THE ROLE OF INTERNATIONAL WATER LAW AND SUPPORTING
UNIVERSALLY APPLICABLE WATER MANAGEMENT
PRINCIPLES IN THE DEVELOPMENT OF A MODEL
TRANSBOUNDARY AGREEMENT BETWEEN
RIPARIANS IN INTERNATIONAL
RIVER BASINS

By
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A dissertation submitted in partial fulfillment of
the requirements for the degree of
DOCTOR OF PHILOSOPHY

WASHINGTON STATE UNIVERSITY
School of Earth and Environmental Sciences
MAY 2013

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To the Faculty of Washington State University:

The members of the Committee appointed to examine the dissertation of MALCOLM JOHNS GANDER find it satisfactory and recommend that it be accepted.

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ACKNOWLEDGEMENT

The author heartily extends his appreciation to Dr. Akram Hossain, Professor of Engineering, Washington State University Tri-Cities, for his guidance and support throughout the formative stages of this dissertation. Committee Chairman and Vice Chancellor Dr. James Pratt provided important advice and ongoing encouragement throughout the entire process. The author is grateful for the participation of Committee Members Dr. Michael Barber, Professor Civil Engineering, and Professor Dr. Darryll Olsen, who both provided useful technical direction. Graduate Advisors Dr. John Strand and Dr. Allan Felsot readily provided ongoing administrative support throughout the Ph.D process. The author greatly appreciates the ongoing support and technical advice provided by Dr. Salman M.A. Salman, J.D., and Gabriel Eckstein, J.D. Most importantly, the author is indebted to his wife and fellow scientist Melanie Keenan, LG, LHG, for her unyielding resolve in supporting my pursuit of this endeavor and all matters of our personal and professional lives.
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Abstract

By Malcolm Johns Gander, Ph.D.
Washington State University
May 2013

Chair: James R. Pratt

International water law, an outgrowth of international law, is a
conglomeration of tenets from international conventions and treaties that
recognize rules codified by contesting states, customary law, judicial
decisions, and writings of qualified legal practitioners. A set of water
management principles (WMPs) is presented, and form the basis for the
development of a model transboundary agreement (TBA), or template treaty,
for international river basins. The relevant tenets of international water law,
which support the selection of the WMPs, are identified and analyzed.
This study is undertaken because the world community has not yet agreed upon a universally applicable treaty to manage the uses and protection of shared water resources. The set of WMPs are largely adopted from The International Law Association’s 1966 Helsinki Rules, the United Nation 1997 Convention on Non-navigable Watercourses, and existing TBAs. These include the concept of equitable and reasonable utilization as the guiding principle of international watercourse management. A few existing concepts refined by the author are presented (e.g., the establishment of emergency contingency plans; the mapping and monitoring of all water wells within a basin), as are relatively recent concepts that have not typically been incorporated into most existing TBAs (e.g., acceptance of aquifers [groundwater] as a resource often situated primarily below basins, and the need to conjunctively manage this resource along with surface water).

Chapter One addresses WMPs, Chapter Two presents the template treaty, Chapter Three presents a proposed TBA for the Pilcomayo River Basin (PRB) of Bolivia, Argentina and Paraguay (“proposed PRB treaty”), and Chapter Four discusses plans for promoting the template treaty and the proposed PRB treaty.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>iv</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>viii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>ix</td>
</tr>
<tr>
<td>CHAPTER ONE</td>
<td>1</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>The Four Theories of International Water Law</td>
<td>2</td>
</tr>
<tr>
<td>Sources of Water Management Principles</td>
<td>5</td>
</tr>
<tr>
<td>What Constitutes Good Water Management Principles?</td>
<td>8</td>
</tr>
<tr>
<td>Analysis of Water Management Principles and Tenets of International Water Law</td>
<td>19</td>
</tr>
<tr>
<td>Summary</td>
<td>49</td>
</tr>
<tr>
<td>CHAPTER TWO</td>
<td>51</td>
</tr>
<tr>
<td>Introduction</td>
<td>51</td>
</tr>
<tr>
<td>Template Construction</td>
<td>51</td>
</tr>
<tr>
<td>CHAPTER THREE</td>
<td>58</td>
</tr>
<tr>
<td>Introduction</td>
<td>58</td>
</tr>
</tbody>
</table>
Overview of Each Country’s Water Law and Management

Structure……………………………………………………………….....62
Argentina…………………………………………………………………63
Bolivia……………………………………………………………………67
Paraguay…………………………………………………………………71

CHAPTER FOUR…………………………………………………………..75

Introduction………………………………………………………….. 75
Discussion: Possibility of Use of Proposed PRB Treaty………………..76
Planned Activities……………………………………………………..77

BIBLIOGRAPHY…………………………………………………………81

APPENDIX

A. TEMPLATE FOR A MODEL TRANSBOUNDARY
   AGREEMENT…………………………………………………………99

B. TEMPLATE AGREEMENT FOR THE PILCOMAYO RIVER
   BASIN………………………………………………………………157

C. 1995 PILCOMAYO RIVER BASIN TREATY…………………...212
LIST OF TABLES

1. Water Management Principles and the Basis for Their Application to a Model Transboundary Agreement as Indicated or Implied Through the Practice of International Water Law………………………20
LIST OF FIGURES

1. Figure 1; International River Basins Worldwide……………………..2
2. Figure 2; Hierarchy of Water Management Principles……………….. .25
3. Figure 3; Plan View of the Pilcomayo River Basin………………….59
Dedication

This dissertation is dedicated to my mother and father, Hilda Gander and Robert Gander, Ph.D., who instilled in me the joy of learning and intellectual curiosity.
CHAPTER ONE

INTERNATIONAL WATER LAW AND SUPPORTING WATER MANAGEMENT PRINCIPLES

Introduction

The focus of Chapter One is an analysis of relevant water management principles (WMPs) in the context of international water law, as the law pertains to transboundary agreements (TBAs) concerning international river basins. Given that world freshwater resources are becoming increasingly taxed and approximately one-half of the land area of the earth’s surface is covered by basins, or watersheds, with a river bounded by two or more countries, the need for a workable template TBA (“template treaty”) to facilitate international cooperation is evident (Figure 1). As stated by international water law authority Salman M.A. Salman, “…the world community has not yet succeeded in agreeing on a universally applicable treaty to regulate the uses and protection of shared water resources” (Salman 2007). Chapter Two presents a template treaty for a model TBA. Chapter Three presents a proposed TBA (“proposed PRB treaty”) for the Pilcomayo River Basin (PRB) of Bolivia, Argentina and Paraguay. Chapter Four
Figure 1. The colored areas represent 263 international basins worldwide, covering 45 percent of the world’s land surface. About 60 percent of the world’s groundwater lies within these international basins (Wolf, A.T., 2002. Atlas of International Freshwater Agreements.).

presents a plan for raising awareness and promoting the use of the template treaty and proposed PRB treaty.

The Four Theories of International Water Law

The management of international rivers is grounded in four theories (McCaffrey 2007; Salman 2007; Bourne in Wouters 1997; and others). These theories gradually gained prominence in response to population growth and the need for more drinking water, energy, and food. Civilization developed the ability to modify river basins on a large scale, building dams
for hydroelectric power and water storage, and diverting water prodigious distances.

One theory is referred to as the Harmon Doctrine, or principle of absolute territorial sovereignty. This is named for United States Attorney General Judson Harmon’s 1895 opinion concerning the diversion of water from the Rio Grande River, which flows from the United States into Mexico. Mexican farms were substantially harmed by the severe reduction of available water as a result of years of diversion by the United States. Harmon’s response to Mexico’s claim proclaimed that the United States possessed an unconditional right, within its territory, to use any amount of water from this international river that it desires, without liability or obligation to compensate Mexico. This opinion has been repeatedly refuted by many international tribunals and the writings of qualified experts.

A second principle is absolute territorial integrity. It holds that a downstream riparian state has the right to demand the continuation of the natural flow of an international river into its own territory. This demand amounts to a restriction on the upstream riparian, which at most tolerates only minimal uses by that state and routinely favors the downstream riparian (Salman 2007). It is the opposite of absolute territorial sovereignty because it guarantees a downstream riparian with the natural flow that comes into its
territory - virtually any quantity of water it desires - without liability or obligation to compensate the upstream riparian. Like absolute territorial sovereignty, absolute territorial integrity is not accepted by modern international water law. Moreover, both of these principles are commonly grounded in the concept of protecting existing uses, or prior appropriation, defined as the state that first establishes use of a particular water resource thus acquires title to it (“first in time, first in right”). The doctrine of prior appropriation is increasingly considered an untenable principle because it frequently favors the first user’s access to a disproportionately large volume of a shared ‘watercourse’ (i.e., a freshwater river and its associated tributaries and underlying groundwater; see McCaffrey 2007 for a complete analysis of this term). A prime example of the prior use doctrine is found in Egypt’s continued claim to most of the Nile river waters. Egypt’s refusal to relinquish a portion of their prior appropriation is the primary reason they have not agreed to the 2010 Nile River Agreement.

A third principle is limited territorial sovereignty, or limited territorial integrity. (Bourne 1996 [p. 236-240] in Wouters 1997). It holds that each riparian of an international watercourse has a right to use a reasonable amount of this water while observing an “equitable apportionment” (ILA 1956) or “equitable accommodation of competing interests of states sharing
international watercourses” (McCaffrey 2007, p. 168). The roots of this broad acceptance can be traced back to the Holy Roman Empire; has been supported by numerous publicists since the nineteenth century; and was formally endorsed in the 1911 Madrid Declaration (McCaffrey 2007, p. 147).

A fourth principle is a “community of interest” of riparian states in an international watercourse. It holds that the rights over the watercourse are fairly held by each riparian; rights may be divided among them on the basis of reasonable proportionality or divided as defined by agreement (Salman 2007, p. 627). The concept that a community of interest is inherent by virtue of the natural, physical unity of a watercourse is confirmed by case law including the Permanent Court of International Justice’s 1929 ruling concerning the River Oder (River Oder 1929) and the 1997 ICJ ruling (ICJ 1997) concerning the Gabcikovo-Nagymaros project (ICJ 1997; McCaffrey 2007, p. 150). Given that the international community has accepted a system for sharing the resources of the sea, McCaffrey (McCaffrey 2007, p. 169-170) reasons that this concept is also applicable to a watercourse.

Sources of Water Management Principles

The 1997 United Nations Convention (United Nations 1997), primarily authored by the International Law Commission (ILC), the United Nations’
legal arm, and the 1966 Helsinki Rules (ILA 1966), authored by the
International Law Association, are the two most important single sources of
WMPs which embody international legal rights and obligations. The ILA’s
Helsinki Rules formed the basis of the ILC’s 1997 United Nations
Convention; thus, the Helsinki Rules have emerged as one of the most
influential documents within the family of declarations, resolutions, rules,
and recommendations or “soft law” (Vinogradov et al. 2003). Elements of
an instrument such as the Helsinki Rules may eventually be adopted by
countries, other international organizations, or conferences that contribute to
the formation of international law (also referred to as customary
international law). In contrast, conventions and treaties or agreements are
legally binding, by virtue of their written acceptance by participating
countries, or their citation as a legal basis for a judicial decision. Examples
are the 1997 United Nations Convention (see discussion later regarding its
citation by the ICJ regarding the Gabcikovo Nagymaros project), or the 1978
Amazon Treaty (Amazon 1978).

To summarize, the contributing sources for the development of IWL
(ICJ 1999) are:

a) Customary international law, as generated from resolutions and rules from
legal organizations, which results from a general practice that becomes
accepted as law when referred to or adopted by a number of organizations and countries. Elements of the 1966 Helsinki Rules have been widely accepted by the international community as customary international law ((Bourne in Wouters 1997, p. 89);

b) General principles of law that are recognized by nations, or international law, and includes international treaties or conventions;

c) Judicial decisions;

d) Writings of highly qualified practitioners or publicists of the various nations (e.g., McCaffrey 2007).

Several transboundary agreements have elements that have been generally regarded as appropriate and in many cases proven effective in practice. These include the Indus River Treaty (1960), Columbia River Treaty (1961), Amazon Treaty (1978), and Nile River Treaty (1959; 2010), and portions of these treaties have been incorporated into this compilation of WMPs. Although not accepted as customary international law, several relevant principles are also taken from the Utton Transboundary Resource Center Model Interstate Compact (Muys et al. 2007), which is a model TBA for states within America. The most important contribution from Muys et al. 2007 was the incorporation of a relatively simple water allocation
methodology to ensure consistent stream flow levels for all riparians, and to preserve ecological habitats.

**What Constitutes Good Water Management Principles?**

Substantive and Procedural Rules. The WMPs selected for inclusion in this compilation can be grouped into two categories: substantive rules, and procedural rules. Substantive rules establish the essential, or material rights and obligations of states sharing a watercourse. The concept of an obligation to practice ‘equitable and reasonable utilization’ of a resource is an example of a substantive rule. Procedural rules are required courses of action that provide a means through which the substantive rules are implemented and the watercourse is managed. The establishment of a third party to resolve disputes between signatories on a treaty is an example of an obligatory procedural rule.

Good WMPs have been shown to be effective through their employment in those existing agreements that have proven to be useful tools of cooperation between nations. Court rulings confirm the viability of specific WMPs. Most prominently, the family of resolutions, declarations, and rules of legal organizations over the last 100 years has provided a broad underpinning from which to extract relevant WMPs.
Existing Agreements. Most of the WMPs incorporated into the model TBA have been adopted from existing agreements. Some of the WMPs, such as the establishment of emergency contingency plans, have been identified in relatively few existing agreements, and their content have been modified by the author in an effort to aid in promoting public safety and helping to minimize property damage.

The WMPs, including obligations to regularly exchange data and information, safeguard ecosystems, protect recharge and discharge zones, prevent pollution, monitor water levels and water quality of the watercourse and aquifer, and provide prior notification of planned activities, have been subjected to real-world situations and proven useful. Thus, to varying degrees, these WMPs have withstood the test of time and varied conditions, which would seem to be the most stringent test of any principle.

Court Rulings. In part, the viability of the WMPs in treaties are demonstrated through court rulings upholding the respective concepts. For example, as is detailed below, there are a number of legal decisions that support the appropriateness of the equitable and reasonable utilization of a shared river basin.

Legal Organizations. Four legal organizations have each made important contributions to the advancement of international water law: most
prominently, the International Law Association (ILA); the Institute of International Law (Institut de droit International [IIL]); the International Law Commission (ILC); and the Inter-American Bar Association.

The oldest of these four organizations (founded 1873), the Institute of International Law’s most important contributions have been the Madrid Declaration (IIL 1911), Salzburg Resolution (IIL 1961), and the Athens Resolution (IIL 1979). The Madrid Declaration was the first to articulate the no-harm rule. It discouraged unilateral basin modification and encouraged prior notification and the establishment of joint water commissions.

The concepts of mandatory compensation for injury, equitable apportionment over prior appropriation (i.e., right to a quantitative portion of a water resource based on first utilization), sharing of technical information, and prior notification were articulated through the Salzburg Resolution. The Athens Resolution promulgated environmental protection of waters (in particular) beyond the boundaries of each respective state, and prior notification of activities that could pollute basin waters. It called for the establishment of a basin-wide international commission to share technical information, consult amongst members concerning transboundary pollution issues, and established a unified network for permanent observation and pollution control.
The IIL’s 1997 Strasbourg Resolution (IIL 1997) addressed shared watercourses and the environment, prohibiting acts of pollution and harming other riparians. The Resolution also provided guidelines by which award of compensation is justified.

The Inter-American Bar Association’s most significant contribution to IWL is the 1957 Declaration of Buenos Aires (Buenos Aires 1957). This was the first declaration to provide a legal definition to shared international water resources (Wohlwend 2001). The concepts of equitable sharing of the resource and avoidance of causing harm; sharing of development, operation and maintenance costs; establishment of a joint water commission; and collection and sharing of technical information; were all included in this declaration.

Over the last 60 years in particular, the International Law Association (ILA) has made the most significant contributions to defining the linkage between international law and international water law, and refining the tenets of international water law. The ILA established the International Rivers Committee in 1954, thus beginning an ongoing effort that has led to the production of several significant reports over the years, most notably, the 1966 Helsinki Rules. The following summarizes those ILA conferences that
generated opinions that have subsequently been cited or otherwise utilized in treaties, conventions, resolutions, and court rulings.

The Committee first presented a ‘Statement of Principles’ at the 1956 ILA Conference in Dubrovnik (ILA 1956). The Conference supported the concept that a state holds a dominant right to the flow of water within its boundaries (i.e., prior appropriation). The Conference provided for prior consultation concerning new works by one state, which could adversely affect another state. If the states cannot agree, they should then seek arbitration. Further, if injury was incurred, then the responsible state would be liable to compensate the injured party (Bourne 1996, pages 236-240; Bourne in Wouters 1997 provides a full analysis of the development of these concepts at the Dubrovnik conference.)

The 1958 New York meeting of the ILA modified the Dubrovnik results by supporting equitable and reasonable utilization of shared waters over a prior appropriation rule (ILA 1958). The 1958 meeting also held that compensation to the injured party is not mandatory.

The 1960 Hamburg Conference addressed procedural issues concerning non-navigational uses (ILA 1960). One significant recommendation was the establishment of pollution-control commissions in respective basins in coordination with the co-riparian states of each basin. The commissions
would facilitate the completion of preliminary engineering studies concerning the control and abatement of water pollution.

The 1962 Brussels Conference established procedures for settling disputes (ILA 1962). The meeting also resulted in the proposal of three articles that defined water pollution; prevented the introduction of new forms of pollution and increases in the degree of pollution; and called for reasonable measures to reduce existing pollution to cause no substantial injury of another riparian. After revision of the Brussels procedures and articles by inclusion of the concept of equitable utilization as a backdrop for pollution prevention and control, the 1964 Tokyo meeting provisionally accepted the articles (ILA 1964).

Like the 1964 Tokyo meeting, the 1966 Helsinki meeting focused on establishing the concept of equitable and reasonable utilization as the guiding principle with regard to international watercourses (ILA 1966). A number of factors are weighed to determine equitable and reasonable utilization. These include the concepts of obligation to prevent harm, and the primary right to some portion of water by virtue of prior appropriation; these factors do not have the same stature as the guiding principle. The Helsinki Rules addressed waters in international drainage basins, which were defined in Article I as “a geographical area extending over two or more
States determined by the watershed limits of the system of waters, including surface and underground water, flowing into a common terminus.” Thus, the Helsinki Rules were the first international legal instrument to call out transboundary groundwater (Salman 2007, p. 629). Moreover, the Helsinki Rules established universal principles and related procedures regarding free navigation on shared watercourses, and dispute resolution by a third party, which was adopted in its entirety in the United Nations 1997 Convention (United Nations 1997).

The 1972 New York Conference addressed flood control by establishing that riparians shall cooperate on flood control measures in the spirit of good neighborliness, consistent with the duty of interested parties which is implicit in the Helsinki Rules (Bourne 1996, page 252) in Wouters (1997). The 1972 Conference also called for exchange of information, and compensation for substantial damage caused by a state’s disregard of reasonable cooperation in the implementation of flood control measures (ILA 1972).

The 1974 ILA New Delhi Conference (ILA 1974) and 1976 ILA Madrid Conference (ILA 1976) resulted in a resolution consisting of a series of articles on the protection of water resources and water installations in times of armed conflict. The preamble of the resolution acknowledged the
lack of specific rules of international law pertaining to protection of water resources and water storage appurtenances during wartimes. The articles were therefore intended to serve as guidelines for the establishment of rules of law, given the increase in world population and attendant water installations, the overriding need for health and survival of all peoples, and the destructive power of modern weapons (Bourne 1996, p. 265 in Wouters 1997).

The 1978 Manila Conference (ILA 1978) first presented articles on the regulation of the flow of water in international watercourses, and these articles were finalized at the 1980 Belgrade Conference (ILA 1980). The articles espoused the concepts of cooperation and equitable and reasonable decision making in controlling, moderating, increasing, diverting, or otherwise modifying flows. The articles also addressed the obligation to prevent harm by stating that water resource development and use shall not cause substantial injury to either the environment or the water resources of other States.

The 1982 Montreal Conference expanded the work of the 1962 Brussels Conference in addressing the prevention and reduction of surface water pollution in international drainage basins, and stopping the spread of existing pollution to other states (ILA 1982). The 1986 Seoul Rules
extended the Montreal Rules’ main provisions to pollution of international groundwaters and the question of substantial injury to riparian states (ILA 1986). Also addressed were the installation of works to manipulate resources shared by riparians, and prior notification. Additionally, the Seoul articles defined the two types of groundwaters: a) that which has hydraulic connection to surface water, and b) “fossil groundwater,” i.e., that which has no communication with surface water. Significantly, Seoul linked the concept of fossil groundwater to the principle of equitable utilization (Bourne in Wouters 1997, p. 276). The importance of ongoing data collection of groundwaters; the establishment water quality standards; and the interdependent nature of surface water and groundwater were also espoused in the Seoul Rules.

The 1996 Helsinki Conference (ILA 1996) further refined provisions regarding cross-media pollution, originally addressed at the 1994 Buenos Aires Conference (ILA 1994). This Conference also prepared recommendations on the International Law Commission’s (ILC’s) draft articles, which were finalized the following year in the United Nations 1997 Convention.

The 2004 Berlin Rules were a departure from previous ILA efforts in that it addressed national in addition to international freshwater resources
(ILA 2004). Significantly, the Berlin Rules do not regard equitable and reasonable utilization as the guiding principle of customary international law as established in the Helsinki Rules and the 1997 United Nations Convention. The Berlin Rules hold equitable and reasonable utilization as equally important as the obligation to not cause significant harm (Salman 2007, p. 638). Indeed, some practitioners believe the Berlin Rules hold equitable and reasonable utilization subordinate to the no harm principle (Bourne 2004).

The Berlin Rules are the most substantial of the ILA rules to date. They address the established principles of Helsinki Rules and the 1997 United Nations Convention, elements of which have become customary international law, but also includes emerging principles, and does not differentiate between the two. The Berlin Rules insure that basic human needs are met, along with ecological preservation, information –sharing, prior notification, and third party dispute resolution. They also augment guidelines for groundwater management originally developed in the 1986 Seoul Rules, by calling for monitoring of groundwater levels, assessment of industrial and agricultural impacts, protection of recharge areas, and promotion of the conjunctive management of aquifers and surface water resources.
The 2006 Toronto Conference (treaty construction and sustainable development; enforcement of international environmental law) (ILA 2006), 2008 Rio de Janeiro Conference (continental shelf issues) (ILA 2008), 2010 The Hague Conference (water as a universal human right) (ILA 2010), and the 2012 Bulgaria Conference did not produce results as influential as those summarized above.

The International Law Commission (ILC) members were the principal authors of the 1997 United Nations Convention on the Law of the Non-navigational Uses of International Watercourses (United Nations 1997). Begun in 1970, this Convention required twenty-seven years to complete. This was due to attempting to resolve the complexities of issues such as reconciling the relationship between equitable and reasonable utilization versus the obligation to prevent harm, or reconciling the right of prior appropriation versus equitable and reasonable utilization. As of November 2012, twenty-nine states had ratified the Convention; ratification by thirty-five states are necessary to enter the Convention into force (International Water Law Project 2012a).
Analysis of Water Management Principles & Tenets of International Water Law

The analysis will address tenets of IWL in the order presented in Table 1, which presents the elements of a model TBA, referred to as water management principles (WMPs). Figure 2 summarizes the WMPs in hierarchical form.

Equitable and reasonable utilization v. obligation to not cause significant harm. These WMPs are presented together as they are fundamental and inevitably, often in opposition. The equitable and reasonable utilization of a shared watercourse is the most important tenet of the WMPs, and is continually tested with respect to the principle that one riparian is obligated to not cause significant harm to other riparians. A careful review of treaties, case law, and declarations indicates that the concept of equitable and reasonable utilization increasingly holds primacy over the obligation to not cause significant harm. The obligation to not cause significant harm can be thought of as one of the elements for determining equitable and reasonable utilization (Salman 2007, after Helsinki Rules [ILA 1966]). It may be more appropriate as well as more precise to state that upon accepting that equitable and reasonable utilization is the fundamental principle upon which
Table 1. Water Management Principles (WMPs) and the Basis for Their Application to a Model Transboundary Agreement (TBA) as Indicated or Implied Through the Practice of International Water Law.

