and springs

The stormy speed of the Pühajõgi calms down near the river-mouth which has been redesigned by heavy machinery. The maps of different times depict different flow angles of the river when discharging into the Gulf of Finland. *Photo: Anne-Ly Feršel.*

The River Pühajõgi, although descending from the North-Estonian limestone cliff, does not have a waterfall but merely rapids, whereas the Mägara brook indeed descends as a cascade worth seeing.

The formation of the waterfalls in North-East Estonia commenced after the withdrawal of the Baltic Ice Lake (approx. 13,000 years ago), yet the Aluoja waterfall took shape in a significantly later period. It is believed that as a result of breaking limestone for the quondam lime-kiln in the Pühajõe hill-fort, flat terraces were formed at the edges of the canyon. During the second half of the 18th century, the Lady of the Voka Manor had intended to build a castle in Aluoja, the site of a lime-kiln in Aluoja proves this plan, and was to acquire money for this purpose by selling the pearls, from the river pearl mussels living in the watercourse.

The cascade is located in a deep canyon within the length of 200 metres from Aluoja brook, and comprises five terraces: 1.4 m, 0.8 m, 1.8 m, 1.4 m and 0.5 m. When moving up the stream, there are another two smaller terraces (less than 0.5 metres). Thus the elevation of the entire cascade is nearly six metres, and, according to some estimations, even up to ten metres (Suuroja, 2007).

When compared with the most admired Valaste waterfall of North-East Estonia, the one in Aluoja indeed seems like a minor trickle, however, this rill is incessant as there are abundant springs in the slopes feeding the cascade. The scenic beauty of the cascade can be enjoyed from observation platforms, specifically built for this purpose. Upstream from the cascade, there are striking fissures and swallow holes (with the diameter of nearly five metres and depth of up to half a metre). The ones absorbing up to 50 l/s of water are associated in folk tales with the Devil.

The springs in the vicinity of the Aluoja cascade have been regarded as sacred sacrificial springs by our ancestors. Creatures, entities and beings with a soul were believed to be hidden there. Sacrifices were believed to good fortune in hunting and fishing, and beat an enemy in war. The largest spring (on the left bank) – Aluoja – with the flow rate of up to 40 l/s emanates from the second terrace.

Aluoja cascade in autumn. It is nice to enjoy the water from special platforms. *Photo: Eva-Liis Tuvi.*

The sacred spring near the Mägara brook. The more observant eye can notice ribbons tied to plants, sacrificed to the holy spring. *Photo: Anne-Ly Feršel.*

When the river rises from its banks

Although the flow rate of the Pühajõgi is not that substantial, the river has indeed flooded nearby lands. An article published in 1936 in the *Postimees* newspaper focuses on the subject matter as to how to save the area of the Lageda mill and Järve settlement from the flooding of the Pühajõgi. At that time, it was hoped that by dredging and straightening the river, it would be possible to improve 133 hectares of hayfields belonging to 52 landowners.

The floods of the recent past, these of 2003 and 2008 are still vivid in people's memory, caused as a combined impact of a number of natural and anthropogenic factors. Due to the specificity of the relief (the northern edge of Jõhvi Uplands is higher than the southern part), the water surplus flows to the lower landscapes in the vicinity of Jõhvi. And the human factor – people have excavated mines in the earth's crust and closed down some of them afterwards: neglected mines are either submerged or filled with ground water, and the water has nowhere to go. And now, when in addition to the two above-described circumstances, there is heavy precipitation all at once, all the preconditions are there for a flood. In 2003, there were obstacles in the runoff of the water – the river was cluttered with branches and trees. After the flood, the river was cleared of beaver dams and fallen trees, and this should be done again.

The water that once was sacred is not clean any more

When our great-grandparents named the River Pühajõgi, the water therein had to be crystal clear. Now, it is unfortunately not the case. The Pühajõgi was already considered slightly polluted half a century ago, during the period 1959–1966 (Järvet, 2006). This is also the time of the most harsh description – the river was referred to as a wastewater canal (Pahkla, 1966). However, during the next five years (1967–1972) the status of the river continued to deteriorate: prior to the inflow of the River Vasavere, the Pühajõgi was severely polluted, and, in the lower courses from there, the pollution was average.

According to the 1991 assessment, the status of the river had improved somewhat: clean until Jõhvi (only a small river section before Jõhvi was slightly polluted), and, thereafter, from Jõhvi to the river-mouth average pollution.

In 1995, the water in the River Pühajõgi was turbid, whereas the turbidity, colour and odour varied in different sections. Still, as stated in the general assessment, the Pühajõgi was one of the rivers in Estonia where the pollution load was the greatest. It is known that in 1992, a total of 35.1 million cubic metres of wastewater was discharged into the Pühajõgi (Kont, 1995).

During the monitoring period preceding the publication of the book about Estonian rivers, *Eesti jõed*, in 2001, the River Pühajõgi was one the Estonian water bodies with the largest concentration of biogenic elements.

During the period 2003–2005, a total of 1.025 million cubic metres of wastewater was annually discharged in the river (Leisk *et. al.* 2006). At that time, the water contained a lot of ammonium ions and phosphorus, which in turn decrease the oxygen level; based on these indicators the status of water in the

The flood of 2003, in the place where the Mägara brook joins the River Pühajõgi. *Photo: Bruno Uustal.*

A view to the place where the Mägara brook and the River Pühajõgi join into one, taken from the riverside valley, near the motor race track. *Photo: Anne-Ly Feršel.*

river was assessed to be very poor in this period.

The most recent assessments regarding the status of the River Pühajõgi, presented in the draft water management plan of the Eastern Estonian river basin district (2009) are as follows: "poor" until the inflow of the River Rausvere, "fair" from there to the river-mouth. At the same time, the status of the River Pühajõgi was assessed good and excellent, on the basis of the monitoring results of autumn 2009, in two monitoring points (middle and lower courses). True, the total phosphorus indicators and the concentration of sulphur compounds, originating from mine drainage water, did cause problems in certain places (Esimese seireringi …, 2009). However, such a one-time assessment might not provide an actual picture of the status of the river: let us not forget that the autumn of 2009 was extremely heavy with rainfall. High concentration of sulphur compounds in the water with oxygen deficit poses a great threat to the biota because of toxic hydrogen sulphide.

