Convention on Protection and Use of Transboundary Watercourses and International Lakes

SEMINAR ON THE ROLE OF ECOSYSTEMS AS WATER SUPPLIERS
(Geneva, 13-14 December 2004)

POLAND NATIONAL REPORT

PROTECTION OF WATER-RELATED ECOSYSTEMS AND THEIR ROLE AS WATER SUPPLIERS

POLISH NATIONAL REPORT

Prof. dr Waldemar Mioduszewski
Institute for Land Reclamation and Grassland Farming, Falenty, 05-090 Raszyn, Poland
ph. 48(22) 7200531, fax 48(22) 6283763, email: w.mioduszewski@imuz.edu.pl

Contact person of Ministry of the Environment, Department of Water Resources:
mgr inz. Iwona Gawlowska, email: iwona.gawlowska@mos.gov.pl

1. Introduction

Poland is one of European countries of very small resources of surface waters. Per capita renewable resources expressed as the mean annual outflow from the country amount 1580 m^3 (data of the Institute of Meteorology and Water Management) while the same index for Europe equals 4560 m^3. Moreover, these moderate resources are unequally distributed in time and space. That is the reason for the occurrence of water surplus (floods) and water deficits (droughts).

Natural retention capacities of the river catchments have diminished markedly due to decreasing area of forests, disappearance of small water bodies and wetlands, covering the ground surface with impermeable materials (roads, squares) and due to draining systems. These reasons are assumed to increase the rate of water cycling and transport of chemical substances in catchments and thus to increase the frequency of extreme phenomena like floods and droughts. They also contribute to the elevated load of pollutants to surface waters.

Present methods of counteracting droughts and floods are based mainly on technical measures like the construction of water reservoirs, flood embankments, draining systems etc. In many cases obtained economic effects were not satisfactory but resulted in environmental losses. It is necessary to look for other methods of improving the structure of water balance. Such pro-ecological methods might involve activities leading to the enlargement of potential retention capacities of small river catchments. Basic target in this aspect is the protection and reconstruction of wetlands or, in other words, of water-related ecosystems.

Some actions to protect wetlands have been undertaken in Poland with a variable success. In most cases the rationale for these actions is to protect wetland flora and fauna, actions aimed at protecting and retaining water resources are undertaken to a lesser extent. Regardless of the reasoning, however, positive effect on water relations is observed in every case.

This report presents basic actions associated with the protection and restitution of wetlands undertaken in recent years. Legal, organisational and financial conditions determining the maintenance of wetlands in a good ecological status are described.

2. Water-related ecosystems – present status and threats

The notion “water-related ecosystems” has been taken from Water Framework Directive of EU and has not been clearly defined so far. It is commonly understood as a synonym of “wetlands”, “hydrogenic sites” or “wet areas”. Wetlands mean the areas overgrown by hygrophilous vegetation or covered by surface deposits accumulated by water (peat, mud, alluvia). Wetlands where organic matter accumulated in the form of peat are termed “peat wetlands”, others - as “non-peat wetlands”. Wetland means sometimes the site secondarily transformed due to drainage, particularly when it has potential natural value and there is a possibility of its restoration.

Wetland areas in a broad sense occupy 4 345 400 ha i.e. c. 14% of the country area. It is estimated that 15% of the total wetland area (both natural and transformed) is covered by forests

and shrub communities. The remaining area is occupied mainly by grasslands and also sometimes by croplands.

Over 80% of wetlands, including hydrogenic forest sites, have been drained in order to intensify sylvan and agricultural production. Lacking data do not allow to evaluate the transformation of all wetlands, their utilisation and preserved natural values. Detailed inventory was performed only for peatlands (table 1). Presented data demonstrate that only c. 9% of peatlands preserved their natural or close to the natural status.

