UNITED
NATIONS

E

Economic and Social
Council

Distr.
GENERAL

ECE/MP.WAT/WG.2/2007/12
6 June 2007

ENGLISH ONLY

ECONOMIC COMMISSION FOR EUROPE

MEETING OF THE PARTIES TO THE CONVENTION ON
THE PROTECTION AND USE OF TRANSBOUNDARY
WATERCOURSES AND INTERNATIONAL LAKES

Working Group on Monitoring and Assessment

Eighth meeting
Helsinki, Finland, 25–27 June 2007
Item 4 of the provisional agenda

ASSESSMENT OF THE STATUS OF TRANSBOUNDARY WATERS IN THE UNECE REGION[1]

PRELIMINARY ASSESSMENT OF TRANSBOUNDARY RIVERS DISCHARGING TO THE ATLANTIC OCEAN
(Transboundary water bodies shared by Portugal and Spain as well as those shared by Ireland and United Kingdom)

Submitted by the Chairperson of the Working Group on
Monitoring and Assessment[*]

[1] At their fourth meeting (Bonn, Germany, 20–22 November 2006), the Parties to the Convention mandated its Working Group on Monitoring and Assessment with the assessment of transboundary rivers, lakes and groundwaters in the UNECE region. For details, please refer to documents ECE/MP.WAT/WG.2/2007/1 and ECE/MP.WAT/WG.2/2007/3.

[*] The present document was submitted late due to resources constraints in the secretariat and late submission by some countries.

GE.07-22910

I. ASSESSMENT OF THE STATUS OF THE MINO RIVER[2]

1. The basin of the Mino River, also known as Miño (in Spain) and Minho (in Portugal), is shared by Spain (upstream country) and Portugal (downstream country).

Basin of the Mino River			
Area	Country	Country's share	
17,080 km^2	Portugal	850 km^2	5%
	Spain	16,230 km^2	95%
Source: Portuguese National Water Plan (Instituto da Agua, INAG,2002)			

Hydrology

2. The Mino River has its source in Spain in the Meira Mountains (750 m) and empties into the Atlantic Ocean at Caminha. The basin has a pronounced mountainous character with an average elevation of about 683 m above sea level.

3. A major transboundary tributary to the Mino is the Trancoso. The major Portuguese tributaries are the rivers Gadanha, Mouro and Coura. One major Spanish tributary is the Luoro (see below).

Discharge characteristics of the Mino River at the station Foz do Mouro (Portugal)		
Discharge characteristics	Discharge, m^3/s	Period of time or date
Q_{av}	314	1 March 1973–31 January 2007
Q_{max}	4,681	1 March 1973–31 January 2007
Q_{min}	7	1 March 1973–31 January 2007
Source: Portuguese National Institute of Water (Instituto da Agua, INAG)		

4. In Portugal, there are two reservoirs on the Coura tributary; lakes and reservoirs occupy some 2.8% of the basin area.

Pressure factors

5. In Portugal, agriculture uses about 95% and the urban sector about 5% of the available water resources. The main forms of land use are forests (62.7%) and cropland (30.8%). The population density is about 92 persons/km^2.

6. Pressures on water resources from agricultural activities are mainly due to the use of fertilizers and pesticides, as well as irrigation. Some untreated or insufficiently treated wastewater discharges, mainly from Spain, cause additional pressures.

[2] Based on information submitted by the Portuguese National Institute of Water (Instituto da Agua, INAG) as well as publication of the United Nations Environment Programme Division of Early Warning and Assessment, Office for Europe titled *Freshwater in Europe – Facts, Figures and Maps.* (UNEP/DEWA-Europe, 2004).

7. Eutrophication is generally decreasing along the main stem of the river, mainly due to the river's self-purification capacity.

8. In Portugal, manufacturing industry is almost not present and causes hardly any impact. There are, however, two abandoned wolfram mines that have a local impact on the quality of water resources. Transport is another pollution source, due to exhaust gases, fuel transport and spills or leakages of dangerous substances.