Riverside forest near the Pühajõe graveyard: the situation is better than earlier, but still... These reappearing waste piles are probably not brought here from the other end of the country. *Photo: Eva-Liis Tuvi*.

During the 1960s, the majority of pollution in the river was caused by the wastewater from the settlements (Kukruse, Jõhvi, Toila), mines and also agriculture. The inflow of organic compounds, however, decreased in the first years of the new century. Having obtained permits for the special use of water, the thermal plant of Kohtla-Järve Soojus and the Illuka rural municipality discharged their wastewater into the Pühajõgi, through the River Rausvere, in 2009. The quality of the water and the biota in the river will definitely continue to be affected by the water to be pumped out of the mines. If the amount of the latter decreases then the relevance of other potential pollution sources would increase. Moreover, given the situation where there is no additional inflow of water, there is a danger that the river may become partially dry. The impact of the mining field is nearly non-existent on the flow rate and chemical composition of the Mägara brook.

Biota in the past and present, hopes for the future

The cool-water River Pühajõgi, with its rapids, was known in the past as the spawning bed of precious fish. By today, the Pühajõgi has lost its value as a fish river, and part of the flora in the river has disappeared. However, when the situation improves, there is hope that the former biodiversity of the river can be restored.

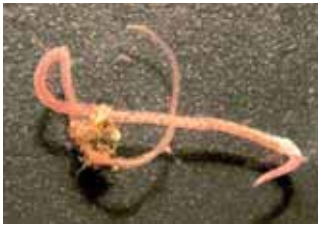
BIOTA

- 23 species of vascular plants;
- Fish: the total of 15 species of fish have been registered in the river in all times; according to the test catches of 1995, there were nine species (river trout, pike, roach, bleak, stone loach, burbot, three-spined stickleback, nine-spined stickleback, perch), and, according to unchecked data, also grayling; bullhead was added to the above list during the 2005 monitoring catches; in 2009, the monitoring catches in the rivermouth area revealed only 3 species (river trout, salmon and sea trout); it is likely that river lamprey and brook lamprey might also live in the Pühajõgi;
- Crayfish: in the past, there used to be abundant crayfish in the river, they disappeared in the meantime, and during recent years, crayfish has again been spotted in the river.

Vascular plants. In 1995, during the study of the flora of the Pühajõgi, the total of 23 vascular plant species were found in the river, whereas the severely polluted river sections were without any macroflora. Ten species of vascular plants grew within the limited conservation area, among them also water cress, common water plantain, Canadian waterweed, reed canary grass. Seven species were found in the river section permeating through the Oru park, among them spiked water milfoil and branched bur-reed.

Canadian waterweed (*Elodea canadensis*) has obtained its name from the country of origin and extremely rapid growth. Vegetative propagation has indeed contributed to the rapid spread of the plant which, originally from North-America, had reached Europe (the British Isles) in the thirties of the 19th century. 1905 marks the first registered record of finding Canadian waterweed in Estonia. Canadian waterweed is a dioecious plant, and it was knowingly only the female plant that occurred in Europe, yet, by way of vegetative propagation, it has by now conquered nearly all of the local freshwater bodies and has been declared as an invasive foreign species, i.e.

Non-biting midges (*Chironomidae) are less than one centimetre long dipterans, i.e. with two wings. In calm weather, the swarming midges make a buzzing sound but they do not attack people as the chironomid imagos do not feed on anything. Photo: Henn Timm.*



Earthworms (*Oligochaeta*). *Photo: Henn Timm.*

the one impoverishing local aquatic communities. The plant is particularly proliferating in nutrient-rich waters, attaching itself weakly into the bottom of the body of water, and growing up to 50–150 cm in height. Canadian waterweed may not always be observable from the shore, but in the water it is hard not to notice the plant, growing like a green wall. Herbivorous animals in water bodies feed on the waterweed, and even domestic animals enjoy it. A great amount of water extracted from water bodies has also been used as fertiliser of fields. In addition, the plant is used in schools, in nature classes: three leaves of the plant, arranged in a whorl by three, contain one layer of cells, and thus are suitable for studying the build-up of cells under the microscope.

The status of **large invertebrates**, during the 2009 monitoring within the section of the River Pühajõgi valley and Toila-Oru, was assessed to be poor. 19 taxa were registered in the Pühajõgi valley (limited conservation area), and 23 in the Toila-Oru section. The prevailing species were as follows: chironomids, oligochaetes, and the common freshwater shrimp (*Gammarus pulex)*.

The larvae of the non-biting midges (*Chironomidae*) are up to 25 mm long red worms sold in pet shops as feed for aquarium fish, and they are also an important food for fish in natural bodies of water. The flying midges are up to 10 mm long, and they do not feed on anything, i.e. they do not attack people. Male chironomids form thick swarms.

Earthworms (*Oligochaeta*) have a small number of bristles, and live mainly in the bottom of water bodies, e.g. slugs, sludge worms, *Eiseniella tetraedra*. The earthworm *Lumbricus* also belongs to the subclass of *Oligochaeta* and may occur in water bodies during floods.

Fish. According to reference literature, the following species of precious fish lived in the Pühajõgi in the 19th century: river trout, salmon, sea trout and eel. In the 1930s, the fry of salmon and whitefish were introduced in the river, but in the middle of the last century, the river, which used to be a cool-water spawning bed for salmon and river trout, lost its fisheries-related value because of pollution. In the 1980s, the River

Pühajõgi was so polluted that sea trout and salmon did not come to spawn there any longer. A total of nine species of fish was found in the 1995 test catches: river trout, pike, roach, bleak, stone loach, burbot, three-spined stickleback, nine-spined stickleback, perch. The most frequent species in different river sections were the pike, three-spined stickleback and nine-spined stickleback. In the lower courses of the river, in the vicinity of the Pühajõe limited conservation area, where the water is enriched with oxygen in fast-flowing rapids, the following species were caught: pike, stone loach, nine-spined stickleback, and, to some extent, also burbot and three-spined stickleback, and in the Oru park vicinity, also young river trout. Local people have said that grayling has also been seen in the river. The 2005 test catches also revealed bullhead.

