ANNEX I

PROFILES OF GEF INTERNATIONAL WATERS PROJECTS IN THE LA PLATA BASIN

1. GF/1100-97-07: Strategic Action Program for the Binational Basin of the Bermejo River. This project is executed by the Governments of Argentina and Bolivia, through the Binational Commission for the Development of the Bermejo and Grande Tarija River Basin, with the support of the OAS/UDSMA as executing agency at the regional level, and UNEP, as the GEF implementing agency. Begun in 1996, the Bermejo is the first international waters projects financed by the GEF in Latin America, and the first at the global level to reach the implementation stage. It has as its objective the mitigation and control of environmental problems that affect the basin, particularly erosion and sedimentation, and the promotion of sustainable development in the region. The Bermejo River generates approximately 80 percent of the annual sediment load to the la Plata River estuary.

The Strategic Action Program, elaborated during 1997-2000, is a long-term initiative made up of 136 projects within four major areas: i) Institutional Development and Strengthening; ii) Environmental Protection and Rehabilitation; iii) Sustainable Development of Natural Resources; and iv) Information, Education, and Public Participation, including Replication of successful pilot demonstration projects. The total investments foreseen in the long term program amount to about US $ 470 million, to be executed over a 20-year period. Both Governments are seeking to resolve the most pressing environmental problems of the Basin by catalysing the implementation of this program. To this end, short-term projects and initiatives of immediate priority, totaling US $ 11.04 million, are being executed during the period 2001-2005 with the financial assistance of the GEF. The work program includes a component for the dissemination and replication of the results and experiences throughout the la Plata Basin, complementing the present initiative.

2. GF/1100-99-16: Implementation of Integrated Water Resources Management Program in the Upper Paraguay River Basin and Pantanal. The project has the object of implementing a program of strategic actions for the integrated management of the Upper Paraguay River Basin and the important Pantanal wetland in Brazil, through the strengthening of the institutions in charge of water resources management in the Basin, the production and dissemination of information on the Basin, and the practical implementation of sustainable production and environmental recovery programs in the region. The project is executed by the National Water Agency (ANA) of the Brazil, with the support of the OAS as regional executing agency, and UNEP as implementing agency of the GEF. It has the financial support of the GEF in the amount of US $ 6.6 million, with a total project cost of US $ 16 million, and is being executed during the period 2000-2003. The project includes the convening of a trinational meeting, proposed for mid-to late- 2003, between Bolivia, Brasil, and Paraguay, at the invitation of Brasil, to consider the transboundary problems of this major sub-basin and the extension of the project results throughout the Upper Paraguay River Basin. Enhancing water resources management within the Upper Paraguay River Basin contributes to the protection of the headwaters of the la Plata Basin hydrologic system.

3. RLA/99/G31/A/1G/99: Environmental Protection of the la Plata River and Its Marine Front: Prevention and Control of Contamination and Restoration of Habitat. This project began during November of 1999 with financing in the amount of US $ 5.7 million from the GEF; the total project cost is US $ 8.1 million, with other funding being provided by Argentina and Uruguay, international cooperation agencies from Canada, France, and Germany and the IDB. The objective of this project is the preparation of a Transboundary Diagnostic Analysis (TDA) and a Strategic Action Plan for the la Plata estuary. The GEF implementing agency is the UNDP, acting in support of the Binational Commission of the River of the la Plata and its Maritime Front. The Maritime Front includes the la Plata River estuary to its confluence with the Southwest Atlantic Large Marine Ecosystem (LME), and encompasses critical habitat areas for marine, estuarine, and freshwaters fishes and birds. The Maritime Front also forms an important navigational corridor for marine transportation, including points of transshipment of goods to and from throughout the la Plata Basin by river, rail and road. This is the end point of the la Plata Basin hydrologic system.

4. P068121: Environmental Protection and Sustainable Development of the Guarani Aquifer System. This project is the first one financed by the GEF to assist to the protection of one of the world's largest aquifers. The Guarani Aquifer has a transboundary character, and extends over 1,282,000 km^2 through Argentina, Brasil, Paraguay, and Uruguay inside the Paraná geologic basin. The project has completed a preparatory phase using PDF, Block B, funding and project financing has been approved by the four countries. The World Bank is the GEF implementing agency. The OAS is executing agency for the project in the countries. The project cost is US $ 26.76 million, of which US $ 13.4 million is financed by the GEF with the balance being contributed by the countries, the International Atomic Energy Agency (IAEA), the German Geological Survey (BGR) and the Government of The Netherlands. The project will enhance the scientific knowledge and technical capacity of agency staff, carry out monitoring, and agree a coordinated management framework in the international environment. The results of the project will include a Strategic Action Programme based upon a Transboundary Diagnostic Analysis. The project began execution during the last trimester of 2002. The Guarani Aquifer is economically important as a major goundwater source within the la Plata Basin, and hydrologically important both as a water resource and as the groundwater component of the la Plata River system.

