Ministerstwo Infrastruktury

Draft Environmental Forecast for the Project ‘Water Resources Management in Poland’
Summary

Warsaw, 27 April 2023

ODJT ZIELONE OKO PRACOWNIA OCHRONY ŚRODOWISKA ODJ ENVIRO

Ministerstwo Infrastruktury

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1 Information on the content of the assessed document

The draft Multi-Year Program 'Water Resources Management in Poland' (MP WRMP) is a multi-year program within the water management sector resulting from the legal conditions present in Poland for the implementation of objectives set out in strategic documents developed at a national level.

The main objective of the MP WRMP is 'to achieve a favourable water balance (drought protection and water retention) and to increase flood protection'[1]. The MP WRMP was assumed to be a programme implemented between 2024 and 2033.

The main objective of the MP WRMP will be achieved through the implementation of two investment priorities:

- The construction of water reservoirs;
- The reconstruction of flood protection infrastructure.

The implementation of the measures in the investment priorities will be achieved through two specific objectives:

- Specific Objective 1 - Increase retention and green energy production;
- Specific Objective 2 - Improve ice-breaking by increasing the navigational performance of the waterway.

Under both investment priorities, 20 projects are planned to be implemented.

The MP WRMP will be implemented by the Państwowe Gospodarstwo Wodne Wody Polskie (State Water Holding Polish Waters). The total value of investment projects has been indicated in the MP WRMP to be PLN 6.292 billion (Investment Priority I - PLN 5.732 billion, and Investment Priority II - PLN 0.56 billion). The programme will be financed from the state budget.

2 Assessment of the links with strategic and planning documents at EU, international and national level, including environmental protection objectives relevant to the draft document

The Forecast analyses strategic documents which set out the environmental protection policy objectives. Due to the fact that the above-mentioned documents contain various arrangements concerning protection of particular environmental components, an attempt was made, for the needs of this Forecast, to list the most important strategic environmental protection objectives resulting from the above-mentioned documents. As a result of this analysis, the following aggregated environmental objectives were identified:

- to stop the loss of biodiversity and the degradation of ecosystem functions and restore them as much as possible,

[1] Multi-Year Program 'Water Resources Management in Poland', as of 06.04.2023.

- to stop the deterioration of water bodies and achieve their good status,
- to maintain and improve people's comfort and quality of life,
- to prevent soil degradation,
- to reduce atmospheric emissions of pollutants and improve or maintain levels of air quality that do not pose a risk to human health and the environment,
- to prevent and mitigate the negative effects of climate change, including adapting to climate change,
- to protect acoustic climate and reduce noise emissions,
- to sustainably manage natural resources, including the diversification of energy sources and continued dynamic development of renewable energy sources,
- to protect and restore landscape values
- to protect and mitigate negative impacts on monuments and material assets,
- to develop a resource-efficient, low-carbon and low-waste economy.

As a result of the study work, it was concluded that the assessed document is in line with the environmental protection and sustainable development policy in terms of emission reduction, independence from fossil fuels, resource-efficient economy, and counteracting the effects of climate change. On the other hand, any technical measures introducing significant changes to the natural environment, including aquatic ecosystems and river valleys, will, as a rule, contradict the objectives related to stopping the loss of biodiversity and degradation of ecosystem functions and restoring them as much as possible, as well as stopping the deterioration of water bodies and achieving their good status. Consequently, the technical activities will be allowed to be implemented provided that strict conditions are met that are related, inter alia, to the maximum possible reduction of negative impact on the ecosystem.

3 Methods of the analysis of the effects of the implementation of the provisions of the draft document and frequency of its performance

The progress towards achieving the objectives, based on indicators, will be reportable in two periods: a medium term (2027) and a long term, at the end of the Programme (2033).

The entity responsible for monitoring the implementation of the provisions of the document will be the body developing the MP WRMP, i.e. the minister responsible for water management.

The entity responsible for the regular supervision of the implementation of the MP WRMP, together with the provision of information on the progress of the investments included therein, will be the State Water Management Holding Polish Waters.