<table>
<thead>
<tr>
<th>Water Management Principle</th>
<th>Legal Decisions, Treaties, Conventions &amp; Rules that Support Inclusion of WMPs in a Model TBA*</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equitable and reasonable utilization</td>
<td>Helmand 1872; Zwillikon 1878; Kansas v Colorado 1902; Wurttemberg and Prussia v. Baden 1927; Oder 1929; New Jersey v. New York 1931; Meuse River 1937; Roja 1940; Zarumilla 1945; ILA 1966; Aral Sea Agreement 1993; Mekong 1995; Ganges 1996; ICJ 1997; United Nations 1997; Senegal 2002; Nile 2010</td>
<td>Equitable and reasonable utilization is the single most important principle of transboundary agreements. If participating parties consistently cooperate, then effective agreements can be completed.</td>
</tr>
<tr>
<td>Obligation to not cause significant harm</td>
<td>Wurttemberg and Prussia v. Baden 1927; ICJ 1997; United Nations 1997; Nile 2010</td>
<td>In the majority of historic documents that include this fundamental concept, the phrase ‘obligation to not cause harm’ gradually evolved into ‘obligation to not cause significant harm.’ This modification was necessitated by the generally universal acceptance that in the course of equitable and reasonable utilization of the water resources of a basin or watercourse, there are instances where some or all parties may incur some measure of harm by (for example) a reduction of a volume of water or an economic loss of some kind. Such harm or loss notwithstanding, the achievement of the most even distribution of water and/or attendant economic benefits is the objective in first invoking the concept of equitable and reasonable utilization of the resources in a watercourse.</td>
</tr>
<tr>
<td><strong>Obligation to protect international watercourses and their ecosystem</strong></td>
<td>ILA 1966; Amazon 1978; Aral Sea Agreement 1993; Mekong 1995; ICJ 1997; United Nations 1997; Senegal 2002; Nile 2010</td>
<td>The protection and conservation of the water resources and related ecosystems is fundamental. Ecological protection is often compromised because funding is directed toward other priorities. Therefore, the challenge for countries and organizations managing ecological programs is to utilize limited financial resources as efficiently as possible.</td>
</tr>
<tr>
<td><strong>Conduct Environmental Impact Assessments and Audits</strong></td>
<td>Nile 2010; ICJ 2010</td>
<td>Prior to and following the implementation of projects and activities within the basin, the completion of written environmental impact assessments and audits shall be undertaken per the Joint Water Board¹ or other organizations so directed by the Commission.</td>
</tr>
<tr>
<td><strong>Prior notification to and consent from other riparians is required before implementation of projects or activities</strong></td>
<td>ICJ 1949; ILA 1966; Mekong 1995; United Nations 1997; Senegal 2002; ICJ 2010; Nile 2010</td>
<td>Prior notification and consent will be required through the Joint Water Board¹ for any project or activity that may affect water quality or quantity. Prior notification and regular consultations between riparian states will promote cooperation and fair use of resources.</td>
</tr>
<tr>
<td><strong>Creation of a Joint Water Board¹ with members from each riparian country</strong></td>
<td>Rio Grande 1889; Helmand 1872; Nile 1959; 2010; Columbia 1961; ILA 1966; Ganges 1996; Mahakali 1996; United Nations 1997; Genevois 2008; Nile 2010</td>
<td>The Joint Water Board¹ will have representatives from each signatory state. These representatives will not only be hydraulic engineers, but also technical experts such as planners, ecologists, economists and social scientists.</td>
</tr>
<tr>
<td><strong>Creation of a mechanism to share information and technical data between the riparian states, and with the public, through the Joint Water Board¹</strong></td>
<td>Rio Grande 1889; Columbia 1961; ILA 1972; ILA 1966; Pilcomayo 1995; United Nations 1997</td>
<td>The signatory states have a duty to share information and technical data to maximize the efficient use of the resource; promote cooperation; and inform the residents of all riparian states of activities and plans.</td>
</tr>
<tr>
<td>Establish an equitable and flexible water allocation methodology that accounts for water fluctuations, in cooperation with the Joint Water Board</td>
<td>Helmand River 1939; Lesotho1986; Komati 1992; Ganges 1996; Senegal 2002; Genevois 2008</td>
<td>Wolf (1999) presents this concept. As noted in the Inda/Bangladesh 1996 Ganges River agreement, implementation of a flexible water allocation methodology can address man-made or climatic water level fluctuations, or address changing population needs or changing political values.</td>
</tr>
<tr>
<td>Acknowledgement of the existence of groundwater beneath international river basins, i.e., transboundary aquifers, and requires cooperation and equitable allocation of aquifer resources</td>
<td>ILA 1966; United Nations 1997; Genevois 2008;</td>
<td>The Genevois Agreement of 1977 (revised 2008) is the only true treaty focusing on the management/allocation of a transboundary aquifer (Eckstein, G, personal communication, October 30, 2012).</td>
</tr>
<tr>
<td>Establishment of baseline surface water and groundwater level conditions and ongoing collection of daily/weekly water level information throughout the aquifer wherever wells are available</td>
<td>Pilcomayo 1995; Ganges 1996; ICJ 1997a; Genevois 2008;</td>
<td>The ongoing collection of surface water and groundwater level information will support the development of more effective water resource planning and management.</td>
</tr>
<tr>
<td>Establishment of baseline surface water quality, sediment quality, and aquifer (groundwater) quality conditions, consisting of analysis of chemical compounds and metal constituents (funding-dependent), and collection of ongoing water quality information.</td>
<td>Pilcomayo 1995; ICJ 1997a; Genevois 2008;</td>
<td>Like water level data, the collection of water quality data (including the completion of laboratory testing) will better support the decision making process.</td>
</tr>
<tr>
<td>Establishment of a water quality protection program (surface water and groundwater)</td>
<td>Pilcomayo 1995; Genevois 2008</td>
<td>In addition to the implementation of engineering controls that reduce pollutants, water quality protection programs are necessary to raise awareness and educate the population in ways to protect and conserve surface water and groundwater resources.</td>
</tr>
<tr>
<td>Establishment of a conjunctive water resource planning and management program</td>
<td>Conjunctive management acknowledges the interconnections of surface and subsurface waters within a drainage basin.</td>
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</tr>
<tr>
<td>Requires a Flood Control Operating Plan¹ and Emergency Contingency Plans¹ to address floods and other natural or man-induced disasters.</td>
<td>Individual countries routinely have emergency plans to address flood events or other disasters. However, such programs between nations are less common and should be completed to more efficiently use disaster relief resources.</td>
<td></td>
</tr>
<tr>
<td>Right of free navigation along the full extent of a watercourse or lake</td>
<td>The right of all countries to use portions of a watercourse or lake that exist within the boundaries of a specific country has been a longstanding practice between countries in the Americas and Europe.</td>
<td></td>
</tr>
<tr>
<td>Dispute resolution through a third party Dispute Resolution Panel¹</td>
<td>The third party will consist of one member selected by each riparian. In the case where there is an even number of riparians, one additional member will be selected by all riparians.</td>
<td></td>
</tr>
<tr>
<td>Enforcement action for a lack of adherence to Commission decisions will be implemented by the Council of Ministers¹, or (if necessary) the third party Dispute Resolution Panel¹</td>
<td>A formalized procedure for enforcement of treaty provisions, agreed to by all riparians, is a reasonable and necessary mechanism to insure that treaty rules and principles are upheld and to facilitate implementation of decisions.</td>
<td></td>
</tr>
<tr>
<td>Enforcement by compensation to one party who was damaged by an action of another party. Compensation to be addressed initially by the Council of Ministers¹, or (if necessary) the third party Dispute Resolution Panel¹</td>
<td>As established in this template treaty, compensation will be paid to the injured party, subject to the terms established by the Commission (or if necessary, the third party). Commensurate compensation will always be paid by the inflicting party except in those extreme and unusual cases where some portion or the compensation will be borne by the other riparians.</td>
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</tr>
</tbody>
</table>
Grounds for treaty termination/rules for riparians desiring withdrawal from treaty

Columbia 1961; Pilcomayo 1995; Nile 2010

Provisions for termination including minimum advanced notice requirements are necessary for effective basin planning.

*These references are primarily treaties and court decisions. Two products of legal organizations – the ILA’s 1966 Helsinki Rules and ILC’s 1997 United Nations Convention on International Watercourses – are also referenced as elements of these documents have risen to the level of customary international law.

Footnote 1: Titles such as “Joint Water Board” or “Emergency Contingency Plans” are capitalized because of their use as specific organs or documents, respectively, in the template treaty
Figure 2. Flow chart showing the hierarchy of Water Management Principles used in the construction of a template treaty for a model transboundary agreement between riparians in international river basins.

**HIERARCHY OF WATER MANAGEMENT PRINCIPLES**

<table>
<thead>
<tr>
<th>Equitable and Reasonable Utilization</th>
<th>(Primary Guiding Principle)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Obligation to Prevent Significant Harm</strong></td>
<td>(Primary Supporting Principle That Will Typically Influence How Equitable &amp; Reasonable Utilization Is Administered)</td>
</tr>
</tbody>
</table>

Subordinate Water Management Principles In Decreasing Order Of Importance:

| Establish a Joint Water Board with Representatives from each State to Oversee Technical Aspects of Planned and Ongoing Projects |
| Establish a H₂O Allocation Methodology, Addressing Natural & Man-made Fluctuations |
| -Acknowledge Groundwater & Conjunctive Surface H₂O/Groundwater Management |
| -Mapping of existing wells (water supply, irrigation, & environmental monitoring) |
| -Ongoing surface water and groundwater level measurement |
| -Collect baseline and ongoing water quality data, including lab analysis for contaminants |
| Establish Flood Control Operating Plan & Emergency Contingency Plans |
| Practice Prior Notification to Riparians Prior to Initiation of Projects |
| Share Technical Data, & Social & Cultural Information with the Public |
| Allow Free Navigation Along the Full Extent of the Watercourse |
| Establish a Third Party Resolution Panel for Issues Riparians Cannot Settle |
| Establish a Procedure for Enforcement of Treaty Provisions |
| Establish a Procedure to Provide Compensation to a Damaged Riparian Party |
| Conduct Environmental Impact Assessments Before Projects & Audits After Completion |
| Establish Grounds for Treaty Termination & Rules for Withdrawal from Treaty |

Transboundary agreements are constructed, then it is also essential to accept
that the obligation to not cause significant harm is compatible with and supportive of this fundamental principle (McCaffrey 2007, p. 407-408).

In essence, fairness and reasonable compromise among parties that share a resource must drive decisions, mindful of the fact that some or all parties may incur some harm in the course of establishing equitable and reasonable utilization (Wurttemburg and Prussia v. Baden 1927; River Oder 1929; New Jersey v. New York 1931; Montevideo 1933; Meuse River 1937; River Roja 1940; Indus River 1960; IIL 1961; ILA 1966; IIL 1979; Aral Sea Agreement 1993; Mekong River 1995; ICJ 1997; United Nations 1997; Bourne 1996; Calfisch 1998; McCaffrey 2007; Salman 2010).

Equitable and reasonable utilization of a water resource will, to varying degrees, supersede any legal claim grounded in the concept of historic appropriation, also referred to as prior appropriation (i.e., the absolute right to the full quantity of water in a given basin or watercourse simply because that state [or private landowner] held first claim to the resource). The most compelling argument against the historic appropriation claim is the need to first address fundamental human needs for survival (Wolf 1999; McCaffrey 2007; Salman 2007: 2010). The self-serving concepts of absolute sovereignty or absolute territorial integrity cannot prevail over the basic requirement to protect public health and safety in the management of an
international watercourse. This fundamental concept of public protection is consistent with traditional principles concerning trusteeship of earth resources and the welfare of the community (ICJ 1997a).

The Gabcikovo Nagymaros case concerns a 1977 treaty between Hungary and Czechoslovakia (now Slovakia, as of 1993). A treaty was executed to allow construction of dams and related works along a 200-kilometer reach along the Danube River, which divides the two countries. Hungary eventually took the position that the project should not go forward due to concerns about adverse environmental consequences, which eventually led to their withdrawal from the project and termination of the treaty, despite protests from Czechoslovakia and the question of whether termination was legally allowable. In response to this withdrawal, Czechoslovakia unilaterally began construction of an alternative dam and associated works entirely within a portion of its own territory.

In 1992 Czechoslovakia and Hungary agreed to have the International Court of Justice (ICJ) rule on the dispute. The Court ruled that international treaty law does not allow Hungary to terminate the treaty unilaterally, and the countries were ordered to negotiate a settlement that provided for project completion (ICJ 1997).
ICJ’s ruling is significant for several reasons. The Court cited the 1997 United Nations Convention on international watercourses (United Nations 1997) in concluding that both States must achieve some of the objectives noted in the Treaty by managing the shared water resources in an equitable and reasonable manner. The process of achieving equitable and reasonable solutions necessitates cooperation and compromise, which is what the court ordered the countries to do. The Court’s act of invoking principles from the 1997 United Nations Convention is an example of the development of an accepted practice, which contributes to the establishment of the tenets of international water law.

The Court applied the concept of “community of interest,” one of the four foundational theories of international water law. This theory emphasizes the need to cooperate with other riparians as part of the use, development and protection of the shared nature of interests in an international watercourse (McCaffrey 2007, p. 217). The community of interest doctrine supports the notion that a riparian cannot unilaterally assume control of a shared resource, or unilaterally construct a dam, as Czechoslovakia did.

In the German intrastate case of Wurttemberg and Prussia v. Baden (Wurttemberg and Prussia v. Baden 1927), the German court indicated in
their written opinion that the general doctrine of equitable apportionment takes precedence over the doctrine of prior appropriation. The case involved the percolation of significant quantities of water through the banks and bed of the Danube River in certain parts of Baden and Wurttemberg, so much so that a section of the river in Wurttemberg would dry up during certain periods of the year. In response to Baden’s proposal to construct dams and hydroelectric power plants on the river, Wurttemberg filed an injunction against Baden to halt construction and to remove naturally-occurring sand and gravel deposits that were impeding river flow and thus further causing river levels to drop. This loss of water was also experienced by Prussia, a downstream riparian, who joined Wurttemberg’s claim. Baden filed a counterclaim to restrain Wurttemberg from their own construction projects to reduce the lowering of the Danube, which would also have the effect of lowering levels of water in Baden’s Aach River, which benefitted from the percolation away from the Danube. For both sides, the principal issue was injury to existing uses resulting from water diversion.

The court ruled that neither Baden nor Wurttemberg could construct works to change the flow of the Danube and that Baden must clear the river channel of naturally-accumulated material. Further, both sides were ordered
to negotiate a compromise; the court did not provide a specific solution but did rule in a manner consistent with the concept of equitable utilization.

Although not international river basin examples, the following U.S. Supreme Court cases are two of several high court rulings that demonstrate the logic of the concept of two contiguous states’ rights to an equitable apportionment of a resource – as opposed to one state retaining a majority stake because of prior appropriation.

In Hinderlider v. La Plata River and Cherry Creek Ditch Company (Hinderlider 1938), the court ruled in a manner consistent with equitable and reasonable utilization over prior appropriation. The Cherry Creek Ditch Company held a water right for a portion of water from the La Plata River. This right was removed due to an action by the State Engineer of Colorado, who was compelled to this action in order to comply with the provisions of an agreement between New Mexico and Colorado. The Ditch Company argued that its constitutionally-sound prior vested right was being violated by this compact between the two states. The court ruled that this private company’s prior right is limited, and can be overtaken by two states’ agreement. This interstate compact had to be upheld because Colorado could not supply water to the Ditch Company in excess of Colorado’s share of the water in the stream (Bourne, p. 73, in Wouters 1997).
The essence of equitable apportionment holds that a reasonable share of a watercourse’s flow is available to all riparians, prior appropriation notwithstanding. Unless injuries are substantial as a result of one state’s utilization of the resource, the sharing of waters is acceptable. Additionally, one state’s ‘vested right’ via prior appropriation will not overrule the equitable apportionment of a river’s resources amongst riparians. That is, if an individual state’s historic appropriation exceeds or reduces what is reasonably due to each riparian from a volumetric standpoint, then the state claiming historic appropriation will not be honored.

As demonstrated in Kansas v. Colorado (1902), equitable and reasonable distribution of basin water will prevail unless a ruling body determines that excessive harm or substantial detriment has been incurred. Kansas filed a claim seeking to halt use of river water for irrigation because Kansas contended it was injured by depriving farmers of needed water. The court held that there was indeed some measure of injury to the southwestern portion of Kansas along the Arkansas River. However, it was concluded that “the withdrawal of water…has not proved a source of serious detriment” in the amount of water Colorado was utilizing (Kansas v. Colorado 1902).

Obligation to protect international watercourses and their ecosystems; and Completion of environmental impact assessments and audits. The protection
of existing habitats, restoration of damaged habitats, and prevention of the introduction of alien species are all important aspects of ecological sustainability. These concepts have been codified in many treaties, conventions, case law, and rules by legal organizations (Indus 1960; ILA 1966; Amazon 1978; United Nations 1997; ICJ 1997; ILA 2004; Nile 2010).

Ecological protection is often compromised because funding is directed toward other priorities. Therefore, the challenge for countries and organizations managing ecological programs is to utilize limited financial resources as efficiently as possible.

Prior to the implementation of projects and activities in the basin, the completion of environmental impact assessments is necessary as a planning tool to guard against adverse environmental impacts. Similarly, environmental audits of activities in general, or projects under development or completed are necessary on an annual basis, or scheduled periodically on a continuing basis (ICJ 1997a, p. 111).

Prior notification and consent from other riparians is required before implementation of projects or activities. Two early works - the 1933 Declaration of Montevideo (Montevideo 1933) and the 1957 Buenos Aires Resolution (Buenos Aires 1957) – were significant in the development of customary international law concerning prior notification (Bourne in
Wouters 1997, p. 27). They required consent and notification of riparian states before actions are undertaken in a watercourse. Two court cases – Corfu Channel (ICJ 1949) and Uruguay v. Argentina 2010 (ICJ 2010) - provide the legal basis requiring notification practices.

The Corfu Channel case involved three separate incidents between the British Navy and Albania’s territorial waters. The first incident saw Navy ships come under fire, without any contact, from Albanian fortifications during their movement through international waters and within Albanian territorial waters. The next incident involved Navy ships striking mines and incurring considerable damage in these waters. The third incident occurred when the Navy conducted mine-clearing operations in Albanian waters without permission from Albania.

The court ruled that Albania had erred in not providing notification to the British Navy about the presence of the mines in these international waters. This portion of the ruling was the basis for ordering Albania to compensate Britain for ship damage in the amount of approximately $2 million. Britain’s mine-clearing operation was ruled illegal.

The Uruguay v. Argentina case arose in 2005 when Uruguay authorized construction of a large pulp mill on the banks of the Uruguay River. Although both countries had agreed to a location, Argentina (the
downstream riparian) filed a claim against Uruguay because Uruguay failed to notify them prior to construction. The court ruled in favor of Argentina, agreeing with Argentina’s procedural claim that Uruguay had an obligation to first inform Argentina (ICJ 2010). The upshot of the ruling was only a declaration of wrongdoing; no fine or other penalties were levied. Indeed, Argentina’s insistence that the mill be dismantled was not honored by the court.

These rulings underscore the importance of prior notification in the eyes of the court concerning international watercourses. The ILC had previously supported this concept in robust fashion by noting that it is not enough to merely acknowledge the possibility of significant harm from a project. Rather, if the state contemplating a project believes there could be a “significant adverse effect,” which is less impactful than significant harm, then notification is likewise required (ILC 1994). The objective is the avoidance of disputes, before the possibility that the more legally significant harm may result from proposed use (McCaffrey 2007, p. 473).

Creation of a technical working group with members from each riparian country. The creation of technical working groups with members from each riparian in a basin has been a common element of many treaties. One of the earliest of these technical groups, the International Boundary and Water
The Rio Grande Commission, was established in 1889 as part of the Rio Grande River agreement between Mexico and the United States (Rio Grande 1889). The duties of this group are illustrative of the core issues typically addressed in the administration of a TBA. They include regulation, conservation, and volumetric distribution of the waters between riparians; water quality sampling and analysis; management of joint construction projects for dams and reservoirs, and the operation and maintenance of these works; flood protection of borderlands; and resolution of sanitation and water quality problems.

Modern examples of technical groups are found in the Columbia River Treaty’s Permanent Engineering Board (Columbia 1961), the Council of Delegates of the 1995 Agreement establishing the Trinational Commission for the Pilcomayo River Basin in South America (Pilcomayo 1995), the Genevois Aquifer Management Commission in the France-Switzerland Agreement (Genevois 2008). It is also found in the 2010 Nile Agreement, which is yet to be enforced (Nile 2010).

Ideally, the technical groups are best served by a group of experts from various fields, not just hydraulic engineering. Planners, ecologists, economists and social scientists would provide the breadth of experience
necessary to make the most informed decisions concerning issues that can affect entire societies.

**Creation of a mechanism to share information and technical data with the public, through the Joint Water Board (i.e., the so named technical group in the present template TBA).** The sharing of all types of information, whether related to public health and safety, scientific, cultural, or social is essential to promote cooperation and good neighborliness. The practice of collecting environmental data on an ongoing basis and the exchange of information has been instituted for many different media per court decisions or international conventions, including air pollutants (e.g., Trail Smelter 1941; Convention on Long-Range Transboundary Air Pollution 1981).

The sharing of water levels, and water quantity and quality information, is provided for in many treaties and facilitated through technical groups (Columbia 1961; Pilcomayo 1995; ILA 1966; United Nations 1997; ILA 2004; Nile 2010).

**Acknowledgement of the existence of groundwater beneath international river basins.** At present, the law of transboundary aquifers is in a relatively early stage of development (Eckstein 2011). However, a growing body of documentation and practice indicates the emergence of accepted legal standards regarding aquifers and groundwater in general. Since the first
mention of transboundary groundwater in an international legal instrument in the 1966 Helsinki Rules (Salman 2007, p. 629), an increasing level of sophistication and detail towards transboundary aquifers is found in the 1986 Seoul Rules (ILA 1986), the 1989 Bellagio Draft Treaty (Hayton and Utton 1989), the 2004 Berlin Rules (ILA 2004), the 2008 Genevois Treaty (Genevois 2008), and the 2008 United Nations resolution on The Law of Transboundary Aquifers (United Nations 2008). The Seoul Rules defined groundwater as either communicating with surface water or as having no interaction with surface water (i.e., “fossil water” or “confined water”). The avoidance of groundwater pollution was stressed, particularly with regard to the long-term effects and inability to complete aquifer restoration in a relatively short time (e.g., one to two years). The Seoul Rules also included the need to protect groundwater recharge areas and establishment of joint water quality standards.

The Bellagio Draft Treaty is a more comprehensive set of articles that support the concept of inclusion of international groundwater within an overall water resource management plan. It calls for the establishment of a joint technical group; preparation of written management plans to address droughts, floods, and other public health emergencies; maintenance of a
technical database; and accommodation of differences and a procedure to resolve disputes.

The Berlin Rules defined specific groundwater monitoring activities that are needed to properly assess and manage a basin drinking water resource and take into account the interdependent nature of surface water and groundwater. It calls for monitoring groundwater levels, pressures and quality; developing aquifer vulnerability maps; accounting for both natural and artificial recharge; and promoting the management of an entire aquifer by all basin states rather than limiting activities to a respective state’s physical boundaries.