9. During flood events, unsafe and/or irregular drinking-water supply is of concern.

Transboundary impact

10. The waters of the river Louro, a Spanish tributary to the Mino, have a significant impact on Portuguese territory. The river drains important agglomerations in Spain and carries insufficiently treated industrial and municipal wastewaters from the industrial area of Porriños and the city of Tuy in Spain.

11. Organic matter from wastewater discharges and pathogens from wastewater discharges and pesticides are mostly of local significance. Nitrogen forms are both of local and transboundary significance and have also an adverse impact on the marine environment.

Trends

12. Since 2002, the status of the Mino River in Portuguese territory has improved significantly. This was mainly due to the implementation of the Portuguese National Water Plan (PNA) and the Portuguese Water Supply and Residual Water Treatment Plan (PEAASAR), notably the specific Residual Water Treatment Plants (ETARs) to treat industrial and urban sewage. Some occasional pollution events still occur due to inappropriate agricultural practices. Transboundary pollution originating from Spain is still significant, and requires more stringent control measures by Spain.

II. ASSESSMENT OF THE STATUS OF THE LIMA RIVER[3]

13. The basin of the Lima River, known as the Limia in Spain, is shared by Spain (upstream country) and Portugal (downstream country).

Basin of the Lima River			
Area	Country	Country's share	
2,480 km^2	Portugal	1,180 km^2	48%
	Spain	1,300 km^2	52%
Source: Portuguese National Water Plan (Instituto da Agua, INAG, 2002)			

[3] Based on information submitted by the Portuguese National Institute of Water (Instituto da Agua, INAG) as well as the publication *Freshwater in Europe – Facts, Figures and Maps* (UNEP/DEWA-Europe, 2004).

Hydrology

14. The Lima has its source in Spain at Lake Beon (975 m) and ends up in the Atlantic Ocean at the city of Viana do Castelo. The basin has a pronounced mountainous character with an average elevation of about 447 m.

15. A major transboundary tributary to the Lima is the Castro Laboreiro. The Vez is a major Portuguese tributary.

Discharge characteristics of the Lima River (monitoring site Snirh)		
Discharge characteristics	Discharge, m^3/s	Period of time or date
Q_{av}	68	16 April 1945–30 September 1990
Q_{max}	1,380	16 April 1945–30 September 1990
Q_{min}	0	16 April 1945–30 September 1990
Source: Portuguese National Institute of Water (Instituto da Agua, INAG)		

16. There are two major reservoirs on the Lima: the transboundary reservoirs of the Alto Lindoso Dam and the Touvedo Reservoir. These dams were constructed in 1992 and 1993, respectively.

17. Ponte de Lima, Ponte da Barca and Arcos de Valdevez in Portugal are the urban areas mostly affected by floods. The existing reservoirs, constructed for hydropower production, reduce the risks of flooding in the first two villages; however, due to the specifics of flow formation after heavy precipitation in the Serra da Peneda/Peneda mountain range, the resulting increased flood discharges cannot always be stored in the existing reservoirs.

18. In Portugal, lakes and reservoirs occupy some 1.6% of the basin area. Protected areas include the Lagoas de Bertiandos and San Pedro dos Arcos, which are – permanent and temporary, respectively – freshwater lagoons on the right bank of the Lima in Portugal.

Pressure factors

19. In Portugal, agriculture uses about 90%, industry about 6%, and the urban sector about 4% of the available water resources. The main forms of land use are forests (70.9%) and cropland, which cover 25.4% of the Portuguese part of the basin. The population density is about 130 persons/km^2.

20. In Portugal, pressures on water resources from agricultural activities are mainly due to the use of fertilizers and pesticides, as well as irrigation. There is a risk of contamination due to several abandoned ore mines. There is also some risk of accidental water pollution from industrial wastewater discharges. The former dumpsites were recently closed. Due to road and railroad crossings, there is also a risk of water pollution if road/railroad accidents should occur.