It was assumed that monthly reporting will take place as part of the existing system of reporting, while the State Water Holding Polish Waters will prepare annual information to the minister responsible for water management.

4 Potential transboundary environmental impact

This SEA has analysed the potential for transboundary environmental impact as a result of the implementation of investment activities included in the draft MP WRMP in the Odra and Wisła river basin areas.

For the Odra river basin area (which is an international river basin area), a potential transboundary impact is verified in the context of investments located close to the border with the Federal Republic of Germany and the Czech Republic.

For the Wisła river basin district, a potential transboundary impact is verified in the context of investments located close to the border with the Czech Republic, Slovakia, Ukraine, Belarus, the Republic of Lithuania and the Russian Federation.

When analysing the possibility of a transboundary environmental impact as a result of the implementation of the investments included in the draft MP WRMP in the Odra and Wisła river basin areas, the criteria contained in the Espoo Convention were used to help determine the types of activities the implementation of which may have a significant, harmful transboundary impact, and which are not listed in Annex I of the Convention such as: the size of the investment, the location (especially in relation to protected, culturally important and populated areas), and the exposure (the negative impact on people and biota).

The analyses concluded that both the implementation of the investment and the remaining measures from the catalogue of measures for the Odra and Wisła river basin areas will not cause a negative impact on the area of neighbouring countries, i.e. the Federal Republic of Germany, the Czech Republic, the Slovak Republic, Ukraine, Belarus, the Republic of Lithuania and the Russian Federation.

The lack of identification of transboundary impacts at the level of strategic assessment does not exempt from analysis in this respect at the stage of a detailed individual assessment when the decision on environmental conditions for the project is obtained.

5 Current state of the environment, potential problems relevant to the implementation of the document

5.1 Location and topography

Poland is situated on the Central European Lowlands between the Baltic Sea in the north and the Carpathian and Sudeten ranges in the south. The country's geological structure is highly diversified and varied, with major tectonic units meeting in the area: the East European Platform, Palaeozoic folding structures, and the Alpine Folding Range.

The landscape of Poland is characterised by:

- the sloping of the area from south-east to north-west,
- the presence of lowland areas in a significant part of the country,

- the presence of high mountains in the south of the country,
- latitudinal stripes of the landscape,
- the existence of an extensive old glacial landscape in central Poland, a young glacial landscape in the area of the last glaciation in northern Poland and pre-Quaternary landforms in the south with isolated areas of karst formations.

5.2 Land surface and soil

Poland is dominated by soils of medium and low fertility, with a predominance of brown and grey-brown podzolic soils developed on till and clay. Also common are podzolic soils, usually formed on sandy and gravelly substrates.

The dominant form of land use in Poland is agriculture and forestry, covering 90% of it. Arable land accounts for 60% of land, with forests and wooded areas covering 30%, and other land amounting to the remaining 10%. Of the agricultural land area, arable land accounts for 72%, permanent grassland for 20%, and orchards approximately 1%. Changes in land use over the last decade have been insignificant, but there has been a marked increase in the area occupied by urbanised and built-up land, a particular characteristic of the growth of large urban centres.

Soils and the land surface are constantly exposed to chemical, physical and biological degradation. The main environmental problem related to the protection of soils and the land surface is the adverse changes in land use - especially its development. The high rate of takeover of agricultural land for non-agricultural purposes, especially the most valuable soils (quality classes 1-3), is also worrying. The main threats to soil quality in Poland include acidification, sterilisation, salinisation and a decline in organic matter content. Soil is also threatened by water and wind erosion processes, geomechanical transformation, a decrease in soil water retention capacity and biological degradation.

5.3 Surface water

The territory of Poland is located in the catchment areas of three seas: the Baltic Sea (99.7% of the country's area), the North Sea (0.1% of the country's area) and the Black Sea (0.2% of the country's area).

Poland's water resources are relatively small compared to other European countries. They amount to approximately 1,500 m^3/year/inhabitant, which is about 36% of the European average.

