

Guryevka River Basin: WATERDRIVE Case Area in Russia (Kaliningrad)



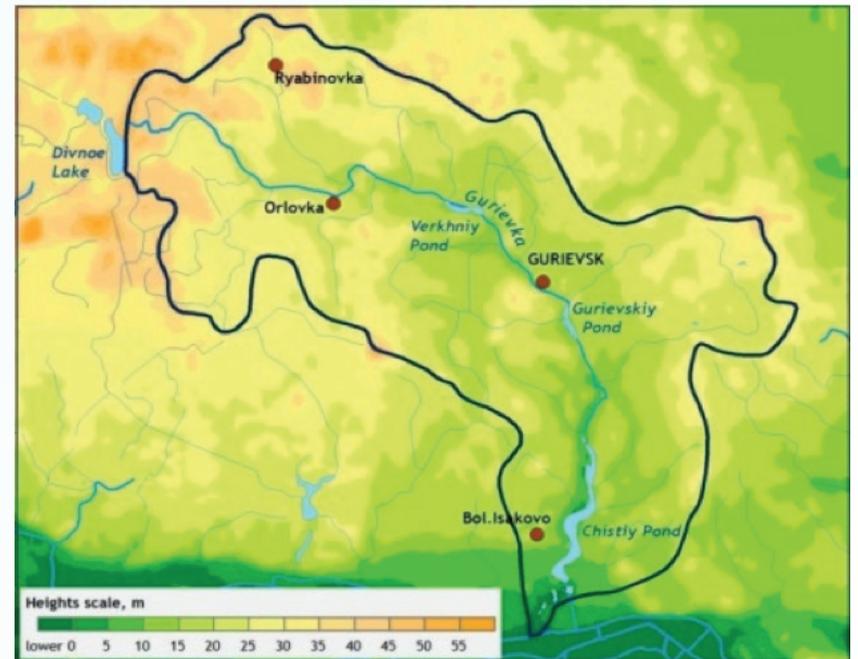
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Eutrophication

The main sources of negative impact in the Guryevka river basin are human settlements, industrial facilities and agriculture. Analysis have shown that nutrient concentrations (nitrogen and phosphorus) increase as the river flows from source to mouth, which correlates with the degree of human impact and population.

Of the 19 settlements located in the Guryevka river basin, 7 have a centralised wastewater collection and disposal system, of which only three have a wastewater treatment plant: two biological wastewater treatment plants and one mechanical wastewater treatment plant. All domestic wastewater enters surface watercourses either directly or through a sewerage system and treatment plant.

The once artificially created ponds (3 ponds) on the Guryevka River now act as natural settling ponds, thus contributing to the river's self-purification process. However, this is not enough to ensure that the ecosystem does not degrade.