The 2008 Genevois Treaty, which revised the original 1978 agreement between France and Switzerland, is the first and only treaty that both manages and allocates waters of a transboundary aquifer (Eckstein 2011, p. 575). The agreement sets extraction limits; recognizes artificial recharge obligations and allocates funds from both countries to defray costs for the recharge effort; and requires ongoing groundwater level measurement and water quality sampling and analysis and interpretation.

The 2008 United Nations General Assembly Resolution on the Law of Transboundary Aquifers represents significant progress in international recognition that transboundary aquifers supply over one-half of the world’s
drinking water (United Nations 2008). Prepared by the International Law Commission (ILC), the United Nations’ legal arm, the Resolution is composed of nineteen draft articles that are structured in a manner similar to the United Nations 1997 International Watercourses Convention (United Nations 1997). In December 2011, the United Nations General Assembly reiterated its commitment to global groundwater resource management by adopting a related Resolution which places the draft articles on the provisional agenda of its 68th session in October 2013. This action underscores the need for nations to form bilateral and regional transboundary aquifer agreements, based on the draft articles (International Water Law Project 2012b).

Establishment of baseline surface water and groundwater level conditions and ongoing collection of water level measurements. and Establishment of baseline surface water and groundwater quality and ongoing collection of water quality information. The implementation of a program to conduct ongoing surface water and groundwater measurement plus conducting water quality laboratory analysis, and evaluation of the data, will support fair water allocation practices and better resource management. The intent is that this growing body of knowledge will drive responsible decision making and
cooperation between riparians as they establish and modify water allocation schedules.

Treaties such as the Indus River (Indus 1960) and Columbia River (Columbia 1961) established surface water measurement and surface water quality studies, but did not address groundwater. The Bellagio Draft Treaty (Hayton and Utton 1989), the Berlin Rules (ILA 2004) and the Genevois Treaty (Genevois 2008) provide the most comprehensive guidelines for management and allocation of both surface water and groundwater resources.

Include language that identifies the need to establish water allocation agreements, which account for water fluctuations in cooperation with the Joint Water Board. The responsible management of flow levels and distribution of water resource volumes between riparians is of central importance in any substantive agreement regarding international watercourses. Several existing treaties created over the last half of the 20th century address this common theme in a relatively straightforward and effective manner.

The 1960 Indus Waters Treaty between India and Pakistan is a water-sharing treaty designed to increase the amount of water available to both parties through engineering works within the Indus basin (Indus 1960). The
objective of equitable apportionment of the waters was achieved by allocating the waters of the three Eastern Rivers – the Sutlej, the Beas and the Ravi – to India, and those of the Western Rivers – the Indus, the Jhelum and Chenab – to Pakistan. The Treaty stipulates that each country will not interfere with the rivers allocated to the other, aside from some defined exceptions concerning hydroelectric power generation, and certain agricultural, domestic, and non-consumptive uses. The impetus for the Treaty came primarily from Pakistan, who feared that the since the source of the rivers of the basin were in India, potential conflict with India could result in drought and famine for Pakistanis.

The 1986 Lesotho Highlands Water Project Treaty joined Lesotho and South Africa in a project (in progress) that provides for the construction of a series of dams to generate power for Lesotho and to transfer water from the mountains of Lesotho to South Africa (Lesotho 1986). Subsequent to the treaty’s execution, the establishment of an instream flow requirement policy was completed in 2002.

The 1992 Komati River Basin Treaty between Swaziland and South Africa provides for a comprehensive water management plan to support the construction of one dam in Swaziland and one dam in South Africa (Komati 1992). The management plan acknowledges that water allocation schedules
may change based on natural hydrologic fluctuations, changing rates of extraction, or restrictions on allocations due to rationing. The plan also addresses short-term (days to weeks) to long-term (2-3 years) flow measuring and solutions to low flow periods; short-term to long-term water quality monitoring; and management of water release patterns to meet user needs and ecological requirements.

The 1996 Ganges River Treaty at Farakka between India and Bangladesh sets out a water-sharing formula aimed at optimum utilization of the resources of the region (Ganges 1996). If the flow of the Ganges drops below 50,000 cubic feet per second (cfs) over any ten-day period, then the riparians will meet immediately to make fair and equitable adjustments. If during the dry season (January – May) the flow is 70,000 cfs or less, it is then allocated equally between the two countries. If the flow is 70,000-75,000 cfs, Bangladesh receives 35,000 cfs and India receives the balance. Further, if the flow is over 75,000 cfs, then India receives 40,000 cfs and Bangladesh receives the balance (McCaffrey 2007, p. 294-295). The water-sharing aspects of the treaty are reviewed every five years at a minimum.

The preceding treaties all address surface water resources and are silent on the allocation of groundwater. As discussed, the Genevois Treaty is the
only agreement that defines specific allocation schedules for transboundary aquifers.

**Navigation.** The Helsinki Rules established logical navigation guidelines, and the Berlin Rules amply adopted the language from the Helsinki Rules. The fundamental principle from these Rules, and from the practice of states over two centuries, holds that freedom of navigation for riparian states on international waterways should be presumed to be the prevailing standard under general international law (McCaffrey 2007, p. 197).

Unrestricted use of a waterway for free navigation was supported in early agreements by the United States and Canada through the Jay Treaty of 1794 (Jay 1794) and the Treaty of Washington in 1871 (Malloy 1910). Similarly, the 1877 Heidelberg Regulation (Heidelberg Regulation 1877) and the IIL’s Paris Regulation of 1934 (Paris Regulation 1934) both espoused free movement on international waterways.

The twentieth century brought many competing uses into play in river systems including generation of hydroelectric power, industry, sanitation, domestic use, diversion for irrigation and other purposes, and recreation. This resulted in the proposition that customary international law denies priority to any one use of the waters of international watercourses (Bourne in Wouters 1997, p. 303). Article VI of the Helsinki Rules states that ‘a use or
category of uses is not entitled to any inherent preference over any other use or category of uses.’

The need for freedom of navigation, along with some measure of regulation and limitations, is inherent within a watercourse shared by states. Free navigation, as defined by the Helsinki Rules and adopted in this template TBA, allows riparian states to move throughout the course of the watercourse, enter ports, and transport goods and passengers between the respective territory of a riparian State and the open sea. A riparian state is required to maintain the watercourse within its jurisdiction; may police that area within its own territory providing it does not unreasonably interfere with other riparians’ navigation rights; restrict the loading or unloading of goods and passengers in its territory; and grant rights of navigation within its territory. In times of war, in order to facilitate navigation for humanitarian purposes, the riparian state may suspend its obligations.

Dispute resolution through a third party. Most resolutions and treaties with a dispute resolution procedure provide for the selection of the third party by the riparians themselves (Montevideo 1933; Indus 1960; Columbia 1961; ILA 1966; United Nations 1997; ILA 2004; Nile 2010). Typically, each riparian selects one member of the resolution team. When disputes arise, the third party is required to respond and then hand down a decision in a matter
of months. Because decisions were made by representatives of the TBA, acceptance of the decisions are expected. However, the option of review by the International Court of Justice (ICJ) as a last resort is provided by some treaties and conventions (Columbia 1961, United Nations 1997, Nile 2010).

**Enforcement of Commission decisions, and Efforts to enforce orders of compensation.** Conspicuously absent from most treaties is a procedure to insure that decisions rendered by the management structure of a treaty are actually enacted. In the creation of a model interstate compact, Muys et al. (2007) detailed a straightforward enforcement procedure that has been adopted in the template TBA. The procedure moves through fact-finding, concession, resolution or dispute, and third party dispute resolution (“Dispute Resolution Panel”). If the decision of the Dispute Resolution Panel is not adhered to, the procedure provides for the implementation of sanctions, if deemed appropriate, which could be followed by judicial intervention by the ICJ for injunctive relief. This process is a fair and gradual escalation of actions that has not been typically adopted in treaties to date. However, the opportunity for review by a series of committees populated by representatives from all riparians provides a formalized approach that encourages resolution at several junctures of the procedure.
Like the procedure for enforcement, a procedure to determine whether compensation is warranted and if so, the amount, has not typically been detailed in treaties. Compensation mechanisms are usually not stated explicitly or stated but not discussed in detail (e.g., Nile 2010). The template TBA spells out the obligation to make appropriate compensation for the most likely actions that might justify compensation, i.e., floods (ILA 1972) or water pollution (ILA 1982) caused by irresponsible actions by an upstream riparian. If one riparian alleges substantial harm by another riparian and documents same, then the accused riparian must respond within 30 days. At this point, the processes of enforcement and if necessary, dispute resolution, will then be invoked.

Several court cases provide the legal basis for awards of compensation. The Helmand River dispute resulted in compensation to Afghanistan for incurring serious injury to an existing use (Helmand 1872). A border dispute existed between Persia (now Iran) and Afghanistan over a region known as Sistan, where both states were using water resources. A British commissioner, Sir Frederick Goldsmid, was selected to resolve the dispute and determine a boundary line through the region. His 1872 ruling awarded the bulk of the Sistan to Persia, except for certain networks of irrigation canals assigned to Afghanistan. Persia obtained the Sistan based on a
combination of ancient right and geographic preference. Afghanistan was compensated for their loss of use of most of the Sistan by receipt of both sides of the river in an upstream region known as the Kohak. The ruling also prohibited each state to substantially alter the river flow in order to sustain irrigation needs on both banks of the river.

The Trail Smelter case concerns air pollution instead of water pollution, but the issues are regarded as analogous to principles of international watercourses (Trail Smelter 1941). Here, the Canadian smelter’s sulfur dioxide emissions damaged trees, crops and soil in the downwind United States. The initial 1935 court ruling ordered Canada to pay $350,000 to cover damages incurred in Washington state prior to 1932. A program of environmental monitoring was also required as part of the verdict, to aid in the prevention of possible future damages.

The United States was not satisfied with this award and requested arbitration to obtain additional compensation. In 1941 the arbitration panel awarded the United States an additional $78,000 for damage to properties suffered between 1932 – 1937. The panel ordered more air emissions studies and directed the implementation of a more stringent regulatory compliance regime. Additionally, the court specifically stated that it would
allow future claims for damages if the smelter failed to comply with the developing regime.

The court’s decisions, and in particular the arbitration panel’s decisions, reflect their intent to achieve a balance between industrial activities and preservation of the environment. The smelter was allowed to continue operating under more strict standards, and the landowners with agricultural interests had to tolerate some damage. Monetary compensation was granted because significant harm was caused by the smelter.

The previously-discussed Corfu Channel case ended in a monetary award of $2 million as compensation for significant harm from the boat damage caused by mines in the Albanian portion of the Channel (ICJ 1949).

Grounds for treaty termination for riparians desiring withdrawal from treaty. The terms of notification of a country’s desire to withdraw from a treaty are typically one year (e.g., Pilcomayo 1995) or two years (Nile 2010). The Columbia River Treaty has a ten year prior notification requirement, undoubtedly because of the complex relationship posed by the series of dams that generate power and revenue for both the United States and Canada. Establishing defined rules of withdrawal will help preserve cooperation between nations.
Summary

The WMPs analyzed here in Chapter One are incorporated into the template for a model TBA in Chapter Two. Most of the WMPs are taken from existing treaties, conventions, and rules. In most cases, the WMPs are general but express a basic directive that is critical to supporting cooperation among riparians and effective basin management (e.g., prior notification, environmental impact assessment of planned measures, ecological protection, information exchange, etc.).

However, a greater level of detail has been included in the template for several other WMPs because of the critical need to carry out these management measures to insure relatively consistent flow levels, reasonable water apportionment to all riparians, effective planning of water resource utilization, and flood/emergency planning. These are surface water and groundwater level measurement and water quality analysis, utilization of a water allocation methodology, conjunctive water resource planning and management, and development of a Flood Control Operating Plan and Emergency Contingency Plans, respectively.

Several other principles, not directly tied to water management per se, are also included in greater detail to provide a framework for cooperation in
resolving issues that inevitably arise in the course of basin management. These are procedures for enforcement of decisions, compensation to riparians who incur substantial harm, and dispute resolution by a third party.

The procedures or actions necessary to implement the more detailed WMPs are not considered prohibitively onerous because all riparians will be subjected to the same requirements. Additionally, the Basin Commission and its various organizations (e.g., the ruling Council of Ministers or the Joint Water Board) are comprised of representatives of all riparian states and can establish specific operating rules that can potentially satisfy riparians’ objectives, mindful of the inevitable need for compromise that can only be achieved through cooperation. In total, the end product is a template that consists of universal principles that support fair management of the resource over the long-term. Principles requiring more details for successful administration have been included sparingly, because an overriding goal is to create a concise template that is relatively straightforward and thus more likely to be implemented by riparians.
CHAPTER TWO

A TEMPLATE FOR A MODEL TRANSBOUNDARY AGREEMENT
FOR INTERNATIONAL RIVER BASINS

Introduction

A template treaty (‘‘template’’) has been prepared for use by riparians of watercourses in international river basins (Appendix A). The template promotes cooperation and discourages unilateral actions by riparians without prior discussion. The template provides for the maintenance of reasonable flow levels; implementation of a simple water allocation methodology; and promotes groundwater management in association with the management of surface water quality and quantity.

Template Construction

To the maximum extent possible, the template adopts principles generally accepted as customary international law. Additionally, it applies text that has been used or otherwise recognized in the practice of forging agreements between states, but has not yet risen to the language of international law.

In general, the template is intended to be a universal starting point for groups charged with writing such treaties, similar in concept to the intent of the model interstate compact created by Muys et al. 2007 for United States watercourses shared by two or more states. The template strives for conciseness and simplicity whenever possible. Certain topics are written in an intentionally general level of detail to accommodate ratification and to allow the signatory parties to write more specific procedures through committees populated by their representatives.

The author has incorporated water management principles (WMPs) that will readily apply to most basins, regardless of the unique environmental and political conditions posed by individual basins. Other than a few logical additions to previously-employed WMPs introduced by the author (e.g., regular well water level measurements of all existing domestic, agricultural, and environmental monitoring wells; preparation of emergency preparedness plans), this template is a compilation of elements of applicable treaties (i.e.,
Nile 2010; Indus 1960; Columbia 1961; Amazon 1978); certain conventions and resolutions (United Nations 1997; United Nations 2008; ILA 1966; ILA 1986); and papers by reputable practitioners (e.g., McCaffrey 2007; Salman 2011, 2010 and 2007; Bourne in Wouters 1997); and a model interstate compact prepared for use in transboundary settings in the United States (Muys et al. 2007).

Therefore, by and large, this template does not present new concepts or ideas. It does, however, make choices in selecting the most universal principles that riparians can hopefully agree upon, ratify, and use to facilitate long-term cooperation.

As first articulated in the 1966 Helsinki Rules (ILA1966); indicated in the United Nations 1997 Convention (United Nations 1997) and the United Nations 2008 Convention (United Nations 2008); referenced in the 1997 Gabcikovo-Nagymaros ruling (ICJ 1997) by the International Court of Justice; and followed in the 2010 Nile Agreement (Nile 2010); this template follows the principle of equitable and reasonable utilization of the resource as the primary tenet in basin-wide watercourse management. As analyzed in Chapter One, this principle is the most viable means to ensure fair apportionment of surface water and groundwater resources in order to sustain vital human needs and protect ecological habitats. The author
acknowledges the concept that *the obligation to not cause significant harm is one of the elements for determining equitable and reasonable utilization* (Salman 2007, after ILA 1966) is a relatively widely accepted but not universally held belief.

The following details the amendments and additions to the Nile 2010 foundational document that are incorporated into the template:

- Requires the implementation of a water allocation methodology to insure that all riparians have continuous access to reasonable flow to address vital human needs, and agricultural and economic development project requirements (Annex I). Whereas some type of methodology is required, a relatively simple formula for apportioning available water, taken from Muys et al. 2007, is suggested and is based on water level data collected in the basin. The cornerstone of the water allocation methodology is the need to maintain an adequate level of instream flow, the need for monitoring such flows, and the provision to make necessary changes when appropriate.

- Emphasizes the importance of groundwater as a drinking water resource, stresses groundwater management and the interdependent nature of surface water and groundwater resources, and the need to properly assess, conserve, measure and estimate quantities (Annex I) (ILA 1986; United Nations 1997; United Nations 2008; Eckstein 2005; Eckstein 2011).
-Revises the definition of a watercourse as defined in the United Nations Convention (United Nations 1997) by removing the phrase “…normally flowing into a common terminus” because of its technical inaccuracy in many natural settings. In this template, a watercourse is defined as “a system of surface waters and groundwaters constituting by virtue of their physical proximity – and not necessarily their hydrologic connectivity - a unitary whole (modified from United Nations 2008; SADC 2000; United Nations 1997; Rosenstock 1993, 1994).


- Following the Enforcement protocol in Annex III, goes beyond the language used in the Nile Agreement and the United Nations 1997 Convention, i.e., “…to discuss the question of compensation” by defining, through language taken from Columbia River Treaty (Columbia 1961), basic events that may justify the payment of compensation. Further, this template draws from several ILA conferences to address the need for developing criteria and procedures for assigning compensation (ILA 1980); basic conditions under which a state is liable for flood damage (ILA 1972); and
the requirement of compensation from a state causing pollution (ILA 1982). The procedures will provide for efforts to enforce payment of compensation (Muys et al. 2007) and the procedures will include dispute resolution (Annex IV), if necessary, to force a state to compensate another.

- Establishes a process to resolve disputes by a third party Dispute Resolution Panel (“Panel”) (Annex IV) (Indus 1960; Columbia 1961; United Nations 1997). The Panel will establish its own procedures, which provides for sanctions and, as a last resort, resolution of the dispute by the International Court of Justice.

- The template assumes the inclusion of three signatory parties (also referred to as Contracting States or riparian parties). However, where appropriate, provisions are noted for a different number of signatory parties. For example, in the case of establishing a third party for dispute resolution, if there are an even number of signatory parties, then each signatory will choose one member of the third party body and each signatory will choose through agreement one additional third party member to achieve an odd-numbered total of third party members. This arrangement is necessary as the Dispute Resolution Panel will provide rulings to resolve disputes by a simple majority vote through an odd-numbered total of third party members.
- Provides guidelines for the freedom and regulation of navigation along shared watercourses (ILA 1966).

- The template assumes each signatory party is a member of the United Nations, and requires registration with the Secretariat of the United Nations per Article 102 of the Charter of the United Nations (Columbia 1961).
CHAPTER THREE

A PROPOSED TRANSBOUNDARY AGREEMENT (TBA) FOR THE PILCOMAYO RIVER BASIN OF ARGENTINA, BOLIVIA AND PARAGUAY

Introduction

A proposed agreement, or treaty (“proposed PRB treaty”) is presented to manage surface water and groundwater resources of the Pilcomayo River Basin (PRB), shared by Argentina, Bolivia, and Paraguay (Appendix B).

The Pilcomayo River and its tributaries represent the principal water resource for approximately 1.5 million people (Trinational Commission 2010 website: www.pilcomayo.net): 1.0 million in Bolivia, 300,000 in Argentina, and 200,000 in Paraguay. The PRB comprises an area of 270,000 km², and is situated within the large Plata River Basin, which occupies 4,144,000 km² (Figure 2). By comparison, the United States’ Mississippi River Basin occupies an area of 2,981,076 km², about three-quarters the size of the Plata River Basin.

This proposed PRB treaty expands on concepts presented in the 1995 Pilcomayo River Basin Treaty (“1995 Treaty”) between Argentina, Bolivia,
and Paraguay, designed to promote economic development and water resource protection (Appendix C: Agreement Establishing the Trinational Commission for the Development of the Pilcomayo River Basin, signed May 29, 1995 and entered into force May 9, 1996). The 1995 Treaty established a commission with two representatives from each country, charged with the following primary objectives:

Figure 3. Plan view of the Pilcomayo River Basin, with inset showing its location within the larger Plata River Basin (Trinational Commission 2010 website: www.pilcomayo.net).
• Establish a technical Trinational Commission to manage the natural resources of the basin, and its economic development

• Establish a General Management Plan to prioritize and finance projects

• Conduct studies to support flood control, sediment retention, and flow regulation

• Prepare technical/legal documents that constitute studies of possible engineering or environmental projects

• Establish a surface water monitoring program and database that measures water levels and analyzes water quality throughout the basin

• Regularly share and publicize basin-wide information and technical data amongst the signatory parties

• Establish programs to prevent pollution and protect basin ecology

The 1995 Treaty also contains the following administrative controls:

• A brief dispute resolution procedure, which directs the signatory parties in dispute to resolve the issue through direct negotiations, and

• The signatory parties will be participants in the agreement indefinitely, unless notice is given one year in advance of withdrawal...
The proposed PRB treaty is philosophically compatible with the 1995 Treaty, and adds to the objectives of the 1995 Treaty by mandating the following:

- Implementation of a water allocation methodology to ensure that flow levels are maintained to address vital human needs, and agricultural and economic development
- Preparation of a basin-wide groundwater well map, implementation of a program to measure groundwater levels, and quantification of the groundwater supply
- Preparation of a Flood Control Operating Plan and Emergency Contingency Plans to address floods and other natural or man-induced disasters
- Prior to and following the implementation of projects and activities within the basin, the completion of written environmental impact assessments and audits shall be undertaken. The 1995 Treaty calls for environmental impact studies, but does not define the need for periodic impact studies following the completion of projects and activities.
- Rules for the regulation of navigation along shared watercourses within the basin.
The proposed PRB Treaty contains the following administrative controls that expand controls established in the 1995 Treaty:

- Establishes a formal procedure for Enforcement of decisions and as appropriate, payment of compensation; and provides a procedure for Dispute Resolution by a third party
- The signatory parties will be participants in the agreement for a period of twenty-five years, unless notice is given two years in advance of withdrawal.

Overview of Each Country’s Water Law and Management Structure

Argentina, Bolivia and Paraguay are similar in the structure and administration of their existing water laws, their goals in revamping these laws, and the challenges posed by each country’s environmental, social and economic conditions. As presented here, a cohesive international agreement would be beneficial to manage these types of common problems.

Each country’s water laws are relatively vague and fail to address many current water management issues (USAID 2012; Almansi et al. 2010; OECD 2006; World Bank 2006; Nonna 2002; World Bank 2000a; World Bank 2000b). To varying degrees, each country has attempted to ameliorate their respective water laws through constitutional amendments that establish national, provincial, and/or local agencies, along with national or
international basin agencies, charged with adopting and managing legal requirements and policies (Porporato and Robbins 2008; OECD 2006; Nonna 2002; USAID 2012; Arrieta 2007). This has created a confusing array of overlapping jurisdictions, resulting in inefficient development of basic water delivery infrastructure for citizens, particularly in rural areas, widespread pollution of principal aquifers serving major cities (USAID 2012; Steurer 2008; World Bank 2009), and a lack of regulatory compliance and enforcement (Almansi et al. 2010).

Although progress is being made, delivery of safe drinking water and basic sewage/sanitation service to all urban and rural households is lacking in all three countries (WHO 2012). The inability to complete construction of infrastructure is grounded in the failure of the respective countries to establish and manage either a government-run or privately-run construction effort.

**Argentina**

The 1994 constitutional amendment (Article 124) assigned each respective province original water rights ownership of natural resources existing in their territory. The National Congress, through the Argentine Civil Code, also established in 1994 public ownership of surface and groundwater through Article 2340 (World Bank 2000a).
Water resource management functions occur at the national, provincial, municipal, and river basin level in this country of approximately 40,000,000 citizens. The main national organization for water resource management, which reports to the president, is the Undersecretariat of Water Resources, in the Secretariat of Public Works in the Ministry of Federal Planning, Public Investment and Services (Europa World Yearbook 2012). This organization plans and executes water policy, programs and projects, oversees regulatory compliance, and proposes and implements policies and projects related to public water works (OECD 2006). Despite the existence of this national organization, the constitution does not clearly define a national water law to guide this entity in regulating the water resources that also receive management from the individual provinces (OECD 2006; World Bank 2000a). By-products of this condition include a lack of power on the national level to influence, lead, and enforce the establishment of a coherent national water policy; duplication of provisions; and poor coordination and conflict between provinces as evidenced by a lack of inter-provincial management of watershed basins that occupy multiple provinces (OECD 2006; World Bank 2000a).