For the purposes of the current updates of the river basin management plans (RBMPs) in Poland, 4,195 water bodies have been identified, including: 3,116 river water bodies (including 74 artificial water bodies, 1,633 heavily modified water bodies), 1,068 lake water bodies (including 120 heavily modified water bodies), 7 transitional water bodies (no heavily modified water bodies) and 4 coastal water bodies (no heavily modified water bodies).

The assessment of the status of water bodies, which is the basis for the preparation of the RBMPs that are currently in force, showed the poor status of 78% of river water bodies (for 22% of water bodies, no assessment was made), 62% of lake water bodies (for 36%, no assessment was made) and all transitional and coastal water bodies.

5.4 Underwater

The hydrogeological characteristics of Poland's area are determined by geological conditions. Below the land surface, a groundwater system with a free table is usually developed. The groundwater table is usually found in layers one metre to a few metres thick, but there are also layers a dozen or more metres thick, in which case the groundwater level is usable. In large areas, groundwater is the primary source of water supply for terrestrial ecosystems. Quaternary aquifers are of the greatest use (and importance for inland ecosystems) - they contain nearly 75% of groundwater resources; they are the main source of water supply for inland ecosystems. These waters are mostly supplied by infiltration of rainwater and surface water, and drained by rivers and lakes.

The national hydrogeological nomenclature distinguishes between Major Groundwater Reservoirs and groundwater bodies; the location of the investments indicated in the assessed document in relation to the aforementioned structures is presented in the annex to the forecast.

Threats to groundwater quality depend mainly on the depth of the aquifers, their isolation from the land surface and the location of pollution sources. The groundwaters most at risk of degradation are those whose water table occurs at depths of less than 5 m, especially within urbanised areas and intensive agricultural cultivation. In contrast, the main causes of poor quantitative status are the exploitation of groundwater for municipal, industrial and - locally - agricultural purposes. These pressures result in declining groundwater levels and a slow decline in groundwater resources. Deforestation of the catchment area, development of river valleys and a decline in retention, as well as a high degree of sealing of the catchment area, all contribute to a decrease in the recovery of groundwater resources.

5.5 Air

At present, Poland is divided into 46 zones, including:

- 2 agglomerations with more than 250,000 inhabitants;
- 18 cities with more than 100,000 inhabitants;
- 16 regional areas not included in cities with more than 100,000 inhabitants and agglomerations.

In the assessment of air quality in Poland for 2021, 40 out of 46 zones recorded exceedances of the normative concentrations for one or more pollutants. As a result, a given zone was assigned class C for that pollutant. Most zones were classified as C due to exceedances of the target level for benzo(a)pyrene in particulate matter PM10 within the area of the zone (39 out of 46 zones). Six zones located in the Mazowieckie, Podlaskie, Warmińsko-Mazurskie and Zachodniopomorskie voivodeships attained Class A for each of the pollutants under consideration.

All 16 zones for which the air quality assessments of ozone are carried out, taking into account the target level defined for the protection of plants, obtained class A in 2021. None of the zones exceeded the applicable criterion value.

In the classification of zones based on the long-term objective level criterion, all sixteen zones were classified as class D2.

5.6 Climate

Poland's climatic conditions in terms of zonal classification are within the warm temperate, transitional climate zone. For the most part of the year, polar-maritime and polar-continental air masses prevail.

According to the latest IMGW[2] summary of the year 2022, the area average air temperature in Poland was 9.5°C, 0.8°C higher than the annual multi-year average (calculated for the so-called climatological normal period, i.e. 1991-2020).

In most areas of the country, annual rainfall totals are between 500 and 600 mm. Consecutively, in 2022 and 2021, the averaged precipitation amounted to 534.4 mm and 627.4 mm, which was 87.4% and 103% of the standard determined from measurements in 1991-2020.[3]

The spatial distribution of precipitation in Poland varies widely; in 2022, the range of variability was marked by values of 350 mm to nearly 950 mm, and in the following year (2021), it ranged from just over 450 mm to nearly 1050 mm.

5.7 Landscape

According to the typology of Richling and Ostaszewska (2005) developed with the main criterion of terrain differentiation in Poland, there are 4 classes - types of natural landscape: the landscape of lowlands, the landscape of uplands and low mountains, the landscape of medium and high mountains, and the landscape of valleys and depressions.