ANNEX II

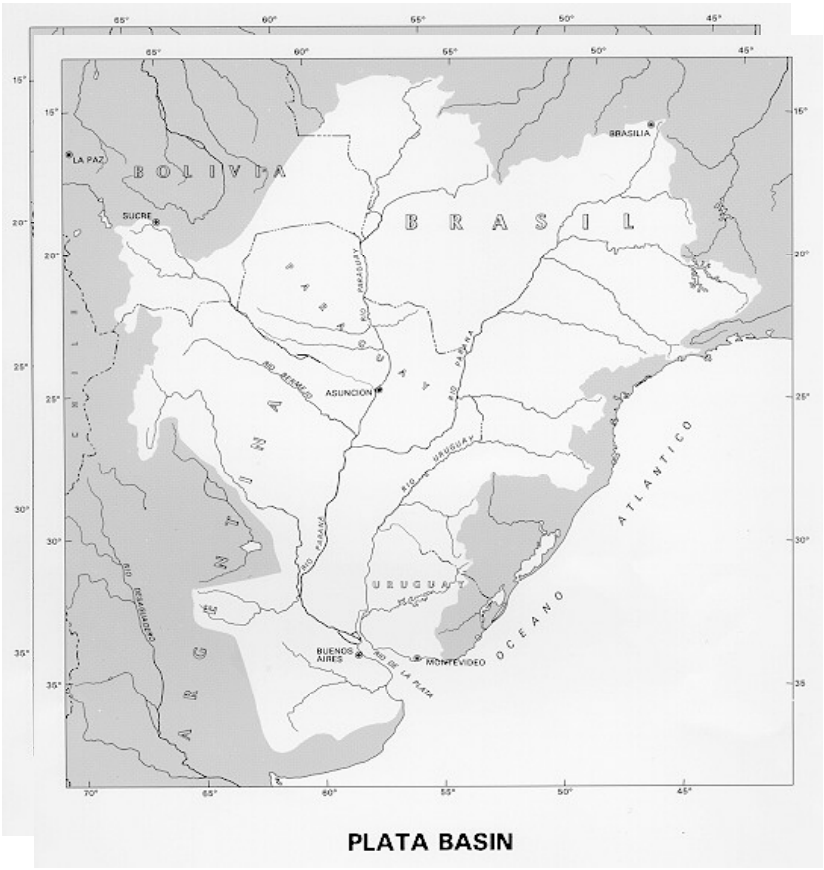
CHARACTERISTICS OF THE LA PLATA BASIN

The la Plata River is one of the great rivers of the world. Draining approximately one-fifth of the South American continent, extending over some 3.1 million km^2, and conveying waters from central portions of the continent to the southwest Atlantic Ocean,[1] the la Plata River system rivals the better-known Amazon River system in terms of its biological and habitat diversity, and far exceeds that system in economic importance to southern and central South America. The la Plata Basin includes almost all the southern part of Brazil, the south-east of Bolivia, a large part of Uruguay, the whole of Paraguay, and an extensive part of northern Argentina. It accounts for 17 percent of the surface area of the South American continent. The Basin is comprised of three large river systems; namely, the Paraná River, the Paraguay River, and the Uruguay River. Each of these waterways has unique characteristics that reflect the source waters of the rivers and the human influences that define their flow patterns and environmental status. Map 1 shows the location of the la Plata River Basin and its component drainage systems. In addition, water that infiltrates into the groundwater system from within the Basin provides recharge for the Guarani Aquifer, one of the largest continental groundwater reservoirs in the world.

In terms of discharge, the **Paraná River** is the most important in the Basin, with a mean annual flow of about 17,700 m^3s^{-1}. The Upper Paraná River lies wholly within Brasil, but, further downstream, the River forms the frontier between Brasil and Paraguay, and, later, between Argentina and Paraguay. After it joins the Paraguay River, the Paraná River remains within Argentine territory until it meets the la Plata River. Measured along its principal tributary, the Paranaíba River, the length of the Paraná River is 3,740 km. Its width is highly variable, ranging from 150 m in the headwaters to 2.5 km near the City of Pousadas in Argentina. West of this City, the Paraná River channel is divided by a series of islands, passing through a reach with very low gradients between its confluence with the Paraguay River and its confluence with the la Plata River. Within this stretch of river, lying wholly within Argentina, the width varies from between 4.2 km near Corrientes and 2.0 km near Rosário. The Paraná River floodplain is much wider than the river channel, extending to 13 km at Corrientes and to 56 km at Rosário-Victória.

