

CONCISE SUMMARY OF A PROPOSAL OF THE ODRA RIVER BASIN DISTRICT PLAN

The Odra River Basin district is one of eight districts within the Czech Republic for which a proposal of a plan for development of the basin was produced. The Plan was based on the Directives of the European Parliament and Council of Europe No. 2000/60/ES concerning activities of the EU Community with regards to the water policy at river basins (the so called Framework Directives). The work was done well in advance in order to give the public at least one year time for submitting their comments thereon before the plan's implementation period would commence. The *Proposal of the Plan for the Odra River Basin* was procured by the company Odra River Basin (a public organisation), Regional Offices of the Moravian-Silesian and Olomouc regions of which the statutory area the basin forms part. Apart of the Central Office of the Water Authority and the main external supplier - the company Pöyry Environment a.s. Brno, development of the plan was assisted by the Department of Forestry of the Czech Republic and Agricultural Water Management Authority (i.e., their sections responsible for the Odra River Basin), branch of the Agency for Nature Conservation and Landscape Protection of the Czech Republic with domicile in Ostrava, and Water Utilisation and Sanitation companies operating in the area.

The prepared documentation consists of 511 pages of text, 158 map attachments and 178 pages of provisions. In order to prepare the document for comments by the public, it was supplemented by a short summary of which this excerpt forms part.

Introduction

The main goal of water management planning is to eliminate the priority hazardous substances from water and reduce the level of nutrients it carries in order to attain concentrations that would compare favourably with those of a healthy marine environment. If this goal could be achieved it would reflect also in good quality waters within the interior, i.e., surface and ground waters alike. As a consequence of this endeavour, the public would be offered better quality potable water. The main emphasis of the planning is on the fulfilment of wide environmental goals including protected areas that dependent on water environment. However, should the particular water environment be substantially damaged by human activities or its natural condition be such that the above goals could not be achieved or its achievement would be unaffordable, then, in such a situation, a less strict environmental criteria could be applied. Under certain, specific, conditions it may even be possible to apply exceptions from the specified ecological requirements or prevent the conditions from further worsening, provided, it is in the interest of the public. A similar situation would apply in cases of unexpected or unforeseen circumstances (floods or droughts). The planning process requires that the proposed measures, designed to secure the set goals, be inclusive of economic analyses of water services based on a long-term prognosis concerning the supply/demand of water in a specific area. Furthermore, it must be realised that the process of "transparent" planning cannot be carried out without participation of laymen and the professional public.

Principles regarding the Water Management Planning as per the General Guidelines were incorporated into the Judicial Code of the Czech Republic, and rules applicable to the compliance with these principles include the following generally binding regulations:

- Act No. 254/2001 Coll., regarding waters, as amended,
- Public notice No. 142/2005 Coll. regarding planning of water affairs
- Plan of the main river basins in the Czech Republic (PHP ČR).

The Public Notice No. 142/2005 Coll. specifies contents and formal ordering of a Plan for basins as follows:

- A) Description of a basin
- B) Utilisation of waters and its impact on the waters
- C) Condition and protection of water formations
- D) Flood protection and hydrological regime of the landscaped area
- E) Evaluation of the impact various measures have on the area
- F) Economic analysis

A. Description of the Odra River Basin

This section (107 pages of text, 37 attachments of maps and 3 table attachments) offers a description of the basin, its characteristics, geomorphologic, climatic and hydrological conditions together with a study regarding forestry condition, economic and residential situation within the area and a list of nature and environment protected areas. The section includes information on contacts with regards to the planning process and on measures concerning communication with the public during this process.

The catchment area of the basin measures 6 252 km² and is situated between two mountain regions, i.e., "Hrubé Jeseníky" (with the highest mountain of Praděd – 1492m RL) and "Beskydy" (with the highest mountain of Lysá hora -1323 m RL). The source of the Odra River lies at Odra Hills at the elevation of 635m RL and the river leaves the Czech territory at the elevation of approximately 190m RL. The basin's Southwestern watershed border is also the main European watershed of the Dunaj and Odra Rivers.

A long-term average flow through the Odra River, measured above its confluence with the Olše River at the location where both rivers leave the territory of the Czech Republic, is 49 m³.s⁻¹ and its average flow under the Olše River is 63 m³.s⁻¹. An average annual precipitation in the basin area amounts to 5,1 x 10⁹.m³, which translates to approximately 820 mm of rainfall per annum of which 300 mm is washed into rivers.