Poland is privileged in terms of the diversity of its environment and landscapes - there are landscapes of the sea coast with wandering dunes and steep cliffs, lowlands and lake districts, marshy river floodplains, as well as uplands and high mountains in the south of the country.[4] At the same time, the negative impact of human activity transforming or leading to the disappearance of some natural landscapes has introduced the necessity of landscape protection. The majority of areas valuable in terms of landscape attractiveness in Poland are protected under various forms of nature conservation. The basic forms protecting landscape values are landscape parks, areas of protected landscape, and natural and landscape complexes.

5.8 Natural resources

Poland is characterised by a diverse geological structure. Poland is one of the countries with a high raw material potential and significant reserves of mineral deposits. This applies to both documented and prospective resources. Some of the raw materials have resources allowing

[2] Charakterystyka wybranych elementów klimatu w Polsce w 2022 roku – podsumowanie. IMGW-PIB, styczeń 2023.
[3] Komunikat Biura Prasowego IMGW-PIB, MGW-PIB: Wstępna analiza klimatyczna 2021 i „Klimat Polski 2021" – IMGW-PIB 2022.
[4] Ochrona środowiska 2021, GUS, Warszawa, 2021 r.

for long-term exploitation securing the domestic needs of the economy (hard coal, lignite, rock salt, indigenous sulphur, construction and rock minerals). However, the resource base of liquid and gaseous hydrocarbons is limited.

The appendix to this forecast shows the location of the investments identified in the draft MP WRMP in relation to the documented mineral deposits.

5.9 Environmental conditions

Polish nature is represented by approximately 63,000 species from the kingdom of plants, animals and fungi. Strictly protected species include 589 animal species, including: 92 species of invertebrates and 497 species of vertebrates: 50 species of mammals, 427 species of birds, 5 species of reptiles, 10 species of amphibians and 5 species of fish, as well as 415 species of plants and 232 species of fungi.

In Poland, biodiversity is shaped mainly by relatively large areas: forests, wetlands and agricultural areas. Poland's forests cover an area of 9.3 million hectares, which accounts for approximately 29.6% of the country's area. Approximately 20% of agricultural land (approx. 46% of the country's area) is permanent grassland - diverse seminatural ecosystems formed and maintained through hay or pasture use. Polish agriculture is characterised by a fragmented structure of farms and land (approx. 1.37 million farms with an average area of approx. 10.6 ha), which is conducive to the preservation of landscape and biodiversity.

In 2021, the area of walking and recreational parks, greens and estate green spaces was 62,500 hectares, occupying 0.2% of the country's area.

A significant part of Poland's area is covered by areas of high natural value. By the end of 2020, 10.1 million hectares (32.3% of the country's area) were covered by forms of area nature protection. Nature values are also evidenced by the large area of the Natura 2000 network of areas created for the protection of species and natural habitats endangered on a European scale. This network accounts for about 20% of the country's land area (about 61.1 km2). The CSO indicates that the network consists of 864 special habitat protection areas (3.9 million ha) and 148 special bird protection areas (5.6 million ha). In addition, area protection covers, among others, 23 national parks, 126 landscape parks, 1502 nature reserves and 387 protected landscape areas. The nature protection system also includes ecological corridors - among others for fish and lampreys (river corridors) and for large mammals (land corridors). A special group of valuable ecosystems are wetlands (peat bogs, marshes, wetlands), which play an important role in water retention.

For aquatic ecosystems, the following threats are most relevant:

- the disruption of watercourses by dams,
- the regulation of rivers leading to an unification of hydraulic conditions and riverbed morphology,
- the changes in the flow regime due to hydraulic engineering activities and changes in the development of the catchment area (increase in soil sealed surfaces),
- excessive water abstraction,

- excessive lowering of the water level in river valleys by dewatering drainage systems,
- embankments that impede or interrupt the connectivity of floodplain ecosystems with valley ecosystems,
- shoreline transformation - reinforcement, development and deprivation of coastal and shoreline vegetation,
- excessive or inappropriate exploitation of aggregates,
- eutrophication caused by unregulated wastewater management and nutrient runoff from unsustainably fertilised fields.