In particular, many different national and provincial agencies administer laws that address water resources at various levels via
commercial law, mining codes, federal laws on energy, navigation, transportation, harbors, natural resource protection, and toxic waste regulation. A sampling of these national agencies include: Ministry of Internal Affairs; Ministry of Foreign Affairs, International Commerce and Cults; Secretariat of Agriculture, Livestock, Fisheries and Food in the Ministry of Economy and Production; Secretariat of Energy; and Secretariat of Environmental and Sustainable Development in the Ministry of Health and Environment.

The twenty-three Argentine provinces likewise support a great diversity of ministries that address aspects of water management, including irrigation, flood prevention, food and agriculture, sanitation, and environmental protection (with a focus on the vast areas of wetlands). Additionally, each of the ten river basins are subject to interjurisdictional commissions specific to each basin. These commissions were initially successful but became ineffective due to a lack of funding (OECD 2006).

Coordination of the implementation and enforcement of regulations between the various national and provincial agencies would be a challenge for any developed nation. Not surprisingly, cooperation between Argentinean agencies is lacking and conflict is the norm due to competing
interests (Steurer 2008; OECD 2006; Nonna 2002; World Bank 2000a; World Bank 2000b).

Regulatory problems have also adversely affected the completion of water infrastructure construction for both urban and rural citizens. Drinking water is piped to the individual premises of 83 percent of the urban population and piped to either individual premises or public standpipes of 98 percent of the urban population (WHO 2007 [note: WHO 2007 presents the most recent data; the WHO 2012 reference reports no Argentina information]). In contrast, Argentina rural areas receive piped in water to only 40 percent of individual premises while 80 percent of the rural population obtain water from public standpipes (WHO 2007).

The sewerage infrastructure is more problematic. Only 48 percent of the urban population and 5 percent of the rural population is serviced by sewage collection systems (WHO 2006). Additionally, this condition is not adequately supporting 91 percent of the urban population and 77 percent of the rural population that has access to improved latrines and septic systems (WHO 2006).

The ongoing water management problems are well-illustrated by the failed privatization of the public water and sewer system for the city of Buenos Aires over the period of 1992 – 2006 (Poporato and Robbins 2008).
A private company was contracted in 1992 in an attempt to complete an infrastructure system that had not been finished by government-sponsored institutions prior to 1992. The privatization effort was no longer funded as of 2006, primarily due to a lack of consistent management and enforcement of contractual obligations by the regulatory agency charged with overseeing the Aguas Argentinas consortium (Porporato and Robbins 2008).

**Bolivia**

Water management in Latin American countries can best be understood through a grouping into two broad categories: water rights and water resources. The 1906 Water Act established the Bolivian government as the principal authority in charge of overall water management (World Bank 2006).

With regard to water rights in this country of approximately 11,000,000 citizens, its definition under the 1906 Water Act is vague, e.g., stating that “the water passing through the land belongs to the landowner as long as it does not affect others (Mattos 2000).” The law does not contain a step-wise process to grant water rights (USAID 2012; World Bank 2006; Larock 2004). Legislative attempts have been made to better define the inadequately-addressed water rights issue of the 1906 Water Act. Over the last twenty years, multiple legislative provisions have been passed that
provide landowners with conditional rights to water on their land, subject to the rights afforded to other parties such as the community in which they reside. Legislation includes the Environmental Act, the Mining Code, the Electricity Act, Water and Sanitation Services Law, the Irrigation Law and the Hydrocarbons Act. The laws were not written to complement one another, nor are they comprehensive in their treatment of the aspect of the water rights each addresses, resulting in contradictory laws that are not enforceable on a consistent or coherent basis (USAID 2012; World Bank 2006).

With regard to water resources, several legislative efforts were attempted in 1988, 1995 and 1999 to revise the nation’s water law and create a single law to govern water resources, but none has been finalized to date (USAID 2012; World Bank 2006; Mattos 2000). These efforts involved establishing governmental institutional frameworks for water management; privatized concessions tied to the distribution of water rights; a fee program for farmers using irrigation infrastructure; and recognition of groundwater as public property (Mattos 2000; USAID 2012).

Bolivia’s new Constitution of 2009 does establish some guidelines for water resource management, but there is still no overarching law clearly defining water resources and water rights administration. The Constitution
guarantees citizens’ access to water, and prohibits outright privatization of surface water and groundwater (although there is no current process to obtain groundwater rights or control groundwater resources [USAID 2012]).

The Constitution reinforces the Morales administration’s decentralized approach to governance by allowing and encouraging individual community public-private partnerships to provide basic potable water and sewage services (Flores 2008; COB Constitution 2009). This approach is further defined under the Water and Sanitation Services Law No. 2066 of 2000 and the Irrigation Law No. 7828 of 2004, which protect the water resource rights of indigenous and peasant farm worker communities.

The main national organization for water resource management is the Environment and Water Resources Ministry, created in 2009 as part of the new Constitution. This Ministry is responsible for sanitation and related infrastructure, irrigation, water basins and hydrological resources, and environmental protection (COB Constitution 2009).

As in Buenos Aires, Argentina, attempts at traditional large-scale water privatization projects have failed in Bolivia. Between 1997 and 2005, Bolivia privatized the water utilities. This involved establishing contracts with private entities who were subject to specific infrastructure expansion requirements. Tariffs to individual households were integral to complete the
expansion; however, the tariff rates were not pre-determined and rose to levels that the generally poor populace could not afford. Additionally, the private providers did not meet the established construction milestones, which was in part due to the inability of the national government to properly manage the private entities. The intersection of failed contractor performance with inadequate regulatory oversight, unrealistically high tariffs and public outrage, and the (then) new Morales administration’s philosophy declaring water a public trust with universal access to water, led to the suspension of privatization in 2006 (Hailu et al. 2009; Water for People 2006).

Regulatory oversight problems have also adversely affected the completion of water infrastructure construction for both urban and rural citizens. Drinking water is piped to the individual premises of 95 percent of the urban population, which comprises 67 percent of the total Bolivian population (WHO 2012). In contrast, with regard to Bolivia’s rural population, only 51 percent of individual premises receive piped in water, another 20 percent of the rural population obtain water from public standpipes, and the rest of the rural segment collect drinking water from surface water or other sources (WHO 2012).
The sewerage infrastructure situation is probably the biggest single health problem in Bolivia. Two-thirds of the overall population, roughly six million people, lack a sanitary barrier between human excrement and the water they drink and food they eat (Water for People 2011). Less than 10 percent of the rural population have access to safe private toilets (WHO 2012). Only 35 percent of the urban population and 10 percent of the rural population is serviced by sewage collection systems (WHO 2012).

Paraguay

The 2007 Water Resources Law guarantees each of Paraguay’s 6,000,000 citizens the human right of access to a minimum amount of drinking water, to be determined by the Ministry of Public Health and based on availability (Arrieta 2007). This Law provides an exemption from tariffs for households and small businesses. Use of water resources for other purposes such as agricultural or industrial development is subject to tariffs that will likewise be set based on availability and volume of water required by individual projects.

Several water management laws complement the 2007 Water Resources Law (Capaldo 2009). Act 352/94 (“Wild Protected Areas”) provides for the management and preservation of water basins and wetlands, as well as the control of erosion and sedimentation. Act 294/93
(“Environmental Impact Assessment”) requires the completion of environmental impact assessments prior to construction of water and sewerage works, in order to aid in the protection of the water resources. Act 1863/01 (“Agrarian Statute”) provides for management of irrigation.

As in Argentina and Bolivia, expanding access to sustainable water and sanitation services for the rural poor and increasing sanitation coverage in urban areas are by far the biggest challenges for Paraguay. The Ministry of Public Works and Communications is responsible for providing basic utility infrastructure services. Whereas approximately 85 percent of the population in urban areas is served by a network water connection, only 35 percent have similar access in rural areas, and only 15 percent of urban residents have access to a network sewerage connection (WHO 2012; World Bank 2009). Drinking water is piped to the individual premises of 85 percent of the urban population, which comprises 61 percent of the total Paraguayan population (WHO 2012). In contrast, only 35 percent of Paraguay’s rural population receives piped in water to individual premises, another 31 percent of the rural population obtain water from public standpipes, and the rest of the rural segment collect drinking water from surface water or other sources (WHO 2012).
There are three entities that provide the majority of water supply and sewerage service in Paraguay (World Bank 2009). Service for urban settlements above 10,000 inhabitants are largely provided by the national water and sanitation utility, (Sanitary Services Company of Paraguay, Empresa de Servicios Sanitarios del Paraguay S.A., ESSAP S.A.). ESSAP S.A. is the largest individual service provider, operating approximately 260,000 household connections, which represents 36 percent of the market share (76 percent of which is in Asunción). Since the 1970s, a growing group of independent private suppliers, called Aguateros, has become a significant provider that addresses unmet demand in semi-urban areas. Aguateros operate about 105,000 connections (representing 14.4 percent of total population served). In rural areas with settlements under 10,000 citizens, the National Environmental Sanitation Service (Servicio National de Salud Ambiental, SENASA) facilitates the provision of water services through local water user committees, called Juntas de Saneamiento. These committees collectively have the largest market share, supplying water to approximately 362,000 households (49.8 percent of the total). In total, these three entities together manage approximately 730,000 potable water connections serving around 3.6 million people.
This mixture of nationalized (ESSAP S.A. and SENASA) and private suppliers (Aguateros) of water and sanitation services has been moderately successful. It is the latest chapter in a story of past failed attempts at either fully nationalized or fully privatized infrastructure programs. For example, between 1995 – 2003, the World Bank provided a loan to the government of Paraguay for (among other services) construction of 50,000 home sewerage connections in Asuncion, and 600 water connections and latrines and improved roads in Encarnacion. Due to ineffective governmental management of the project and graft, none of the 50,000 sewerage connections were ever constructed. A post-project review revealed that inclusion of some level of the private sector, particularly the local community members, may have led to a more productive result. As a consequence, the project was a factor in the government’s support of the role of Aguateros in rural communities. This is evidenced by the expansion of World Bank funding of the Aguateros through SENASA (World Bank 2011).
CHAPTER FOUR
THE FUTURE

Introduction

Now that a template treaty has been completed and the basis for its construction has been presented and analyzed, is there a realistic use for the template? If so, how would its utilization be implemented?

As indicated by Salman Salman (2007), countries that share river basins and aquifers would benefit from the knowledge that a template for a transboundary agreement exists and is generally recognized as a reasonable basis for cooperation and water resource management. The achievement of the United Nations’ Millennium Development Goals (MDGs) of 2000 (e.g., eradication of poverty and hunger; reduction in child mortality; improvement in maternal health; environmental sustainability; the development of a global partnership) are strongly linked to the need for transboundary cooperation. Freshwater drinking water supplies are becoming increasingly strained as world population growth has increased from 6 billion in 1999 to 7 billion in 2012, and is expected to be 8 billion by 2025. As of 2001, forty percent of the world’s population lives in internationally shared basins (ODI 2001), and forty-five percent of the world’s land surface is occupied by international basins (Wolf 1999).
Given these factors, the template treaty could be beneficial not only in the form of the proposed PRB treaty, but as a basis for action in other parts of the world. The following explores how the proposed PRB treaty as well as the template treaty will be promoted.

**Discussion: Possibility of Use of Proposed PRB Treaty**

Any attempt to promote use of the proposed PRB treaty must come through individual government channels and local non-profit organizations that are considered reputable by the respective nation’s leadership. Promoting the proposed treaty through the United Nations or Office of American States or any other organizations with ties to the United States or other outside countries should only be initiated if there is a clear indication for support of this approach from the three governments of the PRB. Therefore, an educational and promotional effort must first be initiated with the governments of the three countries.

Bolivia and their second term populist president Evo Morales is decidedly averse to any involvement by the United States or other nations in development projects by multinational corporations (such as mining or other resource development projects). This sentiment is a result of many factors, not the least of which was the failed attempt by the World Bank’s contractor Bechtel Corporation to implement a substantial increase in Cochabamba’s
(third largest city) water works fees as part of their planned engineering project. The population united in protest against Bechtel’s actions and their associated plans to privatize the water system and literally ran Bechtel out of the country in 2002 (Larock 2004).

Because the majority of users of the PRB are Bolivian (about 1.0 million of the 1.5 million total inhabitants of the basin), and because Bolivia’s mining industry is the PRB’s single biggest polluter aside from human sewage, cooperation from Bolivia is of central importance.

**Planned Activities**

Efforts for promotion of the proposed PRB treaty will center on two paths: communication with the Pilcomayo Trinational Commission, and communication with embassies of the three riparians. The most critical riparian is the government of Bolivia, which has by far the greatest population exploiting resources in the basin. Although the Bolivian government strives, in general, to separate itself from the United States, it still accepts financial aid for health care programs from the United States government. Promotion of the proposed PRB treaty, which advances proper management of water quality and quantity and is thus fundamental to preservation of public health, could be conducted through this avenue.

Secondarily, both the proposed PRB treaty and the template treaty will
be forwarded to the following organizations that are actively involved in transboundary cooperation related to international river basins: World Water Council, Global Water Partnership, World Bank, United Nations Environmental Program (UNEP), United Nations Development Program (UNDP), Global Environment Facility (GEF), Organization of American States (OAS), North American Congress on Latin America (NACLA), and the National University of Argentina. The author has developed personal relationships with managers at most of these organizations through meetings or email correspondences. In order to advance relationships with decision makers, periodic meetings will be held with managers during ongoing business trips to Washington, D.C.

It is hoped that certain managers will help facilitate review and some level of acceptance by government officials in one or more of the riparian states, eventually leading to use of portions of the proposed PRB treaty to improve the existing 1995 Treaty, or adoption of some form of the template treaty in another basin. At a minimum, these activities will raise awareness within governments concerning the need for both surface water and groundwater resource management and transboundary cooperation.

Prominent private corporations that sell goods or services in these three countries (e.g., Coca-Cola, Proctor and Gamble, and FedEx) will be
approached to provide funding to support promotion of the proposed PRB treaty. Corporate citizenship and environmental sustainability will be the rationale in proposing this vehicle for responsible water resource management.

Another planned activity is delivering presentations at international conferences related to water resources, such as the United Nations-Water: World Water Week conference in Stockholm (August 26-31, 2012), and the International River Symposium in Brisbane, Australia (September 26-29, 2013). International presentations will focus more on the broad applicability of the template treaty, rather than featuring the proposed PRB treaty. Funding sources will be either Amazon Web Services (present employer), private corporations, or personal.

Aside from publication of the condensed version of this dissertation in Water International, publication online and in print in two Latin American non-governmental periodicals will be pursued. The Bolivian Environmental and Development Forum, whose mission is to protect the environment of Bolivia, is a non-governmental organization that publishes articles online on a monthly basis. The North American Congress of Latin America publishes a bi-monthly periodical that addresses political and environmental topics throughout South America.
There are many international examples demonstrating that it typically requires several years for multiple countries to draft and come to an agreement regarding the shared resources of a basin, as was the case with the 1995 PRB Treaty (Laboranti 2011). Therefore, it is likely more realistic to first promote, in the case of the PRB, a portion of the proposed PRB treaty. Therefore, I will focus on the need for adopting the water management principle that acknowledges the existence of groundwater beneath international river basins, i.e., transboundary aquifers, which require cooperation and equitable allocation of aquifer resources. This would include the mapping of all existing domestic, agriculture, and environmental monitoring wells, and implementation of a continuous program of water level measurement to quantify the resource as part of the conjunctive management of surface water and groundwater resources.
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http://www.wssinfo.org/data-estimates/introduction/


Title: Treaty for Doe River Cooperation

Parties: State X, State Y, State Z

Basin: Doe

Date: 2/17/13

State X – State Y – State Z: Treaty For Doe River Cooperation

Preamble

State X, State Y, and State Z (“Contracting States”) of the Doe River Basin,

Conscious of the importance of the integrated management of the water resources for social well-being and economic development for the peoples of the States of the Doe River Basin, which includes the surface water bodies and subsurface waters (i.e., groundwater) of the Basin, regardless of whether or not the groundwater is hydrologically connected to surface water;

Inspired by the common goal to promote the harmonious development of the Doe River Basin, to permit an equitable distribution of the benefits of
said development among the Basin States so as to raise the standard of living of their peoples;

Conscious that both socioeconomic development and conservation of the water resources and associated ecological habitat are inherent responsibilities in the sovereignty of each State, and that it is vital to maintain a balance between economic growth and environmental protection;

Convinced that it is in their mutual interest to establish an organization to promote the management and sustainable development of the Doe River Basin for the benefit of all;

Mindful of the global initiatives for promoting cooperation on integrated management and sustainable development of the water resources, Resolve to sign the following Treaty:

**Article 1**

**Scope of the Treaty**

This Treaty addresses the use, development, protection, conservation and management of the Doe River Basin water resources and associated ecological habitat, and establishes an institutional mechanism for cooperation among the Contracting States (Nile 2010).
Article 2

Use of Terms

For the purposes of this Treaty:

(a) "Watercourse" means a system of surface waters and groundwaters constituting by virtue of their physical proximity – and not necessarily their hydrologic connectivity - a unitary whole (modified from United Nations 2008; SADC 2000; United Nations 1997; Rosenstock 1993, 1994).

(b) “International Watercourse” means a watercourse, parts of which are situated in different States;

(c) “Doe River Basin” means the geographical area determined by the watershed limits of the Doe River System of waters; this term is used where there is reference to environmental protection, conservation or development;

(d) “Doe River System” means the Doe River and the surface waters and groundwaters that are related to the Doe River, which includes groundwater aquifers that may extend beyond the geographic boundary of the Doe River Basin;

(e) “Treaty” means this Treaty and its Annexes;

(f) “Contracting States” are the Doe River Basin States, which are the signatory parties of this Treaty, i.e., States, X, Y, and Z.
(g) “Water security” means the right of all Doe River Basin States to
reliable access to and use of the Doe River System for health, agriculture,
livelihoods, development and environment.

(h) “International Union” is a fictitious international group of countries, of
which States X, Y and Z are a part.

(i) “Metropolitan City, State X” is a fictitious city and state.

(j) “Conjunctive Water Use” refers to simultaneous use of surface water and
groundwater to meet demand.

(k) “Panel” or “Dispute Resolution Panel” refers to a third party
organization formed to conduct dispute resolution.

(l) “Commission” or “Doe River Basin Commission” is the governing body
of this Treaty. It is comprised of (i) Conference of Heads of State and
Government, (ii) Council of Ministers, (iii) Joint Water Board, (iv) Sectoral
Advisory Committees, and (v) Secretariat.

(m) “Conference” or “Conference of Heads of State and Government” is
composed of Heads of State and Government of Doe River Basin States, and
shall be the supreme policy-making organ of the Commission.

(o) “Council” or “Council of Ministers” is composed of the Minister for
Water Affairs of each Doe River Basin State and other ministers according
to the agenda of the Commission, and is the governing body of the Commission.

(p) “Board” or “Joint Water Board” refers to the group designated by the Contracting States to address all relevant water management issues as defined under this Treaty.

(q) “Committees” or Sectoral Advisory Committees” refer to groups that will address specific sectoral matters within the competence of the Commission.

(r) “Secretariat” refers to the organization that includes the Executive Secretary, which manages the administration and finances of the Commission.

Article 3

Effective Date and Duration of Treaty

1. Effective Date. This Treaty, after legislative ratification by each of the signatory Contracting States, shall become operative and enter into force on the sixtieth day following the date of ratification. The original of the present Treaty, of which the English and Spanish texts are equally authentic, shall be deposited with the International Union, which shall send certified true copies thereof to the Contracting States.
2. Registration. In conformity with Article 102 of the Charter of the United Nations, the Treaty shall be registered by State X with the Secretariat of the United States (Columbia 1961).

3. Duration. The initial term of the Treaty shall be twenty-five (25) years from its effective date. No later than one (2) years prior to the expiration of the initial or any renewal term, the Contracting States shall notify the International Union whether they propose (a) an additional twenty-five year (25) or other length term without any change in the Treaty’s provisions; (b) an additional twenty-five year (25) or other length term with certain amendments to the Treaty, which shall have been approved by the Contracting States and shall accompany the notification; or (c) termination of the Treaty, accompanied by the proposed terms of such termination, which shall include, at a minimum, proposals to satisfy the requirements of this Article 3. Whichever option is exercised shall require unanimous approval of the Contracting States (Muys et al. 2007).

4. Termination. Termination of the Treaty shall be subject to the following conditions (Muys et al. 2007), at a minimum:
(a) Satisfaction of all outstanding financial obligations of the Contracting States;

(b) Preservation of all valid existing rights derived from this Treaty in the waters covered by the Treaty; and

(c) Preservation of all environmental protection obligations assumed by the Contracting States.

5. Modification or Amendment. This Treaty may be modified or amended by the unanimous action of all Contracting States. Any signatory party may withdraw from this Treaty upon two (2) years’ notice to the other signatory parties and the International Union.

PART 1. GENERAL PRINCIPLES

Article 4

General Principles

The Doe River System shall be protected, used, conserved and developed in accordance with the following general principles, consistent with the overriding Basin-wide objectives of responsible management of the water resources and associated ecological habitat.

1. Cooperation, and Community of Interest. The principle of cooperation between the Contracting States and the principle of a
community of interest amongst the States of the Doe River Basin, on the basis of sovereign equality, mutual benefit and good neighborliness in order to obtain optimal utilization, adequate protection and conservation of the Doe River Basin as the States pursue social and economic development.

2. **Equitable and Reasonable Utilization.** The principle of equitable and reasonable utilization, by each Basin State within its territory, of the surface waters and groundwaters of the Doe River System.

3. **Obligation to Not Cause Significant Harm.** The principle of an obligation to not cause significant harm to the Contracting States of the Doe River Basin.

4. **Ecological Protection, Conservation & Sustainability.** The principle that the Contracting States take all appropriate measures, individually and, where appropriate, jointly, for the protection, conservation and sustainable development of the Doe River Basin and its ecosystems.

5. **Navigation.** The principle of freedom of movement on the entire navigable portion of the watercourse and the responsibility of maintenance of that portion of the watercourse within the respective riparian’s jurisdiction.
6. **Subsidiarity.** The principle of subsidiarity, whereby development of the Doe River Basin water resources recognizes the utility of sub-basin organizations and arrangements;

7. **Exchange of Information and Data.** The principle that the Contracting States execute the regular and reciprocal exchange of information and data on planned measures and on existing measures related to the condition of the water resources of the Basin, where possible in a form that facilitates its utilization by the States to which it is communicated.

8. **Environmental Impact Assessments and Audits.** The principle of environmental impact assessment of planned measures, and the principle of environmental auditing of measures in progress or completed.

9. **Peaceful Resolution of Disputes.** The principle of the peaceful resolution of disputes through the Joint Water Board or, if necessary, a third party body (“Dispute Resolution Panel”) consisting of representatives selected by the Contracting States (see Article 32).

10. **Prevention and Mitigation of Harmful Conditions and Management of Emergency Conditions.** The principle of reduction or elimination of harmful conditions from human activity such as disease or natural causes such as floods, and establishment of contingency plans.
11. **Protection in Times of Armed Conflict.** The principle that facilities and installations associated with water resources shall enjoy the protection of established rules of international law during times of armed conflict.

12. **Water Security.** The principle that each Contracting State has the right to reliable access to and use of the Doe River System for health, environmental protection including agricultural production, livelihoods, and economic development.

**PART II. RIGHTS AND OBLIGATIONS**

**Article 5**

*Equitable and Reasonable Utilization*

1. Contracting States shall, in their respective territories, utilize the water resources of the Doe River System and the Doe River Basin in an equitable and reasonable manner. Each Basin State is entitled to an equitable and reasonable share in the beneficial uses of the water resources. In particular, the volume of the water resources shall be used fairly and proportionately, and developed by the Basin States with the objective of attaining optimal and sustainable utilization, and in a manner consistent with environmental protection of those water resources. Fundamentally, equitable and reasonable utilization of the resource involves the maintenance
of stream and river flow levels to meet the vital human needs of the populations of the Contracting States and the Basin ecosystem.