The outcome of the monitoring catches of 2009, within the section of the river permeating the Pühajõgi limited conservation area and the Oru park landscape protection are, was only three species: salmon, sea trout and river trout. Thus, the fish fauna in different sections of the river is relatively poor and especially in some areas. As a result of long-term pollution, grayling has disappeared from the river, and possibly also bullhead. Still, the researchers of fish do not exclude the possibility that the river lamprey, brook lamprey, minnow, stone loach, three-spined stickleback, nine-spined stickleback and the bullhead could still be currently living in the River Pühajõgi (Esimese seireringi …, 2009).

The status of the river has improved during the recent times and this gives hope that the local fish fauna would revive in a couple of years, and preparatory work for this has been made: trout fry were released in the river at the Lagedi dam in the autumn of 2009.

There is one species of trout living in Estonia, yet this species has two ecological forms – river trout and sea trout, both of them spawn in rivers. River trout become sexually mature at the age of three or four, females later than males. Sea trout spawn for the first time when they are 3–6 years old, in October-November, in rapid-rich, fast-flowing rivers with a gravelly bottom. The roe develop in light spawning nests, which are easily noticeable in the river-bottom, for 4–5 months. The baby fish live in the vicinity of the spawning nest. In their second summer, the young fish start to migrate from the spawning sites, either upstream or downstream, looking for rapidly flowing sections of the river. Fishermen tend to prefer deeper parts of the river for fishing, as bigger fish live in deep waters. The spread of river trout in more warm-water rivers depends on the existence of rapids. There is not enough room for them all in one rapid. If the water is cool, the trout would cope with a lower flow rate.

At the age of two, some of the trout go through the phase of physiological changes: some of them become silver-coloured and descend to the sea – they evolve into sea trout. The other part – the river trout – remains living in the river, and if the river has no connection with the sea, all the descendants of the trout would be river trout.

Young trout start feeding on smaller organisms: algae, zooplankton, smaller benthic

River trout (Salmo trutta morpha fario) is the type of trout living solely in rivers. Fishermen like the fish for its red meat and exciting fishing experience. River trout lives in clean and oxygen-rich rivers. *Photo: Erko Zlatan.*

invertebrates. During their first summer, they mainly eat the larvae of different aquatic insects (midges, squaregill mayflies, stoneflies, caddisflies) and common freshwater shrimp which become the main food the trout as of their first autumn of life. During their second year of life the trout also eat airborne insects and focus on a specific feeding object, which might be the common freshwater shrimp, larvae of caddisflies or insects. As of the third year of life, frogs become an addition to the food. The share of fish in the nutrition of river trout is small: larger trout would prevailingly eat the nine-spined stickleback, and, if the food situation is poor, also their own fellow species.

The salmon, sea trout and river trout all live in the River Pühajõgi – how to differentiate between them? Adult sea trout are larger than river trout, they are more silvery, and there are no red spots on their sides. It is good to make a difference between young salmonids – the salmon and trout – according to the adipose fin: the top of the adipose fin is nearly always red in the one-or-two-year-old trout (Järvekülg, 2008).

The part of the River Pühajõgi, starting from the mouth of the Mägara brook to its discharge into the sea, is included in the list of spawning beds and habitats of the following species: salmon, river trout, sea trout and grayling – in this part of the river, it is forbidden to build new dams and reconstruct existing ones to the extent which would raise the level of water or alter the natural bed of the water body and the hydrological regime. Fishing is forbidden throughout the year in Mägara brook and 100 metres downstream of the dams. Elsewhere, fishing is allowed for persons who have obtained a fishing permit, however, it is not allowed to fish during the close season or to catch undersized fish.

Crayfish. According to written records and recollections of local people, there had been abundant crayfish in the River Pühajõgi at the end of the 19th century, but the population was later struck by disease and the crayfish had died. In 1995, the crayfish was not found, but it has been seen in the river again during recent years.

Through the ancient settlement sites

There are eight larger populated areas located within the catchment area of the River Pühajõgi, three of them on the right bank of the river, two on the left bank, and three settlements lie on both riverbanks. The entire region has been a settlement site already in the prehistoric times: the first signs of human habitation originate from the tombs of the 1st millennium in the vicinity of Toila. The first records of villages are mainly from the 13th century when the relevant data was entered in the Danish Census Book. The part of the river in the southeast–northwest direction is a distinctive borderline between east and west: the areas remaining to the east of the River Pühajõgi (except for the vicinity of today's Narva) are not mentioned in the Danish Census Book – it might be, as has been suggested, that taxes were imposed on coastal people in a different way, or, that at the time of making these entries, there was no human settlement to the east of the holy river (Schulbach, 1922).

SETTLEMENTS ON THE BANKS OF THE RIVER PÜHAJÕGI

(downstream from the river source)
Kohtla rural municipality:
Amula village
(on both sides of the river);
Kukruse village
(on the right riverbank);
Jõhvi rural municipality:
Kotinuka village
(on the left riverbank);
Jõhvi town
(on the right riverbank);
Linnaküla village
(on the right riverbank)
Toila rural municipality:
Pühajõe village
(on both sides of the river);
Voka village
(on both sides of the river);
Toila small town
(on the left riverbank).

MAN-MADE FACILITIES ON THE RIVER PÜHAJÕGI

- Larger bridges: Kotinuka bridge, Liiva (Voka) bridge, Kõrve bridge, Pühajõe bridge; smaller bridges in the Oru park.
- Watermills (5 altogether, according to oral history): two in Jõhvi – Käbina flour and woollen mill (both decayed); Lageda mill (was still working on electric power during the collective farm period); Pühajõe Manor mill (only the limestone wall is preserved, on the left bank of the river); a mill in the Oru park, under the Lipumäe hill (decayed).

The River Pühajõgi, its tributaries, objects under nature conservation, old mill sites and riparian settlements in the rural municipalities of Kohtla and Jõhvi.

Amula village

It is known that the village used to be a large settlement once in the past, but was demolished in the middle of the 19th century (Tensmann, 1931). In 2009, there were 43 inhabitants living in Amula.

Kukruse village

Kukruse (*Kuckarus*) is mentioned in the Danish Census Book in 1241, as a village with six farmsteads, the first record of the Kukruse Manor dates from 1453.