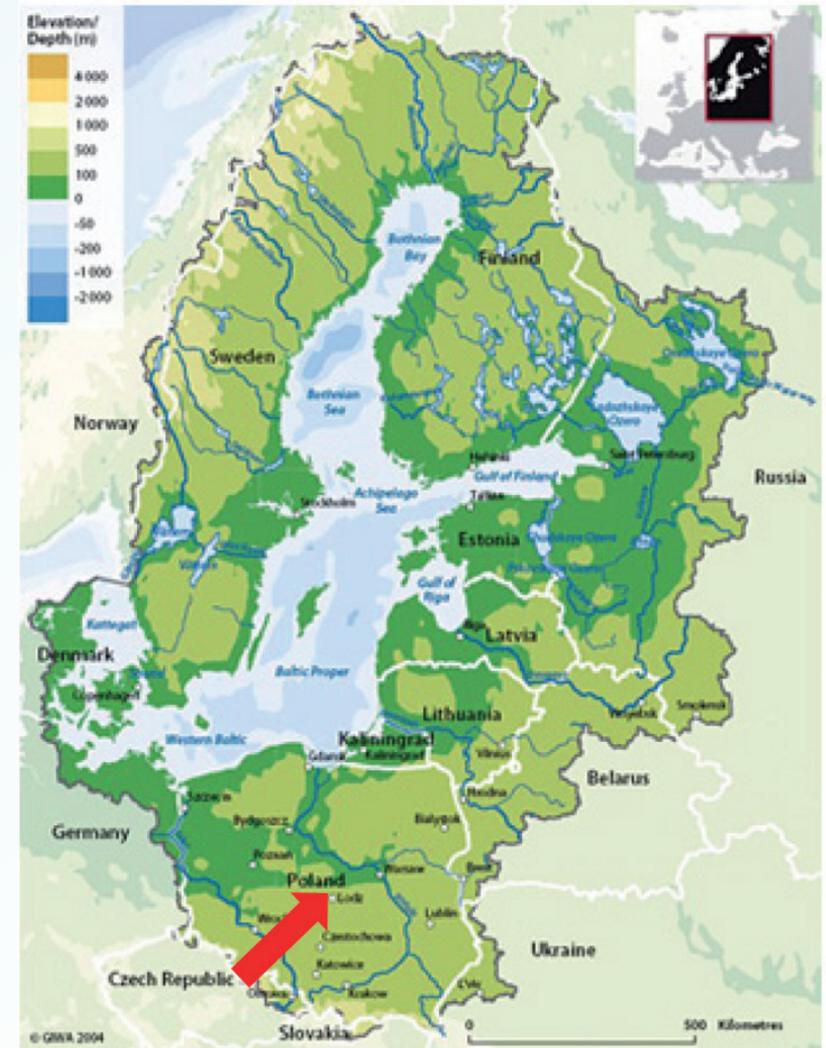
Gurievka River Basin in The Baltic Sea Region

The Guryevka River (Mühlen Fluss) is a small river in Kaliningrad Oblast, the right tributary of the Pregolya River.

The Guryevka River runs in an arc around the city of Kaliningrad, through the Guryevsk urban district.

The river system of the Gurievka river includes ponds (downstream): Upperpond, Guryevskiy pond, Chistiy pond.

- The length of the river is 27 km
- The catchment area is 85.2 km²
- River width: from 2 m to 6 m



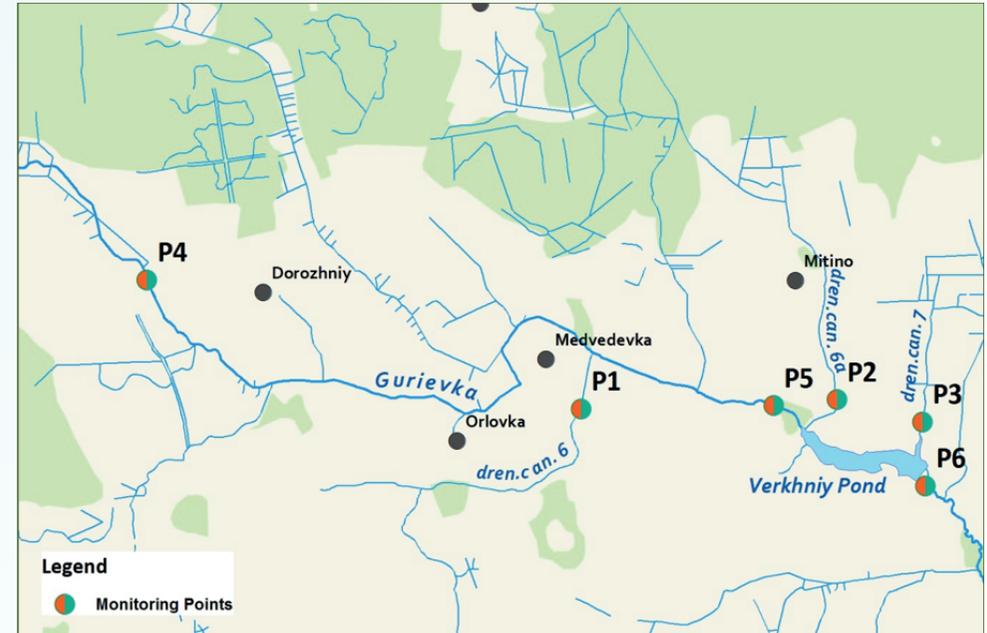
The Upper Pond catchment

- The catchment of the Upper Pond/Lake Dambas (44 km² in area) is allocated within the catchment of the Gurievka River.
- The area of «Upper pond/Lake Dambas» is about 11.5 hectares
- The land use structure of the Upper Pond catchment has the following form: about 50% of the land within the catchment area is meadows and pastures, 10% of the catchment area is occupied by arable land.
- The total drainage canals catchment area is 1030 ha, of which 490 ha is agricultural land.
- Currently, the drainage system is designed in such a way that its watercourses collect water mainly from forest areas and agricultural lands
- The selected area includes 3 drainage channels.



