Chapter 12
From the Abundance of Waters to the Scarcity of Studies: Contemplating Hydropolitics in Mexico-Guatemala and Mexico-Belize Borders

Edith F. Kauffer

Negotiations on water sharing are intensely political
Sadoff et al. (2008)

Abstract Facing the paradox of the borders of Mexico with Guatemala and Belize, through which most of Mexico and Guatemala water resources flow, versus the lack of studies about it, how do we articulate local and international dimensions into the political water analysis in the boundary regions that Belize, Guatemala, and Mexico share? This chapter intends to provide some areas of thought regarding this question. Starting from the description of transboundary dimension of water in the studied region, this work proposes a new concept of "hydropolitics" as multiple to analyze diverse international and local dynamics regarding water in this region of multiple borders.

Keywords Mexico · Guatemala · Belize · Transboundary river basins · Borders · Hydropolitics · Water policies

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E. F. Kauffer (✉)
Centro de Investigaciones y Estudios Superiores en Antropología Social-Sureste, Chiapas, México

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12.1 Introduction

In the last three decades, the boundaries that Mexico shares with Guatemala and Belize, traditionally known as the "southern border," have been the object of rich academic work. The so-called southern border went from being considered a forgotten border to a border described and analyzed by diverse disciplines in the social sciences.[1] Consequently, nowadays historical and contemporary phenomena such as colonization processes (De Vos 1993; Rodas Núñez 2014); population issues (Ángeles Cruz 2005; Piedrasanta Herrera 2014a, b), especially migrations (Kauffer Michel 2002; Torras Conangla 2014; Ángeles Cruz 2010; Baltar et al. 2013; Rivera Farfán 2015); historical processes of shaping the borders of Chiapas (Castillo et al. 2006; Guillén 2003; Valdez Gordillo 2006; Fábregas 2015), Tabasco (Vautravers 2005), and Campeche (Torras Conangla 2012); trade relations (Villafuerte 2004); and religious and cultural interactions (Rivera Farfán 2014; Piedrasanta Herrera 2014a, b) have been extensively documented. In this increasingly profuse and detailed literature that recently includes the questioning of the "southern border" notion (Fábregas and González 2014; Kauffer Michel 2013d, 2017), the environmental issue has been understudied in a portion of the Mexican territory characterized by abundance of biodiversity and underground and surface water resources.

Academic work regarding water issues in the Mexico-United States border shows an entirely contrasting reality compared to the situation of the Guatemala and Belize borders. In the northern border, water is a key issue and stands out in five aspects: (1) it is the object of specific publications in both countries with a remarkable increase in the last 20 years; (2) it is an essential aspect in Mexico-United States border and transboundary research; (3) it is significant for the entire American continent; (4) it presents a wide range of studies of various disciplines from human studies to engineering focused on diverse topics and issues; and (5) it holds a special place in the social literature about water in Mexico and in international publications addressing issues of transboundary waters (Kauffer Michel 2011a, b).

The relationship of the southern border with natural resources as well as the sociopolitical dynamics around water in international basins requires further study (Kauffer Michel 2005c). This applies to all scientific disciplines that tend to ignore the existence of borders and the transboundary dimension, even while conducting studies few meters away from the international boundary line on international basins or rivers (Equihua et al. 2006). However, the lack of studies regarding water can be seen especially in Mexican social sciences, which have historically focused their water studies in the center (Boehm 2006), north of the country (Aboites Aguilar 2000a), Distrito Federal (Martínez et al. 2004; Perló and González 2005), and neighboring states of the capital city (Espinosa Henao 2006; Saldívar 2007; Sandré Osorio 2005; Stephan-Otto 2003; Vargas et al. 2006) and to very few exceptions in

[1]Note that most of the contributions regarding the southern border of Mexico are focused on the study of processes involving only the state of Chiapas and don't usually include the three other border states which are Tabasco, Campeche, and Quintana Roo.

Chiapas (Molina 1976). Thus, research on water in Mexico is characterized by an almost total absence of references regarding the bordering states of Chiapas, Tabasco, Campeche, and Quintana Roo, as Aboites Aguilar states (2009) (see Aboites Aguilar 1998; Aboites Aguilar and Estrada Tena 2004; Aboites Aguilar et al. 2000; Ávila García 2002a; Birrichaga 2007; Castañeda González et al. 2005; Durán et al. 2005; Escobar et al. 2008; Kroeber 1994; Meyer 1997).

Recently, some contributions regarding water problems in the Mexican southeast (Aboites Aguilar 2000b) and later regarding the southern border of Mexico have emerged in individual publications (Burguete Cal y Mayor 2000; Birrichaga 2008[2]; Contreras Utrera 2008) or as part of collective works, especially about water in the state of Chiapas (Ávila Quijas et al. 2009; Benez and Kauffer Michel 2012; Contreras Utrera 2009b; García García 2005a, b; García García et al. 2006; Kauffer Michel 2006b, 2009, 2011c, 2012, 2014a, b; Kauffer Michel and García 2003; Kauffer Michel and García 2004; March and Fernández 2003; Mejía González 2011; Mejía González and Kauffer Michel 2008; Rojas Rabiela 2009[3]; Soares 2006; Solís Hernández 2011; Valette 2011; Vera 2005), Tabasco (Jhabvala 2006; Gracia Sánchez and Fuentes Mariles 2004, Kauffer Michel 2013a, b, c) or both states (García García 2013; Kauffer Michel 2005a, 2008, 2013d) and in the two borders, including the Guatemalan and Belizean portions (Kauffer Michel 2005d). Suchiate River has been the focus of very recent studies (Gómora 2013, 2014; Kauffer Michel 2011a; Ordoñez Morales 2011; Santacruz de León 2011a, b) as well as Grijalva river basin. The topic of floodings in Chiapas (Álvarez Gordillo and Álvarez Gordillo 2011) and Tabasco river basins (Capdepont and Marín Olán 2013; Galindo et al. 2013; Kauffer Michel 2013a; Ramos Reyes et al. 2013) has also been studied through collective publications (González and Manse 2014). Mexican regional and interdisciplinary focuses on water issues have been launched (Kauffer Michel and Castillejos 2015) as well as Central American regional projects including the Mexican borders (Kauffer Michel and Medina 2014; Kauffer Michel 2014a, b). Some transboundary river basins remain little studied like Candelaria River (Kauffer Michel 2005b, 2010) or mainly by nonsocial scientists like the Usumacinta River (de La Meza and Carrabias Lillo 2011).