[1] The la Plata River system is comprised of the 1.5 million km^2 Parana River Basin, the 1.1 million km^2 Paraguay River Basin, and the 0.4 million km^2 Uruguay River Basin; the la Plata River Basin proper drains a further 0.1 million km^2 basin. The la Plata River Basin extends over 1.4 million km^2 of Brasil, 0.9 million km^2 of Argentina, 0.4 million km^2 of Paraguay, 0.2 million km^2 of Bolivia, and 0.2 million km^2 of Uruguay. The Paraguay River extends some 2,500 km from its origins in the Brasilian Chapada de Paresis to its confluence in Argentina with the Parana River. The Parana River flows about 3,750 km from the Southeast of Brasil to the la Plata Delta. The Uruguay River 1,600 km from the Southeast of Brasil to the la Plata Estuary. Thirty-one large dams, and fifty-seven large cities with populations in excess of 100,000 persons, including the capital cities of Brasil, Paraguay, Argentina, and Uruguay, are to be found within this Basin. The human population of the Basin is estimated to be approximately 67 million individuals.

The **Paraguay River** is formed by the junction of two rivers, the Santa Ana and the Diamantino. Together with other tributaries, this River feeds the Pantanal, a wetland of global concern, which extends over 700 km in length within the Upper Paraguay River Basin. Downstream of the Pantanal, the Paraguay River receives flows from the Pilcomayo and Bermejo Rivers. About one-third of the Paraguay River sub-basin is within the territory of Brasil, one-third is within Paraguay, and the balance is shared about equally between Argentina and Bolivia (see Table 1). Except for the Pilcomayo and Bermejo Rivers, which descend in steep-sided valleys from the Bolivian antiplano to the plains of the Gran Chaco, and with the further exception of a portion of the left bank of the Paraguay River between the River Apa and the junction with the Paraná River, the Paraguay River Sub-basin is an immense alluvial plain with very low gradients and subject to extensive seasonal flooding. Mean annual flow is about 2,700 m^3s^{-1}.



The **Uruguay River** rises in Brasil, where it is formed by the junction of the Pelotas and Canoas Rivers; farther downstream it is joined on its left bank by the Ibicui and Negro tributaries. The Negro is the larger, joining the Uruguay River not far from the la Plata estuary. After its confluence with the Negro, the Uruguay River becomes wider, effectively forming an extension of the la Plata River. Its mean annual flow is about 5,500 m^3s^{-1}.

The Paraná River delta extends through a region shared by the Argentine Provinces of Buenos Aires and Entre Rios. At this point, its width varies from about 18 km to more than 60 km, and its area exceeds 14,000 km^2. The delta is formed by the enormous volumes of sediment transported from the Paraguay River to the Paraná River, primarily

via tributaries like the Bermejo River, and by the hydrological effects of the Uruguay River and tidal influences in the la Plata estuary. The delta has five main channels and numerous islands, many of which are totally submerged when water levels are high; high discharges from the Paraná and Uruguay Rivers, associated with high tides in the la Plata estuary, contribute to severe flooding problems within the delta region.

The **la Plata estuary** extends for 250 km from the Paraná River delta to its debouchement into the southwest Atlantic Ocean Large Marine Ecosystem (LME). This debouchement is defined by a line between a point near Punta del Este in Uruguay to a point near Punta Rasa in Argentina. The estuary is shared between Argentina and Uruguay. Numerous ports, the most important of which are Buenos Aires, Montevideo and la Plata, are located along the shoreline of the estuary.

The drainage areas of the three major subbasins—the Paraguay, Paraná, and Uruguay—are tabulated in Table 1. Their principal reaches, water resource characteristics, and environmental significance are summarized in Table 2.

Table 1: Approximate division of areas of the three Sub-basins of the Rivers Paraná, Paraguay and Uruguay, between the countries Argentina, Bolivia, Brazil, Paraguay and Uruguay.