Adverse effects on the natural environment are also linked to climate change and the extreme phenomena that accompany it (heavy rainfall, prolonged waves of high temperatures, long periods without rain, droughts). Aquatic and water-dependent ecosystems are particularly likely to be affected.

5.10 Population

According to the Central Statistical Office (CSO), the population of Poland in the first half of 2022 was 37,827.4 thousand, i.e. 162.2 thousand less than in the corresponding period of 2021. Relating changes in the number of population to individual voivodeships, the largest decrease in population occurred in the Śląskie Voivodeship (-116,383 persons) and the largest increase in the Mazowieckie Voivodeship (+87,766 persons). A decrease in population was recorded in 11 voivodeships, meanwhile an increase was recorded in 5.

The population density has decreased compared to the previous year and is 121 persons per km^2. The year 2022 is the next year after 2021 to see a decrease in population density - from 2012 to 2020, the population density remained unchanged at 123 persons per km^2. The first decrease to 122 persons per km^2 occurred in 2021 (01.01.2021) and the next, to 121 persons per km^2, in 2022 (01.01.2022). As in the previous year, the highest population density was recorded in the Śląskie Voivodeship and amounted to 355 persons per 1 km^2. A high level of this indicator was also recorded in the Małopolskie Voivodeship (226 persons per 1 km^2), as well as the Mazowieckie Voivodeship (155 persons per 1 km^2). Last year, the lowest population density was recorded in the Podlaskie (58 persons per 1 km^2) and Warmińsko-Mazurskie (59 persons per 1 km^2) voivodeships.

5.11 Monuments

Poland is an area with monuments of various types. These objects represent cultural heritage gathered over the centuries. Some of them are unique, not only in Poland, but also on the European scale. There are objects on the UNESCO World Cultural and Natural Heritage List, the List of Polish Historical Monuments, and on the register of the National Heritage Institute (NID). According to data provided by NID, the number of monuments in Poland, not including movable monuments, is 78 941, the number of archaeological monuments is 7 807, there are 165 Monuments of History, and 40 sites are inscribed on the UNESCO World Heritage List. This figure includes every single monument object that has been listed.

6 Environmental impact of the implementation of the MP WRMP

6.1 Impact on land surface and soil

The arrangements of the MP WRMP should support the improvement of the retention conditions of the land surface (in the area of water reservoir development) and the protection of the banks of rivers, lakes and water reservoirs. This will be accompanied by a local increase in soil moisture and an enhancement of resistance to erosion and fire.

Improved water retention conditions will raise groundwater levels and increase the degree of protection of soils from degradation and from mucking up of soils of organic origin. In addition, increasing the degree of flood protection protects the earth's surface from the activation of mass movements and the soils from contamination by flood wave sediments.

On the other hand - the largest hydro-engineering investments may influence the change of groundwater levels and flows. This impact can be both positive (improvement of groundwater conditions) and negative - e.g. lowering of groundwater levels (causing, among other things, drying of the ground) as a result of linear erosion in the riverbed caused by the lack of deposition of mineral particles, which were previously moved from the higher part of the catchment area.

6.2 Impact on surface water

Due to the preliminary design stage of most of the planned measures, it is difficult to determine their impact on surface water. It will depend, among other things, on the scale of the activity, the mitigation solutions designed to minimise the impact, and the method of implementation. Nevertheless, it is possible to identify the key types of effects that are certain to occur already at this stage.

The positive impact of flood prevention measures will be related to the protection of water from pollution that enters with the passage of flood waters through urban areas.

The construction of the reservoirs is undoubtedly associated with negative impacts on surface waters, both in terms of environmental and, potentially, chemical status. This impact will occur both during construction and operation of the reservoirs, and its intensity and scale will result from the way the facility is designed and constructed, including the minimisation measures applied.

The greatest threat is posed by the interruption of the morphological continuity of a watercourse as a result of the construction of an impoundment structure - disruption of the morphological continuity and change in habitat conditions. In the case of hydroelectric power stations, there is additionally a risk of fish mortality in the turbines of the power station, which is why it is so important to use appropriate measures.