It is worth mentioning contributions on the history of water in Chiapas (Contreras Utrera 2005, 2009a) and Tabasco (Salazar 2013; García García 2013) and the first resource catalog (Sandré Osorio and Kauffer Michel 2014), which includes the states of Campeche, Chiapas, Tabasco, and Quintana Roo, in addition to Yucatan. Among these recent publications, those covering international or transboundary water problems are scarce (Kauffer Michel 2004, 2005c, 2006a, 2011a, b; Santacruz de León 2005, 2006, 2011a, b; Santacruz et al. 2005).

[2]Although in this case just 1 out of 35 presented studies refers to a southern border state; most are dossiers from the north and center part of the country.

[3]In this case, the author makes brief references to the presence of hydraulic works in prehispanic and colonial times in the states of Campeche, Tabasco, Quintana Roo, and a mention to Chiapas.

Facing the paradox of the borders of Mexico with Guatemala and Belize, through which most of water resources of Mexico and Guatemala[4] flow, versus the lack of studies about it, how do we articulate local and international dimensions into the political water analysis in the boundary regions that Belize, Guatemala, and Mexico share? This chapter intends to provide some areas of thought regarding this question. Starting from the description of transboundary dimension of water in the studied region, this work proposes a renewed concept of "hydropolitics" to analyze diverse international and local dynamics regarding water in this region of multiple borders.

12.2 Two "Borders": Exceeding the Hegemonic Notion of Southern Border

This chapter assumes the uncommon position of opposing the hegemonic notion of "southern border," which has allowed over the last two decades to visualize the existence of the area as opposed to the "northern border," still considered nowadays in many political and government circles as the only relevant border in Mexico. This position is based on the fact that it is a contradictory notion to address the issue of transboundary waters and it is a little susceptible to visualize cooperation relationships when diminishing transboundary dimensions. Indeed, "southern border" is a Mexican denomination, since this border is in the case of Guatemala the northern or northwestern border—depending on the referred fragment—and to Belize it stands as the northern border. It also constitutes a regional border that shows the northern limit of Central America. This Mexican denomination excludes those Central American visions of border reality, the existence of "the other side," and the possibility of sharing transboundary positions. It carries the hegemonic vision of more than two decades of research from the Mexican side, which contributes in the reinforcement of economic and academic asymmetries regarding the history of Belize and Guatemala, especially the weakness of existing academic structures.

Besides its excluding character, this notion equalizes the Mexico and Guatemala border with that of Mexico and Belize. Nevertheless, each border has its own history, local characteristics, and relationships, which prevent us from speaking of a single reality (Kauffer Michel 2013d) and lead us to consider the denomination of southern border as inadequate. On these grounds, this chapter will consider two borders and not the southern border of Mexico, when trying to be coherent with the acknowledgment of water flow beyond political boundaries, with the need of looking at or from the other side and while trying to be consistent with the approach of considering political dimensions from local to international settings through the concept of hydropolitics.

[4]Belize is not included in here due to its homogenous situation.

12.3 Transboundary Dimension of Water As a Resource in the Borders Among Mexico, Guatemala, and Belize

The Mexican states of Chiapas, Tabasco, Campeche, and Quintana Roo; the Guatemalan departments of San Marcos, Huehuetenango, El Quiche, and El Peten; and the Belizean districts of Orange Walk and Corozal that comprise the Mexico and Guatemala and Mexico and Belize[5] administrative borders have the advantage of being located in a region particularly rich in water resources as a result of heavy rainfall which could be evidenced by the existence of abundant surface waters in the area.

Thereby on the Mexican side, facing an annual mean rainfall of 740 mm on the national scale, between 1981 and 2010, the bordering states are characterized with the following figures: Tabasco, 2184 mm; Chiapas, 1842 mm; Campeche, 1251 mm; and Quintana Roo, 1267 (Conagua (Comisión Nacional del Agua) 2016). Meanwhile, Belize stands in the 17th place in the world ranking regarding rainfall with 1705 mm (Conagua (Comisión Nacional del Agua) 2008); and in Guatemala, the bordering areas' total rainfall can reach 6000 mm (Dardón Sosa 2002). Regarding per capita water availability, expressed in cubic meters per person per year, the southern border Mexican administrative region (i.e., the one that includes Chiapas and Tabasco, as stated by Conagua from 2010) totaled 18,852 m^3 in 2015 versus 6373 m^3 in the Yucatán Peninsula (that covers the states of Campeche, Quintana Roo, and Yucatán), compared to the national average of 3692 m^3 (Conagua (Comisión Nacional del Agua) 2016). Guatemalan and Belizean availabilities were 8600 m^3 and 61,566 m^3, respectively, in 2007, twice and more than 15 times the one of Mexico (Conagua (Comisión Nacional del Agua) 2008).