Table 1. Utilisation of peatlands [www.gridw.pl/raport]

Land use	Area [thous. ha]	Percent
Natural peatlands	12.0	8.8
Meadow utilisation	960.0	70.7
Forests	120.0	8.8
Former peatlands (with surroundings)	150.0	11.0
Protected peatlands	6.1	0.4
Exploited peatlands (peat digging)	2.5	0.2
Total	1358.6	100

Permanent grasslands, except for mountain areas, closely associated with lands of a high ground water level, occupy an area of 5 million ha, 2 million ha out of which (all on peat soils) have been equipped with draining systems. Only on 25% of these drained lands there is a potential possibility of irrigation with the so-called subirrigation i.e. through the maintenance of a high water table in draining ditches during the growing period. Now, irrigation is carried out on only 10 000 ha i.e. on 5% of drained areas. Lack of irrigation poses a threat to both natural environment and water balance of the catchment. Spring waters are drawn down very fast increasing the risk of floods and resulting in water deficits in the summer time.

Noteworthy, the development of agriculture and sequestering of grounds for settlements liquidated many wetlands. It is assumed that the present area of peatlands is by 20% smaller than that in the XIX century.

3. Legal acts and grounds for the protection of wetlands

The principle of legal protection of water-related ecosystems was first clearly formulated in the new Water Act of 2002 within the adaptation of Polish legal regulations to the Framework Water Directive of EU. It should be underlined, however, that various actions to stop wetland draining had been undertaken before by ecological NGOs. Withholding in 1984 further drainage of the valuable anastomosing Narew river valley which was planned to be turned into intensive meadows and pastures could serve as an example of such actions. In 1998 the Committee for Reclamation and Engineering of Agricultural Environment of the Polish Academy of Sciences postulated protection of drained and agriculturally used hydrogenic sites. The Committee underlined the necessity of restricting fast water outflow from such sites. The so-called ecological surveys were performed in those days to indicate actions necessary to protect natural values of these lands. Unfortunately, neither postulates of the Committee nor conclusions from the survey have been implemented.

Fundamental legal acts regulating actions aimed at wetland protection are the Environmental Protection Act and Nature Protection Act. Both do not deal directly with water-related ecosystems but create possibilities to protect them. The Environmental Protection Act obliges every investor to prepare the environmental impact assessment. This is also obligatory in the case of constructing drainage-irrigation systems. The Nature Protection Act formulates the principles of legal protection of valuable areas, including wetlands.

The role of forests as water regulators is appreciated in Poland. Particularly protected are those which were given the status of "water-protective forests". According to the decree of the Minister of Environment dated Aug. 25th 2002 the forests protecting water resources may include:
a) forests surrounding springs of rivers and streams,
b) forests along rivers, lakes, channels and other water bodies navigable or not, distinguished in dependence on their location and character with the consideration that they include:
- in the mountains - forests situated between the banks and nearby natural lines in the field,
- in lowlands - forests situated on flood terraces at the mean water level, around water bodies between the shore of a basin and the closest natural line nearby,

c) forests in protective areas of underground reservoirs and in the buffer zones of water intakes and springs delineated according to the Water Act,
d) forests in moist sites and wetlands.

The country programme of afforestation has been elaborated and is now implemented so far as financial means permit. The aim of the programme is to increase forest coverage of the country by 5%. Attempts are undertaken to increase the retention capacity by various measures including the protection of wetlands. The programme of the development of small retention has been elaborated and its details will be discussed in the next chapter.

Polish accession to European Union poses a threat to wetlands but also creates some chances of increasing the extent of protective measures. The threats stem from the enlargement of farm sizes and intensification of agriculture. The cases of liquidation of protected wetlands on private grounds (new big farms) are already known. The chance for wetlands lies in abandoning agricultural use of grounds difficult for cultivation. They might be, instead, legally protected.

Environmental protection is included into formulated plans of rural development, agro-environmental programmes and into the implemented code of good agricultural practise. The documents pay considerable attention to the protection of water quality in rural areas but practically neglect the problem of protection and restitution of wetlands. They do not also involve the question of appropriate water management of irrigation-drainage systems in grasslands situated in wetlands. It seems that protection of wetlands in the agricultural landscape should find appropriate solution in further renewing of these documents.