The "Jeseniky" catchments area differs from that of "Beskydy" mainly due to differences of their river networks. The Beskydy catchments area belongs to the parts of the Czech Republic that have the richest rainfalls and biggest density of river network. High longitudinal slopes, a character of the geological substrate and large amounts of sediment run-offs carried away by the rivers is the reason for the low stability of river beds and reason for which long sections of some of them had to be modified in the past. Only lower sections of the rivers have a character of lowland-river-flows with larger inundated areas. In the lowest parts of the river flows, in the "Ostrava Basin", the most industrialised part of the Czech Republic, their beds are showing strong anthropogenic degradations that is not only due to the river training of which the purpose was the protection against floods but also sagging of their sections on account of deep-level mining for coal. Some 31, 5 % of the total length of the main basin rivers, i.e., river Olše, Ostravice, Odra, Opava a Moravice, were modified. The largest, untrained, river section belongs to the Odra River in the area above the industrial agglomeration. Here are well-preserved alluvial ecosystems allowing regular and harmless overflows with a substantial retention capacity. The hydrologically more complicated Beskydy part of the basin is further characterised by a fluctuation of its river flows, which is the most distinct in the whole Czech Republic. Forestation of the basin accounts for approximately 38,5% of the area, which is above the national average and also among the highest forestations in the CR.

The total number of inhabitants living in the basin area amounts, almost, to 1,3 million, which averages 212 inhabitants per 1 km² and is substantially higher than the national average of 130 inhabitants per 1 km².

The basic unit of the Water Management Planning is called a “water formation”. This unit is further divided into a category of “*surface water formations*” (which is subdivided into a sub-category of flowing water formations, i.e. “*rivers*” and still water formations, i.e., “*lakes*”), and “*ground water formations*”.

Furthermore, the surface water bodies are divided into “natural surface water bodies”, and when substantially effected by anthropogenic activities, they are called “heavily modified surface water bodies”. Should these water bodies be newly created by means of these activities, they would then be referred to as “man-made water bodies”.

The Odra River Basin consists of 120 *surface water formations* of which 112 falls into the category of “*rivers*” and 8 into the category of “*lakes*”. Furthermore there are 14 *ground water formations* of which 3 are the *upper ground water formations* and 11, so called, *main ground water formations*.

The introductory A section of the plan lists also, so called, *protected areas* and it offers their detailed specification and characteristics. Among these are water bodies designated for the extraction of water for human consumption, areas important from the economical point of view, water bodies used for recreational purposes including swimming, vulnerable and sensitive areas, especially protected areas, localities with a special importance for Europe, bird nesting areas, regional system of ecological stability and important landscape elements.

B. Utilisation of waters and its impact thereon

The purpose of this section (72 pages of text, 33 map attachments and 37 table attachments) is to analyse the current utilisation of waters, determine demands for water by the year 2015 (plus the necessary measures to be put into place in order to achieve set goals), and to evaluate human activities with respect to the overall condition of waters to date. The section deals also with water bodies that are at risk of not having their conditions restored to desired levels.

The main results of the analyses of the current utilisation of waters may be summarised as follows:

There are currently (the year 2006) 471 *registered discharges* of waters (above the limit of 6 000 m³ per annum or 500 m³ per month) into surface water formations in the Odra River Basin, which totals a 206 mill. m³ of water per annum. These come from 37 main municipal areas, 42 industrial sources, 1 food industry and 12 sources with thermal encumbrance. As far as water withdrawals from the *surface formations* (above the same limits) are concerned, currently there are 106 registered withdrawals with the total volume of 177 million m³ of water per annum, 7 main water reservoirs (dams with the total capacity of 385,5 mil.m³ of water) and 3 water transfer schemes. Other types of water “consumers” registered in the basin, are the underground cavities left after mining operations (approximately 150 km²) and users of water for recreation purposes and generation of energy (at 6 water reservoirs, 60 gravity structures). The total withdrawal of ground water, mostly used for providing potable water to the public, reached (219 monitored cases) 23,1 mill.m³ per annum (2006).

Evaluation of morphological affects in the Odra River Basin shows that the basic structure of the basin and its 120 surface water bodies is formed by river network of which total area exceeds 10 km² and its total length is 3 066 km (length of all rivers in the area exceeds 6 thousand km). The morphologic affect on flows at the water formations is subject to many factors and is rather pronounced. By the training of rivers, compacting their embankments, regulating their flows through town residential areas, etc., more than two thirds (69 %) out of the 120 water formations of the basin were thus affected.