These figures undoubtedly show plenty of water in both borders. However, behind this regional and state "natural" abundance, there are specific hidden local realities ranging from scarcity to a glut. Moreover, this annual abundance corresponds in reality to striking contrast between the rainy season, which extends from June to October and the dry season between November and May, meaning that the bordering regions with Guatemala and Belize are not exempt from drought and scarcity episodes and that extreme hydrometeorological phenomena constitute a recurring problem throughout the region.

It is essential to emphasize that despite the abundance conditions of water as a resource, the bordering region is characterized by the highest national shortfalls in access of domestic water and sanitation household services. Whereas in Mexico, the national average reaches 92.5%, the states of Quintana Roo and Campeche are both in the border exceeding such percentage. With 82.6% and 88.8%, respectively, Chiapas and Tabasco (Conagua (Comisión Nacional del Agua) 2016), two states with the highest water abundance in the Mexican Republic, perfectly illustrate the paradox between natural abundance and a lack of access to basic services. In terms of

[5] Situated from west to east.

sewage, compared to an average of 91.4%, Chiapas (84.4%) registers one of the highest shortfalls.

There is no information to evaluate the situation of access to water and sewage services in Belize. In Guatemala, the border region is characterized by high levels of poverty in the four borderline departments: 86.7% of San Marcos population, 78% of Huehuetenango, 81% of El Quiché, and 57% of El Petén are experiencing poverty (Dardón Sosa 2002). The northern border of Guatemala corresponds to peripheral, excluded areas populated by indigenous people[6] that were scenario of an internal armed conflict which lasted more than 30 years. Consequently, the situation of water and sewage services is characterized by a higher shortfall than in the Mexican side. Only 40.7% of the population in the bordering municipalities of San Marcos Department have access to domestic water services and 8.3% to sewage services, while in Huehuetenango Department, the figures represent 50% and 10.4% (Dardón Sosa 2002). In Ixcan municipality, situated in El Quiché, barely 15% of the population has access to domestic water and 8.8% to sewage services.

Water quality constitutes a concerning issue in the region. For instance, Chiapas has just 11 out of 118 municipalities with a wastewater treatment plant in service in 2010 according to a fieldwork. In 2015, although 93 wastewater treatment plants were installed in 122 municipalities (76%) (Conagua (Comisión Nacional del Agua) 2016), interviews evidenced that less than 30 plants were really working (26%). This situation is even more critical in Guatemala, where no urban center conducts wastewater treatments, which are directly discharged into rivers that flow across population centers and carry pollutants downstream. On the other hand, the population is used to dump waste into rivers, and the presence of several waste deposits on the banks of surface currents represents a constant situation in the bordering region, on both sides of the boundary line. Finally, if present, municipal landfills are not established according to environmental norms that prevent soil and water pollution.

As a result of the alarming situation of water quality and sanitation conditions, it is fundamental to note that Chiapas represents the state with the highest child mortality due to diarrheal diseases in the Mexican Republic (43.4 per hundred thousand inhabitants) (Conagua (Comisión Nacional del Agua) 2008), situation that is multiplied in Guatemala with a 3677.46 per hundred thousand inhabitants rate (Dardón Sosa 2002). More recent data about this topic is unavailable.

[6]In 1994, in Guatemala (IICA), the Suchiate river basin population presented the following characteristics: 48%, indigenous; 88%, rural; 75%, in extreme poverty; 43% no water services; and 14%, no latrines. In Coatán river basin, 69% of the population was indigenous; 96%, rural; 51%, no water services; 10%, no latrines; and 75% lived in extreme poverty. On the three uppermost tributaries of Grijalva river basin, the situation arises the following indicators: Cuilco river basin, 72% lived in extreme poverty; 95% was rural; 45% lacking, water; and 22%, latrines. Selegua river basin, 53% indigenous; 78%, rural; 39% had no latrines, and 40%, water. Extreme poverty in 75% in Nentón river basin, 93% of the population are indigenous people; 84%, rural; 49%, lacking water; 25%, latrines; and 75% lived in extreme poverty. There is no more updated information of shared river basins in Guatemala. More recent information about bordering areas are not available.

In this context of natural abundance and socio-hydrological shortfalls, what are the different boundary and transboundary dimensions of water resources in the region?

First, three international rivers, i.e., currents with an international border demarcation function, characterize borders among Mexico, Guatemala, and Belize. As Castillo et al. (2006, back cover), correctly states, "making the history of the southern border of Mexico requires a transboundary vision effort of the facts and historical processes that have occurred on both banks of Hondo, Suchiate and Usumacinta rivers." In fact, these three rivers define much of the Mexican border with Guatemala and that of Belize, which totally consist of 1139 km in length: 53% of Mexico-Guatemala border and 87% of Mexico-Belize portion have a fluvial delimitation.[7] Most of Suchiate river serves as an international borderline (77 out of 92 km) between Chiapas and Guatemala,[8] situation that is repeated in the case of Hondo river between Quintana Roo and Belize but representing for Usumacinta river just one third of its length, separating Chiapas from Guatemala.

It is worth noting that those three rivers do not have the same geographic configuration regarding the three countries. Dinar (2008) distinguishes through-border rivers that cross the border from one country to the other one from border-creator rivers or international rivers. Toset et al. (2000) present another three configurations: the upstream/downstream configuration which is equivalent to Dinar's through border, the mixed type when the river crosses a country, functions as a borderline, and flows in a territory of a second country, and the river-boundary configuration when the current flows within a country and establishes the border with another one. This is a basic element to consider in the analysis of conflict and cooperation dynamics regarding international rivers.