	Area (km^2):			
	Paraná:	Paraguay:	Uruguay:	Total for country:
Argentina:	565.000 (37.5%)	165.000 (15.0%)	60.000 (16.4%)	920.000(**) (29.7%)
Bolivia:	*	205.000 (18.7%)	*	205.000 (6.6%)
Brazil	890.000 (59.0%)	370.000 (33.9%)	155.000 (42.5%)	1 415.000 (45.7%)
Paraguay:	55.000 (3.5%)	355.000 (32.4%)	*	410.000 (13.2%)
Uruguay:	*	*	150.000 (41.1%)	150.000 (4.8%)
Total Sub-basin area:	1 510.000	1 095.000	365.000	3 100.000
% of la Plata Basin:	(48.7%)	(35.3%)	(11.8%)	(100%)

** Areas in this line do not include the area of the la Plata estuary, 130.000 km^2, divided between Argentina and Uruguay.

Table 2: River reaches in the la Plata Basin, water-resource and environmental characteristics, and levels of development.

Reaches	**River**	**Countries**	**Water resource and environmental characteristics**	**Development**
Planalto	Paraguay	Brazil	Rainfall 1300mm to 2000 mm; high specific flows; high sediment production	Mining; one of the biggest cattle herds in the world; soy bean production.
Pantanal	Paraguay	Brazil and Bolivia	High water retention; greatest wetland in the world; rainfall less than potential evaporation. System is maintained from upstream inflows.	Cattle herds; ecological tourism; navigation; Low urban densities; environmental conservation and adaptation to flooding.
Southeastern Brazil	Paraná	Brazil	Rainfall about 1500mm with high specific flows; hydraulic drops; significant deforestation in second half of last century.	Many hydroelectric installations; large urban conurbations (S. Paulo, Curitiba);sediment production; soy bean production; flooding of river bank areas.
Internal Paraguay	Paraguay	Paraguay	Low discharges due to control by the Pantanal and low gradient; extensive flooded areas.	River navigable for international traffic; extensive flooded areas.
Paraguay international	Paraguay	Paraguay and Argentina	Contributing basins with high sediment production and unstable beds; rainfall less than 800 mm	Sparsely populated areas; river navigation; sediment deposition and flooding.
Paraná international	Paraná	Brazil, Argentina and Paraguay	Important changes in bed level; high sediment production and rapid flows.	International hydroelectric installations; navigation.
Argentine Paraná	Paraná	Argentina	Extensive flooded areas during much of the year; low rainfall in tributary basins.	International river navigation.
Upper Uruguay	Uruguay	Brazil	Rainfall from 1500 to 1800 mm; high mean flows; hydraulic drops.	Agricultural production; flooding; high potential for hydropower generation.
Middle Uruguay	Uruguay	Brazil and Argentina	Rainfall about 1500 mm; high mean flows; hydraulic drops; high sediment production.	Hydropower plants; agricultural production; flooding.
Lower Uruguay	Uruguay	Uruguay and Argentina	High rainfall and discharges.	Salto Grande hydropower plant in the middle reach; navigation in the lower reach.
Plata	Plata	Uruguay and Argentina	Tidal effects combine with la Plata flows.	River and maritime navigation predominant.

In a recently published review,[2] the World Resources Institute names the la Plata River system as being among those watersheds of the world having the highest numbers of endemic fishes (in the Paraguay River subbasin), the highest numbers of endemic bird areas (the Parana River subbasin), and the highest number of major dams (the Parana River subbasin). The diversity of fishes and birdlife illustrates the diversity of landforms within the la Plata River Basin. Arising on the eastern slopes of the Andes Mountain, at altitudes above 4,000 m, the Paraguay River subbasin extends across the vast expanse of the central plains of South America, including the diverse Chaco ecosystem and globally significant Pantanal wetlands. The South American *Chapada de Parecis* and *Planalto*, or highlands with elevations of about 500 m that separate the la Plata Basin from the Amazon Basin, form the headwaters of the Parana River and Uruguay River subbasins which rise in the east.

Rainfall within the subbasins varies from less than 100 mm per year in the west to more than 4,000 mm per year in the Brasilian coastal ranges in the east. Rainfall is seasonal, and varies with location within the Basin and altitude. In the northern portions of the la Plata River Basin, rainfall regimes are essentially tropical, with rainfall confined to an approximately three-month period during summer (December-January). In the southern portions of the Basin, rainfall is more evenly distributed through the year. The coefficient of variation in rainfall is between 10 and 25 percent.