Analysis of the state of biogenic load in the Guryevka River basin (catchment of drainage canals in the Upper Pond)

- Concentrations of nitrogen and phosphorus naturally increase from source to mouth.
- The values of the concentration of nitrogen compounds in the points of the main channel of the Guryevka river are lower compared with the values recorded in the channels. It was noted that the value of the concentration of nitrates at points P2 and P3 is high in comparison with other observation points.
- The change in the concentration of phosphorus phosphates in water is such that it is higher at the control points in the main channel of the Guryevka river compared with the control points in the drainage channels. However, the highest total phosphorus was recorded in the drainage channel at point P1.



Monitoring points for the catchment of the Upper Pond

Constructed wetlands



Drainage channel 3 (МПОО-11-6а)

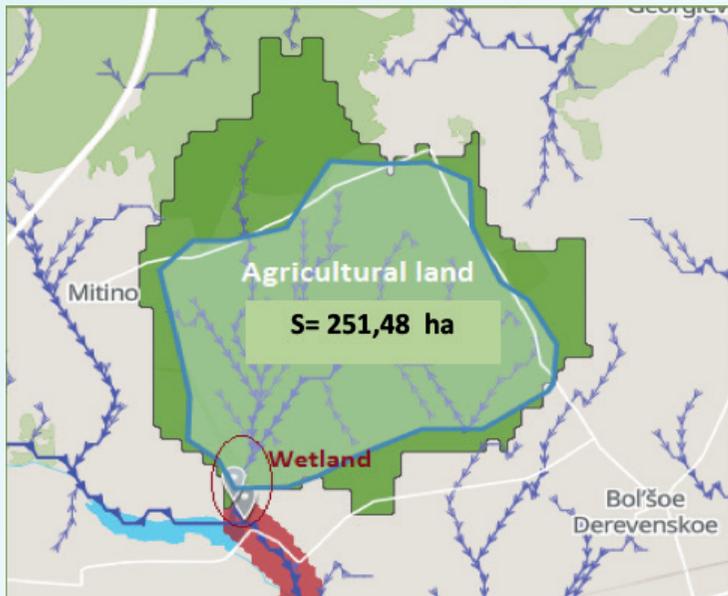
A land plot with the total area of 1,88 hectares was selected to locate a constructed wetland in the pilot area in the riparian zone of the Guryevka River in the Guryevsk City Municipality.

This area includes:

- area of the canal МПОО-11-6а (administered by FGBU "Kaliningradmeliovodkhoz" - federal property),
- riparian zone of the Guryevka River with the total area of 1,52 ha (under the Ministry of Natural Resources - federal property)
- land plots (administered by the municipality) adjacent to the river and canal water protection zones, with the area of 0,416 ha and 0,63 ha.

Constructed wetlands

On the selected area, a Constructed Wetland with surface runoff was to be located