The three international rivers in the borders between Mexico and its neighbors present three different configurations. Usumacinta is a mixed river, while Suchiate is a river-boundary configuration in the denomination of Toset et al. (2000). Finally, Hondo river corresponds to none of the configurations proposed, because it includes three states and those consider only two countries; indeed, it crosses the Guatemalan territory, and then it establishes the borderline between Mexico and Belize.

To the international rivers that create "water boundaries" in both studied borders, the existence of territories called transboundary river basins is added: a river basin is an area where surface runoffs gather toward a common exit or convergence point of waters. In the river basins, natural and water resources are closely related in such a way that agricultural, industrial, rural and urban activities conducted upstream, and

[7]Data calculated by Emmanuel Valencia, Laboratorio de Análisis e Información Geográfica (Laige), El Colegio de La Frontera Sur (Ecosur) from a geographic information system.

[8]Note that other authors propose different measures: Santacruz de León (2006) states that Suchiate river is 120 km, of which 84 correspond to borders; Jiménez Castañeda et al. (2006) mention a main riverbed of 79.2 km; Conagua (2007) evokes 75 km of borderline; and CILA (2006) refers 81 km of river border. As a result, probably, of the social construction nature of the basins, and consequently each sources uses delimitation parameters according to work interests. Probably these estimations also vary as a function of tributaries taken into account for its measuring.

the presence of infrastructures have an impact downstream, especially in quality and quantity water availability. A transboundary river basin refers to the physical and geographical reality described above when the catchment is divided by a political border.

Bordering territory between Mexico, Guatemala, and Belize might be divided into six large river basins, called as international, shared, or transboundary. In this chapter, the three adjectives shall be used indistinctively, even though they refer to a similar situation, each one starts from a different scope and emphasizes on different perspectives for water resources management. The "international basin" term refers to a territory that exceeds the jurisdiction of a single nation-state, which implies that its management might be considered through mechanisms that go beyond national bodies. Meanwhile, when talking about "shared basins," emphasis is placed on the idea of cooperation between states for its management. Finally, the use of the term "transboundary" relates to the existence of common spaces that exceed political frontiers and create continuity beyond divisions established by the human being without political connotation.

Until recent times, except for an atlas published in 1987 (CILA), each country used to represent shared basins through boundary basins, that is, delimited basins through each state sovereignty or, in other words, basins truncated by the international division line. Through a binational effort led by Laboratorio de Análisis e Información Geográfica [*Geographic Analysis and Information Laboratory*] (Laige) from El Colegio de la Frontera Sur (Ecosur) on the Mexican side and Sistema de Información Geográfica del Ministerio de Agricultura, Ganadería y Alimentación [*Geographic Information System from Agriculture, Cattle and Food Ministry*] (MAGA) from Guatemala, between 2007 and 2008, there was a joint effort in the development of a consensus map of international basins between Mexico and Guatemala.[9] As a result, a delimitation of six large transboundary basins was obtained, represented on Fig. 12.1.[10]

These basins, located from west to east, are the following: Suchiate river (Mexico-Guatemala), Coatán river (Mexico-Guatemala), and Grijalva basin (Mexico-Guatemala)—known in Guatemala as Cuilco, Selegua, and Nenton river basins—which penetrate into Mexico as three water courses forming Grijalva river in the Mexican territory, Usumacinta river basin (Mexico-Guatemala-Belize) with a

[9]This activity was conducted as a part of the project "Hidropolítica en la frontera México-Guatemala-Belice," financed by Consejo Nacional de Ciencia y Tecnología (Convocatoria SEP-Conacyt de Ciencia Básica) between July 1, 2005 and June 30, 2009. However, it is necessary to establish that this consensus included just the first four international basins (Suchiate, Coatán, Grijalva, and Usumacinta), and it was established among technical groups of geographic information systems and not validated by any political authorities on both states, to which was presented in a meeting with both foreign offices in 2008 but manifested no interest on the subject.

[10]Methodology and characterization of these basins are the object of a thesis (García García 2010) and a publication (García García and Kauffer Michel 2011) that exceed the interest of this chapter. Note that some sources consider five basins instead of six. However, since 2009, Conagua takes as a reference the presence of six transboundary basins.