Mean annual temperatures within the Basin also vary from less than 10°C in the southern and western portions of the Basin to greater than 30°C in the northern portions of the Basin. Annual variations in mean annual temperature at sites within the Basin range from about 7.5°C to 15°C. The absolute range in temperatures between maxima and minima can exceed 50°C, ranging from lows of less than - 10°C in the southern portions of the Basin and at high elevations, to highs of greater than 40°C in the northern portions of the Basin and at lower elevations. As a consequence, evaporation rates are high, ranging from between 600 and 800 mm per year in the extreme eastern portions of the Basin to between 1,400 and 2,000 mm in the remainder the Basin. The highest rates of evaporation occur in the northwestern portions of the basin where annual evaporation can exceed 2,000 mm per year. Portions of the Basin are considered semi-arid, although much of the Basin varies from tropical in the north to subtropical in the central portions of the Basin.

The climatic variability inherent in the indicators summarized above is reflected in the mean annual runoff rates reported for the various tributaries of the la Plata River system.[3] Flows ranged from about 1 m^3 per second in small tributary streams with watersheds of about 100 km^2 to upwards of 1,000 m^3 per second in larger tributary streams with watersheds of about 50,000 km^2. River flows along the main stems of the primary tributaries approached 15,000 m^3 per second in the Paraguay-Parana River with a watershed area of about 2.3 million km^2, and 5,000 m^3 per second in the Uruguay

[2] Revenga, C., S. Murray, J. Abramovitz, and A. Hammond, *Watersheds of the World: Ecological Value and Vulnerability*, World Resources Institute and Worldwatch Institute, Washington, DC, 1998, 205 pp.

[3] *Cuenca del Rio del la Plata: Estudio para su Planificacion y Desarrollo, Inventario de Datos Hidrologicos y Climatologicos*, Secretaria General de la Organizacion de los Estados Americanos, Washington, DC: 1969, 272 pp.

River with a watershed area of about 0.25 million km^2. Comparable data on groundwater flow rates are lacking, although the water infiltrating into the Guarani Aquifer from within this surface drainage basin forms the major source of recharge for this Aquifer.

Hydrological records show evidence of increases both in rainfall and runoff in the la Plata Basin after 1970. Among other consequences, these variations in rainfall and runoff have important consequences for the Pantanal (the largest wetland in the world, whose area can extend to 140,000 km ^{2}), and for the Paraná River. Comparison of the mean annual flows in the Paraná River and its tributaries before and after 1970 shows evidence of increases ranging from 19 percent to 46 percent. By contrast, mean annual flows in the Upper Paraguay River during the decade between 1960 and 1970 were unusually low; areas formerly subject to seasonal flooding came into use for cattle ranching, but had to be abandoned when water levels rose again after 1970.

The history of the Paraná River shows many occurrences of drought followed by floods. Recent research has detected a fluctuation with period about ten years, less than the period of 15 years described by Charles Darwin in 1834, suggesting the possibility that fluctuations may have become more frequent. Certainly much more needs to be known about factors causing these fluctuations; for example the rainfall in sub-tropical Argentina appears to fluctuate with approximate period between 7 and 10 years, suggesting the possibility of predicting it some years in advance. In addition, some climate studies of the Basin show evidence that streamflows are correlated with el Niño events.

Besides fluctuations in climate, there is also some evidence of trends in climate. Over a large part of the la Plata Basin, annual minimum temperatures are increasing by about one degree per century; in some parts, there is evidence of trends in monthly and annual rainfall. And besides the marked increase in rainfall in the second half of the 1970s, trends in the period before the 1960s have also been detected.

The human settlement patterns and economic import of the la Plata River Basin make the la Plata River system of significant importance to the health and well-being of the peoples of South America. The three river systems comprising the la Plata River drainage system drain waters arising within the national boundaries of Bolivia, Brasil, Paraguay, Argentina, and Uruguay. The national capitals of Brasil, Paraguay, Argentina, and Uruguay all lie within the boundaries of the la Plata River Basin. Thus, the waterways of the la Plata River drainage system are of considerable importance to the region and continent as a whole. The waters of the la Plata River system provide an important economic and transportation artery linking the five Basin countries, and form a continuum across which the full range of the human condition is displayed. Population density averages about 24 persons per km^2, but vary widely across the Basin, with the majority of the population concentrated in the non-mountainous areas of eastern Argentina, Brasil, and Uruguay. Paraguay, and the mountainous areas of Bolivia, have much lower population densities, reported to be about 6 to 7 persons per km^2.

The population in the la Plata Basin is highly concentrated in cities. The State of São Paulo, Brasil, for example, has a population of 36 million, of which about 92 percent lives in urbanized areas. The total population of the Basin has grown from 61 million in 1968 to 116 million in 1994, with the greater part concentrated in small or medium-

sized towns that lack basic social and economic infrastructure. These urban concentrations need water for domestic use, while incomplete treatment of urban wastewater affects both water quantity and water quality in the Basin. In addition, poor people from rural areas are attracted to the urban centers by the possibility of a better life in cities, only to find that there is nowhere to live except along river margins. Thus, the likelihood of flooding and public health degradation is increased. Further, damage to water resources and risks to human populations can also result from industrial wastewater and toxic spills in intensively industrialized areas.