2. To ensure that the Contracting States utilize the water resources in an equitable and reasonable manner, the Basin States shall, as facilitated by the Joint Water Board, take into account the following (ILA 1966, Article V):
   a. Geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character;
   b. The social and economic needs of the Contracting States;
   c. The population dependent on the water resources in each Basin State;
   d. The effects of the use or uses of the water resources in one Basin State on other Basin States;
   e. Existing and potential uses of the water resources;
   f. Conservation, protection, development and economy of use of the water resources and the costs of measures taken to that effect;
   g. The availability of alternatives, of comparable value, to a particular planned or existing use;
   h. The volumetric contribution of each Basin State to the waters of the Doe River System, with regard to water allocation, and with regard to water diversion or storage projects for flood control or agriculture or hydroelectric power development (Annex I);
i. The extent and proportion of the drainage area in the territory of each Basin State.

3. The weight to be given to each factor a. through i. is to be determined by its importance in comparison with that of other relevant factors. In determining what is a reasonable and equitable use, all relevant factors are to be considered together and a conclusion reached on the basis of the whole (ILA 1966).

**Article 6**

**Obligation to Not Cause Significant Harm**

1. Doe River Basin States shall, in utilizing Doe River System water resources in their territories, take all appropriate measures to prevent the causing of significant harm to other Basin States (United Nations 1997).

2. Doe River Basin States shall, individually and, where appropriate, jointly through cost-sharing by the Contracting States that may be affected, make every effort to take all appropriate measures to prevent or mitigate conditions related to the Doe River System that may be harmful to the Contracting States, whether resulting from human conduct or natural causes, such as flood conditions, invasive water weeds, water-borne diseases, siltation (silting), erosion, drought, or desertification. In implementing this
provision, Doe River Basin States shall take into account guidelines to be
developed by the Joint Water Board (Annex II).

3. Where significant harm nevertheless is caused to another Doe River
Basin State, the State, whose use causes such harm shall, in the absence of
agreement to such use, take all appropriate measures, having due regard to
the provisions of Article 4 above, in consultation with the affected State, to
eliminate or mitigate such harm and, where appropriate, to discuss the
question of compensation (United Nations 1997).

(a) The Contracting States will be liable to the other and shall make
appropriate compensation to the other with respect to any act, failure to act,
omission or delay amounting to a breach of the Treaty or of any of its
provisions, other than an act, failure to act, omission or delay occurring by
reason of war, strike, major calamity, act of God, uncontrollable force or
maintenance curtailment (Columbia 1961).

(b) Except as provided in (a), none of the Contracting States shall be liable
to the other or to any person in respect of any injury, damage or loss
occurring in the territory of another Contracting States caused by any act,
failure to act, omission or delay under the Treaty whether the injury, damage
or loss results from negligence or otherwise (Columbia 1961).
(c) The Commission will establish procedures and criteria for compensation (ILA 1980). In the case of floods, a basin State is not liable to pay compensation for damage caused to another basin State by floods originating in that basin State unless it has acted contrary to what could be reasonably expected under the circumstances, and unless the damage caused is substantial (ILA 1972). In the case of a breach of a State’s international obligations relating to water pollution in an international drainage basin, that State shall cease the wrongful conduct and shall pay compensation for the injury resulting therefrom (ILA 1982).

4. When one or more of the Contracting States alleges substantial harm by another Contracting State, based upon documented observation or monitoring, or substantial verified factual evidence from a reliable, identified third party, the Commission shall request the representative for that State to respond to such allegation in writing within 30 days. The enforcement process, beginning with providing the allegation in writing, is presented in Annex III. If the allegation is not resolved, the dispute resolution process provided in Annex IV will then be invoked.
Article 7

Ecological Protection, Conservation and Sustainability

1. Doe River Basin States shall take all appropriate measures, individually or jointly, to protect, conserve, sustain, and where necessary, rehabilitate the Doe River Basin and its ecosystems, in particular, by:

(a) protecting and conserving water quality within the Doe River Basin;

(b) preventing the introduction of species, alien or new, into the Doe River System which may have effects detrimental to the ecosystems of the Doe River Basin;

(c) protecting and conserving biological diversity within the Basin;

(d) protecting and conserving wetlands within the Basin; and

(e) restoring and rehabilitating the degraded natural resource base.

2. The Contracting States shall, through the Joint Water Board, take steps to harmonize their policies in relation to the provisions of this Article.

Article 8

Navigation

1. This Article refers to those river and lake portions which are both navigable and separate or traverse the territories of two or more of the Contracting States (ILA 1966, Articles 12-20).
2. Rivers or lakes are navigable if in their natural or canalized state they are currently used for commercial navigation or are capable by reason of their natural condition of being so used.

3. In this Article, the term “riparian State” refers to a Contracting State through or along which the navigable portion a river flows or a lake lies.

4. Subject to any limitations or qualifications referred to in this Treaty, each riparian State is entitled to enjoy rights of free navigation on the entire course of a river or lake.

5. “Free navigation,” as this term is used in this Article, includes the following freedoms for vessels of a riparian State on the basis of equality: (a) freedom of movement on the entire navigable course of the river or lake; (b) freedom to enter ports and to make use of plants and docks; and (c) freedom to transport goods and passengers, either directly or through trans-shipment, between the territory of a riparian State and the open sea.

6. A riparian State may exercise rights of police, including but not limited to the protection of the public safety and health, over that portion of the river or lake subject to its jurisdiction, provided the exercise of such rights does not unreasonably interfere with the enjoyment of the rights of free navigation defined in this Article.
7. Each riparian State may restrict or prohibit the loading by vessels of a foreign State of goods and passengers in its territory for discharge in such territory.

8. A riparian State may grant rights of navigation to non-riparian States on rivers or lakes within its territory.

9. Each riparian State is, to the extent of the means available or made available to it, required to maintain in good order that portion of the navigable course of a river or lake within its jurisdiction.

10. The rules stated in this Article are not applicable to the navigation of vessels of war or of vessels performing police or administrative functions, or, in general, exercising any other form of public authority.

11. In time of war, other armed conflict or public emergency constituting a threat to the life of a State, a Contracting State may take measures derogating from its obligations under this Article to the extent strictly required by the exigencies of the situation, provided that such measures are not inconsistent with its other obligations under international law. The Contracting State shall in any case facilitate navigation for humanitarian purposes.
Article 9

Subsidiarity

Contracting States shall plan, implement and develop the Doe River Basin water resources at the most efficient level by:

(a) recognizing the utility of sub-basin organizations and arrangements;

(b) allowing all those within a State who will or may be affected by a project in that State to participate in an appropriate way in the planning and implementation process;

(c) make every effort to ensure that the project and any related agreement is consistent with the overriding Basin-wide objectives of responsible management of the water resources and associated ecological habitat.

Article 10

Regular Exchange of Data and Information

1. In pursuance of their cooperation concerning the use, development and protection of the Doe River Basin and its water resources, Doe River Basin States shall on a regular basis exchange readily available and relevant data and information through the Joint Water Board, on both planned and existing measures and on the condition of water resources of the Basin, where possible in a form that facilitates its utilization by the States to which it is communicated.
2. If a Doe River Basin State is requested by another Basin State to provide data or information that is not readily available, it shall employ its best efforts to comply with the request but may condition its compliance upon payment by the requesting State of the reasonable costs of collecting and, where appropriate, processing such data or information.

3. In the implementation of their obligations under Paragraph 1 and 2, Doe River Basin States agree to observe procedures to be developed by the Joint Water Board.

**Article 11**

**Environmental Impact Assessment and Audits**

1. For planned measures that may have significant adverse environmental effects, Doe River Basin States shall, at an early stage, undertake a comprehensive assessment of those effects with regard to their own territories and the territories of the other Contracting States.

2. The criteria and procedures for determining whether a planned measure is likely to have significant adverse environmental effects shall be developed by the Joint Water Board.

3. Where circumstances so warrant, according to criteria to be developed by the Joint Water Board, a Contracting State that has implemented measures of the kind referred to in paragraph 1 shall conduct
an audit of the environmental impacts of those measures. That State shall enter into consultations relating to the audit with the Contracting States affected by the measures upon their request.

4. The Joint Water Board, taking into account legislation that pertains to the Contracting States, shall adopt criteria for carrying out audits of measures that exist at the date of the entry into force of this Treaty.

5. Contracting States shall carry out audits of measures existing at the date of the entry into force of this Treaty in accordance with legislation that pertains to the Contracting States, and in accordance with criteria adopted by the Joint Water Board under this Treaty.

Article 12

Prevention and Mitigation of Harmful Conditions and Management of Emergency Conditions

1. The Contacting States shall, individually and, where appropriate, jointly through cost-sharing by the Doe River Basin State or States that may be affected, make every effort to take all appropriate measures to prevent or mitigate conditions related to the Doe River System that may be harmful to other Basin States, whether resulting from human conduct or natural causes, such as flood conditions, invasive water weeds, water-borne diseases, siltation (silting), erosion, drought or desertification. In implementing this
provision, the Basin States shall take into account guidelines to be developed by the Joint River Board.

2. For the purposes of this provision, “emergency” means a situation that causes, or poses an imminent threat of causing, serious harm to Doe River Basin States or other States and that results suddenly from natural causes, such as floods, landslides or earthquakes, or from human conduct, such as industrial accidents.

(a) Contracting State shall immediately notify other potentially affected States and competent international organizations of any emergency in its territory.

(b) The Contracting State within whose territory an emergency originates shall, in cooperation with potentially affected States and, where appropriate, competent international organizations, immediately take all practicable measures necessitated by the circumstances to prevent, mitigate and eliminate harmful effects from the emergency.

(c) The Joint Water Board (JWB) will develop contingency plans (Annex II) for responding to emergencies in cooperation with other affected States and supportive international organizations.
**Article 13**

**Protection of the Doe River Basin and Related Installations in Time of Armed Conflict**

In times of armed conflict, the Doe River System and its associated facilities shall enjoy the protection accorded by the principles and rules of international law and international humanitarian law, whether the conflict occurs within a respective State or internationally, or whether the conflicting parties originate from one or more States.

**Article 14**

**Water Security**

Mindful of the provisions of Articles 4 and 5, the Contracting States acknowledge the vital importance of maintaining water security, defined as the right to reliable access to and use of the Doe River System for health, environmental protection including agricultural production, livelihoods, and economic development. The States also acknowledge the necessity for cooperative management and development of waters of the Doe River System, in order to achieve water security. Therefore, the Contracting States agree to work cooperatively through the Joint Water Board, and all other appropriate means, to achieve and sustain water security.
PART III. INSTITUTIONAL STRUCTURE

SECTION A. THE DOE RIVER BASIN COMMISSION

ARTICLE 15

Establishment

The Doe River Basin Commission is hereby established by the Doe River Basin States.

ARTICLE 16

Purpose and Objective

The purpose and objective of the Commission is to:

(a) serve as an institutional framework that will facilitate and promote closer cooperation among the Contracting States.

(b) facilitate and promote the principles, rights, and obligations provided for in this Treaty.

ARTICLE 17

Organs

The Doe River Basin Commission (“Commission”) is comprised of:

(a) Conference of Heads of State and Government

(b) Council of Ministers
(c) Joint Water Board

(d) Sectoral Advisory Committees

(e) Secretariat

**ARTICLE 18**

**Headquarters**

The headquarters of the Commission shall be situated in Metropolitan City, State X.

**ARTICLE 19**

**Legal Status**

1. The Commission is established as an intergovernmental organization and shall enjoy international legal personality, with such legal capacity as may be necessary for the performance of the functions, in particular, the capacity to enter into agreements, to incur obligations, to receive donations, to enforce the provisions of the Treaty, and to sue and be sued in its own name.

2. The Commission and its officials shall, in the territory of each Contracting State, enjoy such privileges and immunities as are necessary for the performance of their functions under this Treaty.

3. The privileges and immunities referred to under this article shall be provided for in detail in a Protocol to this Treaty.
SECTION B. THE CONFERENCE OF HEADS OF STATE AND GOVERNMENT

Article 20

Structure and Procedure


2. The Conference shall establish its own rules and procedures.

Article 21

Functions

The Conference shall be the supreme policy-making organ of the Commission.

SECTION C. THE COUNCIL OF MINISTERS

Article 22

Structure

The Council of Ministers (the “Council”) shall be composed of the Minister for Water Affairs of each Doe River Basin State and other ministers according to the agenda of the Commission.
Article 23

Procedures

1. Except as otherwise provided, the Council shall establish its own rules and procedures.

2. The Council shall convene once a year in regular session and in special session at the request of any Doe River Basin State.

3. Unless the Council decides otherwise, the venue of regular sessions shall rotate among the Doe River Basin States in alphabetical order, in English. The venue of a special session shall be the same as that of the preceding regular session.

4. Regular sessions shall be chaired by the Doe River Basin State in which they are held. Special sessions shall be chaired by the State that chaired the next preceding regular session.

5. Decisions of the Council shall be taken by consensus.

6. Decisions of the Council are binding on all Doe River Basin States.

Article 24

Functions

1. The Council is the governing body of the Doe River Basin Commission (“Commission”). It may refer matters to the Conference of Heads of State for decision.
2. The Council oversees the effective implementation of the Treaty, serves as a forum for discussion of matters within the scope of its functions and the Treaty, and promotes the full and effective application of the Treaty.

3. The Council adopts, keeps under review and revises as necessary, plans for the coordinated, integrated, and sustainable management and development of the Doe River Basin. Similarly, the Council adopts, keeps under review and revises as necessary rules, procedures, guidelines and criteria for the implementation of the provisions of this Treaty.

4. The Council may establish, and assign responsibilities to any ad hoc committees it considers to be necessary for the proper fulfillment of its functions.

5. The Council approves the annual work programs of the Commission.

6. The Council ensures the financial sustainability of the Commission.

7. The Council approves rules and procedures governing the operations of the Joint Water Board, and the Secretariat, as well as its work program and financial and staff regulations.

8. The Council appoints the Executive Secretary and other senior staff of the Commission.

9. The Council makes determinations concerning the staffing and organizational structure of the Secretariat.
10. The Council examines and makes decisions regarding the determination of equitable and reasonable use of water in each riparian country taking into consideration the factors provided in Article 5, paragraph 2.

11. The Council decides upon a sliding scale of contributions of Doe River Basin States for the financing of the budget of the Commission, and approves the budget of the Commission.

12. Where appropriate, the Council decides upon formulas for cost and benefit sharing by the Contracting States regarding joint projects within the Doe River Basin.


15. The Council will perform other functions where consistent with the purposes of the Commission as it may decide.
SECTION D. THE JOINT WATER BOARD

Article 25

Structure and Procedures

1. The Joint Water Board (the “JWB”) shall be composed of two members from each Contracting State, who shall be senior officials. Delegates may bring other experts to meetings of the JWB as necessary to deal with special questions. These experts should be knowledgeable in fields such as ecology, human resources, planning, and economics, as well as hydraulic engineering.

2. The JWB may establish specialized Working Groups to deal with matters within its competence.

3. The JWB shall propose, for the approval of the Council, its own rules and procedures.

Article 26

Functions

1. The JWB shall prepare for the consideration of the Council cooperative programs for the integrated and sustainable management and development of the Doe River Basin. The JWB shall advise the Council on technical matters relating to the use, development, protection, conservation
and management of the Basin and the Doe River Basin System, including protection from drought and floods.

2. The JWB shall propose to the Council rules, procedures, guidelines and criteria provided for in this Treaty. The JWB shall make proposals to the Council concerning appointment of the Executive Secretary and senior technical staff of the Secretariat, and supervises the Secretariat.

3. The JWB shall make recommendations to the Council on the implementation of the provisions of this Treaty. The JWB recommendations will include decisions regarding the determination of equitable and reasonable use of water by each of the Contracting States, taking into consideration the factors provided in Article 5, paragraph 2. The JWB shall make recommendations to the Council concerning rules and procedures governing the operations of the Secretariat, as well as its work program. When directed to do so by the Council, the JWB shall make recommendations to the Council concerning the modification of the Treaty or the elaboration of protocols.

4. The JWB shall perform such other functions as may from time to time be assigned to it by the Council.
SECTION E. SECTORAL ADVISORY COMMITTEES

Article 27

1. Sectoral Advisory Committees (“SACs”) may be established by the Council to address specific sectoral matters within the competence of the Commission.

2. Unless the Council decides otherwise, a SAC shall be comprised of one member from each of the Contracting States who is an expert in the field of activity of the SAC in question.

3. SACs shall be governed by the rules and procedures applicable to the Commission, given that operational changes will be made as needed.

4. The Council may establish a SAC charged with establishing linkage between sub-basin organizations and the Commission.

Article 28

SACs shall address the tasks assigned to them by the Council.

SECTION F. THE SECRETARIAT

Article 29

Structure

1. The Secretariat shall be headed by an Executive Secretary, who shall be appointed for a three year term by the Council.
2. The Executive Secretary shall be accountable to the Conference through the Council.

3. The Executive Secretary and the officials of the Secretariat shall enjoy in Doe River Basin States the privileges and immunities necessary for the performance of their functions.

4. The staff and structure of the Secretariat shall be determined by the Council on the recommendation of the Conference, taking into account the principle of geographic distribution.

5. The office of the Secretariat shall be situated at the Headquarters of the Commission.

**Article 30**

**Functions**

1. The Executive Secretary shall represent the Commission as to matters specified in the rules and procedures governing its operations and in particular in its relations with international and bilateral assistance institutions and with any Doe River sub-basin institutions or arrangements.

2. The Executive Secretary shall serve as the secretariat for meetings of all organs of the Commission.

3. The Executive Secretary shall be responsible for the administration and finances of the Commission. The Executive Secretary shall prepare a
proposed budget of the Commission and submits it to the Council for review.

4. The Executive Secretary shall prepare, taking into account any relevant information provided by the Contracting States, and shall submit reports to the Council concerning the annual work programs of the Commission.

5. The Secretariat shall assist the JWB with the preparation of a plan for the coordinated, integrated, and sustainable management and development of the Doe River Basin.

6. The Executive Secretary shall be responsible for the carrying out of studies and the performance of other activities proposed by the JWB and authorized by the Council. The Executive Secretary may engage consultants with the approval of the JWB to assist in the performance of these functions.

7. The Secretariat shall compile available data and information and coordinates monitoring of information relating to the Doe River Basin, including information concerning water resources, the environment and socio-economic matters, reviews and synthesizes the information with a view to integrating it into basin-wide databases and establishing standards, and develops mechanisms for the regular exchange of information where needed.
8. The Secretariat shall receive reports from sub-basin organizations and transmits the reports to the Council for its consideration.

9. The Secretariat shall perform any other functions assigned to it by the Council.

10. The Secretariat shall provide other assistance to all organs of the Commission, on their request, concerning matters related to the discharge of their functions.

**PART IV. SUBSIDIARY INSTITUTIONS**

**Article 31**

**Sub-Basin Organizations and Arrangements**

1. The Contracting States shall recognize the utility of sub-basin organizations and arrangements.

2. The Contracting States that are also members of sub-basin organizations or arrangements shall undertake to ensure that the purposes, functions and activities of such organizations and arrangements: Are consistent with those of the Doe River Basin Commission; are consistent with the principles and rules set out in or adopted under this Treaty; and will work in close cooperation with the Doe River Basin Commission.

3. The Doe River Basin Commission shall maintain regular contact, and shall cooperate closely, with any sub-basin organization or arrangement.
PART V. MISCELLANEOUS PROVISIONS

Article 32

Settlement of Disputes

1. In the event of a dispute between two or more Contracting States concerning the interpretation of application of the present Treaty, the States concerned shall, in the absence of an applicable agreement between them, seek a settlement of the dispute by peaceful means in accordance with the following provisions:

(a) If the States concerned cannot reach agreement by negotiation requested by one of them, within a period of six months from the date of filing, they may jointly seek resolution by a Dispute Resolution Panel (“Panel”), whose membership will be established within 90 days of the execution of this Treaty.

(b) The Panel will consist of one member selected by each riparian State. In the case where there is an even number of States, one additional member will be selected by agreement from all States (Indus 1960; Columbia 1961); if an agreement cannot be reached on the appointment of an additional member, the Council of Ministers will appoint that member.

(c) The appointed Panel must reach a decision within six months of written receipt of the dispute (Annex IV).
Article 33

Supplementary Instruments

1. The Contracting States may adopt bilateral or multilateral instruments that supplement the present Treaty, concerning portions of the Doe River Basin or the Doe River System, such as sub-basins and tributaries, or concerning individual projects or programs relating to the Doe River Basin or the Doe River System, or portions thereof.

2. The supplementary instruments referred to in paragraph 1 shall apply the principles of, and be consistent with, the present Treaty.

3. Supplementary instruments may be adopted as Protocols to the present Treaty by consensus by the Contracting States.

PART VI. FINAL CLAUSES

Article 34

Amendment of the Framework or Protocols

1. Amendments to this Treaty may be proposed by any of the Contracting States. Amendments to any protocol may be proposed by any State to that protocol.

2. Amendments to either this Treaty or any protocol shall be adopted at a meeting of the Contracting States.
3. Articles 1, 2, 3, 4, 5, 6, 10, 11, 14, 23, 24, and 32 of the present Treaty may be amended only by consensus. As to proposed amendments to other articles or to any protocol, the Contracting States shall make every effort to reach agreement by consensus. If all efforts at consensus have been exhausted, and no agreement is reached, the amendment shall as a last resort be adopted by a two-thirds majority vote of the Contracting States to the instrument in question present and voting at the meeting, and shall be submitted by the Depositary to all Contracting States for ratification, acceptance or approval.

Article 35

Adoption and Amendment of Annexes

1. The annexes to this Treaty or to any protocol shall form an integral part of the Treaty or of such protocol, as the case may be, and, unless expressly provided otherwise, a reference to this Treaty or its protocols constitutes at the same time a reference to any annexes thereto. Such annexes shall be restricted to procedural, scientific, technical and administrative matters agreed upon by the Contracting States.

2. Except as may be otherwise provided in any protocol with respect to its annexes, the following procedure shall apply to the proposal, adoption and entry into force of additional annexes to any protocol:
(a) Annexes to this Treaty or to any protocol shall be proposed and adopted according to the procedure described in Article 35. In particular, any annex relating to one of the articles listed in paragraph 3 of Article 35, which may be amended only by consensus, must be adopted by consensus;

(b) Any of the Contracting States that are unable to approve an additional annex to this Treaty or an annex to any protocol to which it is party shall so notify the Depositary, in writing, within one year from the date of the communication of the adoption by the Depositary. The Depositary shall without delay notify all Contracting States of any such declaration of objection received. A State may at any time withdraw a previous declaration of objection and the annexes shall thereupon enter into force for that State subject to subparagraph (c) below;

(c) On the expiry of one year from the date of the communication of the adoption by the Depositary, the annex shall enter into force for the Contracting States of this Treaty or to any protocol concerned which have not submitted a notification in accordance with the provisions of subparagraph (b) above.

3. The proposal, adoption and entry into force of amendments to annexes to this Treaty or to any protocol shall be subject to the same
procedure as for the proposal, adoption and entry into force of annexes to the Treaty or annexes to any protocol.

4. If an additional annex or an amendment to an annex is related to an amendment to this Treaty or to any protocol, the additional annex or amendment shall not enter into force until such time as the amendment to the Treaty or to the protocol concerned enters into force.

**Article 36**

**Relationship Between This Treaty and its Protocols**

1. A State may not become a party to a protocol to this Treaty unless it is, or becomes at the same time, a party to this Treaty.

2. Decisions under any protocol shall be taken only by the Contracting States that are party to the protocol concerned. Any Doe River Basin State that has not ratified a protocol may participate as an observer in any meeting of the parties to that protocol.

