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REPUBLIC OF ESTONIA
MINISTRY OF THE ENVIRONMENT

Transboundary Cooperation between Estonia and Latvia in the frame of River Basin Management Planning in Gauja/Koiva River Basin District

Background document for the 2nd cycle RBMPs

June 2016

This document has been prepared by the authorities responsible for the development of River Basin Management Plans: Latvian Environment, Geology and Meteorology Centre (Latvia) and Estonian Ministry of the Environment.

**Approval of the background document “Trans-boundary Cooperation
between Estonia and Latvia in the frame of River Basin Management
Planning in Gauja/Koiva River Basin District”**

The Estonian and Latvian water directors,

Taking into account the agreement between the Ministry of the Environment of the Republic of Estonia and the Ministry of the Environment of the Republic of Latvia on co-operation in protection and sustainable use of trans-boundary watercourses signed on 24 October 2003;

Implementing the requirements of the Water Framework Directive 2000/60/EC with regards to coordination of administrative arrangements within river basin districts;

Taking into account that in Estonia, the Koiva river basin management plan 2016-2021 was approved by the Government on 7 January 2016 and in Latvia, the Gauja river basin management plan 2016-2021 was approved by the Latvian minister of environmental protection and regional development on 22 December 2015;

Looking forward to even closer co-operation in the management of the joint Gauja/Koiva river basin in the coming years to ensure achievement of all relevant environmental objectives,

Have agreed to approve the background document “Trans-boundary Cooperation between Estonia and Latvia in the frame of River Basin Management Planning in Gauja/Koiva River Basin District” based on the information from the recently approved river basin management plans 2016-2021 in both countries.

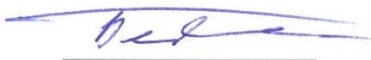
Signed on 8 July 2016 in two copies in English language.

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List of abbreviations

BQE	Biological Quality Element
GEP	Good ecological potential
GES	Good ecological status
PoM	Program of Measures
RBD	River Basin District
RBMP	River Basin Management Plan
WB	Water body
WFD	Water Framework Directive (2000/60/EC)
QE	Quality element
IC type	Intercalibration type
HPP	Hydropower plant
PE	Population equivalent

INTRODUCTION

The Water Framework Directive¹ (WFD) sets a ground for transboundary cooperation in cross border waters and significant water issues. The main objective of the WFD is to achieve good chemical and ecological status (GES) or ecological potential (GEP) for all surface waters (as well as coastal waters) and good chemical and quantitative status for all groundwater bodies.

The present document summarises the work results in the field of river basin management planning conducted in Estonia and Latvia in 2010–2015, as well as describes environmental (WFD) objectives that shall be achieved and measures that shall be implemented in 2016-2021.

Gauja RBD is located in Latvia and Koiva RBD in Estonia. Ca. 90% of Gauja/Koiva RBD area is located on the Latvian side and 9.25% on the Estonian side. Land usage characteristics and proportions in Gauja/Koiva RBD can be seen in Figure 1.

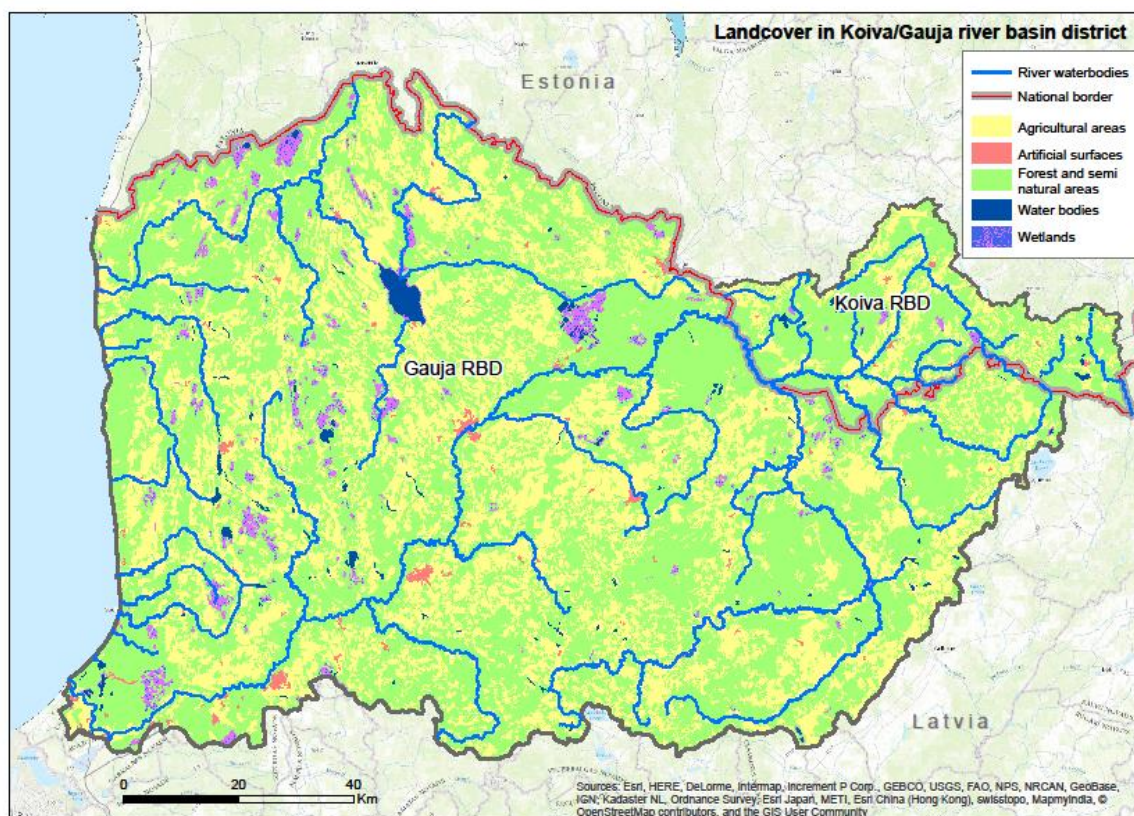


Figure 1. Transboundary RBD Gauja/Koiva

With respect to the strategic objective of developing the joint River Basin Management Plan (RBMP), the priority for the Estonian-Latvian cooperation in 2010–2015 was to harmonise the approaches and methodologies used for the assessment of water status, impacts and