Within the Basin, the per capita Gross National Product (GNP[4]) of the five countries ranges from about US $ 8,000 in Argentina to less than US $ 1,000 in Bolivia:[5] Brasil has a per capita GNP of about US $ 4,000, Paraguay of about US $ 2,000, and Uruguay of about US $ 5,000. About 60 percent of the Gross Domestic Product (GDP) of the five countries is generated from within this drainage area. As may be expected from the foregoing, the relative levels of industrialization vary among the countries. For example, the economies of Uruguay and Argentina are dominated by the production of industrial goods and services, while the economy of Bolivia remains more broadly based with agricultural production, the production of industrial goods, and services being more equally distributed across the board. In other words, the greater the degree of industrialization and development of service industries, the higher the reported GNP.

Severe flooding**,** with loss of life and extensive damage to infrastructure and economic production, is a frequent occurrence, especially in the Paraná and Uruguay Sub-basins. The Paraná River and its tributaries—including the Iguaçu River, for example—have many riverside towns that are frequently flooded, especially since 1970. Along the international reaches, the Argentine cities of Resistencia, Corrientes, Rosário, and Santa Fé suffer severely from flooding. At just one site on the Iguaçu River tributary of the Paraná River, damage due to flooding in the decade between 1983 and 1993 has been estimated at more than US $ 110 million. Similar damage is incurred in cities of the Uruguay River basin, principally in downstream reaches affecting the town of São Borja, Itaquí, and Uruguaiana, as well as towns along the Alegrete tributary. During the el Niño event of 1983 and 1984, more than 40.000 people were affected in more than 70 towns along the reach of the Uruguay River within the Brasilian State of Rio Grande do Sul; and in the la Plata Basin as a whole, losses associated with this el Niño event were estimated to amount to more than US $ 1 billion. In the middle reaches of the Paraná River, the four largest discharges on record followed the four el Niño events of 1883, 1904, 1992 and 1998.

Deforestation and intensive agriculture, as well as urbanization, in the Paraguay, Paraná and Uruguay River basins from the 1960s onwards, particularly in Brasil, is likely to have contributed to the increased runoff and degradation of water quality in the Basin. Deforestation in the Basin has left some areas with only 5 percent of the original forest

[4] The GNP is a measurement of the economic performance of a country, equaling the sum of the values of all goods and services, plus investments including governmental expenditures, within a country.

[5] 1995 GNP as reported by The World Resources Institute, *1998-99 World Resources: A Guide to the Global Environment—Environmental Change and Human Health*, Oxford University Press, New York: 1998, p. 237.

cover. In the Brasilian State of São Paulo, the area under primary forest has fallen from 58 percent at the beginning of the twentieth century to about 8 percent at its close; in the State of Paraná, forest cover fell from 83 percent in 1890 to 5 percent in 1990. In 1945, 55 percent of the eastern part of Paraguay was forested; by 1990, only 15 percent was under forest cover.

In Brasil, rice is produced under irrigation in the basin of the Ibicuí River, a tributary of the Uruguay. This production has resulted in conflict between rice-growers and towns in the region, which need water for domestic consumption. In Argentina, areas planted to cereals and oil-seed crops increased from 20 to 26 million hectares during the 1990s, whilst, in the province of Buenos Aires alone, the area under cultivation grew by 40 percent between 1988 and 1993. The extent of lands utilized for cereal production has widened to include areas that are marginal for cereals, where intensive production and high inputs have increased the risk of soil degradation. This is of great concern; soil organic content has fallen by 50 percent from its value at the start of the twentieth century, reducing the capacity of the soil to hold water. Direct seeding with minimum cultivation is now leading to some reduction in soil loss, and the area thus cultivated is growing rapidly, but even low-till/no-till agriculture results in changes to the hydrological cycle. The economy of Paraguay, lying totally within the la Plata Basin, is highly dependent on agriculture, 90 percent of which is cattle production; but its production of cereals, currently about 10 million tons, is increasing due to the adoption of new technologies and expansion of areas in production.