**Article 37**

**Functions of the Depositary**

The Depositary shall, in particular, inform the Contracting States:

(a) of the deposit of instruments of ratification or accession, or of any other information, declarations or other instruments provided for in the present Treaty.
(b) of the date of the entry into force of the present Treaty.

IN WITNESS WHEREOF the undersigned plenipotentiaries, being duly authorized by their respective Governments, have signed the present Treaty.

Done at ______, this ___day of _____________, 2012.

.................................................................................................
Name, Title and Ministry,
State X

.................................................................................................
Name, Title and Ministry,
State Y

.................................................................................................
Name, Title and Ministry,
State Z
ANNEX I

Management of the Interdependent Surface Water and Groundwater Resource

1. The utilization of the water resources in an equitable and reasonable manner (United Nations 2008; United Nations 1997) involves acknowledgement that the Doe River System consists of: 1a) a surface water resource, and 1b) a groundwater resource. The management of the interdependent nature of these resources by the Contracting States is addressed in (1c).

1a) The surface water resource is defined as those lakes, ponds, reservoirs, rivers, streams, tributaries, and canals that are situated within the geographic entity known as the Doe River Basin.

1b) The groundwater resource consists of two types. One type includes water that seeps into the ground and eventually flows into surface water bodies, thus displaying a hydrologic connection between groundwater and surface water. A second type is defined as water that seeps into the ground but does not interact with surface water; this type is termed “confined groundwater” or “fossil water.”

1c) i. Groundwater Communication. The waters of an aquifer that is intersected by the boundary between two or more States are international
groundwaters and such an aquifer with its waters forms an international basin or part thereof. Those States are Basin States regardless of whether the aquifer communicates with surface water, or whether the aquifer does not interact with surface water and exists as fossil water (ILA 1986).

1c) ii. Groundwater Pollution. Basin States shall prevent or abate the pollution of international groundwaters in accordance with international law applicable to existing, new, increased and highly dangerous pollution. Special consideration shall be given to the long-term effects of the pollution of groundwater (ILA 1986).

1c) iii. Information Exchange. Basin States shall consult and exchange relevant available information and data at the request of any one of them for:

- the purpose of preserving the groundwaters of the Basin from degradation and protecting from impairment of the geologic structure of the aquifers, including recharge areas;

- the purpose of considering joint or parallel quality standards and environmental protection measures applicable to international groundwaters and their aquifers (ILA 1986);

- the purpose of preserving the surface waters of the Basin from degradation;
- the purpose of considering joint or parallel quality standards and environmental protection measures applicable to international surface waters;

- the purpose of establishing equitable and reasonable water allocation among the Contracting States, whether for the purpose of consumption, or water diversion or storage projects for flood control or agriculture, or electric power development. It is acknowledged that the first critical step in the allocation and management of any international water resource is the development of a common set of data, collected on an ongoing basis, and analysis of that data (1c.iv and 1c.v).

1c) iv. Groundwater Data Collection. Basin States shall co-operate, through the Joint Water Board (JWB), for the purpose of collecting and analyzing – on a continuous basis - additional needed information and data pertinent to the international groundwaters or their aquifers. This will include development of a database that identifies all existing groundwater wells, whether used for drinking water, agriculture, or environmental monitoring. A program of water level measurement shall be planned and implemented by the JWB within 90 days upon the execution of this Treaty. Water levels will initially be collected on a monthly basis from each well, and eventually on a weekly basis, if possible. The JWB will manage the collection and
interpretation of water level data, and will publicize this information. The JWB will work to eventually establish a program that collects water quality data such as temperature, pH, and conductivity, and chemical concentration data for contaminants such as metals, fuel constituents, and solvent constituents.

1c) v. Surface Water Data Collection. Basin States shall co-operate, through the JWB, for the purpose of collecting and analyzing - on a continuous basis - additional needed information and data pertinent to the international surface waters of the Basin. Analysis of the water resource includes the measurement of water levels (“stream gauging”) in streams and tributaries of the basin on a daily basis. The purpose of stream gauging is to facilitate making better estimations of seasonal flow and annual flow, which will in turn support JWB engineering studies necessary to plan and implement water allocation measures, including flood control measures and possible water diversion projects. The JWB will manage the collection and interpretation of water level data, and will publicize this information. The JWB will work to eventually establish a program that collects water quality data such as temperature, pH, and conductivity, and chemical concentration data for contaminants such as metals, pesticides, fuel constituents, and solvent constituents.
1c) vi. Conjunctive Water Resource Planning and Management. The JWB shall interpret the collected data and develop a basinwide Conjunctive Water Resources Management Program establishing construction or implementation priorities for the components of the Contracting States’ proposed programs (conjunctive water use refers to simultaneous use of surface water and groundwater to meet demand)(ILA 2004; ILA 1986).

The development of the Conjunctive Water Resources Management Program (CWRMP) will be based upon the collected data and submittals from the Contracting States. The submittals will consist of (a) the respective State’s estimated water requirements for specific projects or categories of uses, including adequate stream flows, for the next five (5) years; (b) the assumptions underlying such estimates, including population projections; and (c) the estimated water supply available to meet such needs identified as to the sources of such supply, whether from surface flows, subsurface waters hydrologically connected to surface flows, non-tributary subsurface waters, imported waters, or developed waters (Muys et al. 2007).

Each State shall also provide the JWB with its plans to supplement such supplies, e.g., construction of new storage, diversion, desalination, watershed restoration, recycling/reuse, or wastewater treatment projects; expansion of existing projects; increased conservation; intrastate, interstate,
or interbasin transfers; or other actions, along with the timing, location, increased yield, estimated cost, and impact on water quality of each component (Muys et al. 2007).

1c) vii. Water Allocation. The Basin States, through the JWB, shall utilize the following water allocation methodology, or a similar methodology, to present annual apportionment of quantities of water to each Contracting State from Basin waters within that state considered adequate to (1) first maintain stream flows to fulfill the requirements of this Treaty and other applicable international agreements, and to maintain a healthy and productive basin-wide ecosystem in designated reaches of the system, in such amounts, and for such seasons or duration as defined by the JWB and (2) provide additional flows to satisfy base apportionment use requirements of the Contracting States as defined by the JWB (Muys et al. 2007).

As depicted in the table below, the requirements to satisfy these uses and certain non-consumptive uses, such as hydroelectric power generation, have been converted to a percentage of flows of the waters of the Doe River Basin. This Treaty further provides for future supplemental apportionment by the JWB of reasonably predictable supplies in excess of the base apportionment to each State on a percentage basis. Supplemental apportionment shall be implemented without fee, or if deemed appropriate
by the JWB, at a reasonable price to be determined by the JWB, based primarily on comparable transactions in the Basin (Muys et al. 2007).

**Base Flow Apportionments**

<table>
<thead>
<tr>
<th>River X</th>
<th>State</th>
<th>Base</th>
<th>Percentage of Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>____ AF</td>
<td>_____ percent</td>
</tr>
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<td></td>
<td>B</td>
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<td></td>
<td>C</td>
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</tbody>
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<table>
<thead>
<tr>
<th>River Y</th>
<th>A</th>
<th>____ AF</th>
<th>_____ percent</th>
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<tbody>
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<td></td>
<td>B</td>
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<td>_____ percent</td>
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<tr>
<td></td>
<td>C</td>
<td>____ AF</td>
<td>_____ percent</td>
</tr>
</tbody>
</table>

The Basin’s estimated safe annual yield of _____ acre feet (AF) to satisfy the base apportionments is based on an analysis of the average annual and seasonal flows for the entire period of record, the driest 10-year period.
of record, and the wettest 10-year period of record, taking into account existing surface and underground storage facilities.

Entire period of record  ___ AF
Driest ten-year period  ___ AF
Wettest ten-year period ___AF

Consequently, the base apportionment of _____ AF of flows is determined to be reasonably secure, as is the availability of excess water for further supplemental apportionments. If future availability deviates substantially from these water supply estimates so that the base or supplemental apportionments cannot be satisfied, the JWB is authorized to make appropriate equitable reductions (Muys et al. 2007).

The JWB shall also develop criteria for the allocation of such shortages among the Contracting States and specific triggers for the implementation of such use curtailments. If unanticipated impacts of an individual State’s programs should substantially, disproportionately, and adversely affect another State’s apportionment, the JWB shall allocate that burden pro rata among all of the Contracting States based on their respective shares of the
total Basin apportionments unless the Contracting States agree on another formula (Muys et al. 2007).

1c) viii. Water Allocation Documentation. The Contracting States, through the JWB, are hereby mandated to create a record of the actual data and the projections relied upon by negotiators of the States in the course of establishing water allocation amounts assigned to each State. Creating a record of this information will insure that there can be no disagreement if and when the States’ expectations are not realized, and adjustments are deemed necessary (Muys et al. 2007).

1c) ix. Transfers of Apportionments. Contracting States may make such portion of their unused base apportionments or any supplemental apportionments available to other states or to the Commission for such periods, upon such terms and conditions, and for such consideration, if any, as the parties may negotiate unless the JWB after notice and hearing disapproves the transfer after determining that it would cause substantial injury to another signatory party (Muys et al. 2007).

1c) x. Monitoring of Apportionment Usage. The JWB shall monitor water usage throughout the Basin and enforce the Treaty apportionments, giving credit for the use of imported or developed water. It shall provide de minimis exemptions for various kinds of uses, recognize a reasonable
margin of error in measurement methodology, employ a system of debits and credits for under- and over-uses or deliveries with provision for a quantity limitation on such debits and requiring overuse payback over a reasonable period, and establish similar reasonable rules and procedures to monitor the apportionments in an equitable and efficient fashion (Muys et al. 2007).

**ANNEX II**

**Flood Control and Emergency Contingency Plans**

1. Flood Control Operating Plan. Utilizing data collected and interpreted in Annex I, the Joint Water Board (JWB) will prepare, within one year of the ratification of this Treaty, a draft Flood Control Operating Plan. The primary purpose of the Plan is to identify those areas within the Doe River Basin that are most susceptible to flood hazards and pose the most risk to human health and ecological concerns, and to develop a plan to prepare for and reduce risk during flood events.

2. Emergency Contingency Plans. In order to reduce risk to human health and ecological concerns, in response to not only floods but other natural or man-induced disasters, the JWB and/or their designated organizations will develop Contingency Plans within one year of the ratification of this Treaty.

The Contingency Plans shall provide for:
(a) pre-emergency preparedness and training; the emergency period management; and post-emergency management and recovery.

(b) initial and ongoing communications by word-of-mouth through trained emergency staff and message reader boards at designated community locations in undeveloped areas; and a telephone emergency number and radio station and computer emergency messaging.

(c) evacuation plans; and operation of active emergency centers and staging areas to send and receive victims, staff, and provisions.

3. Flood Control Facilities. The JWB will oversee the construction and operation of projects and facilities deemed necessary or desirable for flood damage prevention or reduction. The JWB shall store and release waters within the Basin, in such manner, at such times, and under such regulations developed in consultation with sub-basin organizations, as it deems appropriate to meet various flood conditions (Muys et al. 2007).

4. Flood Plain Zoning. The JWB may determine the extent of the flood plains in the Basin and may establish encroachment lines and delineate the areas subject to flood, including a classification of lands with reference to relative risk of flood and the establishment of standards for flood plain use that will safeguard the public health, safety, and property. The JWB may facilitate one or more Contracting State’s entry into agreements to provide
technical and financial aid to another Contracting State or its political subdivisions for the administration and enforcement of any ordinances or regulations implementing such standards (Muys et al. 2007).

5. Flood Control Standards. The JWB may establish standards governing the uses of land in areas subject to flooding by waters in the Basin. Such standards shall not restrict the power of the Contracting States or their political subdivisions to adopt more restrictive standards.

5. Land Ownership for Flood Control. If unanimously agreed to by the Contracting States, the Doe River Basin Commission may acquire any interest in lands and improvements thereon within an established flood plain for the purpose of restricting the use of such property so as to minimize flood hazards and to implement its flood plain restrictions. The JWB will facilitate such acquisitions and oversee the management of such property.

ANNEX III

Enforcement

1. Alleged Violation and Response. Upon the basis of documented observation or monitoring, or substantial verified factual evidence from a reliable, identified third party that a Contracting State is (a) not maintaining required stream flows, (b) impermissibly exceeding its Treaty apportionment, or (c) permitting point source discharges or non-point source
land use practices or activities that are violating Treaty approved water quality standards, the Commission shall request the representative for that State to respond to such allegation in writing within 30 days. Such response shall either (a) concede the accuracy of the facts underlying the allegation, but assert that the situation is attributable to specified actions or force majeure events beyond its control; (b) concede the accuracy of the allegation and propose a schedule for detailed remedial action to be funded solely by such member; or (c) dispute, with specification, the allegation in whole or part and request further consultation with the Commission (Muys et al. 2007).

2. Concession. A member’s formal concession of a violation before the Commission and implementation of a Commission-approved plan for remedial action shall excuse such member from liability to any Commission member or that member’s State for any damages sustained as a result of such violation, provided that nothing herein shall adversely affect the rights of private parties to damages (Muys et al. 2007).

3. Resolution. The Commission member’s response shall be promptly referred to the Conference of Heads of State and Government (“the Conference”), the supreme policy-making organ of the Commission, for review and submittal of a recommended course of action to the Commission.
within 30 days. With respect to the concessions in (1), the Conference shall recommend that either (a) the alleged violation be excused by the Commission as beyond the member’s control, (b) the member’s proposed remedial action be approved, or (c) the member’s proposed remedial action be modified and approved in whole or part (Muys et al. 2007).

4. Dispute Resolution. With respect to the member’s disputation of the allegation, if further discussions do not resolve the dispute within 45 days, the dispute resolution procedures detailed in Annex IV may be initiated by any Commission member. No Contracting State shall sue for damages during the pendency of such proceedings before the Commission (Muys et al. 2007).

5. Sanctions. Failure to resolve the dispute through the dispute resolution process shall authorize the Commission to (a) suspend the voting rights of the alleged offending party under the Treaty; (b) suspend any ongoing or planned implementation of Commission projects or programs benefitting that party, including supplemental apportionments; or (c) as a last resort, take appropriate judicial action through the International Court of Justice for injunctive relief to remedy the alleged violation and allow the Contracting States to seek damages for such violation (Muys et al. 2007).
ANNEX IV

Dispute Resolution Panel

1. The Dispute Resolution Panel (“Panel”) will consist of one member selected by each Contracting State. In the case where there is an even number of States, one additional member will be selected by agreement from all States.

2. The Panel will elect a Chairman by simple majority vote. The Chairman will also be one of the members selected by each Contracting State. In the selection of Chairman, each member will vote for a Chairman, and in the event of a tie, the Council of Ministers will appoint the Chairman.

3. The Panel shall determine its own procedure.

4. The Contracting States concerned have the obligation to provide the Panel with such information as it may require and, on request, to permit the Panel to have access to their respective territory and to inspect any facilities, plant, equipment, construction or natural feature relevant for the purpose of its inquiry.

5. The Panel shall adopt its report by a simple majority vote, with each member empowered with one vote, and shall submit that report to the States concerned within six months of written receipt of the dispute, setting forth its findings and the reasons therefore and such recommendations as it deems
appropriate for an equitable solution of the dispute, which the States concerned shall consider in good faith.

6. The expenses of the Panel shall be borne equally by the States concerned.

References


Muys et al. 2007. Muys, J.C., Sherk, G.W. and O’Leary, M.C. Utton

*Transboundary Resources Center Model Interstate Water Compact.*

Utton Transboundary Resources Center, University of New Mexico

School of Law. Albuquerque, New Mexico.


The States of the Nile River Basin. 17 May.


Uses of International Watercourses, United Nations Document


SADC (South African Development Community) 2000. Revised Protocol on Shared Watercourses in the Southern African Development

Community. Windhook, Article 1 (1) (definition of “watercourse”). 7 August.


APPENDIX B

A PROPOSED TRANSBOUNDARY AGREEMENT (TBA) FOR THE PILCOMAYO RIVER BASIN OF ARGENTINA, BOLIVIA AND PARAGUAY

Title: Template Treaty for Pilcomayo River Basin

Parties: Argentina, Bolivia, Paraguay

Basin: Pilcomayo River Basin

Date: 12/12/12

Argentina – Bolivia – Paraguay: Treaty For Pilcomayo River Basin

Cooperation

Preamble

Argentina, Bolivia, and Paraguay (“Contracting States”) of the Pilcomayo River Basin,

Conscious of the importance of the integrated management of the water resources for social well-being and economic development for the peoples of the States of the Pilcomayo River Basin, which includes the surface water bodies and subsurface waters (i.e., groundwater) of the Basin, regardless of whether or not the groundwater is hydrologically connected to surface water;
Inspired by the common goal to promote the harmonious development of the Pilcomayo River Basin, to permit an equitable distribution of the benefits of said development among the Basin States so as to raise the standard of living of their peoples;

Conscious that both socioeconomic development and conservation of the water resources and associated ecological habitat are inherent responsibilities in the sovereignty of each State, and that it is vital to maintain a balance between economic growth and environmental protection;

Convinced that it is in their mutual interest to establish an organization to promote the management and sustainable development of the Pilcomayo River Basin for the benefit of all;

Mindful of the global initiatives for promoting cooperation on integrated management and sustainable development of the water resources, Resolve to sign the following Treaty:

Article 1

Scope of the Treaty

This Treaty addresses the use, development, protection, conservation and management of the Pilcomayo River Basin water resources and associated ecological habitat, and establishes an institutional mechanism for cooperation among the Contracting States.
Article 2

Use of Terms

For the purposes of this Treaty:

(a) “Watercourse” means a system of surface waters and groundwaters constituting by virtue of their physical proximity – and not necessarily their hydrologic connectivity – a unitary whole.

(b) “International Watercourse” means a watercourse, parts of which are situated in different States;

(c) “Pilcomayo River Basin” means the geographical area determined by the watershed limits of the Pilcomayo River System of waters; this term is used where there is reference to environmental protection, conservation or development;

(d) “Pilcomayo River System” means the Pilcomayo River and the surface waters and groundwaters that are related to the Pilcomayo River, which includes groundwater aquifers that may extend beyond the geographic boundary of the Pilcomayo River Basin;

(e) “Treaty” means this Treaty and its Annexes;

(f) “Contracting States” are the Pilcomayo River Basin States, which are the signatory parties of this Treaty, i.e., States, Argentina, Bolivia, and Paraguay.
(g) “Water security” means the right of all Pilcomayo River Basin States to reliable access to and use of the Pilcomayo River System for health, agriculture, livelihoods, development and environment.

(h) “Union of South American Nations” is an international group of South American countries, of which Argentina, Bolivia and Paraguay are a part.

(i) “Conjunctive Water Use” refers to simultaneous use of surface water and groundwater to meet demand.

(j) “Panel” or “Dispute Resolution Panel” refers to a third party organization formed to conduct dispute resolution.

(l) “Commission” or “Pilcomayo River Basin Commission” is the governing body of this Treaty. It is comprised of (i) Conference of Heads of State and Government, (ii) Council of Ministers, (iii) Joint Water Board, (iv) Sectoral Advisory Committees, and (v) Secretariat.

(m) “Conference” or “Conference of Heads of State and Government” is composed of Heads of State and Government of Pilcomayo River Basin States, and shall be the supreme policy-making organ of the Commission.

(o) “Council” or “Council of Ministers” is composed of the Minister for Water Affairs of each Pilcomayo River Basin State and other ministers according to the agenda of the Commission, and is the governing body of the Commission.
(p) “Board” or “Joint Water Board” refers to the group designated by the Contracting States to address all relevant water management issues as defined under this Treaty.

(q) “Committees” or “Sectoral Advisory Committees” refer to groups that will address specific sectoral matters within the competence of the Commission.

(r) “Secretariat” refers to the organization that includes the Executive Secretary, which manages the administration and finances of the Commission.

Article 3

Effective Date and Duration of Treaty

1. Effective Date. This Treaty, after legislative ratification by each of the signatory Contracting States, shall become operative and enter into force on the sixtieth day following the date of ratification. The original of the present Treaty, of which the English and Spanish texts are equally authentic, shall be deposited with the Union of South American Nations, which shall send certified true copies thereof to the Contracting States.

2. Registration. In conformity with Article 102 of the Charter of the United Nations, the Treaty shall be registered by Paraguay with the Secretariat of the United Nations.
3. Duration. The initial term of the Treaty shall be twenty-five (25) years from its effective date. No later than two (2) years prior to the expiration of the initial or any renewal term, the Contracting States shall notify the Union of South American Nations whether they propose (a) an additional twenty-five year (25) or other length term without any change in the Treaty’s provisions; (b) an additional twenty-five year (25) or other length term with certain amendments to the Treaty, which shall have been approved by the Contracting States and shall accompany the notification; or (c) termination of the Treaty, accompanied by the proposed terms of such termination, which shall include, at a minimum, proposals to satisfy the requirements of this Article 3 (3). Whichever option is exercised shall require unanimous approval of the Contracting States.

4. Termination. Termination of the Treaty shall be subject to the following conditions, at a minimum:

(a) Satisfaction of all outstanding financial obligations of the Contracting States;

(b) Preservation of all valid existing rights derived from this Treaty in the waters covered by the Treaty; and
(c) Preservation of all environmental protection obligations assumed by the Contracting States.

5. Modification or Amendment. This Treaty may be modified or amended by the unanimous action of the all Contracting States. Any signatory party may withdraw from this Treaty upon two (2) years’ notice to the other signatory parties and the Union of South American Nations.

PART 1. GENERAL PRINCIPLES

Article 4

General Principles

The Pilcomayo River System shall be protected, used, conserved and developed in accordance with the following general principles, consistent with the overriding Basin-wide objectives of responsible management of the water resources and associated ecological habitat.

1. Cooperation, and Community of Interest. The principle of cooperation between the Contracting States and the principle of a community of interest amongst the States of the Pilcomayo River Basin, on the basis of sovereign equality, mutual benefit and good neighborliness in order to obtain optimal utilization, adequate protection and conservation of the Pilcomayo River Basin as the States pursue social and economic development.
2. **Equitable and Reasonable Utilization.** The principle of equitable and reasonable utilization, by each Basin State within its territory, of the surface waters and groundwaters of the Pilcomayo River System.

3. **Obligation to Not Cause Significant Harm.** The principle of an obligation to not cause significant harm to the Contracting States of the Pilcomayo River Basin.

4. **Ecological Protection, Conservation & Sustainability.** The principle that the Contracting States take all appropriate measures, individually and, where appropriate, jointly, for the protection, conservation and sustainable development of the Pilcomayo River Basin and its ecosystems.

5. **Navigation.** The principle of freedom of movement on the entire navigable portion of the watercourse and the responsibility of maintenance of that portion of the watercourse within the respective riparian’s jurisdiction.

6. **Subsidiarity.** The principle of subsidiarity, whereby development of the Pilcomayo River Basin water resources recognizes the utility of sub-basin organizations and arrangements;

7. **Exchange of Information and Data.** The principle that the Contracting States execute the regular and reciprocal exchange of
information and data on planned measures and on existing measures related
to the condition of the water resources of the Basin, where possible in a form
that facilitates its utilization by the States to which it is communicated.

8. Environmental Impact Assessments and Audits. The principle of
environmental impact assessment of planned measures, and the principle of
environmental auditing of measures in progress or completed.

9. Peaceful Resolution of Disputes. The principle of the peaceful
resolution of disputes through the Joint Water Board or, if necessary, a third
party body (“Dispute Resolution Panel”) consisting of representatives
selected by the Contracting States (see Article 32).

10. Prevention and Mitigation of Harmful Conditions and
Management of Emergency Conditions. The principle of reduction or
elimination of harmful conditions from human activity such as disease or
natural causes such as floods, and establishment of contingency plans.

11. Protection in Times of Armed Conflict. The principle that
facilities and installations associated with water resources shall enjoy the
protection of established rules of international law during times of armed
conflict.

12. Water Security. The principle that each Contracting State has the
right to reliable access to and use of the Pilcomayo River System for health,
environmental protection including agricultural production, livelihoods, and economic development.