The buildings of the manor, preserved until today, comprise the mansion (expanded several times), stables for horses and oxen, granary, coach house, cellar and grain dryer. The distillery, governor's and gardener's houses are in ruins. The windmill was restored at the end of the 1980s, and the near vicinity of the manor was put in good order. A mysterious tunnel was found during maintenance work – according to the more widespread explanation, this had been a secret passage to the church in Jõhvi, and pursuant to another opinion (researchers of the Tallinn University of Technology), it could be a former water pipeline. In oral communication, Olav Vallimäe has said that the opened passage would not lead anywhere. The place-name of Kukruse is historically related to the most important mineral resource of Estonia – oil-shale or kukersite. However, the local manor-owners of the Toll family have also brought fame to the region in the past.

The Toll family, the manor-owners. Friedrich Ludwig von Toll (1781–1841) commenced with the collection of the historical records of the Order and these from the time of Swedish rule, his undertaking was continued by the cavalry colonel and hobby historian Robert von Toll (1802–1876), who was the first to utilise oil-shale for industrial purposes. Hereby it is appropriate to note an intriguing additional clause in bequeathing the Kukruse Manor – the new manor-owner had to, when receiving his inheritance, also assume an obligation to constantly supplement the collection of historical documents. This way, the archive of Kukruse Manor gradually became the largest and most valuable private archives in the Baltics. In 1935, the then Ministry of Education and Social Affairs purchased the archive for 5,000 kroons and transferred it to the central archive of the state; currently, the collection is kept in the Estonian Historical Archives in Tartu. A collection of the archival records from Kukruse was published during the period of 1856–1887, titled *Est- und Livländische Brieflade*, containing documents of agrarian history, geneaology, numismatics and other fields.

Eduard von Toll (1858–1902) was an acknowledged geologist and polar researcher. His tombstone, in the shape of a sailboat, has been erected in his honour in the fam-

Oil shale ash heap is an important landmark in Kukruse and a place for adventure lovers. Yet the mound, smoking and burning from time to time, shows some signs of ageing – it is sinking. *Photo: Anne-Ly Feršel*.

Memorial stone to Robert von Tolli, the founder of the Kukruse Manor. The stone was moved into the ground during land improvement works and was discovered later, when refurbishing the farm. Festive reopening of the memorial stone took place in 2007. *Photo: Eva-Liis Tuvi*.

ily graveyard in Kabelimets (Kabelimäe). Upon the event of opening the Kukruse park, von Toll had erected a memorial stone – this had gone missing but is now located in the vicinity of the Tiigi farmstead in Kukruse.

The rural municipality of Kohtla opened a museum in October 2010, in the cellar of the Kukruse mansion, to commemorate the life and activities of Eduard von Toll, a polar researcher and geologist, and Robert von Toll, an archivist and the first person to industrially utilise oil-shale. The exhibits (a dogsled, ship model, historical maps) cast light on the work and life of Eduard von Toll.

Subterranean oil-shale mining began in Estonia in 1916, in Kukruse. The sight today – the wastage pile in Kukruse reminds us of the mine operating up until 1967. A grandiose plan was devised to actually utilise the landscape shaped by the extraction of oil-shale – the large refuse mound was to accommodate an oil-shale museum (Sikk, 1997). This plan was not possible as the inside of the hill, containing abundant oil-shale residues and pyrites, could possibly ignite. In 2008, this artificial hill revealed its real content once again – new fissures appeared on its sides, with smoke oozing out from there. The GPS measurements confirm that the heap has sunk by one metre in two years (2007–2008) (Kriis, 2008). The relevant changes continued also in 2009. The hill of debris has attracted tourists and athletes who want to run up the hill, in addition, the heap is now the habitat of hogweeds, an aggressive foreign species.

The Uikala landfill is located in the Kukruse village.

At the end of 2009, 45 Late Iron Age burials were excavated in Kukruse, during the construc-

tion of the Tallinn–Narva road, this being a great and pleasant surprise for archaeologists. Most of the burials had abundant contributions, and there was also one – the tree-trunk coffin – which differed from the others. The details and the data concerning the prehistoric finds will be ascertained in the near future.

Kotinuka village

Kotinuka village is depicted on the 1-verst map issued during the years 1891–1912.

In 2002, there were 40 people living in the village. The detailed plan was initiated at the end of 2009 envisaging the construction of the Jõhvi business and logistics park there.

The region is of interest for botanists because of rare plants found in the location: Siberian rocket height (*Ligularia sibirica*, category I of protected species) and Estonian saw-wort (*Saussurea alpina* subsp. *esthonica*, category III of protected species).

The landfill of the Jõhvi town, which has been closed down now, used to be in the village.

Jõhvi

As a village, Jõhvi (then *Gevi*) was first mentioned in 1241, and the knighthood manor (*Jewe*), which belonged to the Narva reeve, in 1491.

There are several contradictory stories about the origin of the name of the town. According to oral history, Jõhvi is a derivative of the Estonian word *jõhvikas* (=cranberry), yet this concept does not have any linguistic grounds. Hermann Kurba, a local lore researcher in the 1930s, suggested that the name Jõhvi would mean river-water, derived from the quondam same-named spring. However, the most acknowledged explanation is the one given by the Finnish linguist Lauri Kettunen, who said that the name comes from the Estonian word *hobusejõhv* (=horsehair).

Official town rights were granted to Jõhvi in 1938. In 1949, Jõhvi became the centre of the county, and in 1950, the regional centre. An oil-shale mine was established in the western part of the town in 1949, operating until 1973. Jõhvi is also one the song festival towns in Estonia as in 1865, the first song festival of the Jõhvi parish took place here.

Mihkli (St. Michael's) Church in Jõhvi. According to Lembit Kiisma, this one-nave Gothic style church-stronghold is one of the most distinct ones in Estonia, regarding its architecture and tragic history. The church, which at the time was probably a wooden edifice, was first mentioned in 1364. A limestone church was built in the 15th century, and, a century later, was turned into a military fortification (thick walls, defence balustrades, the moat).

The legend, associated with the church, tells about two brothers who had started

The former mill and pond in the town of Jõhvi. The pond was also used for boat trips at this time. *Photo from Olav Vallimäe's collection*.

to build a castle in the place, they had quarrelled for some reason, and one of the brothers had died in the fight. To redeem the fratricide, the semi-finished castle was rebuilt into a church.