Superimposed upon the demands for water for domestic and economic purposes in the Basin is the fact that more than 90 percent of the energy used by Brasil comes from hydropower, with the greater part of that hydropower being generated by impoundments on the Paraná River and its tributaries. This River produces the greater part of all of the hydropower produced in the whole of South America. Between 1965 and 1985, many dams for power generation were built on the River, and other works are planned on its tributaries, the Iguaçu, Piquirí, and Ivaí Rivers. On the international reach of the Paraná River, a dam is proposed to be constructed at Corpus, downstream from Itaipu. Beside the planned development at Corpus, another development is being planned at Garabi on the Uruguay River (between Argentina and Brasil)—of the potential production of 16,500 MW available from the Uruguay River, about 8,000 MW is already developed.

Potential hydropower production in the la Plata Basin has been estimated as 92,000 MW, about 60 percent of which has either already been realised or is in process of being so. This value is expected to increase as national demands for energy grow. The main installations currently producing hydro-electricity are: Itaipu on the Paraná River (its production being shared between Brasil and Paraguay), Yaciretá on the Paraná River (shared between Argentina and Paraguay), and Salto Grande on the Uruguay (shared between Argentina and Uruguay). Of the as yet unrealized capacity, a large part is on the common reaches shared by more than one country, with the greater portion being shared by Argentina and Brasil.

Annual growth in electricity demand has already exceeded 5 percent in most countries in the la Plata Basin, and there is concern that the construction of new developments will not keep pace with demand. Moreover, high dependence on hydropower has the consequence that electricity production is very vulnerable to drought; at the end of 2001, Brazil was obliged to impose energy rationing which reduced economic

production. In addition, dams constructed for hydropower generation are known to have modified the downstream character of the Paraná River.

Works to improve navigation within the la Plata Basin have been proposed and undertaken within the Basin since the nineteenth and early twentieth centuries. Historically, the Paraná and Paraguay Rivers, and, to a lesser extent, the Uruguay River, have provided the main transportation routes into the interior of the la Plata Basin; today, these rivers are still important for transport of regional agricultural products. The main navigable reaches include:

- the Paraná-Paraguay River waterway from Cáceres in Mato Grosso to the Atlantic Ocean, covering a distance of 3,600 km: there are plans to improve navigation along portions of this waterway by deepening the channel, thereby providing a passage navigable throughout the year. However, environmental concerns over this development, particularly with respect to the Pantanal, have limited the implementation of the Hidrovia to date. This waterway, however, is a natural line of access joining the interior of the South American sub-continent to the Atlantic Ocean, and one that has immense value for trade;
- the Tietê-Paraná River waterway: the Tietê River passes through an highly industrialised region of Brasil which produces 35 percent of the Brasilian GDP. This reach has locks through which products can be transported between São Paulo, Brasil, and the Paraná River waterway;
- the Uruguay River waterway downstream of the dam at Salto Grande: there is a navigable reach of the Uruguay River shared by Uruguay and Argentina. In addition, the River upstream of Salto Grande is also navigable to São Borja in the Brasilian State of Rio Grande do Sul.

ANNEX III

PROGRAM OF ACTION OF THE INTERGOVERNMENTAL COORDINATING COMMITTEE FOR THE LA PLATA BASIN (CIC)

In implementing the measures contained in the document entitled, "Identification of the Objectives of the System," approved by Decision No. 1/02 at the 528th Meeting of the Intergovernmental Coordinating Committee for the la Plata Basin (CIC), this Program of Action will give priority to those initiatives that help strengthen capacity of the CIC for the integrated management of the la Plata Basin, with a view to furthering the harmonious and sustainable development of the region. [This Program of Action was approved at the 529th Meeting of the CIC.]

On the basis of the objectives stipulated in Article 1 of the Treaty of the la Plata Basin, and the agreements reached at the Foz do Iguazú Technical Meeting held during October 1999, efforts are being made to arrive at a common position on the Basin as quickly as possible. This position will pertain not only to matters related to management of water resources, but also to the other objectives of the Treaty.

To this end, and with the goal in mind of improving the quality of life of the Basin's inhabitants, priority will be given to implementing the following activities within the timescales periodically determined by the CIC:

1) Action: Enhance knowledge of water resources and their management to reduce vulnerability to floods and droughts, and to mitigate their impact on communications, transportation, production, and trade in the region

a) Develop and use representative models of the Basin, principally in relation to its water resources;

b) Acquire more knowledge of global and regional phenomena that have an impact on the la Plata Basin, such as climate change, oceanic and atmospheric currents, and the like;

c) Strengthen the "Technical Water Alert Counterpart," with a view to improving the daily operation of the early warning system, by expanding the network of observation stations, increasing production and exchange of water and meteorological information, and updating forecasting methods.