As far as the requirements regarding water utilisation and measures to be taken in order to ensure that water needs in the year 2015 are satisfied, most of the development trends have showed either stagnation or a marginal growth/decline. This is true mainly with regards to the demands on water volumes. However, greater positive actions may be

expected in cases where water gets polluted by various emissions. This is the reason for not proposing new measures regarding demands on water volumes. Measures concerning water releases are covered in section C. Impact on risks may be deduced from evaluation of the expected requirements on utilisation of waters and whether the data by 2015 will not exceed the applicable criteria pertaining to a good water environment. The evaluation further shows that in spite of the positive trend, especially with regards to the water quality, as far as the future risks are concerned, the situation will not be much different to the current situation:

- At surface waters - out of the 120 water formation (WF) -
 - For still waters - 3 are non-risks, 4 potential risks and 1 risky
 - For flowing waters - 40 are non-risks, 37 potential risks and 35 risky
- At ground waters – out of 122 WF or so called „working units“
 - 44 are non-risks, 42 potential risks and 36 risky

C. Condition of water formations and their protection

Section C, which is the largest section of the Plan (156 pages of text, 54 map attachments and 34 graphic attachments with 172 pages of provisions), deals with conditions that must be adhered to in order that protection of the environment would be inclusive of the protection of water systems, programmes for procurement and the evaluation of volume and quality of waters (programmes for monitoring), environmental goals regarding protection of waters for the duration of the Plan and proposals for achieving these goals.

There are two categories of the evaluation procedure applicable to the *flowing surface water formations*, i.e., evaluation of the ecological, and chemical state of waters. The former category evaluates the basic biological components tied to waters, and the components that are physically-chemical on which the biological components depend. The evaluation of the chemical state of surface waters is based on a summary of indicators regarding this state and their limits.

The *still waters* of the Odra River Basin refer to water reservoirs, which are *heavily modified water bodies* and are thus evaluated according to, so called, ecological potential that is a summary of partial evaluations of biological and physically-chemical components.

The section further demarcates, so called, *heavily modified water bodies (HMWB)* of which character was fundamentally changed by human activities and for which reason the characteristics of good ecological state cannot be attained. The analyses show that out of 120 water formations found within the Odra River Basin, 32 are designated as heavily modified water bodies (8 of which fall under the so called still water bodies) and that to bring them into their natural state would now be practically impossible. It would either preclude or negatively effect their current way of utilisation, replacement of their waters would be practically impossible to guarantee, and measures leading towards a good ecological state of the formations would be technically and economically extremely difficult to implement. The condition of *ground waters* is also evaluated from two different stands, i.e., from the view of their quantity, and chemical composition.

Evaluation of *protected areas* falls under a specific category, i.e., the areas designated for water extraction for human consumption, natural swimming areas, areas sensitive for nutrients (sensitive areas and vulnerable areas), areas designated for protection of habitats and species (SPA - Special Protection Areas, SAC - Sites of Community Importance and small and especially protected areas).

The *Programme of Monitoring* is the basis on which the evaluation of water conditions and the follow-up evaluation of the condition of a water formation as a whole stands. Monitoring of waters for planning purposes is carried out on three, hierarchically arranged, levels, i.e., the *positional, operational and reconnaissance levels*.

The purpose of *positional monitoring of surface waters* is to cover the relevant range of water bodies in order to offer a comprehensive overview of their conditions and assist with an overall evaluation of each basin area. The Odra River Basin features 8 monitoring profiles of the positional monitoring. The positional monitoring of still waters of the area focuses on 5 selected water reservoirs built within the basin.

Operational monitoring of surface waters covers substantially greater areas of a region than the situation monitors and is based on programmes already in place, which it purposefully supplements and expands and it includes monitoring of protected areas. Operational monitoring monitors a chemical and ecological condition/potential of surface waters in order to provide a maximum amount of data needed for the evaluation of effects causing risks to water formations. It also serves to provide information required for the evaluation of changes of pollution in rivers and possible increases of concentration of substances responsible for it.

Out of 112 flowing water formations within the Odra River Basin, there are 146 locations at which the operational monitoring is carried out. Each of these locations has at least one monitoring profile that represents all effects impacting on the section's water condition. Physical-chemical indicators are monitored 12 x per annum and the selected priority and other polluting substances are monitored 6 x per annum. Operational monitoring of still waters is subject to an independent regime and is carried out on 8 water reservoirs at 13 monitoring locations.