¹ Water Framework Directive (2000) "Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy

pressures, as well as for the economic analysis. This work mainly concentrated on surface water assessments. Despite certain progress, there are numerous subjects for further harmonisation in 2016–2021, as well as a need for exchange of data and technical information. Thus this document reflects the current level of knowledge about the trans-boundary water bodies (WB) in Gauja/Koiva river basin district (RBD), as well as indicates further steps to be taken in the coming years.

The document is as a background document for the 2nd cycle of RBMPs in Estonia and Latvia and the present information is based on approved RBMPs in both countries. In Estonia, the Koiva RBD RBMP² was approved by the Government on 7 January 2016 and in Latvia, the Gauja RBD RBMP³ was approved by the Latvian minister of environmental protection and regional development on 22 December 2015.

Transnational cooperation concerning the sea is mainly conducted in the framework of the HELCOM (Convention on the Protection of the Marine Environment of the Baltic Sea) and the topic will not be covered in this background document.

The documents will be submitted to Estonian and Latvian water directors for approval.

² Koiva RBD RBMP, Estonian Ministry of The Environment, www.envir.ee/vmk2015-2021

³ Gauja RBD RBMP, Latvian Environment, geology and meteorology centre, <http://meteo.lv/lapas/vide/udens/udens-apsaimniekosana-/upju-baseinu-apgabalu-apsaimniekosanas-plani-upju-baseinu-apgabalu-apsaimniekosanas-plani-un-pludu-riska-parvaldiba?id=1107&nid=424>

1 Transboundary cooperation activities during the second cycle of preparation of RBMPs

In October 2003, Estonian and Latvian Ministers of the Environment signed a cooperation agreement within the Gauja/Koiva RBD. The agreement provided for the establishment of groups of experts from the competent authorities that would meet regularly to exchange information and coordinate issues important for the development of the RBMPs. The meetings take place regularly since 2004.

In 2004–2005, the development of the international RBMP for the Gauja/Koiva river basin was discussed between Estonia and Latvia. In 2008–2009, during the preparation of the first cycle RBMPs, both countries agreed that establishing a single plan would not constitute an efficient use of resources, and preferred to focus on information exchange and discussions on specific problems, if identified. However, it was agreed to attempt to harmonise some basic elements of the RBMPs during the second planning cycle. This was done by the means of the Gauja/Koiva project (see information provided in Chapter 1.1.) and information exchange meetings (see Chapter 1.2).

1.1 Gauja/Koiva project

The project „Towards joint management of the trans-boundary Gauja/Koiva river basin district” was initiated in 2011 with the aim to enhance the management of the Gauja/Koiva RBD by taking joint actions. The project was funded by Estonian-Latvian programme 2007–2013 and was carried out from 1 July 2011 to 31 October 2013. Its outputs included joint GIS maps for the whole RBD, proposals for the establishment of a common approach to typology, water quality assessment and classification. New data from monitoring and investigatory activities were also obtained. Latvian and Estonian experts conducted case studies, which included proposals for harmonisation of the assessment of point and diffuse sources of pollution and hydromorphological alterations of WBs. In addition, user-friendly information products (a map with basic facts, brochures, info stands, a web site) on different aspects of common river management were prepared. Several cross-border events were also organised, including two river clean-up activities in June and July 2012.

During the project, a closer cooperation of Estonian and Latvian scientists was established, in particular in the frame of development of a common classification system for biological elements in river and lake WBs. This work was later used by Latvian scientists as a basis for finalisation of ecological assessment methods.

The reports and other informative materials are available from the web site of the project: <http://gauja.balticrivers.eu>.

1.2 Ministerial and officials meetings

On 20 May 2014, at the meeting of senior officials from the Estonian, Latvian and Lithuanian Ministries of the Environment, the development of the second cycle RBMP was discussed among other subjects. It was agreed that it is realistic to develop background documents or special chapters for national RBMPs instead of a joint international plan. These background documents or chapters should describe transboundary cooperation and harmonisation efforts, hindrances to joint (cross-border) WBs and their status, as well as further joint activities. It was also agreed that the annual meetings of the Baltic environmental ministers would be informed about the progress in the development and implementation of the RBMPs.

Another meeting of senior officials was held on 4 November 2015. One of the subjects discussed was the progress in developing the second cycle RBMPs.

2 Gauja/Koiva RBD Characteristics and Status

The Gauja/Koiva RBD is a rather sparsely populated region with a relatively small area and low intensity of pressures. In both countries, the Gauja/Koiva RBD is the smallest RBD in the country. The total area of the Gauja/Koiva RBD is about 14,380 km². The largest part of the district is located on the Latvian side – 90.75% of its area (ca. 13,051 km²). The other 9.25% (ca. 1335 km²) is located on the Estonian side.

There are many protected nature areas in the territory of the Gauja/Koiva RBD – close to the Latvian-Estonian state boundary there are Ziemeļvidzeme (Northern Vidzeme) Biosphere Reserve, Veclaicene Protected Landscape Area, Ziemeļgauja (Northern Gauja) Protected Landscape Area in Latvia, and Karula National Park and Haanja Nature Park in Estonia.

There are more than 20 fish species living in the Gauja/Koiva river basin, e.g. perch, ide, grayling, bream, pike, roach, dace, burbot, whitefish, as well as one species of crayfish. Three fish species – salmon, trout, and vimba – as well as lamprey are economically important migrating species.