Trends

21. Since 2002, the status of the Lima on Portuguese territory has improved significantly, mainly due to the measures described in the above chapter on the Mino. Some occasional

pollution events still occur due to inappropriate agricultural practices. Transboundary pollution originating from Spain is still significant, and requires more stringent control measures by that country.

III. ASSESSMENT OF THE STATUS OF THE DOURO RIVER[4]

22. The basin of the Douro River, known in Spain as the Duero, is shared by Spain (upstream country) and Portugal (downstream country).

Basin of the Douro River			
Area	Country	Country's share	
97,600 km^2	Portugal	18,600 km^2	19%
	Spain	78,832 km^2	81%
Source: Portuguese National Water Plan (Instituto da Agua, INAG,2002)			

Hydrology

23. The Douro rises in the Sierra de Urbión (2080 m) in central Spain and crosses the Numantian Plateau. The river mouth is at Foz do Douro (city of Porto).

24. The basin has a pronounced mountainous character with an average elevation of about 700 m above sea level.

25. Major transboundary tributaries include the rivers Tâmega, Rabaçal, Tuela, Sabor, Maças and Águeda. The major Portuguese tributaries are the rivers Sousa, Paiva, Corgo, Távora, Pinhão, Tua and Côa.

26. The river has extensive barge traffic in its Portuguese section, but silting rapids and deep gorges make the other parts of the Douro un-navigable. The Douro has been harnessed for hydropower production.

Discharge characteristics of the Douro River at the station Crestuma Dam (Portugal)		
Discharge characteristics	Discharge, m^3/s	Period of time or date
Q_{av}	567	22 January 1998–13 December 2007
Q_{max}	8,835	22 January 1998–13 December 2007
Q_{min}	0	22 January 1998–13 December 2007
Source: Portuguese National Institute of Water (Instituto da Agua, INAG)		

[4] Based on information submitted by the Portuguese National Institute of Water (Instituto da Agua, INAG) as well as the publication *Freshwater in Europe – Facts, Figures and Maps*, United Nations Environment Programme (UNEP/DEWA-Europe, 2004).

Pressure factors

27. In Portugal, the population density is 98 persons/km^2.

28. Agriculture (86% of total water use in the Portuguese part of the basin) relies on the use of fertilizers and pesticides as well as irrigation. In Spain, the middle Douro is also extensively used by irrigational agriculture.

29. In Portugal, there is a risk of contamination from abandoned ore mines. Untreated or insufficiently treated industrial wastewater is still of concern and breakdowns of municipal wastewater treatment systems are the reasons for significant discharges of polluted water into the river. Due to the many road and railway crossings, there is also a risk of water pollution should traffic accidents occur.

Transboundary impacts

30. Some Spanish tributaries of the Douro have a high phosphate concentration due to urban and industrial effluents. The local presence of nitrates affects different areas in the Spanish part of the basin, but does not cause significant transboundary impact.

Trends

31. Since 2002, the status of the Douro on Portuguese territory has improved significantly, mainly due to the measures described in the above chapter on the Mino. Some occasional pollution events still occur due to inappropriate agricultural practices. Transboundary pollution originating from Spain is still significant, and requires more stringent control measures by Spain.

IV. ASSESSMENT OF THE STATUS OF TAGUS RIVER[5]

32. Spain (upstream country) and Portugal (downstream country) share the basin of the Tagus River, known as Tejo (in Portugal) and Tajo (in Spain).

Basin of the Tagus River			
Area	Countries	Countries' share	
80,600 km^2	Portugal	24,800 km^2	31%
	Spain	55,800 km^2	69%
Source: Portuguese National Water Plan (Instituto da Agua, INAG, 2002)			

Hydrology

33. The Tagus rises in east-central Spain in the Sierra de Albarracín at an altitude of 1,590 meters and empties into the Atlantic Ocean near Lisbon. The basin has a pronounced lowland character with an average elevation of about 633 m above sea level.

[5] Based on information submitted by the Portuguese National Institute of Water (Instituto da Agua, INAG) as well as the publication *Freshwater in Europe – Facts, Figures and Maps*, (UNEP/DEWA-Europe, 2004).