Mihkli Church, together with the manors in Edise, Järve and Kukruse, formed a fortification belt on the important trade and military route in the west–east direction. According to folk tales, these four fortified points were supposed to be connected by an underground passage. Indeed, the beginning of a passage has been found in Kukruse.

The current exterior of the church (except the spire) originates from the first half of the 18th century. The spire was reshaped in 1875 and restored in 1984.

The vaulted cellar under the altar is now the venue of the museum of the Jõhvi fortified church.

The post coach station was built in Jõhvi as one of the stops in the postal road connecting Russia with Western Europe. The statue of a postal horse in the centre of Jõhvi is to commemorate the historic building and the quondam traffic vein. The new concert hall in the former manor park is becoming more and more popular. According to the general plan of the town of Jõhvi, the areas in the vicinity of the River Pühajõgi will be designed as recreational sites.

Instead of the current shopping centre *Tsentraal*, there used to be an inn in olden times, and a pond at the inn, and Käbina mills (flour and woollen mills). The pond was also used for boat trips at this time.

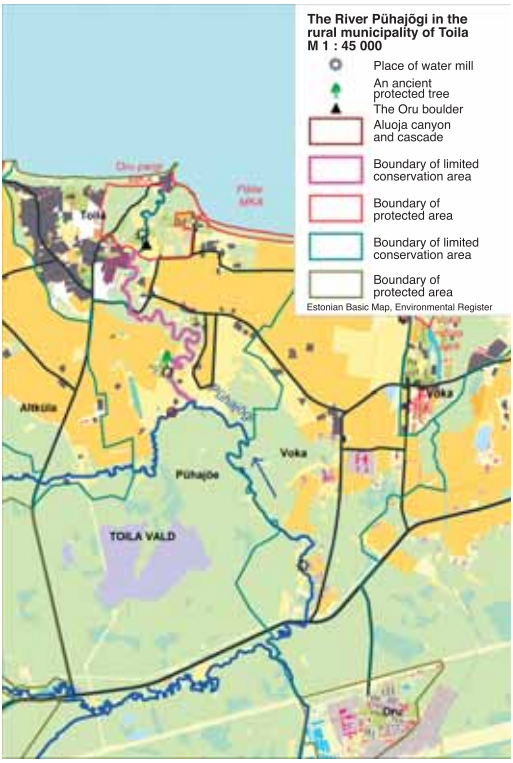
Linnaküla village in the immediate vicinity of Jõhvi is now merged with the Jõhvi rural municipality.

Pühajõe village

Pühajõe village (*Pododt, Poioki*) was first mentioned in the Danish Census Book. The manor (*Pühhajökki*) was founded at the beginning of the 17th century. The church

in Pühajõe is under heritage protection as a typical sacral building of the 19th century in the region. The first wooden church building was erected in Pühajõe (possibly in the site of the ancient sacred grove) in 1467, and operated as an ancillary of the Mihkli Church in Jõhvi. The stone building was constructed during 1838–1839. The church, used as a storehouse since 1967, was restored in 1989 and began to function as an active church again in 1990. The newly renovated congregation building was consecrated in the summer of 2009. On top of the church spire, there are two decorative elements, the cross and the rooster: there are not many similar churches in Estonia.

The graveyard is also under protection as an archaeological monument. At the church, there are several memorial stones, one of them dedicated to the village school established in 1788 – this was one out of the ten schools in the Jõhvi parish at the time. The village school operated in the location until 1861. In the vicinity of the Pühajõe graveyard, on the right riverbank, there are partially preserved artillery redoubts, of nearly one kilometre long and created by the Russian troops during the Great Northern War. In 1700, this was the battlefield of Russians (headed by Boris Sheremetyev) and the Swedes (Charles XII). The camp of the Swedes was located on the site of today's Toila SPA facility. The exact location of the quondam redoubts and the movement of the troops are depicted on the scheme placed next to the graveyard. According to Olav Vallimäe, martial law was violated in the Battle of Pühajõe, as Charles XII did not take any war prisoners.



The River Pühajõgi in the rural municipality of Toila.

The valley of the River Pühajõgi. Elm-trees – protected species – growing on the slopes. Here are also the artillery redoubts from the Swedish times. *Photo: Anne-Ly Feršel.*

A historical picture of the former Lageda mill in the Pühajõe village. *Photo from Olav Vallimäe's collection.*

Lageda mill is the only one out of the five watermills on the River Pühajõgi where the remnants of the buildings are still there. This place and the mill are often known as Lagedi, although historically, the proper place name is Lageda. *Photo: Anne-Ly Feršel*.

The Pühajõgi meandering in the bottom of the valley. A view from the high riverbank, in the vicinity of the Pühajõe lime trees. *Photo: Eva-Liis Tuvi*.

The Kohvimäe farm, taken under heritage protection in 1997, is one of the oldest farmsteads in the Pühajõe village, established 200 years ago. The buildings, listed as architectural monuments, were constructed in the 1870s, and were given the current looks in the 1970s. With regard to cultural history, this farm is known as the birthplace of Abram Simon, the builder of the rural theatre in Toila.

The Pühaoru farm, a part of the former Pühajõe dairy manor, which is located on the coastal cliff, has become well known nowadays. Specialising mostly in grain farming, it was awarded a prize as the best organised production farm in Estonia in 1995.

The European white elm (*Ulmus laevis)* – the protected species of category III – grows on the bank of the Pühajõgi near the bridge of the Toila road.

Four old lindens (more than 200 years old) have been taken under protection in the Pühajõe village, and although they are slightly tangled and tilted, they are still majestic, especially when looked from below, from the riverbank. Unfortunately, suggestions have been made to exclude these trees from the list of protected objects as they are not endangered (Relve, 2000). The Lagedi lindens in the Pühajõe village were of the same age as

the Pühajõe lindens, but they broke in the storm and were cut down in 2010.

Voka village

This village has been named differently in different times. The quondam Kirivere (1426 *Kiriuere*) belonged to the reeves of the Teutonic Order. Voka Manor was established in the 16th century (1586) on the site on the Kolleta village. And the village got its name from the later owners of the manor, the Fock, and this has lasted until today. Historically, Voka small town has been part of the village.

The village of Voka obtained its name after the manor-owners Focks. The picture shows the outbuildings of the manor.
Photo: Anne-Ly Feršel.