The protection of wetlands is part of the programme NATURA 2000. Areas designated for legal protection encompass river valleys, peatlands and other water-related ecosystems.

4. Small retention development programme

To improve water relations in rural areas the Minister of Agriculture in cooperation with the Minister of Environment established in 1995 a programme for the development of small retention. The programme involves a whole set of actions aimed at increasing retention capacity of small river catchments dominated by agricultural use. Actions associated with the protection of water-related areas fell into the agreed priority directions. Such directions include:
- reconstruction, modernisation and construction of water lifting facilities in the existing drainage systems to use water for agricultural irrigation, to slow down the outflow of surface waters and to protect peat soils,
- improvement and modernisation of draining-irrigating objects to implement the results of ecological surveys in order to preserve biological equilibrium of these biotopes,
- construction of water structures on streams to elevate ground water level in the surrounding,
- retention of spring, snow-melt and rain waters in ponds, water holes and terrain depressions.

The agreement served for planning provincial programmes of the development of small retention. According to these plans, mean annual increase of water retention up to 2015 is expected to reach 50 million m^3. Actually, mean annual increment is less than 20 million m^2 (table 2).

Data presented in table 2 show that both programmes and their implementation focused on technical solutions consisting mainly in the construction of reservoirs and in lifting lake waters. Protection of wetlands that would include the improvement of water management in drained hydrogenic sites was realised with much less intensity.

Table 2. The accomplishment of the small retention programme (mean annual values from 1997-2003)

Item	Number of objects		Capacity (retention)		Investment costs	
	pieces	%	mln m^3	%	mln EURO	%
Lake water lifting	30	7.4	11.0	62.3	0.52	3.8
Dam reservoirs	84	20.7	3.3	18.9	7.42	54.8
Fishponds	107	26.5	2.2	12.7	1.35	10.0
Weirs on rivers and channels	110	27.5	0.7	4.2	3.45	25.4
Weirs on small streams and draining ditches	53	13.1	0.1	0.4	0.17	1.3
Other	21	5.1	0.2	1.5	0.62	4.7
Total	405	100	17.5	100	13.53	100

Most weirs listed in table 2 were associated with the improvement of water relations in river valleys so they pertain to water-related ecosystems. Remarkable was a small number of such construction in ditches which proves little care paid to the improvement of ecological status of hydrogenic sites and underestimating their role as the regulators of water relations. Noteworthy were also numerous fishponds. They were mostly dug out in the terrain depressions or in river valleys. Construction of a fishpond was often combined with peat digging and removal and thus with the destruction of originally existing hydrogenic site.

The largest financial support is directed to the construction of dam reservoirs (54.8%) and weirs in channels and rivers (25.4%). The sums came from various sources presented in table 3.

Table 3. Sources of financing the small retention programme (mean of the years 1997-2003)

Source	Percent
Provincial budget	31.0
Provincial funds for environmental protection and water management	21.2
National Fund for Environmental Protection and Water Management	8.7
Communal sources	8.1
Fund for the Protection of Croplands	1.9
Agency for Restructuring and Modernisation of Agriculture	2.5
Other, including private donations	26.6

There are no data on wherefrom the protection of wetlands is financed. It seems that private funds go mainly to the construction of fishponds. Money from other sources are probably distributed in equal proportion among particular investment tasks.

It seems that, in spite of some imperfections, the programme for the development of small retention plays a positive role in improving the structure of water balance in rural areas. Part of financial aids is directed into the improvement of water relations in wetlands.

One should, however, consider intensification of actions within the programme and its dissemination. Particularly important is to stimulate farmers to reconstruct wetlands and small water bodies. Financial support from agro-environmental programmes could help here.

5. Legal protection of wetlands

Twenty-three most valuable areas covering in total 314 527 ha (table 4) were given the highest protective status of national parks.