34. The river is navigable for about 160 km from its mouth. Dams harness its waters for irrigation and hydroelectric power, creating large artificial lakes.

35. Transboundary tributaries of the Tagus include the rivers Erges and Sever. In Portugal, the rivers Alviela, Almonda, Zêzere, Ocreza, Ponsul, Nisa and Sorraia are major tributaries to the Tagus.

Discharge characteristics of the Tagus River at the station Almourol (Portugal)		
Discharge characteristics	Discharge, m^3/s	Period of time or date
Q_{av}	316	2 October 1973–31 December 2006
Q_{max}	13,103	2 October 1973–31 December 2006
Q_{min}	0	2 October 1973–31 December 2006
Source: Portuguese National Institute of Water (Instituto da Agua, INAG)		

Pressure factors and transboundary impacts

36. Two European capitals (Madrid and Lisbon) depend on the river for their water supply and significantly affect the chemical and ecological status of the river.

37. In upstream Spain, part of the river's flow is diverted to the (national) Segura basin, supplying 1.5 million people in southern Spain with drinking water, and providing irrigation and supporting the ecosystem in the La Mancha Nature Reserve. There is much controversy about this water diversion from an international basin to a national basin, as it has negative consequences on the Tagus itself (increasing concentrations of polluting substances due to decreasing flow and causing a deterioration of the river's ecosystem). This has given rise to a black market for water and illegal water use in Spain. (Some 20% of the transferred water, or more than 100 million m^3/year, "disappears" illegally to supply tourists resorts and golf courses, and social imbalances have increased as the transfer mainly benefits big agro-businesses and construction companies, marginalizing traditional farmers.[6]) All in all, the legal minimum flow in the Spanish part of the Tagus (6 m^3/s) is not respected.

38. In Portugal, the basin is mainly covered by forests (51%) and used as cropland (44%). Water use by different sectors is as follows: agriculture – 70%, urban uses – 8%, industrial uses 5%, and the energy[7] sector – 17%. Irrigational agriculture relies on the use of fertilizers and pesticides. Mining activities are carried out at the Pansqueira and Rio Maior mines; however, the risk of contamination is insignificant. On the contrary, there is a high risk of breakdowns of wastewater treatment systems, which can result in significant discharges of polluted water into the river. Due to the many road and railway crossings, there is also a risk of water pollutions should traffic accidents occur.

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[6] *Freshwater in Europe – Facts, Figures and Maps* (UNEP/DEWA-Europe, 2004).

[7] This figure includes thermoelectric power plants. Although they are classified as a non-consumptive user, the power plants at Pego, Carregado and Barreiro, for example, are a major consumer, as they abstract 477 hm^3/year and discharge only 317 hm^3/year.

39. A multi-product pipeline from Sines to Aveiras crosses several water bodies, among them the Lagoa de Santo André (Santo André lagoon) and the rivers Sado and Tagus. In the event of an accident, contamination of these water bodies by hydrocarbons could occur.

40. There are no nuclear power plants in the Portuguese part of the basin. However, the nuclear power plant at Almarez (Spain) has a potential to contaminate the Tagus with radioactive substances. Such contamination risk also exists in the Tagus estuary, should an accident involving nuclear powered vessels (submarines and aircraft carriers) occur.

Trends

41. Since 2002, the status of the Tagus in Portuguese territory has improved significantly, mainly due to the measures described in the above chapter on the Mino. Some occasional pollution events still occur due to inappropriate agricultural practices. Transboundary pollution originating from Spain is still significant, and requires more stringent control measures by Spain.

V. ASSESSMENT OF THE STATUS OF THE GUADIANA RIVER[8]

42. Spain (upstream country) and Portugal (downstream country) share the basin of the Guadiana River.

Basin of the Guadiana River			
Area	Country	Country's share	
66,800 km^2	Portugal	11,500 km^2	17%
	Spain	55,300 km^2	83%
Source: Portuguese National Water Plan (Instituto da Agua, INAG,2002)			

Hydrology

43 The Guadiana has its source in Spain at Campo Montiel (1700 m) and discharges into the Atlantic Ocean at Vila Real de Santo António. The basin has a pronounced lowland character, with an average elevation of about 237 m above sea level (in Portugal).