PART II. RIGHTS AND OBLIGATIONS

Article 5

Equitable and Reasonable Utilization

1. Contracting States shall, in their respective territories, utilize the water resources of the Pilcomayo River System and the Pilcomayo River Basin in an equitable and reasonable manner. Each Basin State is entitled to an equitable and reasonable share in the beneficial uses of the water resources. In particular, the volume of the water resources shall be used fairly and proportionately, and developed by the Basin States with the objective of attaining optimal and sustainable utilization, and in a manner consistent with environmental protection of those water resources. Fundamentally, equitable and reasonable utilization of the resource involves the maintenance of stream and river flow levels to meet the vital human needs of the populations of the Contracting States and the Basin ecosystem.

2. To ensure that the Contracting States utilize the water resources in an equitable and reasonable manner, the Basin States shall, as facilitated by the Joint Water Board, take into account the following:
a. Geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character;
b. The social and economic needs of the Contracting States;
c. The population dependent on the water resources in each Basin State;
d. The effects of the use or uses of the water resources in one Basin State on other Basin States;
e. Existing and potential uses of the water resources;
f. Conservation, protection, development and economy of use of the water resources and the costs of measures taken to that effect;
g. The availability of alternatives, of comparable value, to a particular planned or existing use;
h. The volumetric contribution of each Basin State to the waters of the Pilcomayo River System, with regard to water allocation, and with regard to water diversion or storage projects for flood control or agriculture or hydroelectric power development (Annex I);
i. The extent and proportion of the drainage area in the territory of each Basin State.

3. The weight to be given to each factor a. through i. is to be determined by its importance in comparison with that of other relevant factors. In determining what is a reasonable and equitable use, all relevant
factors are to be considered together and a conclusion reached on the basis of the whole.

**Article 6**

**Obligation to Not Cause Significant Harm**

1. Pilcomayo River Basin States shall, in utilizing Pilcomayo River System water resources in their territories, take all appropriate measures to prevent the causing of significant harm to other Basin States.

2. Pilcomayo River Basin States shall, individually and, where appropriate, jointly through cost-sharing by the Contracting States that may be affected, make every effort to take all appropriate measures to prevent or mitigate conditions related to the Pilcomayo River System that may be harmful to the Contracting States, whether resulting from human conduct or natural causes, such as flood conditions, invasive water weeds, water-borne diseases, siltation (silting), erosion, drought, or desertification. In implementing this provision, Pilcomayo River Basin States shall take into account guidelines to be developed by the Joint Water Board (Annex II).

3. Where significant harm nevertheless is caused to another Pilcomayo River Basin State, the State, whose use causes such harm shall, in the absence of agreement to such use, take all appropriate measures, having due regard to the provisions of Article 4 above, in consultation with the affected
State, to eliminate or mitigate such harm and, where appropriate, to discuss the question of compensation.

(a) The Contracting States will be liable to the other and shall make appropriate compensation to the other with respect to any act, failure to act, omission or delay amounting to a breach of the Treaty or of any of its provisions, other than an act, failure to act, omission or delay occurring by reason of war, strike, major calamity, act of God, uncontrollable force or maintenance curtailment.

(b) Except as provided in (a), none of the Contracting States shall be liable to the other or to any person in respect of any injury, damage or loss occurring in the territory of another Contracting States caused by any act, failure to act, omission or delay under the Treaty whether the injury, damage or loss results from negligence or otherwise.

(c) The Commission will establish procedures and criteria for compensation. In the case of floods, a basin State is not liable to pay compensation for damage caused to another basin State by floods originating in that basin State unless it has acted contrary to what could be reasonably expected under the circumstances, and unless the damage caused is substantial. In the case of a breach of a State’s international obligations relating to water pollution in an international drainage basin, that State shall cease the
wrongful conduct and shall pay compensation for the injury resulting therefrom.

4. When one or more of the Contracting States allege substantial harm by another Contracting State, based upon documented observation or monitoring, or substantial verified factual evidence from a reliable, identified third party, the Commission shall request the representative for that State to respond to such allegation in writing within 30 days. The enforcement process, beginning with providing the allegation in writing, is presented in Annex III. If the allegation is not resolved, the dispute resolution process provided in Annex IV will then be invoked.

**Article 7**

**Ecological Protection, Conservation and Sustainability**

1. Pilcomayo River Basin States shall take all appropriate measures, individually or jointly, to protect, conserve, sustain, and where necessary, rehabilitate the Pilcomayo River Basin and its ecosystems, in particular, by:

(a) protecting and conserving water quality within the Pilcomayo River Basin;

(b) preventing the introduction of species, alien or new, into the Pilcomayo River System which may have effects detrimental to the ecosystems of the Pilcomayo River Basin;
(c) protecting and conserving biological diversity within the Basin;
(d) protecting and conserving wetlands within the Basin; and
(e) restoring and rehabilitating the degraded natural resource base.

2. The Contracting States shall, through the Joint Water Board, take steps to harmonize their policies in relation to the provisions of this Article.

Article 8

Navigation

1. This Article refers to those river and lake portions which are both navigable and separate or traverse the territories of two or more of the Contracting States.

2. Rivers or lakes are navigable if in their natural or canalized state they are currently used for commercial navigation or are capable by reason of their natural condition of being so used.

3. In this Article, the term “riparian State” refers to a Contracting State through or along which the navigable portion a river flows or a lake lies.

4. Subject to any limitations or qualifications referred to in this Treaty, each riparian State is entitled to enjoy rights of free navigation on the entire course of a river or lake.

5. “Free navigation,” as this term is used in this Article, includes the following freedoms for vessels of a riparian State on the basis of equality:
(a) freedom of movement on the entire navigable course of the river or lake;
(b) freedom to enter ports and to make use of plants and docks; and
(c) freedom to transport goods and passengers, either directly or through trans-shipment, between the territory of a riparian State and the open sea.

6. A riparian State may exercise rights of police, including but not limited to the protection of the public safety and health, over that portion of the river or lake subject to its jurisdiction, provided the exercise of such rights does not unreasonably interfere with the enjoyment of the rights of free navigation defined in this Article.

7. Each riparian State may restrict or prohibit the loading by vessels of a foreign State of goods and passengers in its territory for discharge in such territory.

8. A riparian State may grant rights of navigation to non-riparian States on rivers or lakes within its territory.

9. Each riparian State is, to the extent of the means available or made available to it, required to maintain in good order that portion of the navigable course of a river or lake within its jurisdiction.

10. The rules stated in this Article are not applicable to the navigation of vessels of war or of vessels performing police or administrative functions, or, in general, exercising any other form of public authority.
11. In time of war, other armed conflict or public emergency
constituting a threat to the life of a State, a Contracting State may take
measures derogating from its obligations under this Article to the extent
strictly required by the exigencies of the situation, provided that such
measures are not inconsistent with its other obligations under international
law. The Contracting State shall in any case facilitate navigation for
humanitarian purposes.

Article 9

Subsidiarity

Contracting States shall plan, implement and develop the Pilcomayo
River Basin water resources at the most efficient level by:

(a) recognizing the utility of sub-basin organizations and arrangements;
(b) allowing all those within a State who will or may be affected by a project
in that State to participate in an appropriate way in the planning and
implementation process;
(c) make every effort to ensure that the project and any related agreement is
consistent with the overriding Basin-wide objectives of responsible
management of the water resources and associated ecological habitat.
Article 10

Regular Exchange of Data and Information

1. In pursuance of their cooperation concerning the use, development and protection of the Pilcomayo River Basin and its water resources, Pilcomayo River Basin States shall on a regular basis exchange readily available and relevant data and information through the Joint Water Board, on both planned and existing measures and on the condition of water resources of the Basin, where possible in a form that facilitates its utilization by the States to which it is communicated.

2. If a Pilcomayo River Basin State is requested by another Basin State to provide data or information that is not readily available, it shall employ its best efforts to comply with the request but may condition its compliance upon payment by the requesting State of the reasonable costs of collecting and, where appropriate, processing such data or information.

3. In the implementation of their obligations under Paragraph 1 and 2, Pilcomayo River Basin States agree to observe procedures to be developed by the Joint Water Board.
Article 11

Environmental Impact Assessment and Audits

1. For planned measures that may have significant adverse environmental effects, Pilcomayo River Basin States shall, at an early stage, undertake a comprehensive assessment of those effects with regard to their own territories and the territories of the other Contracting States.

2. The criteria and procedures for determining whether a planned measure is likely to have significant adverse environmental effects shall be developed by the Joint Water Board.

3. Where circumstances so warrant, according to criteria to be developed by the Joint Water Board, a Contracting State that has implemented measures of the kind referred to in paragraph 1 shall conduct an audit of the environmental impacts of those measures. That State shall enter into consultations relating to the audit with the Contracting States affected by the measures upon their request.

4. The Joint Water Board, taking into account legislation that pertains to the Contracting States, shall adopt criteria for carrying out audits of measures that exist at the date of the entry into force of this Treaty.

5. Contracting States shall periodically carry out audits of measures existing at the date of the entry into force of this Treaty in accordance with
legislation that pertains to the Contracting States, and in accordance with criteria adopted by the Joint Water Board under this Treaty.

**Article 12**

**Prevention and Mitigation of Harmful Conditions and Management of Emergency Conditions**

1. The Contracting States shall individually, and where appropriate, jointly, through cost-sharing by the Pilcomayo River Basin State or States that may be affected, make every effort to take all appropriate measures to prevent or mitigate conditions related to the Pilcomayo River System that may be harmful to other Basin States, whether resulting from human conduct or natural causes, such as flood conditions, invasive water weeds, water-borne diseases, siltation (silting), erosion, drought or desertification. In implementing this provision, the Basin States shall take into account guidelines to be developed by the Joint River Board.

2. For the purposes of this provision, “emergency” means a situation that causes, or poses an imminent threat of causing, serious harm to Pilcomayo River Basin States or other States and that results suddenly from natural causes, such as floods, landslides or earthquakes, or from human conduct, such as industrial accidents.
(a) Contracting State shall immediately notify other potentially affected States and competent international organizations of any emergency in its territory.

(b) The Contracting State within whose territory an emergency originates shall, in cooperation with potentially affected States and, where appropriate, competent international organizations, immediately take all practicable measures necessitated by the circumstances to prevent, mitigate and eliminate harmful effects from the emergency.

(c) The Joint Water Board (JWB) will develop contingency plans (Annex II) for responding to emergencies in cooperation with other affected States and supportive international organizations.

**Article 13**

**Protection of the Pilcomayo River Basin and Related Installations in Time of Armed Conflict**

In times of armed conflict, the Pilcomayo River System and its associated facilities shall enjoy the protection accorded by the principles and rules of international law and international humanitarian law, whether the conflict occurs within a respective State or internationally, or whether the conflicting parties originate from one or more States.
Article 14

Water Security

Mindful of the provisions of Articles 4 and 5, the Contracting States acknowledge the vital importance of maintaining water security, defined as the right to reliable access to and use of the Pilcomayo River System for health, environmental protection including agricultural production, livelihoods, and economic development. The States also acknowledge the necessity for cooperative management and development of waters of the Pilcomayo River System, in order to achieve water security. Therefore, the Contracting States agree to work cooperatively through the Joint Water Board, and all other appropriate means, to achieve and sustain water security.

PART III. INSTITUTIONAL STRUCTURE

SECTION A. THE PILCOMAYO RIVER BASIN COMMISSION

ARTICLE 15

Establishment

The Pilcomayo River Basin Commission is hereby established by the Pilcomayo River Basin States.
ARTICLE 16

Purpose and Objective

The purpose and objective of the Commission is to:

(a) Serve as an institutional framework that will facilitate and promote closer cooperation among the Contracting States.

(b) Facilitate and promote the principles, rights, and obligations provided for in this Treaty.

ARTICLE 17

Organs

The Pilcomayo River Basin Commission ("Commission") is comprised of:

(a) Conference of Heads of State and Government

(b) Council of Ministers

(c) Joint Water Board

(d) Sectoral Advisory Committees

(e) Secretariat

ARTICLE 18

Headquarters

The headquarters of the Commission shall be situated in Asuncion, Paraguay.
ARTICLE 19

Legal Status

1. The Commission is established as an intergovernmental organization and shall enjoy international legal personality, with such legal capacity as may be necessary for the performance of the functions, in particular, the capacity to enter into agreements, to incur obligations, to receive donations, to enforce the provisions of the Treaty, and to sue and be sued in its own name.

2. The Commission and its officials shall, in the territory of each Contracting State, enjoy such privileges and immunities as are necessary for the performance of their functions under this Treaty.

3. The privileges and immunities referred to under this article shall be provided for in detail in a Protocol to this Treaty.

SECTION B. THE CONFERENCE OF HEADS OF STATE AND GOVERNMENT

Article 20

Structure and Procedure

2. The Conference shall establish its own rules and procedures.

**Article 21**

**Functions**

The Conference shall be the supreme policy-making organ of the Commission.

**SECTION C. THE COUNCIL OF MINISTERS**

**Article 22**

**Structure**

The Council of Ministers (the “Council”) shall be composed of the Minister for Water Affairs of each Pilcomayo River Basin State and other ministers according to the agenda of the Commission.

**Article 23**

**Procedures**

1. Except as otherwise provided, the Council shall establish its own rules and procedures.

2. The Council shall convene once a year in regular session and in special session at the request of any Pilcomayo River Basin State.

3. Unless the Council decides otherwise, the venue of regular sessions shall rotate among the Pilcomayo River Basin States in alphabetical order, in
Spanish. The venue of a special session shall be the same as that of the preceding regular session.

4. Regular sessions shall be chaired by the Pilcomayo River Basin State in which they are held. Special sessions shall be chaired by the State that chaired the next preceding regular session.

5. Decisions of the Council shall be taken by consensus.

6. Decisions of the Council are binding on all Pilcomayo River Basin States.

**Article 24**

**Functions**

1. The Council is the governing body of the Pilcomayo River Basin Commission (“Commission”). It may refer matters to the Conference of Heads of State for decision.

2. The Council oversees the effective implementation of the Treaty, serves as a forum for discussion of matters within the scope of its functions and the Treaty, and promotes the full and effective application of the Treaty.

3. The Council adopts, keeps under review and revises as necessary, plans for the coordinated, integrated, and sustainable management and development of the Pilcomayo River Basin. Similarly, the Council adopts,
keeps under review and revises as necessary rules, procedures, guidelines and criteria for the implementation of the provisions of this Treaty.

4. The Council may establish, and assign responsibilities to any ad hoc committees it considers to be necessary for the proper fulfillment of its functions.

5. The Council approves the annual work programs of the Commission.

6. The Council ensures the financial sustainability of the Commission.

7. The Council approves rules and procedures governing the operations of the Joint Water Board, and the Secretariat, as well as its work program and financial and staff regulations.

8. The Council appoints the Executive Secretary and other senior staff of the Commission.

9. The Council makes determinations concerning the staffing and organizational structure of the Secretariat.

10. The Council examines and makes decisions regarding the determination of equitable and reasonable use of water in each riparian country taking into consideration the factors provided in Article 5, paragraph 2.
11. The Council decides upon a sliding scale of contributions of Pilcomayo River Basin States for the financing of the budget of the Commission, and approves the budget of the Commission.

12. Where appropriate, the Council decides upon formulas for cost and benefit sharing by the Contracting States regarding joint projects within the Pilcomayo River Basin.


15. The Council will perform other functions where consistent with the purposes of the Commission as it may decide.

SECTION D. THE JOINT WATER BOARD

Article 25

Structure and Procedures

1. The Joint Water Board (the “JWB”) shall be composed of two members from each Contracting State, who shall be senior officials. Delegates may bring other experts to meetings of the JWB as necessary to deal with special questions. These experts should be knowledgeable in
fields such as ecology, human resources, planning, and economics, as well as hydraulic engineering.

2. The JWB may establish specialized Working Groups to deal with matters within its competence.

3. The JWB shall propose, for the approval of the Council, its own rules and procedures.

**Article 26**

**Functions**

1. The JWB shall prepare for the consideration of the Council cooperative programs for the integrated and sustainable management and development of the Pilcomayo River Basin. The JWB shall advise the Council on technical matters relating to the use, development, protection, conservation and management of the Basin and the Pilcomayo River Basin System, including protection from drought and floods.

2. The JWB shall propose to the Council rules, procedures, guidelines and criteria provided for in this Treaty. The JWB shall make proposals to the Council concerning appointment of the Executive Secretary and senior technical staff of the Secretariat, and supervises the Secretariat.

3. The JWB shall make recommendations to the Council on the implementation of the provisions of this Treaty. The JWB recommendations
will include decisions regarding the determination of equitable and reasonable use of water by each of the Contracting States, taking into consideration the factors provided in Article 5, paragraph 2. The JWB shall make recommendations to the Council concerning rules and procedures governing the operations of the Secretariat, as well as its work program. When directed to do so by the Council, the JWB shall make recommendations to the Council concerning the modification of the Treaty or the elaboration of protocols.

4. The JWB shall perform such other functions as may from time to time be assigned to it by the Council.

SECTION E. SECTORAL ADVISORY COMMITTEES

Article 27

1. Sectoral Advisory Committees (“SACs”) may be established by the Council to address specific sectoral matters within the competence of the Commission.

2. Unless the Council decides otherwise, a SAC shall be comprised of one member from each of the Contracting States who is an expert in the field of activity of the SAC in question.

3. SACs shall be governed by the rules and procedures applicable to the Commission, given that operational changes will be made as needed.
4. The Council may establish a SAC charged with establishing linkage between sub-basin organizations and the Commission.

**Article 28**

SACs shall address the tasks assigned to them by the Council.

**SECTION F. THE SECRETARIAT**

**Article 29**

**Structure**

1. The Secretariat shall be headed by an Executive Secretary, who shall be appointed for a three year term by the Council.

2. The Executive Secretary shall be accountable to the Conference through the Council.

3. The Executive Secretary and the officials of the Secretariat shall enjoy in Pilcomayo River Basin States the privileges and immunities necessary for the performance of their functions.

4. The staff and structure of the Secretariat shall be determined by the Council on the recommendation of the Conference, taking into account the principle of geographic distribution.

5. The office of the Secretariat shall be situated at the Headquarters of the Commission.
Article 30

Functions

1. The Executive Secretary shall represent the Commission as to matters specified in the rules and procedures governing its operations and in particular in its relations with international and bilateral assistance institutions and with any Pilcomayo River sub-basin institutions or arrangements.

2. The Executive Secretary shall serve as the secretariat for meetings of all organs of the Commission.

3. The Executive Secretary shall be responsible for the administration and finances of the Commission. The Executive Secretary shall prepare a proposed budget of the Commission and submits it to the Council for review.

4. The Executive Secretary shall prepare, taking into account any relevant information provided by the Contracting States, and shall submit reports to the Council concerning the annual work programs of the Commission.

5. The Secretariat shall assist the JWB with the preparation of a plan for the coordinated, integrated, and sustainable management and development of the Pilcomayo River Basin.
6. The Executive Secretary shall be responsible for the carrying out of studies and the performance of other activities proposed by the JWB and authorized by the Council. The Executive Secretary may engage consultants with the approval of the JWB to assist in the performance of these functions.

7. The Secretariat shall compile available data and information and coordinates monitoring of information relating to the Pilcomayo River Basin, including information concerning water resources, the environment and socio-economic matters, reviews and synthesizes the information with a view to integrating it into basin-wide databases and establishing standards, and develops mechanisms for the regular exchange of information where needed.

8. The Secretariat shall receive reports from sub-basin organizations and transmits the reports to the Council for its consideration.

9. The Secretariat shall perform any other functions assigned to it by the Council.

10. The Secretariat shall provide other assistance to all organs of the Commission, on their request, concerning matters related to the discharge of their functions.
PART IV. SUBSIDIARY INSTITUTIONS

Article 31

Sub-Basin Organizations and Arrangements

1. The Contracting States shall recognize the utility of sub-basin organizations and arrangements.

2. The Contracting States that are also members of sub-basin organizations or arrangements shall undertake to ensure that the purposes, functions and activities of such organizations and arrangements: Are consistent with those of the Pilcomayo River Basin Commission; are consistent with the principles and rules set out in or adopted under this Treaty; and will work in close cooperation with the Pilcomayo River Basin Commission.

3. The Pilcomayo River Basin Commission shall maintain regular contact, and shall cooperate closely, with any sub-basin organization or arrangement.

PART V. MISCELLANEOUS PROVISIONS

Article 32

Settlement of Disputes

1. In the event of a dispute between two or more Contracting States concerning the interpretation of application of the present Treaty, the States
concerned shall, in the absence of an applicable agreement between them, seek a settlement of the dispute by peaceful means in accordance with the following provisions:

(a) If the States concerned cannot reach agreement by negotiation requested by one of them, within a period of six months from the date of filing, they may jointly seek resolution by a Dispute Resolution Panel (“Panel”), whose membership will be established within 90 days of the execution of this Treaty.

(b) The Panel will consist of one member selected by each riparian State. In the case where there is an even number of States, one additional member will be selected by agreement from all States; if an agreement cannot be reached on the appointment of an additional member, the Council of Ministers will appoint that member.

(c) The appointed Panel must reach a decision within six months of written receipt of the dispute (Annex IV).

**Article 33**

**Supplementary Instruments**

1. The Contracting States may adopt bilateral or multilateral instruments that supplement the present Treaty, concerning portions of the Pilcomayo River Basin or the Pilcomayo River System, such as sub-basins
and tributaries, or concerning individual projects or programs relating to the
Pilcomayo River Basin or the Pilcomayo River System, or portions thereof.

2. The supplementary instruments referred to in paragraph 1 shall apply
the principles of, and be consistent with, the present Treaty.

3. Supplementary instruments may be adopted as Protocols to the
present Treaty by consensus by the Contracting States.

**PART VI. FINAL CLAUSES**

**Article 34**

**Amendment of the Framework or Protocols**

1. Amendments to this Treaty may be proposed by any of the
Contracting States. Amendments to any protocol may be proposed by any
State to that protocol.

2. Amendments to either this Treaty or any protocol shall be adopted at
a meeting of the Contracting States.

3. Articles 1, 2, 3, 4, 5, 6, 10, 11, 14, 23, 24, and 32 of the present
Treaty may be amended only by consensus. As to proposed amendments to
other articles or to any protocol, the Contracting States shall make every
effort to reach agreement by consensus. If all efforts at consensus have been
exhausted, and no agreement is reached, the amendment shall as a last resort
be adopted by a two-thirds majority vote of the Contracting States to the
instrument in question present and voting at the meeting, and shall be submitted by the Depositary to all Contracting States for ratification, acceptance or approval.

**Article 35**

**Adoption and Amendment of Annexes**

1. The annexes to this Treaty or to any protocol shall form an integral part of the Treaty or of such protocol, as the case may be, and, unless expressly provided otherwise, a reference to this Treaty or its protocols constitutes at the same time a reference to any annexes thereto. Such annexes shall be restricted to procedural, scientific, technical and administrative matters agreed upon by the Contracting States.

2. Except as may be otherwise provided in any protocol with respect to its annexes, the following procedure shall apply to the proposal, adoption and entry into force of additional annexes to any protocol:

(a) Annexes to this Treaty or to any protocol shall be proposed and adopted according to the procedure described in Article 35. In particular, any annex relating to one of the articles listed in paragraph 3 of Article 35, which may be amended only by consensus, must be adopted by consensus;

(b) Any of the Contracting States that are unable to approve an additional annex to this Treaty or an annex to any protocol to which it is party shall so
notify the Depositary, in writing, within one year from the date of the
communication of the adoption by the Depositary. The Depositary shall
without delay notify all Contracting States of any such declaration of
objection received. A State may at any time withdraw a previous declaration
of objection and the annexes shall thereupon enter into force for that State
subject to subparagraph (c) below;
(c) On the expiry of one year from the date of the communication of the
adoption by the Depositary, the annex shall enter into force for the
Contracting States of this Treaty or to any protocol concerned which have
not submitted a notification in accordance with the provisions of
subparagraph (b) above.