Reconnaissance monitoring of surface waters is on the hierarchical lowest monitoring level and is used in extraordinary cases with happenings for which there are no readily available explanations.

The most important step with regards to the planning process belongs to the evaluation of conditions of surface and ground waters. It is based on the comparison of monitored data (based on the monitoring carried out in 2006 – 2007) with the limit values and criteria for a relevant water formation. The evaluation principle is as follows: “ one unsatisfactory measured indicator (criteria) = the whole water formation is labelled as unsatisfactory.

Evaluation of the overall condition of surface water formations is invariably carried out at a location that represents all effects impacting on the water body (representing profile) and is a synthesis of results of chemical and ecological state of flowing waters and chemical and ecological potential of still waters. As a result a less favourable state is then accepted as the resulting condition of the waters. In case the actual direct monitoring from preset locations does not produce a decisive result or is absent altogether then, a so-called, *indirect evaluation* method would be employed. The method would make use of information and databases on a possible occurrence of potential pollution and perhaps even information on an unsatisfactory hydro-morphology of the flows. However, since the procedure of an indirect evaluation is considered as being only a substitute evaluation, an unfavourable state is thus being qualified as a potentially unsatisfactory state.

Out of the total number of 112 flowing water formations, 52 were declared to be in good condition, 18 as unsatisfactory and 50 as completely unsatisfactory.

As far as the still water formations are concerned, from the total number of 8 formations, 6 were declared as having a good ecological potential and the 2 remaining were considered as being unsatisfactory.

Ground and surface water bodies are evaluated in a similar manner. The main starting point for their overall evaluation is the evaluation of partial results of their quantitative and chemical states. A condition of 3 upper ground water formations (689 km²) is monitored at 17 locations and a condition of 14 main formations (6255 km²) is monitored at 58 locations. The overall evaluation of the formations is again subject to the synthesis of their chemical and quantitative states. Appraisal of a condition of a water formation is then determined by the rating of the least favourable finding. Thus out of 14 ground water formations within the basin, 5 are found as acceptable and 9 unacceptable. In all

unacceptable cases it is due to their chemical states. In one of these it is also due to quantitative reasons.

According to the Framework Directives, a priority requirement is to prevent further worsening of the state of water formations and to prevent dangerous or extra dangerous substances from entering these formations. It is expected that by the year 2015 a good state will be achieved at all water formations at which it is technically and economically implementable. Exemptions may apply to those water formations at which this situation cannot be acquired by 2015. This would also apply to those cases where good state (potential) is not at all achievable or its realisation could not be guaranteed or expected to materialise by the year 2015.

In case of some selected formations this period may be extended or less stringent requirements applied. However, extension of a period during which the stated goals are to be achieved must not exceed a length of two periods specified for the Plan's implementation, whilst the Plan's revaluation and updating is carried out every 6 years - calculated from the date it was accepted. The exemptions applied to a particular water formation will not impair the selection of measures to be used for that particular formation. Should a certain water body be labelled as being unsatisfactory, no efforts must be spared in order to improve its condition even though the final result of the endeavour would not comply in full with the set goals.

The total number of surface water formations within the Odra River Basin for which the exemptions are expected to apply is 68.

The *programme of measures* is a tool with which the protection of waters and their sustainable utilisation is achieved. These programmes cover a wide scope of activities from the introduction of available technologies applicable to cleaning of waste municipal and industrial waters and revitalisation of watercourses, up to the various restrictions dealing with pollution of the area and removal of old ecological encumbrances, etc. The programmes are, among others, based on a summary of the preliminary survey of important water management problems evaluated in the year 2007. The plan lists, according to the individual formations, 377 measures applicable to surface waters and 42 measures applicable to ground waters. Specific measures regarding cleaning of wastewaters and revitalisation of watercourses were proposed for 127 localities of which 121 are within the Moravian-Silesian region. Implementation costs of those measures is estimated at 15 Billion CZK and the cost for the 6 remaining ones, located within the Olomouc region, is 0,15 Billion CZK. Furthermore, among these proposed measures, 24 apply to decontamination of areas with old encumbrances and 4 to measures applicable to industrial complexes. There are also 18 measures of a general nature, i.e., measures regarding water protection as part of the environment that is applied mainly to the formations at which water management was identified as a major problem, and those that were classified as being in an unsatisfactory condition.