44. Major transboundary tributaries include the rivers Xévora, Caia, Alcarrache, Ardila, Múrtega and Chança. The major Portuguese tributaries are the rivers Degebe, Cobres, Oeiras, Vascão, Foupana and the Beliche.

45. The Alqueva Dam, the biggest man-made dam on the Portuguese part, became operational in 2002. The reservoir is 82 km long and covers an area of 250 km^2 (63 km^2 in Spain). The reservoir's total capacity is 4,150 billion m^{3,} with a useful capacity of 3,150 billion m^3.

[8] Based on information submitted by the Portuguese National Institute of Water (Instituto da Agua, INAG) as well as the publication *Freshwater in Europe – Facts, Figures and Maps* (UNEP/DEWA-Europe, 2004).

Discharge characteristics of the Guadiana River at the station Pulo do Lobo (Portugal)		
Discharge characteristics	Discharge, m^3/s	Period of time or date
Q_{av}	162	1 October 1946 – 31 January 2007
Q_{max}	10,072	1 October 1946 – 31 January 2007
Q_{min}	0	1 October 1946 – 31 January 2007
Source: Portuguese National Institute of Water (Instituto da Agua, INAG)		

46. The Sapais de Castro Marim area in Portugal is protected under the Ramsar Convention on Wetlands.

Pressure factors

47. In Portugal, the basin is mainly covered by forests (29%) and used as cropland (69%). Approximately 17 persons /km^2 live in the Portuguese part of the basin. Irrigational agriculture relies on the use of fertilizers and pesticides. There is a risk of water contamination by leakages from several abandoned ore mines (S. Domingos and Tinoca). There is also a high risk of breakdowns of wastewater treatment systems, which can result in significant discharges of polluted water into the river. Due to the many road and railway crossings, water pollution in case of traffic accidents may occur.

Trends

48. Since 2002, the status of the Guadiana in Portuguese territory has improved significantly, mainly due to the measures described in the above chapter on the river Mino. Some occasional pollution events still occur due to inappropriate agricultural practices. Transboundary pollution originating from Spain is still significant, and requires more stringent control measures by Spain.

VI. ASSESSMENT OF THE STATUS OF THE RIVER ERNE[9]

49. Ireland and the United Kingdom share the basin of the River Erne, also known as Ûrn.

Basin of the River Erne			
Area	Country	Country's share	
4,800 km^2	United Kingdom	1,900 km^2	59.3%
	Ireland	2,800 km^2	40.7%
Source: United Nations World Water Development Report, 2003.			

50. The 120-km-long Erne rises from Lough Gowna in County Cavan (Ireland). The river is very popular for trout fishing, with a number of fisheries along both the river itself and its tributaries.

[9] Based on information posted by government agencies from Ireland and United Kingdom on the Internet.

51. In Northern Ireland, the river expands to form two large lakes: the Upper Lough Erne (16 km long) and the Lower Lough Erne (29 km long). A bilateral flood-control scheme is operational to manage the water level in the lakes. Hydroelectricity is produced along the 46 m drop in the river's course between Belleek and Ballyshannon.

52. Following recent analysis[10] of pressures in the Irish part of the basin, the following ranking of pressure factors was established: first, diffuse pressures (agriculture, non-sewered population, urban land use, transport, some industrial activities, peat exploitation and forestry activities); second, morphological pressures (hydroelectric dams, reservoirs, channel alterations, agricultural enhancement and flood defences); third, point pressures (urban wastewater treatment plants, storm overflows, sludge treatment plants, IPPC industries[11] and non-IPPC industries); and fourth, abstraction pressures (public and private water supply, and industrial use). Eutrophication, caused mainly by agricultural sources and municipal sewage, has been identified as the single most important problem affecting the quality of surface waters in Ireland. Of Irish rivers, 30% are affected by it.