Operational phase impact at this scale will not be caused by dry flood reservoirs, as they will not be a barrier to ichthyofauna, and changes to habitat conditions will be less extensive.

The negative impact associated with the construction of groynes will result from the transformation of the riverbed and changes in flow conditions. However, as such regulations

have existed on the lower Wisła since the 19th century and, due to dilution, there is a need for their systematic reconstruction, this will not introduce new transformations to the riverbed.

6.3 Impact on underwater

As a rule, water retention involves infiltration of water and thus has a positive impact on groundwater resources and quality. In reservoirs, the accumulation of infiltrated pollutants (along with river water) can occur, which can infiltrate into groundwater, locally worsening its quality status.

Major hydro-engineering projects may affect the depth of the groundwater table and the directions of its flow. This impact can be both positive (improvement of land surface hydrology conditions) and negative: shallow groundwater levels in the vicinity of rivers can be reduced due to river bed erosion.

6.4 Impact on climate and air

At an overall level of assessment of the arrangements of the MP WRMP on the climate and air component of the environment, it should be concluded that its arrangements will directly and indirectly promote improvements in air quality parameters and support the achievement of climate change mitigation objectives.

The construction of hydroelectric power plants will make a direct contribution to climate and energy policy objectives and to improving air quality.

Flood risk reduction will support climate change adaptation objectives.

In turn, the reconstruction of the groynes on the Lower Wisła, which aims, among other things, to improve the performance of the waterway, in relation to climate and air quality, fits into the scope and objectives adopted for sustainable transport, supporting the reduction of greenhouse gas emissions from transport.

The water reservoirs planned in the document will have a direct impact on microclimate conditions (modifications to existing temperature and humidity characteristics, including evaporation) as well as negative changes to local ventilation corridors and wind conditions at the scale of the river valley and adjacent areas.

Short-term and limited to the extent of the investments, negative impacts on air quality will occur at the stage of implementation of individual investments. There will then be time-limited emissions of dust pollutants as well as fumes at the site of construction works. Due to the spatial and temporal limitation, these impacts will not have a significant direct impact on the state and quality of air.

6.5 Impact on landscape

The identification and assessment of the impact of the document's arrangements was carried out in relation to the natural and cultural landscape.

The planned developments have the potential to adversely affect landscape values. The negative impact on the landscape include permanent loss of the river's ability to recreate natural forms in the riverbed and on floodplain terraces, which may cause changes in the landscape through simplification of the mosaic structure of habitats in the riverbed and in the riparian zone. The creation of groynes and bank reinforcements, depending on the scale of investment intentions and technical solutions applied, will transform the landscape (reduce the attractiveness) of the river bank. Regulation and strengthening works in the riverbed are most often connected with the destruction of aquatic vegetation, felling of trees, bushes and shrubs, which are often valuable natural habitats and form a characteristic element of the riverside landscape. At the same time, there may be a potentially positive impact as a result of the development of the land around the reservoir and an increase in the attractiveness of the landscape as a result of the creation of the reservoir (valuable for the development of tourism and recreation). Enhancement of the natural and cultural landscape in terms of panoramic views as seen from the local road network elevated on the hills. The positive impact of the riverbed works will also include the removal of rubbish and waste of various origins, which will enhance the landscape value of the river.

During the construction phase, investment activities (carrying out construction work and the need for heavy equipment) will have a time-limited adverse impact on landscape values.

6.6 Impact on mineral resources

The investment activities included in the draft MP WRMP may affect, both positively and negatively, the availability of natural resources, especially those located in the site or vicinity of the planned investments. A positive impact will occur in the case of protection against flooding of opencast mine sites or deposits with flood water.

6.7 Impact on the environment

Implementation of the arrangements of the assessed document will have a diverse impact on the natural environment. Locally, the possibility of protecting valuable and protected animal, plant and fungi species, natural habitats and nature conservation areas and ecological corridors important for ichthyofauna may be limited. On the other hand, the implementation of the project will result in the creation of new ecosystems with favourable conditions for the formation of valuable natural assets.