The assessment of status of WBs in the Gauja/Koiva RBD in both Estonia and Latvia is based on the principles set in the Water Framework Directive. The assessment of status of surface WBs is based on two components – ecological status and chemical status. The overall status of surface water is determined on the basis of ecological and chemical status, considering the one-out-all-out principle, according to which the overall status of a water body is determined by the status class of the least favourable of the two components and their constituents. The condition is determined on five levels (ecological status classes): high, good, moderate, poor, and bad; as well as two chemical status classes: good and poor. Classification of chemical status in both countries was done based on the requirements of

the EQS directive (2008/105/EC). According to available monitoring data, there were no EQS exceedances in transboundary WBs, but the amount of available data is rather limited.

For groundwater bodies, status assessment is based on chemical status and quantitative status. Two status classes (good and poor) are available.

Comparison of status of Estonian-Latvian cross-border river and lake WBs is shown in the Table 1 and illustration on ecological status in Gauja/Koiva RBD is shown in Figure 2.

Estonia – Koiva RBD					Latvia – Gauja RBD				
WB code	WB name	Status 2 nd RBMP	QE below good status	Reason	WB code	WB name	Status 2 nd RBMP	QE below good status	Reason
River water bodies									
1154200_1	Koiva	good			G225	Gauja	good		
					G231	Gauja	good		
1158400_1	Kolga	good			(no WB)				
1158100_1	Peeli	good			(no WB)				
1158700_1	Peetri	high			G233	Melnupe/ Pēterupe	moderate	Benthic invertebrates, fish	Unclear (physico-chemical QEs and HyMo are good)
1155700_1	Pärlijõgi Saarlase paisuni	moderate	Fish	barriers	G237	Pērļupīte	high		
1154300_1	Ujuste	good			(no WB)				
1158000_1	Vaidava Vastse-Roosa paisuni	moderate	Fish	barriers	G235	Vaidava	moderate	Fish	Unclear (physico-chemical QEs and HyMo is good)
Lake water bodies									
2155900_1	Murati järv	moderate	Physicochemical QEs, benthic invertebrates	natural condition	E205	Muratu ezers	good		

Table 1. Comparison of transboundary water bodies status in Koiva/Gauja RBD

Water bodies are classified as natural, heavily modified (the physical condition of these water bodies has been substantially damaged or deteriorated as a result of human activities, e.g., dredging of water bodies in the process of land improvement operations) and artificial WBs (water bodies that have emerged as the result of human activities, e.g., ditches and channels). Ecological potential indicates how similar is the quality of an ecosystem structure and the functioning of a water body to that of the most similar type of a natural water body.

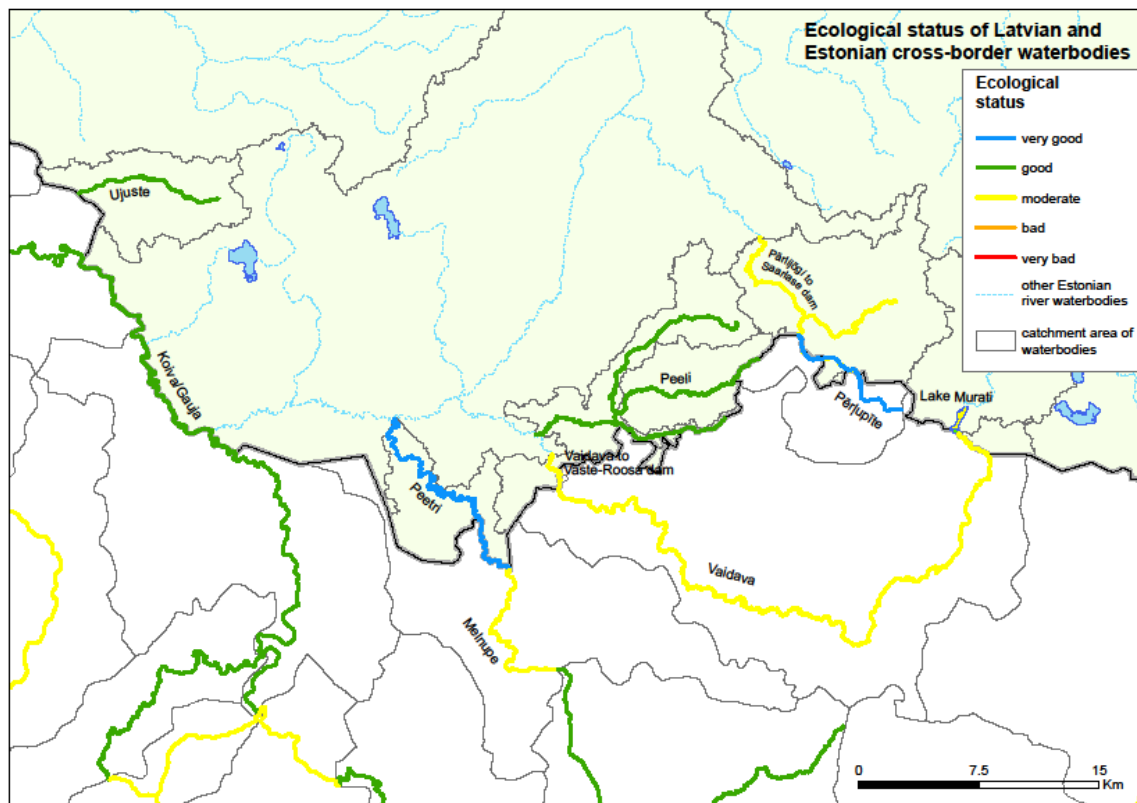


Figure 2. Status of water bodies in Gauja/Koiva RBD

Despite the fact that a large part of Latvian river and lake WB classification methods were adopted from Estonia, the estimation of status class for several cross-border WBs is different in Estonia and Latvia. Depending on a particular water body, differences in national classifications can be related to various reasons, such as different status class boundaries for biological and physico-chemical quality elements, methods of sampling and/or sample processing in laboratory, as well as sampling year and location of sampling points (possible different distribution of pressures in the catchment area).