Water-quality classes and determinands in the UK classification systems for the chemical status			
Class	**Dissolved Oxygen** (% saturation) 10-percentile	**BOD** (mg O_2/l) 90-percentile	**Ammonia** (mg N/l) 90-percentile
A (Very Good)	80	2.5	0.25
B (Good)	70	4	0.6
C (Fairly Good)	60	6	1.3
D (Fair)	50	8	2.5
E (Poor)	20	15	9.0
F (Bad)	less than 20	-	-

53. According to UK classifications, the chemical status of the Erne for the period 2002–2005 was classified as “fairly good” to “good”.[12] The Erne’s biological status has fallen in the same two classes. Zebra mussels are a major problem. They first appeared in the Erne system in 1996.

VII. ASSESSMENT OF THE STATUS OF THE RIVER FOYLE[13]

54. Ireland and the United Kingdom share the basin of the River Foyle.

Basin of the Foyle River

[10] See "Ireland’s environment 2004" at www.epa.ie
[11] Industries that fall under the Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control.
[12] http://www.ehsni.gov.uk/water/quality/rivers/river_results.htm
[13] Based on information posted by government agencies from Ireland and United Kingdom on the Internet.

Area	Countries	Countries share	
2,900 km^2	United Kingdom	2,000 km^2	67.3%
	Ireland	1,000 km^2	32.7%
Source: United Nations World Water Development Report, 2003.			

55. The River Foyle flows from the confluence of the rivers Finn and Mourne at Strabane in County Tyrone, Northern Ireland, to the city of Derry, where it discharges into Lough Foyle and, ultimately, the Atlantic Ocean.

56. The fertile Foyle basin and valley support intensive and arable farming. Pressure factors in the Irish part of the basin are principally the same as described in the chapter on the River Erne.

57. According to UK classifications, the chemical status of the Foyle for the period 2002-2005 was classified as “good”. Its biological status was also “good”.[14]

VIII. ASSESSMENT OF THE STATUS OF THE RIVER BANN[15]

58. Ireland and the United Kingdom share the basin of the River Bann.

Basin of the Bann River			
Area	Country	Country’s share	
5,600 km^2	United Kingdom	5,400 km^2	97.1%
	Ireland	200 km^2	2.9%
Source: United Nations World Water Development Report, 2003.			

59. The 129 km long river has played an important part in the industrialization of the north of Ireland, especially in the linen industry. Today, salmon and eel fisheries are the most important economic features of the river.

60. The land around the Lough Neagh (which is, with 396 km^2 the largest freshwater lake in the British Isles) is typified by improved pasture but also includes some important wetland habitats.

61. The Lower Bann valley is very fertile and supports highly productive farmland. Pressure factors in the Irish part of the basin are principally the same as described in the chapter on the River Erne.

62. According to UK classifications, the chemical status of the Bann for the period 2002-2005 was classified as “fair” to “good”. Its biological status was also “fair” to “good”.[16]

[14] http://www.ehsni.gov.uk/water/quality/rivers/river_results.htm
[15] Based on information posted by government agencies from Ireland and United Kingdom on the Internet.

VIII. ASSESSMENT OF THE STATUS OF THE RIVERS CASTLETOWN, FANE AND FLURRY

63. The Rivers Castletown, Fane and Flurry are small first-order rivers, shared by Ireland and the United Kingdom. Due to their small areas of their basins, their assessment is not included in the present document.

Basin	Area	Country	Country's share	
River Castletown	~ 400 km^2	United Kingdom	~ 300 km^2	76%
		Ireland	~ 90 km^2	24%
River Fane	~ 200 km^2	United Kingdom	~ 200 km^2	97%
		Ireland	~ 10 km^2	3%
River Flurry	~ 60 km^2	United Kingdom	~ 50 km^2	74%
		Ireland	~ 20 km^2	26%
Source: United Nations World Water Development Report, 2003.				

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[16] http://www.nwl.ac.uk/ih/nrfa/station_summaries/203/017.html