D. Protection against floods and water regime of the region

Section C (61 pages of text, 25 map attachments and 25 table attachments) addresses problems regarding protection against floods and other harmful effects caused by water (even those caused by water shortages during dry seasons). The main goal of flood protection systems is the protection of inhabitants living in flood prone areas against floods and mitigation of damages to property and cultural and historical structures by floods.

The most important item of a flood protection system is the one that addresses the so-called *priority areas* as specified in a "compulsory section" of the Plan for Main Water Basins in the Czech Republic. One of the priority areas specified therein is the area of *Upper Opava* (from the source of the Opava River up to the river's confluence with the Moravice River). The development of this section poses great technical and financial challenge to the developers and is currently under consideration by the CZ Government.

The measures proposed include the development of retention areas at the upper Opava region (i.e., water reservoir Nové Heřminovy with a capacity of 16,15 million m³ of water and

7 dry dams – polders) and those of which implementation would increase capacities of rivers in this region and revitalization of some of their sections.

Other measures addressing the remaining sections of the Odra River Basin are mostly directed at, the so-called, *II Phase of the Programme of Flood Prevention* for which finances will be provided by the CZ Government.

The section further deals with an overall state of the *protection against floods and water regime of the region*, including water erosions, stabilization of embankments and other matters regarding land adaptation and renewal. In order to assist with the finalization and implementation of the flood protection measures at the region's river network, the section provides information on areas with flow restrictions, which mostly applies to build-up areas. Approximately 17,5 thousand inhabitants living in the region are still insufficiently protected against floods. However, these unprotected areas concern mainly mixed settlements and dispersed habitats along minor rivers.

From an overall point of view, the flood protection measures to be applied within the basin offer satisfactory protection to all larger establishments situated at larger watercourses. With the exception of the priority areas of upper Opava, the areas that are up to now unprotect or insufficiently protected are areas that are situated along minor rivers. These are mostly areas where flood protection systems were never implemented or which were implemented according to outdated standards previously applied to flood protection systems. Among the areas thus affected are the outskirts of the city of Ostrava and Bohumin situated at the lower parts of the Odra River. Other measures applied to watercourses under management of the public company Odra River Basin are localized areas (again excluding the upper Opava) similar to the habitats along watercourses under the responsibility of the Agricultural Water Management Authority (AWMA), and Forestry of the Czech Republic (FCR). Further upgrading of the protection of agricultural land against floods was not proposed for the oncoming planning period.

A *proposal of measures concerning the protection of areas from extreme water situations* is determined on the basis of the evaluation of the current situation and the specified goals. Apart of activities regarding the priority area of *upper Opava*, the plan contains a summary of localities at which river capacities are to be increased and dry dams (polders) erected and that within the *II phase of the programme for flood prevention* of the 2010 – 2015 planning period. The flood protection measures were proposed for 78 locations at the total cost of 1,88 billion CZK out of which 1.77 billion CZK is to be spent in the Moravian-Silesian region (71 localities), and 0,10 billion CZK in the Olomouc region (7 localities). They concern 43 water formations. In addition to the above, the Forestry of CZ plans to spend approximately 8 million CZK per annum on measures to protect forests against erosion, erection of barriers, restoration of reservoirs and sanitation of erosion furrows.

The flood prevention activities deals also with the determination of *overflow lands*. Out of the total length of 1 355 km of watercourses within the Odra River Basin, the overflow lands had already been demarcated along 1 034 km of their length (i.e., 76% of the total). Data on these areas are being currently updated together with those on their so-called active zones and revisions of locations where new flood protection measures are to be erected. A report produced by AWMA contains some new stipulations that are proposed for the selected watercourses (39,4 km) and FCR (43,4 km). Further activities in this section would be directed towards the improvement of quality of information regarding these areas and will focus on the determination of depths and velocities of floodwaters. The above information is vital in view of the flood risk evaluation and requirements of the newly accepted Directives of the European Community (2007/60/ES) - *on evaluation and management of flood risks* that are to be gradually aligned with the planning cycle of the region. The measures proposed for the on-coming planning period, regarding the subject, require that all areas demarcated and fixed up to the year 2009 were transferred and reshaped into a form, which the above Directives requires.