General information on the WB characteristics in cross-border part of the Gauja/Koiva RBD is shown in the Table 2.

Estonia – Koiva RBD						Latvia – Gauja RBD					
WB code	WB name	WB category	WB type and IC type	WB length, km / WB area, km ²	Associated protected areas	WB code	WB name	WB category	WB type and IC type	WB length, km/ WB area, km ²	Associated protected areas
River water bodies											
1154200_1	Koiva	Natural	3B, IC R-C5	24.65 km	Salmonid river	G225	Gauja	Natural	R6, IC R-C5	87.66 km	Salmonid river; cyprinid river; Natura 2000
						G231	Gauja	Natural	R6, IC R-C5	40.78 km	Salmonid river; cyprinid river; Natura 2000
1158400_1	Kolga	Natural	1B, IC R-C6	14.97 km	-	(no WB)					
1158100_1	Peeli	Natural	1B, IC R-C6	33.95 km	Salmonid river	(no WB)					
1158700_1	Peetri	Natural	2B, IC R-C5	26.19 km	Salmonid river	G233	Melnupe/ Pēterupe	Natural	R4, IC R-C4	13.69 km	Cyprinid river; Natura 2000
1155700_1	Pärlijõgi Saarlase paisuni	Natural	1A, IC R-C6	26.51 km	Salmonid river	G237	Pērļupīte	Natural	R1, IC R-C6	10.29 km	Natura 2000
1154300_1	Ujuste	Natural	1A, IC R-C6	10.16 km	-	(no WB)					
1158000_1	Vaidava Vastse-Roosa paisuni	Natural	2B, IC R-C4	7.58 km	Salmonid river	G235	Vaidava	Natural	R3, IC R-C4	62.22 km	Salmonid river; Natura 2000
Lake water bodies											
2155900_1	Murati järv	Natural	5, IC L-CB1	0.66 km ²	Osprey habitat (code 3150)	E205	Muratu ezers	Natural	L6, IC L-CB1	0.66 km ²	Natura 2000

Table 2. Characteristics of transboundary water bodies in the Gauja/Koiva RBD

2.1 RBD characteristics in Koiva RBD – Estonia

The area of Gauja/Koiva RBD in Estonia is 1,335 km², which is 2.9% of the territory of Estonia. The number of population is rather low (ca. 7700, near 0.6% of all country's inhabitants) and the area has a relatively low economic activity. Near 56.7% of RBD area is covered by forests.

Work on improvement of classification system is an ongoing process. The Estonian methods of ecological status assessment of lake phytoplankton, macrophytes and macroinvertebrates are fully adopted and intercalibrated. The method for lake fish is ready, intercalibration is at the final stage, but the method is not legally binding yet. For biological quality element “macrophytes and phytobenthos”, Estonia does not use benthic diatoms for the assessment of lake eutrophication level. Within legally binding BQE “Macrophytes”, there is an indicator “abundance of green filamentous macroalgae”, which describes the benthic flora response to increased nutrient levels. The Estonian lake hydromorphological status assessment method is finalised but not legally binding yet. Yes

Koiva river basin has only small and medium rivers, so river phytoplankton community is not relevant for the ecological status assessment due to an unstable phytoplankton community. River phytobenthos and benthic invertebrate methods are finished, legally binding and intercalibrated. River macrophyte and river fish methods are developed but in need of improvement and intercalibration using the WFD Guidance document No 30⁴.

The Koiva RBD includes 19 WBs that belonged to either good or high status class in 2013. 5 river WBs and 4 inland lake WBs were in the moderate status class. There are no coastal WBs in the Koiva RBD. Compared to the previous period of RBMP (2010), the condition of 4 out of 28 WBs in Koiva RBD has improved and the condition of 6 WBs has deteriorated. It is hereby essential to note that a large part of WBs have been classified as inferior status classes compared to the previous RBMP due to better and more objective knowledge of the pressures influencing WBs and the condition of waters (both the added monitoring data, as well as enhanced methodologies).

The updated status assessments of 2014 do not show a great change in the condition of WBs – compared to 2013, the status class of 2 WBs has improved and a total of 75% of the surface WBs belonging to Koiva RBD are now classified as a good or high status class.

In the Koiva RBD, there are 3 groundwater bodies and the status of all 3 has been assessed as good. No groundwater body in Koiva RBD is being at risk.

⁴ WFD CIS Guidance Document No. 30 Procedure to fit new or updated classification methods to the results of a completed intercalibration exercise, https://circabc.europa.eu/sd/a/5aee6446-276c-4440-a7de-0d4dec41ed4b/IC_manual_2015_to%20be%20published.pdf

2.2 RBD characteristics in Gauja RBD - Latvia

The area of the Gauja/Koiva RBD in Latvia (together with Salaca river basin, and not including coastal waters) is 13,051 km², which is 20.2% of the territory of Latvia. It is relatively sparsely populated (ca. 255,000, or 13% of all country's inhabitants) and of relatively low economic activity, producing just 9% of the country's GDP. 52% of the RBD area is covered by forests, soils are relatively unproductive. The Gauja/Koiva RBD in Latvia is subdivided into 46 river WBs (2 of these are heavily modified) and 35 lake WBs; it also includes 1 coastal WB and a part of the only transitional WB in Latvia (transitional waters of the Gulf of Riga). With regard to inland waters, according to present delineation, 5 natural river WBs and 1 lake WB (see Table 1 with WB short characteristics above) are near the Estonian border or cross-boundary.