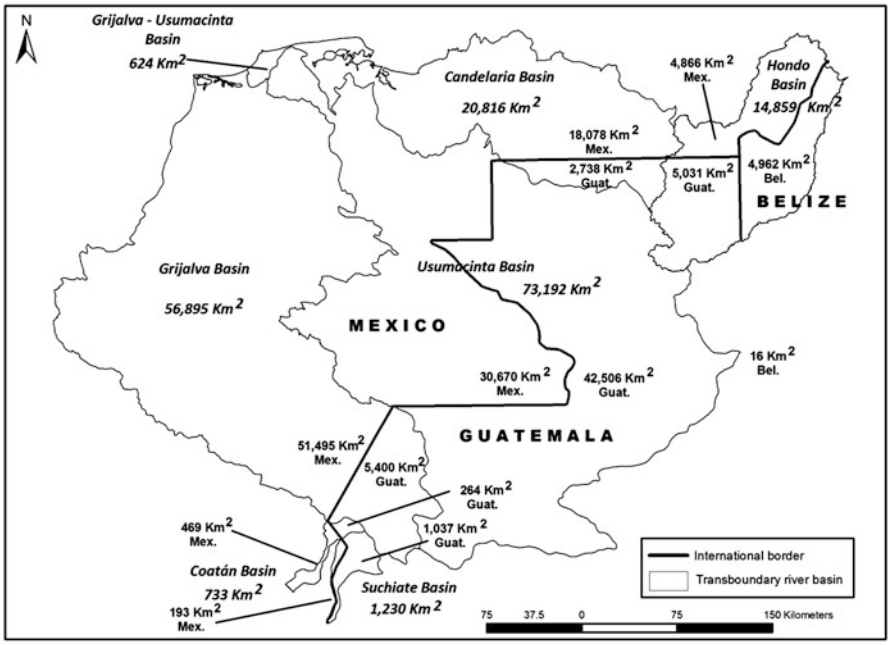

Fig. 12.1 Six transboundary basins on Mexico-Guatemala and Mexico-Belize borders. (Source: Prepared by García García (2010), with the support of Ing. Emmanuel Valencia Barrera, technician of Laige-Ecosur, Unidad San Cristóbal de Las Casas, Chiapas)

very small portion corresponding to Belize, Candelaria river basin (Mexico-Guatemala), and Hondo river which is trinational.

In the transboundary river basins, the upstream situation constitutes a geographic advantage versus downstream locations, as a result of the potential effect of the first over lowermost riparians—individuals or groups—because actions conducted upstream affect water in terms of quality and quantity. This happens in any river basin, apart from its internal or international character. In transboundary river basins, upstream location represents a geographic advantage for the country that holds such a position. However, it is added to other characteristics as political interactions, which could counterbalance such advantage. Two examples of transboundary basins serve to illustrate this situation. Egypt is located downstream in the Nile river basin shared by ten countries, but its condition of regional military power imposed until recently a status quo to the other countries situated upstream, preventing them from making the most of the waters. In fact, Egypt had an exclusive reliance for all necessities on the Nile (Swain 2002) and has even threatened with an armed intervention against its neighbors, in the event of having its interests affected as a result of hydraulic works conducted upstream. This case illustrates that the geographic advantage is not the only dimension involved in terms of international river basins but it also highlights that the situation is able to change as it occurred due to political transformations in Egypt and at regional scale from 2013 (Petersen-Perlman

et al. 2017; Salman 2011). The case of Turkey and its neighbors, Syria and Iraq, in the basins of Tigris and Euphrates rivers is another example: as a result of its strategic position and its condition of the US allied regional military power in the region, Turkey has conducted unilaterally hydraulic works that have affected its neighbors situated downstream, stopping or reducing the quantity of water with no influence of neighboring countries on the situation (Mutin 2003) and behaving as a regional hegemon (Conde 2014).

In Mexico-Guatemala and Mexico-Belize borders, Guatemala is located upstream in the six basins, and Mexico and Belize are downstream riparian.[11] However, for many reasons, Guatemala has never used such a strategic advantage to affect the interests of its neighbors. Some of these reasons are lack of economic resources for the construction of major hydraulic works, geographic and topographic conditions that hinder those works, and the location of some parts of this territory within zones affected by the armed conflict, which lasted more than three decades at the end of the twentieth century. However, Mexico, despite its location downstream, during the 1980s, had projected the construction of four major dams in the Usumacinta river basin, which would have flooded part of Guatemalan El Peten. The opposition of the Guatemalan government to this project and the social unrest promoted its abortion in 1989, and this event is the only conflict regarding the water issue registered in the database of the Oregon State University of the Mexico, Guatemala, and Belize border (Transboundary Freshwater Dispute Database (TFDD) 2007).[12] It is important to note that despite its downstream location, Mexico has not experienced any impact from Guatemala regarding water availability, and on the contrary, it has had the intention of unilateral hydraulic works. Moreover, it should be emphasized that Mexico has suffered negative consequences as a result of its downstream location in transboundary river basins regarding water quality due to bacteriological contamination, organic (as a result of indiscriminate pesticide use) and inorganic (especially produced by open-pit mining and intensive agricultural activities such as a chemical spilling from a palm oil plant in 2015 that contaminated La Pasión river in Guatemala); however, this issue does not appear nowadays in the Mexican political agenda.

Finally, the region is characterized for its multiple transboundary surface currents of diverse magnitude that flow from one country to the other, passing over political borders established by humans and making international the water-related issues resulted from the mobility of this resource. Also, in certain points of both borders, there are some surface water bodies like lagoons or wetlands that hold a transboundary character since they are crossed by the international division line.

[11]Note that this statement is not considering the upstream location of Belize in the Usumacinta river basin because of the absence of surface currents and population in the Belize corresponding 16 km^2 of basin, that is, a 0.021% total of its area. In the Suchiate river basin, Guatemala is also situated downstream.

[12]Note that the research of this database included just English language publications, that is, sources with international magnitude events, and reported on that scale but not necessarily reflecting the rich and detailed transboundary local reality.

Thus, the transboundary dimension of the water resources in the region involves diverse realities that can be analyzed from different perspectives. This chapter proposes the notion of hydropolitics to understand diverse political aspects of these water resources.

12.4 Hydropolitics: Looking for an Articulation Between Waters, Politics, and Policies

Contrary to a statement made a few years ago (Kauffer Michel 2004) regarding the scarce use of the concept "hidropolítica" in Spanish and contrasting to the frequent use of "hydropolitics" in English literature about water, politics and policies, and transboundary issues, nowadays it is quite common to read and hear the term "hidropolítica" in Spanish-speaking academic and political circles. However, this frequent use which encompasses at the same time water-related political aspects and international dimensions of water resources does not have a conceptual clarity in most of instances (Cascão and Zeitoun 2010). Several authors fail to define the term and yet use it (López 2008; Oswald 2008; Salman 2011), which is an issue that was already mentioned by Turton (2002) for the English language academic production. Likewise, the frequent use in English and French of an adjective derived from the term "hydropolitics" (*hydropolitical or hydropolitique*) can be recently observed in literature, attesting to its growing success, as De Stefano et al. (2017) constantly refer in a recent paper.