Table 4. Habitat types in national parks

Habitat	Area [ha]	%
forests	190 730	60,7
agricultural lands	43 823	13,9
waters	22 749	7,2
lands of ecological use (wetlands)	37 927	12,1
other	19 298	6,1
Total	314 527	100

Protected are mainly forest habitats (60.7%) but waters (7.2%) and water-related sites (12.1%) are practically present in every national park. Three national parks were, however, established chiefly for the protection of valuable wetlands. These are:

- The Biebrza National Park established in 1993. It is the largest national park in Poland. Out of 59223 ha total area of the park 15547 ha are covered by forests, 18182 ha by croplands and famous Biebrza Swamps - most valuable natural ecosystems - occupy 25494 ha. The park situated in the Biebrza river valley is important from the hydrologic standpoint. Wide (up to 15 km) flat river valley is covered with organic formations and has great retention capacity estimated at several million m^3 and an ability to reduce flood waves.
- The Narew National Park established in 1996. It encompasses wet valley of the Narew between Suraz and Rzedziany of a total area of 7350 ha. Hydrogenic sites, mainly open meadows and anastomising river which occupy over 90% of the park are the main objects of protection.
- The Warta River-Mouth National Park established in 2001 covers an area of 8038 ha. Extensively used meadows and pastures on organic grounds occupy over 90% of the park. The park situated at the outlet of the Warta to the Odra is flooded in spring every year.

Extensive wetlands can also be found in other parks like the Kampinos National Park (1377 ha), the Polesie National Park (1613 ha) and the Slowinski National Park (2427 ha).

The main problem for the protection of natural values in swamp parks is to maintain moisture in hydrogenic sites and to preserve large meadow areas. The latter condition is associated with the need of preserving appropriate sites for many species of avifauna. Therefore, the plans of nature protection in national parks anticipate hydrotechnical works aimed at hampering water outflow and liquidation of already existing artificial channels and ditches. On the other hand, extensive use of grasslands on wetlands which protects the areas from unfavourable succession of shrubs or reeds is maintained or restored. Financial compensation is planned in agro-environmental programmes for farmers who undertake mowing on the formerly abandoned meadows.

Wetlands are included in other forms of legal protection. Two large landscape parks of an area of several thousand square kilometres (Landscape Park of the Narew Valley and Landscape Park of the Lower Odra) are situated in river valleys. The first encompasses part of the natural valley of the middle Narew dominated by hydrogenic sites. The second is located between flood embankments and is an area formerly drained and intensively used in agriculture but now becomes a valuable natural ecosystem.

There are many (several thousand) small protected areas in Poland, sometimes of an area of several dozen to several hundred ha. They are mainly natural reserves and the so-called lands of ecological use. At least half of these objects was created to protect aquatic ecosystems or hydrogenic sites. They diversify agricultural landscape and play positive role in water cycling within small river catchments.

In spite of past destruction, there are still many valuable wetlands which are not legally protected. Part of them can be found in areas abandoned by agriculture but some are situated on

grounds where an intensive development of agriculture is being observed. There is a reasonable objection that part of these site might be liquidated.

Some prospects for maintaining and protection of wetlands might bring the programme NATURA 2000. The programme involves 11% of the country area and includes nearly all valuable river valleys and wetlands.

6. The role of NGOs and interested persons

Many non-governmental organisations focus their activity on the protection of wetland flora and fauna which means the protection and restoration of wetland areas. NGOs are the only institutions that undertake works on the restitution of destroyed (degraded) hydrogenic sites. Particularly meritorious for wetland restoration seem to be:

- WWF for its factual and financial support of the protection of the Biebrza swamps,
- LABORATORY FOR LIVE ARCHITECTURE that undertakes restoration of hydrographic network in the Biebrza valley including the areas of the Biebrza National Park,
- NORTH PODLASIAN ORNITHOLOGICAL SOCIETY that built in the north-east part of Poland several dozen weirs in small streams to elevate ground water table on dried wetlands. It also performs restoration of several drained objects including widely designed renaturation of the Narew valley downstream the Narew National Park,
- LUBUSKI CLUB OF NATURALISTS which protects several peatlands in the west part of Poland and has restored proper water relations in these areas.