2) Action: Promote integrated management of water and soils to improve the quality of life of the inhabitants, preserve the health of the population, and maximize production in the region while preserving the quality of its waters, among institutional stakeholders and civil society in the member countries

a) Identify and implement pilot projects on waterbodies and in critical areas that present problems linked to erosion, sedimentation, contamination, and conflicting uses, as seen, for instance, in the following:

- Contaminated reservoirs
- Endangered wetlands
- Deforested, highly erosive areas
- Degraded agricultural areas subject to water risk
- High-risk urban areas;

b) Promote sound land management plans and inclusion of techniques for the sustainable use of soils;

c) Strengthen the "Water Quality Technical Counterpart," in order to:

- Step up implementation of scheduled activities
- Ensure continuity in selected monitoring stations
- Update the approved methodological guide
- Optimize sanitary control systems
- Sponsor hydrobiological studies and develop programs to preserve aquatic ecosystems and solve biological problems related to, and affecting, water resource development projects.

3) Action: Promote integration within the region

a) Strengthen the CIC as the permanent organ that promotes, coordinates, and monitors the progress of multinational activities to develop the resources of la Plata Basin so as to promote the harmonious and balanced development of the region, as established in the Treaty of the la Plata Basin and its statutes;

b) Identify currently projects under way or proposed by various agencies and multinational initiatives, and in which the countries of the Basin participate, and promotion of an exchange of experiences among them;

c) Identify ongoing projects to ensure that these projects continue to be implemented in an integrated manner;

d) Prepare and implement a "Framework Program for the Sustainable Development of the Water Resources of the la Plata Basin;"

e) Coordinate and monitor the status of the activities of the Intergovernmental Committee on the Paraguay-Paraná Waterway (CIH) and the Financial Fund for the Development of the la Plata Basin (FONPLATA), in accordance with the provisions of the CIC Statutes;

f) Promote priority development projects in the Basin and support measures to seek financing for them from international organizations, especially from FONPLATA;

g) Develop and promote joint activities involving the private sector and organised civil society;

h) Expand the participation of the CIC in regional forums related to integrate actions and to identify opportunities for new projects.

4) Action: Harmonize and coordinate of data and information gathering related to the region and dissemination of that information through the General Secretariat

a) Implement the "Digital Mapping Project" within the la Plata Basin, incorporating information and data produced by projects in the countries of the region, as a basis for a future documentation/reference center for the Basin;

b) Encourage the exchangeof hydrological, meteorological, and water-quality information, with a view to creating a "Regional Data Bank;"

c) Expand and update the Documentation Center loicated in the CIC General Secretariat, using materials available at headquarters and contributions by member countries;

d) Integrate digital files prepared by member countries, as well as information from other sources, within a Geographical Information System (GIS);

e) Compile and process socio-economic information, such as river transport, agriculture, hydroelectric power, tourism, fishing, mining, and other related activities, relating to the water resources of the Basin;

f) Establish links between scientific and technical institutions present in the Basin, including research institutes, universities, and other organizations;

g) Establish links with networks of government agencies and nongovernmental organizations operating in the Basin, to exchange information on and further develop water resource management capabilities.

5) Action: Environmental preservation

a) Promote the creation of compatible environmental monitoring systems throughout the Basin, and especially within national parks and protected areas;

b) Promote public participation in the preservation of the environment, especially in reserves and biological corridors;

c) Promote reforestation to preserve biodiversity and enhance water management and sustainable economic development;

d) Develop environmental education programs.

6) Action: Harmonization of policies

a) Identify and disseminate the water resource management policies of the member states to encourage compatibility;

b) Promote the exchange of experiences in the area of water resource policy among representatives of the Executive and Legislative Branches in member countries;

c) Promote and disseminate the principles and recommendations of international conferences on water resources and environmental matters, as adopted by member countries;

d) Prepare policy guideline proposals on integrated water resource management applicable to member countries.

7) Action: Training

a) Prepare a training program on integrated water resource management geared to local governments and communities, and reflecting the regional characteristics of the member countries;

b) Disseminate information generated by the CIC.

Final considerations:

The actions referred to in this document are consistent with the most important priorities identified and proposed for implementation during the initial stage of this Program of Action. However, at the same time, if a need to carry out an activity not included in this Program of Action should become apparent while the foregoing actions are being implemented, the Unit for Projects will refer any such proposals to the CIC.

Pursuant to Resolution 1 (VI-E), this Program of Action will be submitted to the Foreign Ministers of the la Plata Basin for final approval.