John Waterbury (1979) was the first author in using the term "hydropolitics" in 1979, in his book about the Nile river. He frames the concept around the interaction of hydraulics, water policy, and the results of this relationship. Waterbury's research centers around the analysis of a process involving the conduct of two sovereign states (Egypt and Sudan) in search for their national interest, water-use policies of the Nile river, and their relationship before the international coordination challenge of a shared resource. To do so, the text addresses the following aspects: the natural dynamics of the Nile river and hydraulic interventions that have modified its annual behavior, the relationships between two of the nine riparian states,[13] national policies and politics of both countries, and the impact of development programs in water resources management.

Reviewing traditional literature around the concept "hydropolitics," we can distinguish two major perspectives: on the one hand, the history of conflict and cooperation dynamics regarding transboundary water resources and, on the other hand, the analysis of "the authoritative allocation of values in society with respect to water" from the redefinition proposed by Turton (2002, p. 16). Resuming these two

[13]In 1979, nine states possessed territory in the Nile river basin. Later, as a result of Eritrean independence from Ethiopia, in 1993, they turned into 10 states. In 2011, the secession of South Sudan from Sudan increased the number into 11 states.

approaches, we propose an applicable perspective to the study of hydropolitics in the transboundary river basins among Mexico, Guatemala, and Belize.

12.4.1 Hydropolitics or Conflict and Cooperation Dynamics Around Transboundary Waters

Elhance (1999, p. 3) is the author that best epitomizes this first perspective of hydropolitics study, starting with the definition of hydropolitics as "the systematic study of conflict and cooperation between States over water resources that transcend international borders." This analysis trend of hydropolitics that can be labeled as "international" is nowadays the most consolidated and represented among the specialists on the topic.

This international perspective undoubtedly stems from Waterbury's work. Indeed, despite explicitly mentioning that hydropolitics does not cover international dimension only, Waterbury (1979, p. 87) uses the title of international hydropolitics in a chapter related to the analysis of relations between the two riparian states, giving the impression that this is the main dimension of hydropolitics analysis.

The dynamics of conflict and cooperation related to sharing water proposed by Elhance (1999) as a focal point of the analysis imply the need of paying exclusively attention in state logistics, since states are considered the main players in hydropolitics (Elhance 1999, p. 14) because of their ability to create water conflicts and to promote the means for cooperation. However, the presence of other players and interdependencies with other aspects are acknowledged, but these have no main role on the analysis.

The international perspective of hydropolitics leads to two main debates: a discussion around water scarcity and its effect in the relationships among states and the study of existing and potential conflicts around transboundary waters. Most of the literature about shared waters, in which studies of the Middle East and Asia are predominant, revolves around this type of issues (Kauffer Michel 2004).

The vision of hydropolitics proposed by Elhance (1999, p. 15) considers geography as crucial for the resulting conflict and cooperation processes in relation to international basins. Physical geography (topography, meteorology, hydrology, and geology) is directly involved in water availability, in the interdependence between riparian states and the potential uses of waters. Economic geography has an impact on water demand and the responses toward its needs. Finally, political geography defines conflict and cooperation dynamics among countries in interaction with a series of other elements that turns the study of hydropolitics into a complex field.

Making an assessment about cooperation and conflict dynamics regarding hydropolitics from six case studies of international river basins, Elhance (1999, pp. 236–242) demonstrates the main elements leading to noncooperation: sovereignty of states, nationalism and pressure of national interest groups, difficulty of assigning economic value to water which involves divergent interests, and lack of

information and available technology. However, he also mentions favorable trends toward cooperation (Elhance 1999, pp. 242–247): the fact that states are not necessarily looking for an armed conflict to solve their differences, international political and economic changes favoring cooperation, accumulated experience in water international agreements, emergence of new technologies for water uses, and the existence of the international convention of 1997—convention of the law of non-navigational uses of international water courses—which defines the rights of international water courses use for purposes other than navigation and was ratified by 35 countries in August 2014 to become an international conventional law for the signatory states.

Thus, the international analysis perspective of hydropolitics is focused in the interaction of various favorable dynamics of cooperation among countries in the field of shared waters and in the local, national, and international elements that promote conflicts among state players.

12.4.2 Hydropolitics As an Adjective: Recent Proposals Regarding Political Dimension

More recent contributions (Turton 2008; Wolf 2007) ponder around the international perspective of hydropolitics and use the *hydropolitical* adjective to create new concepts that enable the analysis of different aspects about cooperation and conflicts dynamics in transboundary waters.

Based on the definition of hydropolitics as "the ability of geopolitical institutions to manage shared water resources in a politically stable sustainable manner, i.e., without tensions or conflicts between political entities," that is, from the traditional and international analysis perspective, Wolf (2007, p. 4) proposes two new concepts: hydropolitical resilience and hydropolitical vulnerability. Hydropolitical resilience refers to the ability to face changes and hydropolitical vulnerability to the emergence of disputes around shared waters. Conflicts emerge in function of two elements: velocity of physical change and the institutional capacity to cope with it. The latter refers, according to Wolf (2007, p. 4), to favorable international relationships, to the presence of treaties or institutions for the management of transboundary waters that are the same or even more important than the change in itself. Thus, institutional capacity is a resilience factor, while vulnerability is the result of changes and institutional weaknesses toward them. Consequently, a river basin that tends to be oriented toward hydropolitics resilience would include international agreements and institutions on shared waters, a history of cooperation in this area, favorable political relationships, and economic development conditions. On the contrary, a trend toward hydropolitical vulnerability would be the result of brutal environmental changes, population growth or an economic asymmetric growth, unilateral projects of magnitude development, absence of institutional capacity, bad international

relationships, and climatic variability which is particularly characterized by alternating floods and droughts (Wolf 2007, p. 5).