There are many more non-governmental organisations dealing with wetland protection; it is hard to list them all. Many of them are of a local character or have been established to perform a single specific task.

It should be mentioned that there are no private investors interested in wetland protection. Aims undertaken by persons are restricted to the construction of fishponds, small water power plants and small recreational or ornamental water bodies. These actions do not always bring ecological or hydrological benefits.

7. Education, science, information

State education system does not involve specific teachings on wetlands or water-related ecosystems. Special attention to these problems is paid, however, by national parks and some NGOs. They edit special publications and organise meetings and festivals for local population and tourists. Some examples of such activities are:

- organisation of the international day of wetlands by the Narew and the Biebrza National Parks,
- contests for pupils of primary schools on wetland flora and fauna and for adults like " the contest of hand meadow mowing",
- organisation of the "day of honey", "day of meadows", "days of various representatives of fauna" etc.

In fact, the importance of water for wetlands and the function of wetlands in water cycling and supply is very rarely mentioned during these events. Water is treated as a common, easily available good and its deficit just proves its importance for the life on Earth.

Science is interested in wetlands in various aspects. There are university centres in Poland which deal with aquatic habitats, wetland flora and fauna, organic soils and peatlands. Less frequent are the studies on wetland hydrology and water management in water-related ecosystems. For many years the studies focused on the use of wetlands for agricultural production and they effected in many papers on draining and irrigation. Now, the studies in the productive aspect are practically absent and they concentrate instead on explaining the role of wetlands for water cycling and retention and their importance for the protection of surface water quality. Recently in the frame of European Union the Excellence Centre for Hydrology of Wetlands were established in Warsaw Agricultural University. The exchange of knowledge and workshops is organized by this Centre.

Education and information are the basic factors which might contribute to the improvement of the ecological status of wetlands. As already mentioned, much has been done in this aspect by

the staff of “swampy” national parks. Some research centres become engaged in this type of activity. The following studies of the Institute for Land Reclamation and Grassland farming may serve as an example:

- elaboration of the digital map of wetlands in Poland. The map in the scale 1:100000 presents location of all wetlands larger than 1 ha. Soils, vegetation and types of land use are presented on the maps.
- edition of the guide “Small retention - protection of water resources and natural environment” ordered by the Ministry of Environment, printed in 3000 copies and distributed among all communes. Large parts of the guide are devoted to the protection of wetlands.
- organisation of training courses and education for water associations dealing with the exploitation of irrigation-drainage systems and for local authorities (communes) on appropriate water management in wetlands.

There are probably much more actions pertaining to the education and information on the role of wetlands for the natural environment and water management. They are, however, not centrally coordinated and very often remain the local initiatives. That is why a comprehensive information on such initiatives is hardly available.

8. Conclusions

Presented overview of actions devoted to the protection of wetlands as an element of water management demonstrates that the activities are dispersed and not directly focused on the protection of water resources. Most often the aim of these actions is to protect wildlife in wetlands. Nevertheless, they play a positive role for the structure of water balance. The importance of wetlands as water suppliers is commonly acknowledged though there are difficulties in the quantitative evaluation of the effect of wetlands on surface and ground water resources.

National parks and the legal system of nature protection play a positive role in wetland protection. It is, however, necessary to undertake broad action to disseminate the idea of the protection and restoration of wetlands with particular reference to legal and economic instruments as stimulators for the creation and restitution small wetlands in agricultural landscape. The involvement of these actions into agro-environmental programmes seems very beneficial. The farmers should obtain financial compensation for the creation and maintenance of wetland area on his field as he does for the creation of ecotone zones or for afforestation.

The creation of a small number of large wetlands will not exert a significant impact on water budget in the country. Many such areas, providing appropriate water management, would improve water quality and enlarge water resources available to agriculture and other users.