The negative impact of individual investments can usually be effectively minimised as a result of measures to reduce the adverse impact generated by the implementation, use and operation of hydro-technical facilities and activities and projects that interfere with the aquatic environment. It is also possible to compensate for natural damages.

6.8 Impact on people

Investment tasks may affect people's health and quality of life. The implementation of the assignments, due to their investment nature, may indirectly negatively affect people's quality of life through noise and increased dust during construction. However, this impact will be local, short-term and will cease with the completion of the investment phase.

It should be emphasised that all investments that will require population relocation or affect the economic activity conducted in the area due to changes in land use of the land intended for investment activities will undoubtedly have a negative impact. These activities may cause social conflicts. Such activities may affect different social groups and economic sectors (e.g. reducing of agricultural or economic activities). Therefore, it is very important to maintain a dialogue with both the population and the local self-government bodies.

6.9 Impact on monuments

The negative impact on historic buildings may occur at the stage of implementation of individual investments, which will be associated with increased traffic of vehicles servicing the construction, creating a risk of damage to monumental buildings as a result of vibrations during the movement of heavy equipment and trucks on the roads.

During the construction phase, there is the possibility of encountering previously undiscovered archaeological sites.

A positive long-term impact may, in some cases, be the improvement of the display value of historic buildings. In view of the flood control function of the planned measures, their implementation, as assumed, will affect the reduction of flood risk, including the protection of monuments from flooding.

6.10 Cumulative impact with other strategic documents

There is a possibility of cumulative negative effects as a result of the implementation of investment programmes related to the development of inland navigation (Programme for the Development of the Odra River Waterway, Programme for the Development of the Wisla River Waterway, National Shipping Programme until 2030) and other documents indicating the implementation of hydrotechnical investments.

In addition to the development of shipping and maintenance works, the potential for a cumulative impact from the implementation of the MP WRMP arrangements could also be:

- the development of coal power and mining - which may cause changes in the hydrological regime of rivers and on groundwater levels,
- hydropower development - which may pose a threat to ichthyofauna and natural habitats in rivers,
- the development of water tourism (the construction/reconstruction/expansion of river marinas and harbours resulting in the transformation of the hydromorphology of the coastal zone of rivers, lakes, reservoirs and the sea),
- the transformation of the valley and the riverbed related to the development of transport and transmission infrastructure,
- the progressive development of agricultural, grassland, forest and other natural areas.

The cumulative effects generated by the planned projects may relate to individual components of the environment and may be expressed in positive or negative environmental effects. The

nature, scale and intensity of the impact depend on the concentration of the project (e.g. within a watercourse or protected area), the type and size of the projects, and the sensitivity of individual environmental components. Some cumulative effects may occur at the stage of implementation (e.g. emission of suspended solids and temporary deterioration of habitat conditions for ichthyofauna) or at the stage of operation/exploitation of the projects (e.g. impact on biological continuity, impact on hydrological regime and ecosystem).

A detailed analysis of the potential for cumulative effects of specific projects will only be possible (and necessary) to be carried out as part of the environmental impact assessments of projects, the water supply and water rights assessments and permits.

7 Proposal of solutions aimed at prevention, limitation or natural compensation of negative impacts on the environment, which may result from the implementation of the study, in particular on the objectives and subjects of protection of Natura 2000 sites and the integrity of these sites

The hierarchy of measures to protect the environment implies that solutions aimed at avoiding and preventing negative impacts should be applied first. If this is not possible, the scale and effects of impacts should be minimised. Once opportunities to reduce impacts to an acceptable level have been exhausted, compensatory measures should be applied. Each of the above steps should target a specific risk of an environmental impact and be assessed for appropriateness, effectiveness, feasibility (legal, technical, environmental) and sustainability in the long term, as well as analysed in terms of environmental impact (so that an action that minimises the impact on one environmental component does not result in a negative impact on other components).