Another analysis proposed by Turton (2008, pp. 35–38) incorporates the concept of hydropolitical complex in reference to South Africa. This author starts with recognition of the diversity of basins and riparian states around economic and military capabilities and especially in various situations regarding their dependence, in some basins, of waters from other countries and, for some states, of waters from a certain basin in particular. The notion of hydropolitical complex leads to two additional notions, pivotal states and basins and impacted states and basins that are used to refer to states and river basins. Turton (2008, p. 37) explains that pivotal states have an economic development and a high dependence degree of shared river basins for water supply. Impacted states share a sharp dependence on waters from the same river basin in pivotal states but find themselves unable to negotiate an equidistribution with the first.

Pivotal basins are situated close to the water availability limit, because all available water is distributed among diverse uses (basin closure concept) and is essential for pivotal states. Meanwhile, impacted basins are integrated with a pivotal state and an impacted state. The second state is not under equity conditions regarding distribution of shared waters (Turton 2008, p. 38). Finally, the concept of hydropolitical complex constitutes an intriguing framework for analysis regarding international relationships in the transboundary basins that Turton (2008) develops for a group of basins in southern Africa, demonstrating an asymmetries game among states.

In both proposals, the political dimension is a key factor for the analysis. The formulation by Wolf (2007) refers to institutions interacting through a set of hydrological, climatic, economic, demographic, and diplomatic elements. Under the perspective offered by Turton (2008), power relationships are articulated through water availability within the scope of a certain basin.

While these approaches to hydropolitics renew the international perspective and highlighted the political dimension of the concept, they still focus their analysis in states as exclusive players of hydropolitics. From traditional hydropolitics literature (Magrin 2016) to current analysis (Salman 2011; De Stefano et al. 2017), the state-centrism remains one of the major characteristics (Allouche and Daoudy 2010). Interstate relations approaches are today considered as a narrow perspective by critical hydropolitics (Sneddon and Fox 2006) and by constructivist hydropolitics (Julien 2012). Recent proposals argue for the necessity to go beyond state-state relations (Thomas 2017; Sneddon and Fox 2006) and include non-state actors in water governance and hydropolitics analysis (Mirumachi and Chan 2014) because water politics and transboundary issues are multi-scalar and multi-stakeholders (Menga 2016). Developing these proposals with other types of players that share transboundary waters remains a pending and highly relevant task for Mexico and Guatemala and Mexico and Belize borders.

12.4.3 Hydropolitics and Water Conflicts in Mexico

Patricia Avila (Ávila García 2002b) is the first person in using the term "hidropolítica" in Spanish in Mexico. This conceptualization emerges from an international perspective, but her main contribution consists in the adjustment of the concept for its use in water local problems in Mexico. Avila (Ávila García 2002b) explicitly starts from Elhance (1999) and Maury (2003) texts—who in turn bases his work on Elhance as well—to create a definition of hydropolitics understood as "the manifestation of tensions arisen from control and management of an increasingly scarce and strategic resource," and which refers to "water use as a political resource and local power source." In this conceptualization effort, Maury (2003) and Avila (Ávila García 2002b) make a distinction between hydropolitics and water policies, being the first result of the second one, that is, hydropolitics is derived from the consequences of a "critical situations set" associated to water policies (Maury 2003). Recently, several authors have taken up again this conceptualization to analyze diverse local conflicting situations related to water in Mexico (de Alba 2007; Rojas 2008).

The conceptualization of the "hydropolitics" term proposed by Avila García (2002a, b) for the Mexican case is focused on the analysis of conflicts surrounding water, and it is interesting in this aspect. Although it helps to translate the previously described international vision to local aspects of water management in Mexico, it does not permit the analysis of diverse dimensions involved in Mexico-Guatemala and Mexico-Belize borders from local to international since they are focused on the conflict. Our position is based on the premise that although the conflict represents a fundamental dimension of politics, this is situated, above all, because of its social regulation function, as defined by Leca (1973). Therefore, the hydropolitics conceptualization proposed by Avila is far too narrow for the apprehension of interactions among local and international dimensions of the hydropolitics study and for the analysis of its complexity.

12.4.4 Hydropolitics According to Turton: Extending the Concept

Based on the complexity of hydropolitics dynamics, Turton (2002) proposes to extend the "hydropolitics" concept as a result of a set of reasons. First, hydropolitics cannot be solely limited to the analysis of state players and should involve other players with an important role in diverse aspects. Derived from this first aspect, Turton mentions that it is necessary to consider interactions among state and non-state players to the extent that Elhance's definition does not include all political interactions regarding water.

For that purpose, Turton (2002, p. 16) uses the notion of "politics" imbedded in the term hydropolitics and to the definition of politics proposed by David Easton as

"the authoritative allocation of values in society." Politics is a dynamic process and on track, where the main focus is the allocation of values through laws and policies, authoritatively exercised (i.e., by an authority). This implies a decision process favoring certain groups, which leads to challenging values and legitimacy of the authority. Therefore it is relevant to understand the who, what, when, where, and how in the analysis of politics.