Pressures present in the Gauja RBD are different types of water pollution – point sources, such as wastewater treatment plants, and diffuse sources, such as pollution from agricultural activities and discharges not connected to a sewage network. Other types of pressures are different hydromorphological alterations, such as dams, barriers, melioration systems, and watercourse regulation. Overall intensity of pressures is relatively low, especially in the near-border areas, due to low population density.

Considering that the territory of the Gauja RBD is sparsely populated and subject to relatively low intensity of pressures (this is particularly accurate for the cross-border areas near Estonia), monitoring of inland surface waters in the near-border areas is, in general, performed less intensively.

In the beginning of the process of development of the 2nd cycle RBMPs, the Latvian system of classification of WB status was relatively undeveloped. It has been substantially improved since then, based largely on the methods used in Estonia.

The first attempts to improve the Latvian classification system were undertaken in 2008–2009, in the frame of the project “Scientific development of the ecological classification system for surface waters, according to the requirements of the Directive 2000/60/EC”⁵. It has been concluded that for a number of BQEs, classification methods developed in Estonia would be suitable also for Latvian conditions.

Work on the improvement of the Latvian classification system was carried out in 2011–2013 in the frame of the project „Towards joint management of the trans-boundary Gauja/Koiva river basin district” (see Chapter 1.1). It provided additional classification methods for e.g. river and lake macroinvertebrates that were used to develop the 2nd cycle RBMPs in Latvia, as well as to re-evaluate water quality monitoring data from the first monitoring cycle (2006–2008).

⁵ Vīrszemes ūdeņu ekoloģiskās klasifikācijas sistēmas zinātniski pētnieciskā izstrāde atbilstoši Eiropas Parlamenta un Padomes Direktīvas 2000/60/EK (2000.gada 23.oktobris), ar ko izveido sistēmu Kopienas rīcībai ūdens resursu politikas jomā, prasībām. Latvijas Universitāte, 2009.

Intercalibration of methods adopted from Estonia took place in 2014–2016 (to be finalised by 1 July 2016 for most BQEs). In parallel, development and intercalibration of a classification system for river and lake fish is being carried out (to be finalised by 1 July 2016).

Overall, according to the assessment provided in the 2nd RBMP for the Gauja RBD, there are 53 river and lake WBs out of 81 (ca. 65%) that are classified in a worse than good status. As for the near-border and cross-border WBs, 2 out of 6 WBs are classified in a moderate status; 3 in a good status; and 1 in a high status class.

As a result of low intensity of monitoring in the Gauja RBD, as well as natural conditions that sometimes impacted biological sampling (e.g. spring floods that caused erosion of sandy river banks resulting in lower quality of samples of benthic invertebrates), there are only 10 (~12%) river and lake WBs for which monitoring data are available for both 2006–2008 and 2009–2014 monitoring cycles, and status assessment confidence is high or moderate. Of these WBs, 7 had the same status class in 2009–2014 as in 2006–2008. 1 water body has improved by 1 status class, and 2 WBs have deteriorated by 1 status class.

For the cross-border WBs, status assessment confidence was estimated as low, therefore it is difficult to make reliable conclusions regarding progress in WB status comparing the results of the first (2006–2008) and the second (2009–2014) monitoring cycle under the WFD.

The ecological status of both coastal and transitional WBs is estimated as moderate. The estimation of chemical status is based on an assessment of hazardous substances in the Baltic Sea (HELCOM, 2010). According to the HELCOM report⁶, the chemical status of the coastal and transitional water bodies in the Gauja RBD is, respectively, poor and moderate (classified on 5-class scale). This corresponds to a poor chemical status in terms of the WFD.

Gauja RBD comprises 5 groundwater bodies. Their chemical and quantitative status is estimated as good. The only risk area is located in groundwater body D4, and is related to Inčukalns tar ponds (a recultivation project was started there in recent years). The risk area is located in the vicinity of Rīga and relatively far from the Estonian-Latvian border region.

4 Pressures and Impacts in the Border Region

The cross-border part of the Gauja/Koiva RBD in Estonia and Latvia comprises a relatively small number of WBs that are relatively little impacted by anthropogenic pressures.

⁶ HELCOM, 2010. Hazardous substances in the Baltic Sea – An integrated thematic assessment of hazardous substances in the Baltic Sea. Balt. Sea Environ. Proc. No. 120B.

At least half of the Gauja RBD territory on the Latvian side is covered by forests. On the Estonian side of the Koiva RBD, the proportion of forests is significantly greater and the largest part of the territory is covered by forests.

There are ca. 250,000 inhabitants in the Gauja/Koiva RBD, 97% of them live in the territory of Latvia.

To estimate point source pressures in the Gauja/Koiva RBD and the cross-border area, both countries used official statistical data on point sources (i.e. wastewaters). Estimation of diffuse pressures on the Latvian side was based mainly on information on land use and discharges not connected to sewage treatment plants. In Estonia, a pollution model called ESTMODEL was used for estimating diffuse pollution caused by land usage. Discharges from unconnected areas were also taken into account in Estonia. Hydromorphological pressures estimations in both countries were based on available information about hydropower plants, melioration systems and watercourse regulation.

Water resources in the Gauja RBD are mainly used for households and agriculture, less for industry; water resources are also used for energy production, recreation, tourism and angling.

3.1 Pressures to water bodies in Koiva RBD – Estonia

The main pressure sources that threaten the status of WBs in the Koiva RBD are agricultural load from cultivated land and livestock buildings, barriers on WBs, and point and diffuse load from wastewater treatment (sewage outlets and unconnected areas).

The pressure analysis detected significant pressures in 3 transboundary WBs (see Table 3).