During 1781–1788, the Voka Manor, together with Toila and Oru manors, belonged to the Duchess Elizabeth Chudleigh, whose undertakings (distillery, the first chemist) were also beneficial for the local people. There are several folk tales narrating about her flying fantasy (incl. the plan to build a castle, see p. 129). At the end of the 18th century, Voka was considered to be one of the most beautiful manor centres.

Voka post coach station was built on the St. Petersburg–Riga road in the 1710s, (the inn had been operating as the station before), and until the end of the 18th century, this was one of the most important post stations in the territory of Estonia. In 1817, the future Emperor of Russia, Nikolai, and Empress Aleksandra and the German Emperor Wilhelm I paid a visit to the Voka Manor. The memorial stone on the seashore in Voka, with inscribed initials and the date, is a reminiscence of the distinguished guests from 1817. In the summer of 2009, the memorial stone was partially in water.

During the Soviet period, the Agricultural Production Association of Estonia and the *Kaljurand* kolkhoz renovated the village into one the best arranged rural settlements in Estonia, equipped with a full-size stadium, a sports hall, shooting gallery and hunting rifle-range, kolkhoz centre, kindergarten, and well maintained lawns. The village centre also encompassed the protected park in Voka.

Port in the river-mouth of the Põhajõgi.
Photo: Anne-Ly Feršel.

Toila small town

In old times, Toila comprised two parts: Toila-Altküla and Toila. Toila-Altküla was first mentioned as Kärilõpe in 1426, and the first written record of Toila (then Männiku) dates from 1547. Toila (Männiku) used to be mainly a fishermen's village. The name of Toila is thought to be of Finnish origins, associated with wishes and hope: the Finnish word *toive* bears such a meaning, hence the derived place-name *Toivela*. In the course of time, the letters *v* and *e* have disappeared from the word, and final form is *Toila* (this is the explanation suggested by Professor Lauri Kettunen). The local manor, established here at the beginning of the 17th century, was the dairy estate of the Voka Manor.

Toila was the local **cradle of culture** as of the second half of the 19th century. The local school founded in 1841, provided three years of education. When these educated young men came of age, they initiated active social life, with Abram Simon as the leader. A male choir was established in 1863, and the singers participated in the first all-country song festival in Tartu in 1869, with the harnessed horses and carts given by Nikolai von Wilcken, the Lord of the Voka Manor. The musical instruments were commissioned from Dresden, Germany, and David Otto Wirkhaus from Väägvere came to teach the musicians. The audience of the brass band comprised a number of the nobility: the band performed in St. Petersburg, at the jubilee birthday of Baron Nikolai von Wilcken, and in the Toompea Castle, for the Governor of Estonia.

Lydia Koidula's play *Säärane mulk ehk 100 vakka tangusoola* was staged in the schoolhouse in 1881, and the construction of the theatre house commenced a year later – this was the first building erected with the purpose to perform theatrical works in Estonia. In the middle of the small town of Toila, there is a memorial stone to the rural theatre and the first theatre building.

Toila has been the home area of several well-known cultural figures, for example the meritorious landscape photographer Carl Sarap (1892–1942). He began to systematically photograph Estonian towns and landscapes together with Johanna Triefeld, an owner of a bookshop in Rakvere. Toila is also the childhood place of the beloved

actor and film director Kaljo Kiisk (1925–2007) – he might have obtained the acting inspiration from his mother who performed in the Simon's theatre group. Composer Veljo Tormis, the son of the parish clerk had spent some years of his childhood in Toila.

The voluntary firemen society was established at the beginning of the 20th century (1901). Having participated in the extinguishing of the fire in the Toila Manor, the society was granted land free of charge and necessary construction material for their society building.

The dairy society was founded in 1911, and can be regarded as the predecessor of the current dairy company Jõhvi Piim. The post office was founded in 1913, and Grigori Yeliseyev, a successful merchant from St. Petersburg, supported the post office by purchasing the stamps for his company from there. A home economics school was launched in 1939.

In 1870, local people started to obtain a new location for the graveyard (the current Toila cemetery), the chapel was completed in 1895. Later, in 1943 and in 1957, stone cairn burials were found in the vicinity of the graveyard – people had been buried there in two different periods: during the 1st and 2nd century, and the 7th to 8th centuries. The burial mound was used up until the 13th century. The finds are in many aspects similar to the artefacts found in the burial mounds of Finland – evidence that the people of Virumaa and Finland had close contacts.

The development of **the resort in Toila** commenced in the 1870s when the first dozens of summer cottages were built. The elite of the then St. Petersburg and Moscow came to rest here. The scenic nature of Toila is perpetuated by painter Ivan Shishkin (1832–1898). Igor Severyanin (1887–1941), a well-known Russian poet lived here for 18 years, his mother is buried in the Toila cemetery. He published a book of poetry in 1935, titled *The Sacred River (Pühajõgi)* and was thereafter referred to as the bard of Pühajõgi. Together with his wife Felissa, Severyanin also translated Estonian poetry.

Due to the magnificent nature and atmospheric conditions, Toila was called the 'air resort'. Likewise, it was a favourite holiday site for the cultural elite of Estonia: Betty Alver, Friedebert Tuglas, Marie Under, Carl Robert Jakobson and many others.

A new sanatorium was built in Toila at the beginning of the 20th century, but was closed down later. The current Toila SPA was completed in 1989.

Fortifications of the riverbank near the former Oru palace, and the Middle bridge. *Photo from the collection of the Estonian History Museum N 5642 : 572*

Instead of the former Oru palace, there is now a Baroque-style park with fountains. *Photo: Anne-Ly Feršel*.

Oru palace and park

Oru palace. In 1897, the important Russian merchant Grigori Yeliseyev purchased nearly 144 hectares of land in the estuary of the River Pühajõgi, including the Pühajõe dairy manor, the river-mouth of the Pühajõgi, a pine forest on the left riverbank and Nõiamets on the right bank, and built a summer palace in this location, using the example of Italian Renaissance villas. The entire palace complex in Oru was completed in 1899, including the summer palace, stables, greenhouse, house for servants and a church. The tower of the servants' house was arranged to utilise wind-power in order to pump water from the well.