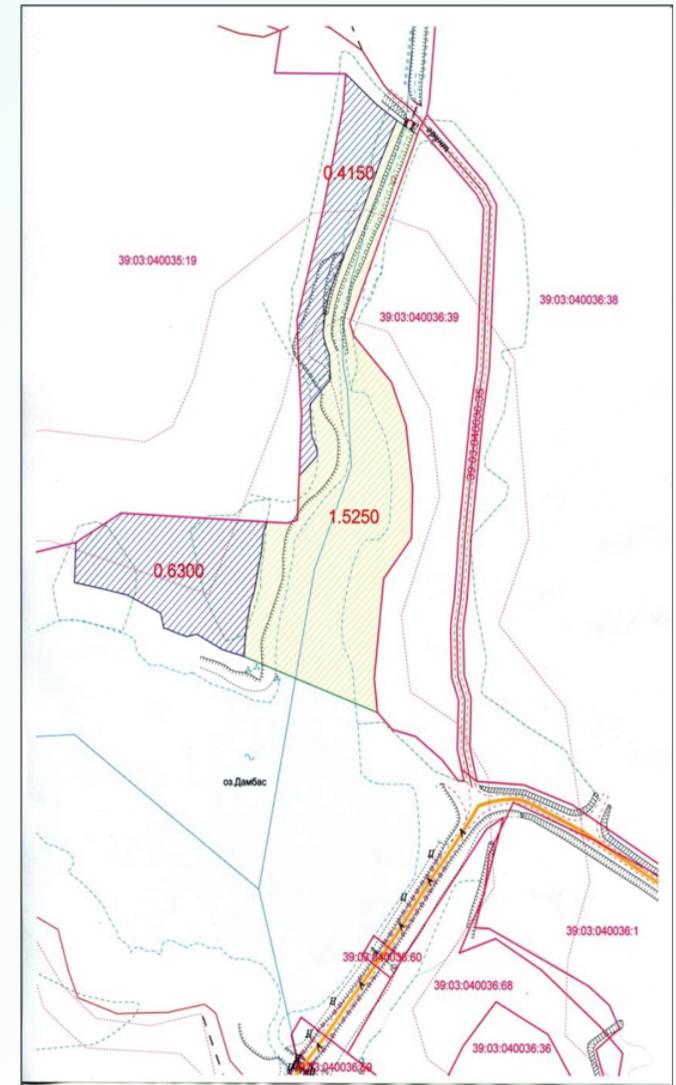
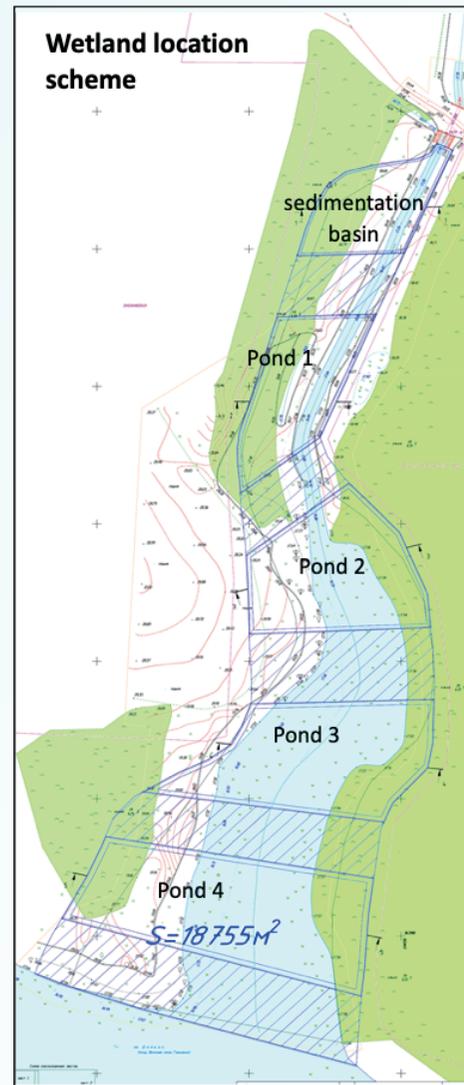
Drainage channel 3 (МПОО-11-6a)