Koiva 1154200_1	-
Kolga 1158400_1	-
Peeli 1158100_1	-
Peetri 1158700_1	-
Pärlijõgi Saarlase paisuni 1155700_1	Dams/barriers – reduce pressure from hydromorphological and hydrological alterations
Ujuste 1154300_1	-
Vaidava Vastse-Roosa paisuni 1158000_1	Dams/barriers – reduce pressure from hydromorphological and hydrological alterations
Murati järv 2155900_1	Agriculture, leaching from arable land – reduce diffuse pollution from arable land.

Table 3. Significant pressures in the transboundary water bodies in the Koiva RBD

Water bodies already in a satisfactory status (good, and very good status) should be maintained. Thus, the prevention of pressure from new sources is important.

3.2 Pressures to water bodies in Gauja RBD – Latvia

The main pressures in the two transboundary surface WBs are the risk of flooding and point load from wastewater treatment plants. Risk of flooding in the WBs Gauja G225 and Vaidava G235 was identified in the Latvian Flood risk management plan for the Gauja RBD, and consequently it was considered as a pressure in the Gauja RBMP, because diffuse pollution can be intensified in the case of severe floods due to soil erosion and more intensive nutrient leaching from soils. Gauja/Koiva RBD is more populated on the Latvian side, therefore flood risk for this territory is considered more important in Latvia than in Estonia.

Four of the transboundary WBs are not significantly impacted by any kind of pressure (see Table 4).

None of the 6 cross-border WBs are identified as being at risk due to significant pressures.

Water body	Significant pressure(s)
Gauja G225	Flood risk
Gauja G231	-
Melnupe G233 (Pēterupe)	-
Vaidava G235	Flood risk Point source pollution
Pērļupīte G237	-
Muratu ez. E205	-

Table 4. Significant pressures in the Latvian transboundary water bodies in Gauja RBD

5 Environmental objectives and measures

In order to address this pressure and meet WFD objectives, Member States should adopt measures.

In both countries the update of the environmental objectives for the WBs was based on two principles: the good status of WBs must be preserved and the WBs in a non-good condition must be upgraded to a good status.

In accordance with the WFD, WBs should have been restored to a good status by 2015. In substantiated cases, it is also possible to set the following exemptions: introduction of an extended objective for a water body; determining the best possible status and establishing it

as the objective, i.e., establishing a more lenient objective; allowing a temporary deterioration of the status, if it is due to natural changes; allowing a deterioration of the status, because it is caused by important and new development activities.

Programme of Measures (PoM) sets forth the measures for the use and protection of water to achieve the environmental protection objectives for surface and groundwater, and for the areas that need protection.

Additionally, measures are divided into basic and supplementary measures. Basic measures are measures intended for the implementation of policies and legal acts deriving from the directives of the European Union. Supplementary measures are measures necessary for the achievement or preservation of the good status of WBs, in the cases where the basic measures are insufficient.

In both countries, measures were determined at the level of WBs, taking into consideration the substantial pressure sources in each specific WB. As an exception, a certain amount of RBD-scale measures were introduced in the process of work that are not related to specific WBs and are connected to the whole RBD.

Supplementary measures have not been set for WBs in a good status. For preserving the good status preventive measures (basic measures) are being implemented.

Based on the significant pressures, measures were assigned to WBs with a non-good status (moderate, poor and bad) with the objective to alleviate those pressures.

5.1 Measures and environmental objectives in Koiva RBD - Estonia

Pursuant to the field of application, the measures in the Koiva RBD PoM are subdivided into administrative (issuance of licenses, surveillance, legal framework), technical (activities related to construction, implementation), consultative (consulting, training, guidance materials), and research-related (scientific or applied studies) measures.

In the case of WBs or pressures where the existing information is not sufficient for determining the cause of failure and pressures, additional surveys will be carried out first. The development and implementation of appropriate measures will be based on research outcomes.

In the case of the PoM for surface water, the measures related to the majority of WBs are aimed at the reduction of the impact of barrages (including opening the fish migratory routes) and controlling the agricultural diffuse load (including both the additional surveillance for performing the requirements of legal acts, as well as implementing measures for introducing environmentally friendly manufacturing techniques), which are followed by activities related to wastewater treatment (including the enhancement of the cleaning of wastewater in wastewater collection areas, as well as the arrangement of on-site wastewater management in low density areas). In PoM, there are in total 70 WBs based measures with different

definitions, which are reflected in more than 2,400 activities in the PoM when inserted to a specific water body or pressure source.

The main responsible implementing bodies are, depending on the nature of the measure, the Ministry of the Environment, the Environmental Board, the Environmental Inspectorate, and the owners of the objects or the user of water. The measures are also implemented by local governments, by the Agricultural Board and other parties.

Measures planned in 2nd cycle of Koiva RBD PoM are shown in Table 5.

Code	Type	Category	Measure name	Implementation
Implementation at water body level				
HMK01	Technical	supplementary measure	Maintenance of ditches, ponds (removal of barriers to the flow, sediment and watercourses cleaning) in forest land	2016-2021
HMK02	Technical	supplementary measure	Implementation of the planned artificial recipient environmental measures on the forest territory (sedimentation pools, marshes)	2016-2021
HMK03	Research	supplementary measure	Research and monitoring of the condition of land improvement and maintenance of environmental facilities to ensure reductions of nutrients inflow and hydromorphological conditions	2016-2021
HPM01*	Technical	supplementary measure	Reduce diffuse nutrient pollution from agriculture by establishment of buffer zones with natural vegetation cover	2016-2021
HPM02*	Administrative	supplementary measure	Control of the use of fertilizers and compliance with the Water Act, additional inspection of misuse (overfertilisation with nutrients, reduction or elimination of washout of nutrients)	2016-2021
HPM03*	Advisory	supplementary measure	Control the use of fertilizers and compliance with the Water Act, additional inspection of misuse (overfertilisation with nutrients, reduction or elimination of washout of nutrients)	2016-2021
HPM04*	Technical	supplementary measure	Advisory services for agricultural producers (of farmers) to raise awareness and to promote environmentally friendly production	2016-2021
HPM05*	Advisory	supplementary measure	Usage of effective and green technologies for fertilisation	2016-2021
HPM13*	Technical	supplementary measure	Green cover in winter in arable land	2016-2021
HPM14*	Technical	supplementary measure	Crop rotation in arable land	2016-2021