With regards to the other flood protection measures, the hydro-meteorological monitoring (consisting of 91 measuring stations) and prognostic services proposed for the basin area had been practically completed. The priority area of the *upper Opava* is to receive the most advanced equipment in order to supplement its existing integrated emergency systems and in addition, approximately 20 new measuring stations are to be built in there.

Apart of dealing with matters pertaining to protection against floods, section D deals also with measures concerning *protection against droughts*. The starting point for the evaluation of conditions that occur during such a situation rests in the "quantitative water balance". An impact of the future development on the water-economical balance of the area covered by the so-called *Water-management Scheme of the Odra River Basin* would be different to that of the areas lying outside the scheme. This is due to the fact that the hydrological systems of the scheme are controlled by management of six dams under jurisdiction of the company Odra River Basin and other two important water transfer schemes. Water for human consumption is provided by reservoirs Šanace and Morávka on the Beskydy side of the basin and a cascade of dams Kružberk and Selská Harta on the side of Jeseníky. Industry in the area receives water from the dam Žermanice at Lučina and Olešná at Olešná (dam Těrlicko at Stonávka, situated within the Olše River Basin, operates independently on the scheme).

From the nineties onwards, the economic values balanced out and the cost of the extracted water has increased many times over. This has resulted in a substantial decrease of demands for the water. In the period 1990 – 2005, this reflected in a 45% drop in demands for potable water. A similar situation also applied to the water for industry. The balance evaluation of the water supply economics over the past years thus shows that no worrisome situations should occur within the part controlled by the scheme provided the current demands on water and adherence to the requirements on minimal flows up to the year 2015 are adhered to. As a spell of drought could perhaps be denoted some worrisome intervals resulting from a seasonal low flows occurring at isolated profiles outside the scheme. The evaluation of this case suggests that even the expected marginal fluctuation of water demands in the area should not cause water shortages by the year 2015. Provided the current statistics concerning the hydrological characters is maintained (i.e., no climatic changes), the currently high state of security with regards to the water supply is not breached anywhere within the scheme and some adjustments to the water management policy at the dams are introduced, the overall condition should be sustained even if the demands on water should increase by 20%, as is expected would happen by the year 2050. However, this increase (20%) could cause anxieties to areas outside the scheme, especially in periods of the low flows, and water saving measures may have to be introduced.

With respect to *the care for watercourses and areas adjacent to their banks*, their owners report that vegetation along approximately 51% of them seem to be in a satisfactory condition but in 37% of cases, improvements would be necessary (the rest passes through urban areas and dams). It was proposed that the situation is attended to at the most needed areas (property rights consideration) along 276 km of rivers (out of 425 km of their continued length), within the planning period by intervening with composition of these areas or by creating them where they do not exist. Access to watercourses within the basin is disallowed in approximately 9% of cases (out of approximately 3100km) due to private ownership of properties attached to them (erected fencing alongside river banks) and the situation is not expected to improve soon.

E. Appraisal of impacts the introduced measures will have on the condition of waters

This section of the Plan (15 pages of text, 9 attachments of maps and 4 table attachments) offers an expert's estimate regarding changes in qualitative components of the

ecological and chemical state/potential, which are to take place after the measures recommended by the economic analysis were implemented in the year 2015.

On basis of the carried out evaluations and their comparison against the set goals, and the assessment of economic returns, the Plan for the Odra River Basin proposed that up to the year 2015, 205 measures concerning sanitation, waste water treatment and revitalization of watercourses at the total cost of 17,0 billion CZK, of which 16,8 billion CZK is to be spent in the Moravian-Silesian region, and 0,25 billion CZK in the Olomouc region (the amounts do not include decontamination of old ecological encumbrances, organizational and general measures and expenditure on preparation and implementation of the priority area of *upper Opava*) be implemented.

Further proposals concerning implementation of 18 different measures of a general character normally applicable to water formations with a substantial water management problems or those of which the condition has been labelled as unsatisfactory. Out of the measures to be taken, 24 concern decontamination of old ecological encumbrances and 4 are applicable to industrial companies.

A comparison of the total condition of the surface and ground water environments prior and after implementation of measures proposed by the Plan for the Odra River Basin shows that in a majority of the cases there will be no situation that would result in the change of classification of the condition, i.e., from unsatisfactory to satisfactory state. This is due to the very strict limits by which the conditions are evaluated, their wide spectrum and the evaluation principles, i.e., "one unsatisfactory component means that the whole system is labelled as unsatisfactory". This approach would unfortunately ensure that in spite of a number of positive changes implemented up to the year 2015, a substantial status reversal, from the unsatisfactory to satisfactory, would not be achieved.