Catchment area: 431 ha

Flow rate: $1,07 \text{ m}^3 / \text{s}$

The Length to the pond: 3.2 km

Agricultural land about 251,48 ha

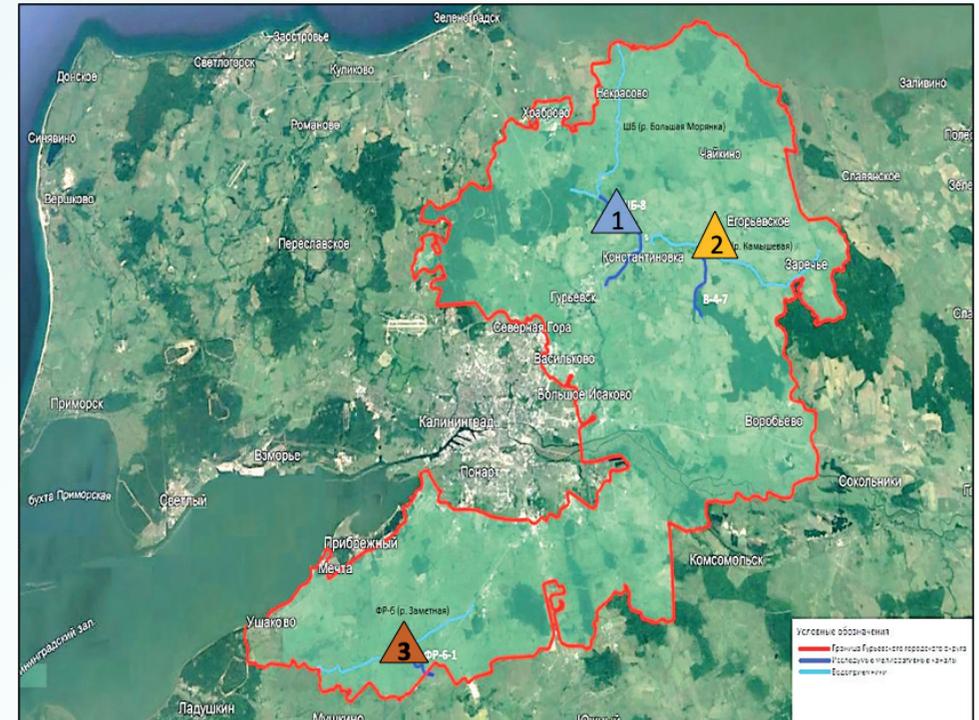


Constructed wetlands

The second phase of the Waterdrive project focused on the study of the Guryevsk urban district in the Kaliningrad region for the selection of agro-environmental measures, such as constructed wetlands and two-stage ditches.

The works were carried out jointly with the FSBI "Kaliningradmeliovodkhoz Directorate". Initially, a review of the catchment area of all reclamation canals under the jurisdiction of FSBI "Kaliningradmeliovodkhoz" was carried out.

The catchments of three drainage ditches were selected, two of which (No. 1, 2) belong to the Primorsky hydrological basin (Guryevka river catchment) with the Curonian lagoon as its recipient, and one more (No. 3) belong to the catchment of Prokhladnaya River, with the Vistula Lagoon as its water recipient.



Constructed wetlands

The Bolshaya Moryanka
river basin
(Guryevka river catchment)
Drained channel 1 (ШБ8)



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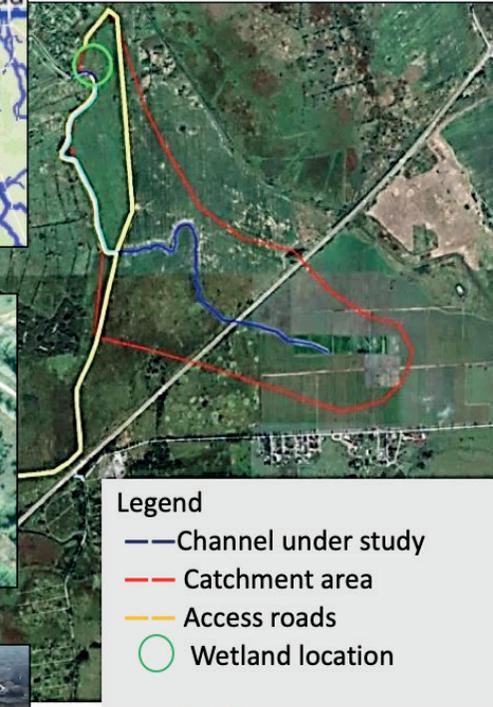


The Bolshaya Moryanka
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Restoration of land melioration system

The territory of the Kaliningrad region is located in the zone of over-hydration, accounting for 23% of all drained and 70% of polder land in Russia.

Since 2018, the Kaliningrad Oblast has been actively restoring and developing its land amelioration system.

To this aim, the land drainage sector is being financed from the federal and regional budgets:

- Funding from the federal budget is provided under State Programme for the Development of Agriculture and Regulation of Markets of Agricultural Products, Raw Materials and Foodstuffs (2013-2025).
- Funding from the regional budget is provided under The State Programme of the Kaliningrad region "Development of Agriculture 2014-2025"



The subsidy mechanism for farmers

The subsidy mechanism is to reimburse part of the costs of land reclamation by farmers, which reduces the financial burden on their own budget.