3. The proposal, adoption and entry into force of amendments to
annexes to this Treaty or to any protocol shall be subject to the same
procedure as for the proposal, adoption and entry into force of annexes to the
Treaty or annexes to any protocol.

4. If an additional annex or an amendment to an annex is related to an
amendment to this Treaty or to any protocol, the additional annex or
amendment shall not enter into force until such time as the amendment to the
Treaty or to the protocol concerned enters into force.
Article 36

Relationship Between This Treaty and its Protocols

1. A State may not become a party to a protocol to this Treaty unless it is, or becomes at the same time, a party to this Treaty.

2. Decisions under any protocol shall be taken only by the Contracting States that are party to the protocol concerned. Any Pilcomayo River Basin State that has not ratified a protocol may participate as an observer in any meeting of the parties to that protocol.

Article 37

Functions of the Depositary

The Depositary shall, in particular, inform the Contracting States:

(a) of the deposit of instruments of ratification or accession, or of any other information, declarations or other instruments provided for in the present Treaty.

(b) of the date of the entry into force of the present Treaty.
IN WITNESS WHEREOF the undersigned plenipotentiaries, being duly authorized by their respective Governments, have signed the present Treaty.

Done at ________, this ___ day of _____________, 2012.

........................................................................
Name, Title and Ministry,
Argentina

........................................................................
Name, Title and Ministry,
Bolivia

........................................................................
Name, Title and Ministry,
Paraguay
ANNEX I

Management of the Interdependent Surface Water and Groundwater Resource

1. The utilization of the water resources in an equitable and reasonable manner involves acknowledgement that the Pilcomayo River System consists of: 1a) a surface water resource, and 1b) a groundwater resource. The management of the interdependent nature of these resources by the Contracting States is addressed in (1c).

1a) The surface water resource is defined as those lakes, ponds, reservoirs, rivers, streams, tributaries, and canals that are situated within the geographic entity known as the Pilcomayo River Basin.

1b) The groundwater resource consists of two types. One type includes water that seeps into the ground and eventually flows into surface water bodies, thus displaying a hydrologic connection between groundwater and surface water. A second type is defined as water that seeps into the ground but does not interact with surface water; this type is termed “confined groundwater” or “fossil water.”

1c) i. Groundwater Communication. The waters of an aquifer that is intersected by the boundary between two or more States are international groundwaters and such an aquifer with its waters forms an international...
basin or part thereof. Those States are Basin States regardless of whether
the aquifer communicates with surface water, or whether the aquifer does
not interact with surface water and exists as fossil water.
1c) ii. Groundwater Pollution. Basin States shall prevent or abate the
pollution of international groundwaters in accordance with international law
applicable to existing, new, increased and highly dangerous pollution.
Special consideration shall be given to the long-term effects of the pollution
of groundwater.
1c) iii. Information Exchange. Basin States shall consult and exchange
relevant available information and data at the request of any one of them for:
-the purpose of preserving the groundwaters of the Basin from degradation
and protecting from impairment of the geologic structure of the aquifers,
including recharge areas;
-the purpose of considering joint or parallel quality standards and
environmental protection measures applicable to international groundwaters
and their aquifers;
- the purpose of preserving the surface waters of the Basin from degradation;
- the purpose of considering joint or parallel quality standards and
environmental protection measures applicable to international surface
waters;
- the purpose of establishing equitable and reasonable water allocation among the Contracting States, whether for the purpose of consumption, or water diversion or storage projects for flood control or agriculture, or electric power development. It is acknowledged that the first critical step in the allocation and management of any international water resource is the development of a common set of data, collected on an ongoing basis, and analysis of that data (1c.iv and 1c.v).

1c) iv. Groundwater Data Collection. Basin States shall co-operate, through the Joint Water Board (JWB), for the purpose of collecting and analyzing - on a continuous basis - additional needed information and data pertinent to the international groundwaters or their aquifers. This will include development of a database that identifies all existing groundwater wells, whether used for drinking water, agriculture, injection, or environmental monitoring. A program of water level measurement shall be planned and implemented by the JWB within 90 days upon the execution of this Treaty. Water levels will initially be collected on a monthly basis from each well, and eventually on a weekly basis, if possible. The JWB will manage the collection and interpretation of water level data, and will publicize this information. The JWB will work to eventually establish a program that collects water quality data such as temperature, pH, and conductivity, and
chemical concentration data for contaminants such as metals, fuel constituents, and solvent constituents.

1c) v. Surface Water Data Collection. Basin States shall co-operate, through the JWB, for the purpose of collecting and analyzing - on a continuous basis - additional needed information and data pertinent to the international surface waters of the Basin. Analysis of the water resource includes the measurement of water levels (“stream gauging”) in streams and tributaries of the basin on a daily basis. The purpose of stream gauging is to facilitate making better estimations of seasonal flow and annual flow, which will in turn support JWB engineering studies necessary to plan and implement water allocation measures, including flood control measures and possible water diversion projects. The JWB will manage the collection and interpretation of water level data, and will publicize this information. The JWB will work to eventually establish a program that collects water quality data such as temperature, pH, and conductivity, and chemical concentration data for contaminants such as metals, pesticides, fuel constituents, and solvent constituents.

1c) vi. Conjunctive Water Resource Planning and Management. The JWB shall interpret the collected data and develop a basinwide Conjunctive Water Resources Management Program establishing construction or
implementation priorities for the components of the Contracting States’ proposed programs (conjunctive water use refers to simultaneous use of surface water and groundwater to meet demand).

The development of the Conjunctive Water Resources Management Program (CWRMP) will be based upon the collected data and submittals from the Contracting States. The submittals will consist of (a) the respective State’s estimated water requirements for specific projects or categories of uses, including adequate stream flows, for the next five (5) years; (b) the assumptions underlying such estimates, including population projections; and (c) the estimated water supply available to meet such needs identified as to the sources of such supply, whether from surface flows, subsurface waters hydrologically connected to surface flows, non-tributary subsurface waters, imported waters, or developed waters.

Each State shall also provide the JWB with its plans to supplement such supplies, e.g., construction of new storage, diversion, desalination, watershed restoration, recycling/reuse, or wastewater treatment projects; expansion of existing projects; increased conservation; intrastate, interstate, or interbasin transfers; or other actions, along with the timing, location, increased yield, estimated cost, and impact on water quality of each component.
1c) vii. Water Allocation. The Basin States, through the JWB, shall utilize the following water allocation methodology, or a similar methodology, to present annual apportionment of quantities of water to each Contracting State from Basin waters within that state considered adequate to (1) first maintain stream flows to fulfill the requirements of this Treaty and other applicable international agreements, and to maintain a healthy and productive Basinwide ecosystem in designated reaches of the system, in such amounts, and for such seasons or duration as defined by the JWB and (2) provide additional flows to satisfy base apportionment use requirements of the Contracting States as defined by the JWB.

As depicted in the table below, the requirements to satisfy these uses and certain non-consumptive uses, such as hydroelectric power generation, have been converted to a percentage of flows of the waters of the Pilcomayo River Basin. This Treaty further provides for future supplemental apportionment by the JWB of reasonably predictable supplies in excess of the base apportionment to each State on a percentage basis. Supplemental apportionment shall be implemented without fee, or if deemed appropriate by the JWB, at a reasonable price to be determined by the JWB, based primarily on comparable transactions in the Basin.
Base Flow Apportionments

<table>
<thead>
<tr>
<th>State</th>
<th>Base</th>
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<th>Flows</th>
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<td>A</td>
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<td>Pilcomayo River</td>
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<td>Tributary River</td>
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The Basin’s estimated safe annual yield of _____ acre feet (AF) to satisfy the base apportionments is based on an analysis of the average annual and seasonal flows for the entire period of record, the driest 10-year period of record, and the wettest 10-year period of record, taking into account existing surface and underground storage facilities.

Entire period of record     ___ AF
Driest ten-year period      ___ AF
Consequently, the base apportionment of _____ AF of flows is determined to be reasonably secure, as is the availability of excess water for further supplemental apportionments. If future availability deviates substantially from these water supply estimates so that the base or supplemental apportionments cannot be satisfied, the JWB is authorized to make appropriate equitable reductions.

The JWB shall also develop criteria for the allocation of such shortages among the Contracting States and specific triggers for the implementation of such use curtailments. If unanticipated impacts of an individual State’s programs should substantially, disproportionately, and adversely affect another State’s apportionment, the JWB shall allocate that burden pro rata among all of the Contracting States based on their respective shares of the total Basin apportionments unless the Contracting States agree on another formula.

1c) viii. Water Allocation Documentation. The Contracting States, through the JWB, are hereby mandated to create a record of the actual data and the projections relied upon by negotiators of the States in the course of establishing water allocation amounts assigned to each State. Creating a record of this information will insure that there can be no disagreement if
and when the States’ expectations are not realized, and adjustments are deemed necessary.

1c) ix. Transfers of Apportionments. Contracting States may make such portion of their unused base apportionments or any supplemental apportionments available to other states or to the Commission for such periods, upon such terms and conditions, and for such consideration, if any, as the parties may negotiate unless the JWB after notice and hearing disapproves the transfer after determining that it would cause substantial injury to another signatory party.

1c) x. Monitoring of Apportionment Usage. The JWB shall monitor water usage throughout the Basin and enforce the Treaty apportionments, giving credit for the use of imported or developed water. It shall provide de minimis exemptions for various kinds of uses, recognize a reasonable margin of error in measurement methodology, employ a system of debits and credits for under- and over-uses or deliveries with provision for a quantity limitation on such debits and requiring overuse payback over a reasonable period, and establish similar reasonable rules and procedures to monitor the apportionments in an equitable and efficient fashion.
ANNEX II

Flood Control and Emergency Contingency Plans

1. Flood Control Operating Plan. Utilizing data collected and interpreted in Annex I, the Joint Water Board (JWB) will prepare, within one year of the ratification of this Treaty, a draft Flood Control Operating Plan. The primary purpose of the Plan is to identify those areas within the Pilcomayo River Basin that are most susceptible to flood hazards and pose the most risk to human health and ecological concerns, and to develop a plan to prepare for and reduce risk during flood events.

2. Emergency Contingency Plans. In order to reduce risk to human health and ecological concerns, in response to not only floods but other natural or man-induced disasters, the JWB and/or their designated organizations will develop Contingency Plans within one year of the ratification of this Treaty.

The Contingency Plans shall provide for:

(a) pre-emergency preparedness and training; the emergency period management; and post-emergency management and recovery.

(b) initial and ongoing communications by word-of-mouth through trained emergency staff and message reader boards at designated community
locations in undeveloped areas; and a telephone emergency number and radio station and computer emergency messaging.

(c) evacuation plans; and operation of active emergency centers and staging areas to send and receive victims, staff, and provisions.

3. Flood Control Facilities. The JWB will oversee the construction and operation of projects and facilities deemed necessary or desirable for flood damage prevention or reduction. The JWB shall store and release waters within the Basin, in such manner, at such times, and under such regulations developed in consultation with sub-basin organizations, as it deems appropriate to meet various flood conditions.

4. Flood Plain Zoning. The JWB may determine the extent of the flood plains in the Basin and may establish encroachment lines and delineate the areas subject to flood, including a classification of lands with reference to relative risk of flood and the establishment of standards for flood plain use that will safeguard the public health, safety, and property. The JWB may facilitate one or more Contracting State’s entry into agreements to provide technical and financial aid to another Contracting State or its political subdivisions for the administration and enforcement of any ordinances or regulations implementing such standards.
5. Flood Control Standards. The JWB may establish standards governing the uses of land in areas subject to flooding by waters in the Basin. Such standards shall not restrict the power of the Contracting States or their political subdivisions to adopt more restrictive standards.

6. Land Ownership for Flood Control. If unanimously agreed to by the Contracting States, the Pilcomayo River Basin Commission may acquire any interest in lands and improvements thereon within an established flood plain for the purpose of restricting the use of such property so as to minimize flood hazards and to implement its flood plain restrictions. The JWB will facilitate such acquisitions and oversee the management of such property.

ANNEX III

Enforcement

1. Alleged Violation and Response. Upon the basis of documented observation or monitoring, or substantial verified factual evidence from a reliable, identified third party that a Contracting State is (a) not maintaining required stream flows, (b) impermissibly exceeding its Treaty apportionment, or (c) permitting point source discharges or non-point source land use practices or activities that are violating Treaty approved water quality standards, the Commission shall request the representative for that State to respond to such allegation in writing within 30 days. Such response
shall either (a) concede the accuracy of the facts underlying the allegation, but assert that the situation is attributable to specified actions or force majeure events beyond its control; (b) concede the accuracy of the allegation and propose a schedule for detailed remedial action to be funded solely by such member; or (c) dispute, with specification, the allegation in whole or part and request further consultation with the Commission.

2. Concession. A member’s formal concession of a violation before the Commission and implementation of a Commission-approved plan for remedial action shall excuse such member from liability to any Commission member or that member’s State for any damages sustained as a result of such violation, provided that nothing herein shall adversely affect the rights of private parties to damages.

3. Resolution. The Commission member’s response shall be promptly referred to the Conference of Heads of State and Government (“the Conference”), the supreme policy-making organ of the Commission, for review and submittal of a recommended course of action to the Commission within 30 days. With respect to the concessions in (1), the Conference shall recommend that either (a) the alleged violation be excused by the Commission as beyond the member’s control, (b) the member’s proposed
remedial action be approved, or (c) the member’s proposed remedial action be modified and approved in whole or part.

4. Dispute Resolution. With respect to the member’s disputation of the allegation, if further discussions do not resolve the dispute within 45 days, the dispute resolution procedures detailed in Annex IV may be initiated by any Commission member. No Contracting State shall sue for damages during the pendency of such proceedings before the Commission.

5. Sanctions. Failure to resolve the dispute through the dispute resolution process shall authorize the Commission to (a) suspend the voting rights of the alleged offending party under the Treaty; (b) suspend any ongoing or planned implementation of Commission projects or programs benefitting that party, including supplemental apportionments; or (c) as a last resort, take appropriate judicial action through the International Court of Justice for injunctive relief to remedy the alleged violation and allow the Contracting States to seek damages for such violation.

ANNEX IV

Dispute Resolution Panel

1. The Dispute Resolution Panel (“Panel”) will consist of one member selected by each Contracting State. In the case where there is an even
number of States, one additional member will be selected by agreement from all States.

2. The Panel will elect a Chairman by simple majority vote. The Chairman will also be one of the members selected by each Contracting State. In the selection of Chairman, each member will vote for a Chairman, and in the event of a tie, the Council of Ministers will appoint the Chairman.

3. The Panel shall determine its own procedure.

4. The Contracting States concerned have the obligation to provide the Panel with such information as it may require and, on request, to permit the Panel to have access to their respective territory and to inspect any facilities, plant, equipment, construction or natural feature relevant for the purpose of its inquiry.

5. The Panel shall adopt its report by a simple majority vote, with each member empowered with one vote, and shall submit that report to the States concerned within six months of written receipt of the dispute, setting forth its findings and the reasons therefore and such recommendations as it deems appropriate for an equitable solution of the dispute, which the States concerned shall consider in good faith.

6. The expenses of the Panel shall be borne equally by the States concerned.
PILCOMAYO RIVER BASIN 1995 TREATY

LEGISLATIVE BRANCH

LAW N° 580

APPROVING THE AGREEMENT ESTABLISHING THE COMMISSION TRINATIONAL DEVELOPMENT OF PILCOMAYO RIVER BASIN

Congress of the Paraguayan nation sanctions with the force of law:

Article 1. - Approval of the Agreement Establishing the Tri-national Commission for the Development of the Pilcomayo River Basin, signed between the governments of Argentina, Bolivia and Paraguay, in La Paz, Bolivia, on February 9, 1995, which reads as follows:

AGREEMENT ESTABLISHING THE COMMISSION TRINATIONAL DEVELOPMENT OF BASIN PILCOMAYO RIVER

The Governments of Argentina, the Republic of Bolivia and the Republic of Paraguay;

Considering the need to establish a permanent technical legal
mechanism responsible for the comprehensive management of the Pilcomayo River Basin which promotes sustainable development of an area of influence, optimize the use of their natural resources, create jobs, attract investment and allow rational and equitable management of water resources;

Considering the Treaty of the River Plate Basin that provides "the rational use of water resources, especially through the regulation of watercourses and their multiple use and equitable", and pursuant to the Joint Declaration signed by Presidents of Argentina, Bolivia and Paraguay, April 26, 1994, in the city of Formosa, Argentina.

They decide to approve this Agreement Establishing the Commission Trinational for expansion by the Pilcomayo River Basin, which is governed by the following statute.

ARTICLE I

The Commission

The Parties agree to establish a Commission Trinational Development Pilcomayo River Basin, hereinafter "the Commission".

ARTICLE II

Composition

The Commission shall consist of a Council of Delegates and is the governing body under whose dependence is the Executive Director:
a) The Council of Delegates shall exercise the highest authority of the Commission and composed of two delegates per country.

- The first delegate shall be the representative of the respective foreign ministries, with the rank of Ambassador.

- The second delegate will preferably the National Director of each of the Pilcomayo River Commissions.

The representatives of the foreign ministries of the Council shall exercise coordinating, and

b) The Executive Director will be responsible for a technical officer, a national of a country that does not participate in the Tri-Accord. His appointment is the responsibility of the Council of Delegates and their functions are regulated in the respective regulations.

**ARTICLE III**

Council of Delegates

a) Meetings.

The Council of Delegates will meet three times a year in regular session.

In the first of these, the Council of Delegates approved the general plan and programs of the year. Halfway through the exercise, the meeting held control and monitoring of these programs and, at the end of it, the meeting will
focus on the assessment of the management and the preparation of
guidelines for the following year. In each Executive Director shall submit a
report thereon.

The Council of Delegates will meet in special session at the initiative of
either Party.

b) Regulation.

The Delgados Council will be empowered to dictate the rules of the
Pilcomayo River Tri-national Commission and to change as deemed
necessary.

c) Decisions.

Decisions of the Commission shall be by consensus of the delegations
from the three countries.

ARTICLE IV

Powers and Functions

The Commission is responsible for fulfilling the objectives proposed in
the Declaration of Formosa, signed on April 26, 1994, by the presidents of
Argentina, Bolivia and Paraguay.

The Commission, therefore, will be responsible for the study and
implementation of joint projects in the Rio Pilcomayo which foster the
development of the Basin.
To fulfill this responsibility, the Commission shall have the following functions:

a) Continue studies and work necessary to achieve multiple use, rational and harmonious river resources, flood control, sediment retention and flow regulation;

b) Prepare the General Plan of Integrated Watershed Management with the corresponding assessment of the investment required for implementation. In preparing the General Plan, it will give priority to projects that will meet the objectives of regional development;

c) Prepare technical and legal documents to call tenders in accordance with the laws in force in each country, in order to carry out studies, projects and works associated with the development of the Basin;

d) Carry out environmental impact studies, related to the activities mentioned in this Statute;

e) Approve the planning and layout of bridges, pipelines and other structures that cross the river and may affect applications and hydraulic operation thereof, and navigation;

f) Promote the development of the supply of services and infrastructure in the region;

g) To plan the exploitation of hydropower;
h) Facilitating activities that promote tourism;

i) Identify areas where no withdrawals may be made affecting resources and water behavior fluviomorphology River;

j) To propose rules relating to the discharge of any pollutants in the river;

k) Monitoring and analyzing water quality, communicating parties to be proven violations;

l) To propose rules governing the activities of the commercial and recreational fishing in the river;

m) Coordinate appropriate measures to avoid disturbances in the ecological balance, including pest control and other factors that pollute the river;

n) cooperate with and assist in studies on endemic diseases, pandemics and epidemics of waterborne;

o) Conduct studies on irrigated agriculture at regional and promote irrigation projects;

p) Establish protected areas in order to preserve wildlife and historic sites;

q) collect and update the information needed to create and maintain a database of hydrological and geotechnical meterológicos;

r) promote and coordinate the installation and operation of measuring stations and networks meterológica, hydrological and hydrographic, and gauging campaigns;
s) To establish and operate a cartographic database Basin;

t) Analyze and discuss the potential of enabling navigable sections once regulated the river;

u) Such other functions as the Parties may care to entrust within their jurisdiction, and,

v) In accordance with Article II paragraph b., the Council of Delegates will regulate the competition functions of the Executive.

**ARTICLE V**

Modification of Statute

The Commission may propose to the Governments modification in whole or in part, of the rules of this Statute, requiring for it the consensus of the three delegations.

**ARTICLE VI**

Power to pass resolutions

The Commission, in the context of their specific competence, issue resolutions shall be binding on the Parties.

**ARTICLE VII**

Legal Status

The Commission shall have international legal personality to fulfill their specific objectives.
ARTICLE VIII

Funding

The Commission is empowered to manage the financing of studies and activities detailed in Article IV.

The funding will come from resources provided by the Parties, by third States, by nonprofit organizations or international agencies.

The Governments of the States Parties shall be responsible for the presentation and realization of funding requests.

ARTICLE IX

Activities in the territory of the Parties

The members of the Commission may enter freely to areas of States Parties where they work.

The Parties shall facilitate the movement of ground vehicles and aircraft overflights in compliance with the Commission's activities.

Consultants and experts performing work mandated by the Commission will be provided with the entry into the territories of the three countries in areas covered by the work.

ARTICLE X

Taxes and Levies

Your treatment will be the subject of a specific agreement between the
parties.

ARTICLE XI

Financing of the operating costs of the Executive Governments will equip equally, the Commission of the funds needed for the functioning of the Directorate. To this end, the Executive General shall prepare a budget based on their work plan, which will be approved by the Council of Delegates.

ARTICLE XII

Linking with Parties and Duty to Report

The Commission will be linked to the authorities of the Parties through the respective Ministries of Foreign Affairs.

The Commission shall submit to the Parties an annual report shall also contain recommendations as appropriate to make.

ARTICLE XIII

Collaboration of public bodies of the Netherlands

The Commission shall receive, upon request and for the fulfillment of its tasks the widest collaboration of technical and administrative agencies officials of the three countries.

ARTICLE XIV

Dispute

Any question which may arise within the Commission in relation to its
functions, will be raised by it to the States parties to strive to resolve the issue through direct negotiations.

**ARTICLE XV**

**Term of Agreement**

The Constitutive Agreement is effective indefinitely. Either Party may denounce it by a notification through diplomatic channels a year in advance.

**ARTICLE XVI**

**Ratification**

Establishing This Agreement shall be ratified in accordance with the procedures under the respective laws of the Parties and shall enter into force once the three countries have fulfilled this requirement.

The instruments of ratification shall be deposited with the Government of Bolivia, who shall inform the other States Parties of compliance with this act.

Done at the city of La Paz, Bolivia on the ninth day of February of the year one thousand nine hundred and ninety-three copies of the same tenor, equally valid.

FDO.: For the Government of Argentina, Mr. Guido Di Tella, Minister of Foreign Affairs, International Trade and Worship.

FDO.: For the Government of the Republic of Bolivia, Dr. Antonio
Aranibar Quiroga, Minister of Foreign Affairs.

FDO.: For the Government of the Republic of Paraguay, Amb. Luis Maria Ramirez Boettner, Minister of Foreign Affairs.

Article 2. - Communicated to the Executive.

Done in the Senate on April 18 of the year one thousand nine ninety-five and in the Chamber of Deputies, the Law being enacted on May 9 the year one thousand nine ninety-five.

Atilio Martinez Evelio Fernández Casado Arévalos

President

President H. Chamber of Deputies H. Senate

Luis Maria Careaga Arrow

Juan Manuel Peralta

Parliamentary Secretary Parliamentary Secretary


Note by Republic Act, published and placed in the Official Gazette.

The President

Juan Carlos Wasmosy
Luis Maria Ramirez Boettner
Minister of Foreign Affairs

Source:

http://www.congreso.gov.py/senadores/leyes/ups/leyes/4224ley%20580-1995.doc