F. Economic analysis

Section F (100 pages of text) offers an evaluation of the financial efficiency of individual measures described in section C proposed for implementation by the year 2015. The purpose thereof is to verify the current economic importance of water utilisation by individual sectors of the nation, its trend and thereafter to analyse economic returns from investments into water utilisation and management services.

From the point of view of the importance of water management, two basic aspects of water utilisation are evaluated, i.e., supply of potable water to the public, and extraction and treatment of wastewaters. For both of these, the technical, economic and socio-economic data were investigated.

Almost 96 % of inhabitants living in the Odra River Basin make use of water extracted from the basin. Their specific consumption is 92 l/inhabitant per day, which is, as a matter of fact, below the national average. However, only 70% of inhabitants of the basin are connected to its wastewater system. Industry uses in total 90 million m³ of water per annum and that mostly from surface sources.

This section examines various payments and fees applicable to water services. The main income comes from industry and the supply of water to the public. Thus the owners of water-supply networks and sanitation systems within the basin received (2005) for their provisioning of water and drainage services payments averaging 41,6 CZK per m³, which is below the CZ average of 44,5 CZK per m³. A ratio between the expenditure paid by households for the supply and drainage of water and their net average income is 1,4%. A ratio of 2 % is considered as socially acceptable.

Section F also offers prognosis on trends regarding volume, costs and expenditures of water usages and management services expressed in a quantified or verbal description. The terms used would be: *possible, minimal and maximal*.

The fundamental part of section F lies in the evaluation of efficiency of the proposed individual measures of which the purpose is to achieve the goals set for the protection of waters.

A feasibility study and setting of priorities of proposals on development and the expansion of WWTP, and development and reconstruction of sewerage systems for settlements with more than 2000 inhabitants, was produced. WWTP for 23 settlements at the cost of 1,3 billion CZK and sewerage systems for 64 settlements with a cost of 9,2 billion CZK are being proposed. Finances available for implementation of these measures in the period 2009 to 2015 represent approximately 9,8 billion CZK. In order to secure the appropriate hydromorphic conditions of the water formations, 24 measures (revitalisation, clearing passageways at weirs) at the total cost of 0,4 billion CZK were proposed.

In order to evaluate return on investments into the water management services, relevant data on total expenditures and revenues were gathered from the main owners of the facilities (administrators of watercourses, operators of water utilities and sanitation systems) then evaluated and from this information the rate of return was calculated. It was determined that the rate of return on investments into the supply of potable water to the public is 113,3% and 106,0% in the case of the extraction and treatment of wastewaters (this is due to the greater volumes of grants). An average amount of grants for water management services is almost 0,9 billion CZK per annum. The return on investments into the administration services of river basins and watercourses is 97,6 %. This excludes grants for the implementation of measures regarding protection against floods.

The pricing policy, applied according to the relevant CZ laws (water law, law applicable to water utilities and sanitation and law on price policy) offers the water users within the Odra River Basin a sufficient incentive for the efficient utilisation of water resources. These, combined with revenues received from the services and grants, assist the endeavours leading to the attainment of the set environmental goals. On the other hand, payments for water supply and extraction services are already reaching levels that are close to the socially acceptable limits. Further increases of payments would thus not be possible and finances needed for implementation of the proposed measures would, even in this case, have to come from the grants.

The finances needed for the realisation of the planned measures proposed for the period 2009 to 2015 are expected to come out of the EU and CZ Government funds. These finances allocated for the Odra River Basin are appointed proportionately to the total planned financial resources set for the CZ, specified by the PLAN FOR THE MAIN RIVER BASINS OF THE CZ, and the impact the problems experienced within the region would have on the country as whole.

Conclusion

The PLAN FOR THE ODRA RIVER BASIN is the result of a search for a balance between the goals set by the applicable legislature, environmental and water management experiences and implementation of measures that are affordable by the authorities requesting the Plan and designers of the methodology and guidelines on which basis it was produced. Creators of the Plan believe that it is a good starting point from where to proceed towards the set goals, those specified by the Overall Directives, the CZ law on waters, Public Notice on planning and THE PLAN FOR THE MAIN RIVER BASINS IN THE CZ. However, it should be borne in mind that the process of planning in the water sector could get modified after all individual plans within the European framework are compared and evaluated. This should take place in the year 2010 or later.