In 1935, Estonian industrialists purchased the palace (which had been empty for some time) and the park, and presented them as a present to the State Chancellery of the Republic of Estonia, to be used by the president as his summer residence. New buildings were added to the summer residence: a warden's house, gardener's house, ambulance-sauna-washhouse, beach house, sauna-water treatment facility, a port, and an observation tower in Nõiamets. An alpine garden, covering two hectares, was created on the klint terrace.

In 1941, the palace was set on fire, and the ammunition kept in the cellars was exploded in 1944. In 1960, the ruins were levelled and covered with sand and soil.

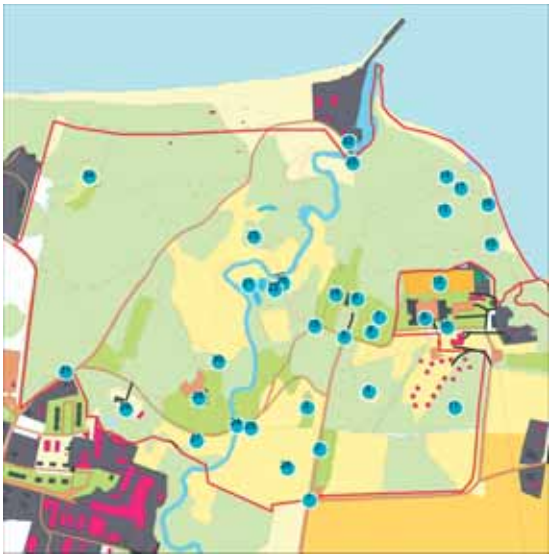
Some of the former buildings are still there – the old building of Toila School (used to be the servants' house and was rebuilt as a school) and the new building of the educational establishment (the former stables).

Oru park. The park near the palace was designed by Georg Kuphaldt (1853–1938), one of the most renowned landscape architects in the 19th century Russia. Kuphaldt had also been involved in creating the Kadriorg Park in Tallinn, the beach park in Pärnu,

THE SIGHTS OF THE ORU PARK LANDSCAPE PROTECTION AREA

1 The former main gate of the Oru park, Bear Gates
2 Linden alley
3 Foundation of the warden's house
4 Children's playground, the site of the former church
5 Palace garden gate
6 The site of the Oru Palace
7 The sculpture Three Graces on the foundation of the greenhouse
8 Rose garden
9 Toila Secondary School
10 Canadian poplar
11 Oak forest
12 School garden
13 Nõiamets – Witch Forest
14 Neidepank cliff
15 Pavilion in Nõiamets
16 The place of the former alpine garden
17 The grotto
18 Fountain and terraces
19 Hõbeallikas – Silver Spring and cave
20 The Middle bridge
21 Ponds
22 Roosteallikas – Vaseallikas – Copper spring
23 Berlin poplar alley
24 The Southern bridge
25 The Oru boulder
26 Arboretum
27 Oak alley
28 Song festival grounds
29 Administrative buildings of the park
30 Lipumägi hill
31 The main gate
32 Harbour
33 The Northern bridge
34 Soldiers' cemetery

Reference source: Mõtuste (2003), Estonian Basic Map, Environmental Register



Olustvere Manor park, and also the garden around the Winter Palace in St. Petersburg.

Oru park (see also p. 153) was established during 1899–1901, utilising the labour of local peasants. The designer has underlined the need to protect natural values: he made excellent use of the magnificent valley of the River Pühajõgi, vistas to the opposite riverbank and the sea. Kuphaldt has described the river-mouth of the Pühajõgi as a murmuring and roaring mountain river of ten metres wide. The nearly 90-hectare park is designed in different styles: the immediate vicinity of the palace with luxurious terraces, pools and fountains is a regular pleasure garden, somewhat resembling the Roman gardens; the other part, under the hill-slope, was park-wood, created in the atmosphere of Nordic crispness and even wilderness.

After the October revolution, Yeliseyev left for France and left the Oru palace and the park to be guarded by his authorised agent. However, as time went on, the palace started to gradually decay and the park was neglected. When the palace and the park were taken into use as the summer residence of the President of the Republic of Estonia, the palace and a number of park facilities were reconstructed according to the design of architect Roman Koolmar (1904–1971). Giving one example, two granite life-size bears, created by Herman Halliste (1900–1973), were installed at the beginning of the linden alley leading to the palace to decorate and light the gates in 1939. This was the first gate decorated with sculptures in Estonia. Now, the sculptures are taken under heritage protection, yet one of the statues has lost a part of its muzzle (it was used as a shoot-

The former main gate of the Oru park, referred to as Karuväravad ('Bear gates'). The history of these two bear figures is also colourful – they were the first of the kind in Estonia, were preserved in a prison camp for some time, and thereafter installed in their former place. *Photo: Eva-Liis Tuvi*.

The former sacred grove on Neidepank cliff. The wilderness of the park is intentional, creating a mystic atmosphere for lonely wanderers. *Photo: Anne-Ly Feršel*.

ing target during the Soviet time), and there is no post in his front paws to hold the lantern. In the meantime, the bears were stored in the prison camp in Sillamäe, and were put back at the palace gates in the second half of the 1960s.

The song festival grounds of the Oru park have been in the vicinity of the **Lipumäe** hill for a long time. During the Great Northern War, the staff of Charles XII had supposedly been near the Lipumäe hill (and, according to other records, at today's spa). The Swedes had won the battle as the local miller had directed them towards the rear of the Russians.

One of the local tales narrates about the robbery of the mill: the robbers had killed the miller's family and stolen the grain, only a little girl survived as she had been sent for help. Indeed, the fact that there had been a mill in olden times is also proved by the records stating that there was a road across the river from under the Lipumäe hill.

Nõiamets (=witch-wood) is a scared grove on Neidepank cliff, in the eastern part of the park. There are three legends associated with the Neidepank cliff – according to one of them this had been a place where peasants were whipped during the times of serfdom. Once, a maiden was taken to the whipping stables to be beaten, but she had got herself free and had jumped off the high cliff. It is in her memory that the place was called Neidepank (=maiden's cliff). According to another story, the coastal cliff was named after the *jus*

primae noctis of the Voka Baron, and the third tale narrates about a maiden who had escaped when soldiers wanted to rape her and fell off the cliff.