Subsidizing is carried out in several direction:

- Implementation of crop-related measures on the lands that are involved in agricultural production; reimbursement (up to 60%);
- Repair of open melioration canals and closed drainage, reimbursement (up to 50%);
- Liming acidic soils on arable land, reimbursement (up to 90%);
- Implementing hydro-melioration measures, reimbursement (up to 50%), including construction, reconstruction and technical re-equipment of irrigation and drainage systems, hydraulic structures, etc.



Main actors:

- **Local and regional authorities - (support activities aimed at the implementation of the project);**

the District Council of Deputies - A037 ; Administration of Guryevsk city district; Committee for agriculture, land use, natural resources and environment protection of Kaliningrad Oblast Duma, A043; Ministry of Natural Resources and Environment of the Kaliningrad region;

- **Department of Agriculture, Guryevsk (Interaction with farmers);**

- **Farmers and local private landowners in the selected area**

Land owners in the area of upper pond:

7 farms (total farmland 626 ha);

- **Institutions/universities** (an active role in the case study);

Kaliningrad State Technical University, 38 AO Baltic Institute of Ecology and the hydrosphere, A013;

- **Contractors** (implementation of plans and activities)

FGBU "Kaliningradmeliovodkhoz"-A039\$; Environmental Center "ECAT-Kaliningrad"-A036

- WUP - ensuring close cooperation with entire groups in the preparation and implementation of the project.



Conference, workshops, local meeting:

- Conferences, meetings, and roundtables were held for representatives of municipal agricultural authorities, farmers, and landowners. These activities are aimed at raising awareness of modern agro-environmental measures.
- The events were held in a mixed format (online/offline).
- Each event was attended by between 40 and 50 participants. These were representatives of local and regional authorities of the Kaliningrad region, invited specialists from St. Petersburg and foreign agricultural specialists from Lithuania, Denmark, Sweden and Poland. Support by regional authority.
- Stakeholder cooperation in the project has had a continuation, with the federal agency FSBI "Kaliningradmeliovodkhoz" expressing interest in the implementation of agri-environmental measures



Lessons learned:

- One of the key factors in the case area is low interest in constructed wetlands from the landowner's perspective.
- The Kaliningrad Region is located in a zone of excessive moisture. The technical condition of the land ameliorative system affects not only the development of agricultural production but also ensures safe livelihoods in the polder areas.
- At present, there is a state support and subsidy system aimed at rehabilitation of the land ameliorative system of the Kaliningrad region. State programs include practically all ameliorative facilities of capital construction that require reconstruction.
- On the territory of the Guryevsk district in 2020, state subsidies were used to renovate: 13.3 km of closed drainage channels; 107.27 km of open melioration channels; 7.97 km of dams. This returned 454 ha of farmland to use.
- However, of all the agri-environmental measures recommended by Waterdrive, only structural liming and afforestation are subsidized in Kaliningrad Region. Subsidies for measures such as the construction of artificial wetlands, two-level channels as well as the use of other nature-based solutions have not yet been applied.



Suggestions to the future:

- Promotion of educational programs and events with a focus on climate change, and the influence of agriculture on the environment, water management, and its possible tools, including wetlands.
- The target groups of such programs should be farmers, the authorities, the population of rural areas, and schoolchildren.
- The priority area is raising awareness of farmers and agricultural producers of the Kaliningrad region about environmental challenges which is implemented in an accessible form and in a variety of formats.
- Continuation of works on the creation of the geodatabase of the reclamation system of the Kaliningrad region for integration into the automated agricultural land management system.
- Forming a pool of experts on ecological issues promotion, creation of an information and resource center on water management. For example, on the basis of ecological center "Kaliningrad-ECAT".
- Development and implementation of incentive measures for farmers by government and municipal agencies in regard to environmental measures (introduction of eco-friendly technologies and measures for environmental damage compensation, etc.), including through support measures from the government (subsidies, grants, tax breaks, etc.).

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