HSV01	Research	supplementary measure	Investigate the impact of diffuse nutrient pollution from storm water, developing appropriate measures	2016-2020
HSV02	Technical	supplementary measure	Proper handling of storm water in major infrastructure objects (sedimentation ponds, sand and oil traps, etc.)	2016-2021
KE03	Research	supplementary measure	Investigate the causes of the WB boor status, identifying the sources of pressure, developing measures	2016-2020
PRV04	Administrative	supplementary measure	Review of the environmental conditions (permit) and, where appropriate, to establish conditions under § 24 of the Water Act (i.e., small agglomerations under 2000) to bring water quality in the water body at least to a good status	2016-2021
PRV05	Administrative	supplementary measure	Additional supervision (control) of legal requirements and conditions for implementation of the Water Permit (sewage outlet)	2016-2021
VHP01*	Administrative	supplementary measure	Additional supervision (control) of legal requirements and the decommissioning of illegal activities (dams without permits)	2016-2018
VHP03*	Research	supplementary measure	Analysing the possibilities of improving fish migration conditions	2016-2018
VHP05*	Research	supplementary measure	Evaluation of effectiveness of fish passage	2016-2020
VHP07*	Administrative	supplementary measure	Sufficient ecological flow and water regime in WB with dams (strengthening reviewing permits and inspectorate controls)	2016-2021
VHP08	Research	supplementary measure	Inventory of dams, investigation of water level and when needed developing appropriate measures	2016-2020
Implementation at the RBD level				
HLK02	Administrative	supplementary measure	Setting stricter manure storage obligations related to the livestock unit restrictions (Water Act amendments)	2021
HLK05	Administrative	basic measure	Environmental Impact assessment of farms with IPPC permit	2016-2021
HLK07	Technical	supplementary measure	Construction/reconstruction of farm buildings, including manure storage and silos	2016-2021
HLK08	Administrative	supplementary measure	Setting possible environmental impact mitigation regulation for the year-round pasturing animals, their winter feeding and resting areas (as a supplement to the Water Act)	2021

HPM09	Administrative	supplementary measure	Preparation of the manure spreading plans with time and quantitative restrictions for controlling cultivated land and nutrient carry-over	2016-2021
HPM11	Administrative	supplementary measure	Additional field supervision over the enforcement of Farmers bookkeeping	2016-2021
HPM12	Administrative	supplementary measure	Shortening of allowed manure-spreading time (amendment to the Water Act)	2021
HPM16	Technical	supplementary measure	Nutrient balance calculations in agricultural plants	2018-2021
OA01	Administrative	basic measure	Registration of hazardous chemicals in the national chemical register	2021
OA02	Administrative	basic measure	Record keeping of dangerous chemicals	2021
OA03	Administrative	basic measure	Clarification of the requirements and setting stricter requirements for priority substances	2021
OA04	Advisory	supplementary measure	Informing residents of the proper handling of priority substances	2021
OA05	Administrative	basic measure	Investigation of pollutant sources and developing measures	2021
PRV07	Advisory	supplementary measure	Training for wastewater treatment plant operators	2016-2021
VHK01	Administrative	supplementary measure	Management plan for beaver (as well as reduction of negative impacts)	2021

***Measure planned for transboundary water bodies. Other measures planned in the catchment area.**

Table 5. Measures planned in Koiva RBD in the second cycle of implementation of RBMP PoM

In the Koiva RBD, extended objectives are set for 10 surface WBs, for 3 of which the extended objective was set in the first RBMP. In 3 transboundary WBs (Pärlijõgi Saarlase paisuni 1155700_1, Vaidava Vastse-Roosa paisuni 1158000_1, Murati järv 2155900_1) objectives are extended until 2021. The main reasoning for extending the deadline were technical feasibility (measures are implemented in stages, and the first study and then implementing technical measures), natural conditions and disproportionate costs.

5.2 Measures and environmental objectives in Gauja RBD - Latvia

In the case of the PoM for surface water in Latvia, the measures related to the majority of WBs are directed to the reduction of the impact of point source pollution (including improvement of wastewater treatment plant efficiency and connections to sewerage) and controlling the agricultural diffuse load (including both the additional surveillance for performing the requirements of legal acts, as well as implementing measures for introducing

environmentally friendly manufacturing techniques), which are followed by activities related to hydromorphological pressures (including destruction of beaver dams). In the Latvian side of the Gauja RBD, there are a total of 26 water body based measures with different definitions.

The main responsible implementing bodies are, depending on the nature of the measure, the Ministry of the Environmental Protection and Regional Development and the owners of the objects/ water users. The measures are also implemented by local governments, the Agricultural Board, and other parties. According to the Law on Water Management, Latvian Environment, Geology and Meteorology Centre is a co-ordinating institution for measure implementation.

In the Gauja RBD, extended objectives are set for 7 surface WBs, for 5 of which the extended objective was set also in the first river basin management plan. As for groundwater bodies, one exemption was set for the risk area in the groundwater body D4. Measures planned in the 2nd cycle of Gauja RBD PoM are shown in the Table 6.