The forecast indicates a synthetic catalogue of measures aimed at avoiding and minimising negative impacts on the environment with respect to its individual components. These actions concern both the stage of project planning and construction, and then exploitation, and refer to all components of the environment for which the possibility of a negative impact has been identified.

8 Proposal of alternatives to the solutions contained in the draft document, together with justification for their selection and description of assessment methods leading to this selection

The draft MP WRMP contains information indicating that there are no alternatives to projects likely to have a significant impact on Natura 2000 sites, for which the risk of such an impact has not yet been excluded.

At the project-specific level - alternatives for retention reservoirs can be dry reservoirs or polders, and for dry reservoirs - restoration of seminatural wetlands. A broad framework of alternatives for artificial retention is provided by the recommendations formulated in the environmental impact assessment for the Plan for Counteracting the Effects of Drought.

However, with regard to regulatory groynes in the Wisła riverbed - it is mainly their size, construction and method of implementation that can be varied, as the consideration of alternative solutions is generally not applicable in the case of renovation and modernisation of the existing infrastructure in cases where failure to carry out these works will result in its further destruction and may pose a greater threat than the lack of any protection.

Due to the low level of detail in the arrangements of the assessed document, including the lack of information on the methodological basis for the selection of the indicated measures, at this stage it is not possible to identify and indicate within the SIA alternative variants of investment projects and to carry out their assessment in terms of technical feasibility and environmental impact.

9 Framework cost-benefit analysis

The draft MP WRMP under assessment contains information on the costs of implementing the various tasks.

The draft MP WRMP does not present parameterised data on social, economic or environmental benefits resulting from the implementation of the investments. For some of the tasks, the data on this subject is derived from the materials on the basis of which other strategic documents have been prepared in which the aforementioned projects are included (in particular the Flood Risk Management Plan). However, due to the fact that the projects are at various stages of planning and such materials are not available for all of them, as part of the work related to the implementation of the investment tasks, more detailed arrangements will be developed, aimed at optimising the costs and benefits, with the highest priority given to care for the environment, compliance with strategic documents and ensuring overriding public interest.

10 Summary/Conclusions

The forecast of the environmental impact of the MP WRMP was prepared for the purpose of conducting the SIA for this document. The analyses performed in the forecast allowed to formulate the following conclusions:

I. The arrangements of the document do not conflict with the policy of environmental protection and sustainable development, but may favour its implementation in an indirect or direct way.

II. The positive nature of the effects of the assessed document will be cumulated with further implementation of strategic documents and regulations dedicated to environmental protection. The negative impacts may be fully or partially mitigated by the implementation of measures contained in other plans in the field of water management or nature protection.

III. Implementation of the measures included in the document requires obtaining a decision on environmental conditions and also, for most of them - a water permit. As part of these proceedings, the impact of individual actions on the environment will be considered, and conditions will be set for preventing, minimising and compensating environmental impacts and their effects.

IV. The arrangements of this document do not generate negative impacts on environmental components such as people, material assets or monuments. Positive effects are expected, in particular in terms of increased safety and protection of human health and quality of life. Individual investment activities may potentially involve adverse impacts which may occur at the stage of construction works. These impacts may be mitigated with the application of appropriate technical solutions.

V. Adoption of the recommendations indicated in the forecast will ensure compliance with the principles of avoidance and permissibility of significant negative impacts on Natura 2000 sites. Possible negative effects are avoidable, minimised or compensated for.

VI. There is potential for pro-environmental principles to be applied to the implementation of the findings of the MP WRMP which may help to ensure and enhance the positive effects of the implementation of this document.

VII. It is recommended to establish a system guaranteeing a high level of environmental protection at the stage of practical implementation of the arrangements of the MP WRMP, concerning, inter alia, the preparation and verification of documentation, monitoring of environmental effects and ensuring integration with environmental documents.

VIII. The document under assessment is an instrument of the policies set out in other strategic documents already in force. Therefore, the monitoring system for environmental aspects related to the implementation of the analysed document is based on the monitoring system for the implementation of those documents. However, it is pointed out that it is justified to prepare an evaluation report summarising the implemented MP WRMP in order to show the most important effects achieved in terms of flood protection improvement.