The caves in the slopes of the River Pühajõgi valley have been a real sight in earlier times. Once, there was a small Nõiametsa (Nõiakoobas, Röövlikoobas 'Witch-cave', 'Robber's cave') cave in the Neidepank terrace, approximately ten metres below the cliff, however, the ceiling of the cave has fell in a long time ago. Now, there is little terrace in this spot, a resting place framed with supporting walls.

Tiskre sandstone outcrops and abundant springs in the valley-slopes within the lower courses of the River Pühajõgi presuppose that there are caves also in this area, yet only one of them has preserved until today – Hõbeallika cave in the right riverbank, in the more than five metres high sandstone wall. It is highly likely that the ceiling of this cave has fallen in a number of times. The last of such occasions, quite an extensive one, substantially decreasing the size of the cave happened in 1956, as a result of exploding the wartime ammunition: the front part of the cave fell in within the extent of 9 metres. At the moment, the triangular opening of the cave is 1.7 metres wide and 1.4 metres high, whereas the cave narrows down in depth when moving on. The Hõbeallika spring (flow rate less than 1 l/s) emanates from the rear wall of this six metres long cave. The vicinity of this cave was designed as a

Hõbeallika cave, a well-known sight in the Oru park. The cave did not remain intact during the war – a large part of it collapsed as a result of the disposal of ammunition. *Photo: Anne-Ly Feršel*.

Vaseallikas ('Copper spring'), sometimes also called Roosteallikas ('Rusty spring'), because of its rusty water, is feeding the ponds with water. *Photo: Anne-Ly Feršel*.

A mill dam on the River Pühajõgi, below the Oru palace situated on the high plateau. *Photo from the collection of the Estonian National Museum (ENM) Fk 114 : 65.*

The ponds, created during the time when the park was the summer residence of the president, and restored after regaining independence. *Photo: Bruno Uustal*.

romantic shady recreational place during the time of the palace. It is known that during the 1930s, coloured lanterns had been used to decorate the cave.

Near the gates of the park, there used to be the Reokoobas cave, used as a refuge in war-times. The ceiling of the cavity has fallen in now; a little spring emanates from the steep valley slope above the cave, the water was believed to heal problems with eyes.

The damming of artificial lakes failed at the time of Yeliseyev's, and these were recreated into ponds when the palace was the summer residence of the president, and were restored after World War II. The Roosteallikas spring feeds the ponds with iron-rich water.

Promenade parties are organised in the Oru park as of 1995, and the day of miners is also celebrated in this venue every year.

Protection of the River Pühajõgi and the landscapes in the vicinity

THE MEASURES TAKEN TO PROTECT THE RIVER PÜHAJÕGI

- Limited management zone on both riverbanks 100 m from the boundary of water;
- Pühajõe limited conservation area (3.9 ha) in Toila rural municipality;
- Included in the list of the spawning beds and the habitats of precious fish, from the mouth of the Mägara brook until the Gulf of Finland;
- Oru park landscape protection area (75 ha) in the rivermouth of the Pühajõgi.

Activities that might affect the river and the biota therein are forbidden on the riverbanks within 100 metres from the boundary of water.

Pühajõe limited conservation area encompasses the river from the mouth of the Mägara brook to the landscape protection area of the Oru park. The aim is to protect the river habitats of European relevance from unfavourable changes. Special attention has to be paid on the habitats of the river lamprey in the River Pühajõgi.

Spawning bed and habitat of precious fish. The part of the River Pühajõgi, starting from the mouth of the Mägara brook to the Gulf of Finland, is included in the list of spawning beds and habitats of the following precious species: salmon, river trout, sea trout and grayling. In this part of the river, it is forbidden to build new dams and reconstruct existing ones to the extent which would raise the level of water or alter the natural bed of the water body and the hydrological regime.

Oru park landscape protection area. Oru park (see also p. 149) was taken under nature protection in 1957. The national landscape reserve of the Saka–Ontika–Toila limestone cliff was established two

Pühajõe limited conservation area commences from the mouth of the Mägara brook and ends on the border of the Oru park landscape protection area. *Photo: Eva-Liis Tuvi*.

The River Pühajõgi in a dry season, within the Oru park area, with only remnants left of the powerful stream. *Photo: Anne-Ly Feršel*.

A view of the Oru park. This park, established on varied terrain, is full of footpaths and scenic views. *Photo: Eva-Liis Tuvi*.

years later (1959), encompassing the longest incessant section of the North-Estonian cliff, and the valley in the lower courses of the River Pühajõgi and the park of the former Oru palace. After several reorganisations, there are two landscape protection areas in this location as of 1997: Ontika (1,212 ha) and that of the Oru park (75 ha). The aim of the latter is to preserve the park landscape with historical value and diverse relief.

The area is divided into one limited management zone.

The tiding up of the Oru park commenced in 1958. A separate unit – Toila forest district – was created in 1971 to maintain and restore the park, with an operating area of merely 1,123 hectares of plots subject to nature conservation related limitations.

According to the inventory conducted in the park by Ilmar Süda in 1996, there were 258 species of trees and bushes growing in the park. The most rare ones are as follows: black pine (*Pinus nigra*), American larch (*Larix laricina*), Japanese Judas-tree (*Cercidiphyllum japonicum*), field maple (*Acer campestre*), American basswood (*Tilia americana*) and others.

The widest tree in the park, the Canadian poplar (*Populus* × *canadensis,* circumference at

one-metre height was 545 cm in 1997) – grows in the schoolyard. The tree, protected as an individual object outside the landscape protection area, was unfortunately broken down in the September storms of 2010.

The erratic boulder in the Oru park was taken under protection as early as in 1935. The large rock is on the right bank of the River Pühajõgi, within the plot of the Oru palace, and is partially buried in the surface. The measurements above the ground are as follows: length 10.7 × width 8.3 × height 2.0 m; circumference 26.5 m (Pirrus, 2009). The Russian-language text inscribed in the boulder states that the nearby road and bridge was built in 1901. The boulder has also been used as a benchmark in the geodetic survey of the vicinity.

Oru park on the banks of the River Pühajõgi is also the habitat and feeding area of the northern bat and Daubenton's bat, both category II of protected species.

The famous Oru boulder, known also as the Yeliseyev's rock. Further in the background is the southern bridge, Lõunasild. *Photo: Anne-Ly Feršel*.

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