No.	Type	Category	Measure name	Implementation
Implementation at water body level				
1	Technical	supplementary measure	Wastewater treatment plant efficiency improvement by providing additional wastewater treatment in agglomerations of p.e.> 2000 affecting risk water bodies	2016–2021
2	Technical	supplementary measure	Enhancement of centralised wastewater collection systems efficiency, increasing the actual connection rate and expanding networks in agglomerations of p.e.> 2000 affecting risk water bodies	2016–2021
3*	Technical	supplementary measure	Enhancement of centralised wastewater collection systems efficiency, increasing the actual connection rate and expanding networks in agglomerations of p.e.> 2000	2016–2021
4	Technical	supplementary measure	Winter green areas or stubble fields (vegetation consisting of perennial grasses in winter, perennial vegetables, catch crops, winter crops, or crop stubble) Keep 2 m wide buffer zones of vegetation on the banks of water courses and water bodies, as well as along the drainage systems of ditches	2016–2019
5	Technical	supplementary measure	Environmentally friendly management of agricultural drainage systems, including environmentally friendly drainage system elements (sedimentation basins, two stage drainage ditches)	2016–2021
6	Administrative	supplementary measure	An assessment of the possibilities to apply different operational regime in small hydroelectric power stations	2016–2021

7	Administrative	supplementary measure	1. Review of the technical regulations on the HPP operation and relevant water use permit conditions; review them together for all small hydroelectric power stations that are located on the same river. 2. A joint action plan development to reduce flood risks for small hydroelectric power stations that are located in one cascade on the river.	2016–2017
8	Research	supplementary measure	Additional monitoring and a study covering at least three consecutive years to determine possible sources of identified loads and the causes of poor quality	2016–2021
9	Administrative	supplementary measure	Prepare management rules for lakes and their surroundings, develop a management plan for the lake and carry out clean-up measures in the lake and its surroundings	2016–2019
10	Technical	supplementary measure	Creation of artificial wetlands	2016–2021
11	Administrative	supplementary measure	Develop the management plans for specially protected nature areas	2016–2019
12	Technical	supplementary measure	Cleaning of watercourses (control the degree of overgrowth and aquatic plants, remove waste and fallen trees) in accordance with the best practice, mowing of macrophytes in regulated river sections	2016–2021
13	Administrative	supplementary measure	Improvement of storm water management	2016–2021
14	Technical	supplementary measure	Remediation works and development of monitoring system at historically contaminated site “Inčukalns acid tar ponds”	2016–2021
Implementation at the RBD level				
1	Administrative	supplementary measure	Continue cross-border cooperation and international agreements on transboundary pollution reduction and water quality improvement; joint monitoring program coordination and joint evaluation of ecological quality.	2016–2021
2	Administrative	Supplementary measure	Cooperate with Estonian authorities responsible for the development and implementation of RBMP with the aim to prepare an international management plan for the shared river basin.	2016–2021
3	Technical	supplementary measure	Gather information and identify the places, where fish passes are needed.	2016–2021
4	Administrative	supplementary measure	Create a list of rivers where beaver dams pose the greatest negative impact.	2016–2021

5	Administrative	supplementary measure	Establish a regulatory framework for provision and use of public water services (water supply and wastewater collection & treatment), as well as of decentralised water services.	2016–2021
6	Administrative	supplementary measure	Establish requirements for decentralised wastewater management systems.	2016–2021
7	Administrative	supplementary measure	Prepare proposals for the amendments to the legislation on cleaning and deepening of surface water bodies.	2016–2021
8	Technical	supplementary measure	Upgrade the necessary technical equipment for water monitoring.	2016–2021
9	Technical	supplementary measure	Introduce a new model for pressure load modelling and analysis.	2016–2021
10	Administrative	supplementary measure	Gather and obtain the information required for modelling of groundwater pressures.	2016–2021
11	Technical	supplementary measure	Renew methodologies for assessing significant point source, diffuse, hydromorphological pressures.	2021

* Measure planned only for the catchment area of the Latvian-Estonian transboundary river water bodies. Other measures planned for the whole Gauja RBD.

Table 6. Measures planned in the Gauja RBD in the second cycle of implementation of RBMP PoM

CONCLUSIONS

Although significant progress has been achieved in comparing and coordinating existing methodologies, as well as assessing pressures and impacts, further joint work is needed in the international Gauja/Koiva RBD to improve the management of transboundary waters.

Considering that the ecological classification methods in Latvia have been for a large part adopted from Estonia, a harmonised approach to water typologies is crucial to obtain comparable ecological status classification results. An attempt to harmonise national typologies with regard to cross-border WBs was made in the frame of Koiva/Gauja project (see Chapter 1.1). Further work is needed to verify the consistency of typologies outside the transboundary area.

River WBs in Latvia were designated based on the criteria of a catchment area size of at least 100 km² (in several cases, river WBs with a smaller catchment area were designated if it was necessary for management purposes). In Estonia, the basis for designating WBs was at least a 10 km² large catchment area. This approach has led to the situation where cross-border WBs designated in Estonia are not always designated as WBs on the Latvian side (see Table 1). It is planned to improve the designation of Latvian WBs in the next planning cycle, with an aim, *inter alia*, to harmonise the network of cross-border WBs with neighbouring countries.

It is important to further harmonise approaches for status assessment and monitoring, as well as to develop a joint methodology for the assessment of pressures (i.e. estimation of total loads and modelling system) and significant water issues.

Concerning the economic analysis of water use, certain work has already been done to coordinate methodologies. Yet, harmonised assessments for the international RBD is valued and needed, as well as filling in the remaining methodological gaps (e.g. on assessment of “environmental costs” and their cost-recovery). Moreover, practically applicable and coordinated methodologies are still missing as regards the assessment of benefits of achieving good water status and exemptions to environmental objectives due to “disproportionate costs”.

In order to adequately assess improvements in water status in both countries, a consistent design of monitoring programmes is needed, e.g. sampling in same years and with similar frequency, as well as using similar sampling and data processing techniques. This monitoring programme should be developed and coordinated before the 3rd cycle of RBMP.

Cooperation in transboundary RBD will continue with the aim of developing a transboundary policy document for the Gauja/Koiva RBD for the 3rd cycle of RBMP implementation.