The definition of hydropolitics resulted from these elements is as follows: "the authoritative allocation of values in society with respect to water" (Turton 2002, p. 16). It suggests an opening of the concept to a wide range of aspects beyond conflict and cooperation processes among states in relation to transboundary waters. Turton goes no further on the definition but explains two basic aspects of the extension on the hydropolitics field. The first one is the scale of hydropolitics studies: unlike the traditional vision, which places them exclusively in the international scope, Turton (2002, p. 239) proposes a multiscale approach of the hydropolitics field, that is, from individual to international, through the following scales: family, community, city, province, national, regional, or international basin. The second element of Turton proposal focuses in the opening of potential topic scopes that the notion of "hydropolitics" involves, which, in the case of South Africa, include dimensions linked to the local context.

Turton (2002) proposes a matrix format to cross diverse scales with thematic scopes that builds three groups: legal-institutional, social, and economic. This configuration enables the location of the richness of thematic scopes related to hydropolitics and its diverse analysis scales. Some scopes involve different scales and others only center on several scales of analysis. For instance, the thematic scope "poverty" involves all scales of social group analysis. Likewise, the scope of international rights is located solely between the scales of river basin and international, because it does not apply to the others.

The fundamentals of Turton's proposal are, precisely, the redefinition of the "hydropolitics" concept, which permits its expansion toward less reduced aspects than those proposed by the international perspective prevailing on the literature of the subject.

12.4.5 Hydropolitics and Policy Interactions Regarding Water: A Proposal Toward Water and Transboundary River Basins

Water issues in the borders among Mexico and Guatemala and Mexico and Belize have created no open conflicts among riparian countries or any relevant bilateral or trilateral cooperation actions. There is no treaty regarding shared waters nor actions for managing transboundary basins because of a lack of interest to include the topic in the political agenda of states, which is dominated with migration issues and problems of security linked to drug trafficking and illegal actions. Thus, on one

side, the state interactions regarding water are extremely limited, while on the other side, there is a multitude of local relationships surrounding water. In fact, water is an everyday issue for communities settled on both sides of international division lines, as well as an interest point for non-state players that pretend to have an influence over the issue of international river basins, like nongovernmental organizations, academic groups, or epistemic communities.[14] Taking into consideration of the above, it is difficult to apply the international perspective of the hydropolitics analysis proposed by Elhance (1999) to the reality of the borders among Mexico and Guatemala and Mexico and Belize.

Finally, water issues in the six transboundary basins, representing a 167,727 km^2 territory, involve dimensions that are not related with the presence of an international division line but with characteristics of the local context, among which we can mention, as an example, the presence of indigenous groups in large areas of transboundary river basins territory, belonging to different political systems, administrative division, national and local institutions, geophysical conditions of the environment, incidence of extreme meteorological phenomena, and territorial representations. Consequently, the analysis of hydropolitics in the borders between Mexico-Guatemala and Mexico-Belize shall necessarily emerge from a proposal which permits to widely involve the realities of political interactions regarding water, that is, its international aspects—which are not reduced to the relationships among states—and local and national dimensions to further analyze interrelationships between these two components. In such a way, the proposal herein is part of the continuity of the "hydropolitics" concept that Turton (2002) extends and emerges from a definition of hydropolitics as *the political interactions regarding water in different scales and pertinent specific topics* for the study of water resources in the borders between Mexico and its southern neighbors.

12.4.6 Conclusion: From One Hydropolitics to Multiple Hydropolitics

Starting from the previously proposed definition of hydropolitics and the complexity of water problems in the borders among Mexico, Guatemala, and Belize that we have pointed out, our proposal is to extend the study of hydropolitics in the region by articulating two major scales: international and local.

As a result of the diversity and complexity of the analysis of water-related political problems in the region, along with diverse visions and perspectives resulted from different disciplinary approaches as political sciences, anthropology,

[14]Concept developed by the constructivist theory of international relationships that Haas (1992, p. 3) defines as a network of professional with a certain expertise and renowned abilities in a particular matter and formulates an articulated approach around a relevant issue of policy derived from understanding its sphere of specialization.

sociology, economy, and history, we have considered convenient to talk about various hydropolitics rather than a single hydropolitics. Talking about multiple hydropolitics then emphasizes our approach from different visions, processes, and phenomena of political interactions regarding waters that are intertwined and characterized by a certain plurality and heterogeneity besides those common elements.

As an example, we are able to find similar realities in faraway places on both sides of the border that repeat themselves through space and time. Other interactions depend on a specific history, political context, or even past and present water policies of each country of each administrative subdivision and, occasionally, of each place. On the other hand, there are transboundary local relationships between inhabitants that may be opposed to international interstate dynamics of water aspects and transboundary basins. There are also external players present with intent of approach that promotes action strategies from local inhabitants under the modality of conflicts or collaboration actions. The essence of politics, regarding the relationship between conflict and regulation, converges in the heart of multiple hydropolitics, from a combination of a bordering and a transboundary perspectives and as a continuum from local to international water issues.

As the most recent proposals from international literature upon hydropolitics argue from a critical and constructivist approaches, transboundary water issues are characterized by fluidity (Cascão and Zeitoun 2010; Hussein and Grandi 2017), and they must enlarge to a diversity of scales and actors (Thomas 2017) to include social dynamics (Julien 2012) and ecosystems (Mirumachi and Chan 2014) and enable an "alternative imaginings and associated praxes" of river basins (Sneddon and Fox 2006, p. 198). As a matter of fact, hydropolitics relates with state-state interactions but mainly depends on "what societies make of it" (Julien 2012, p. 45) as fieldwork in the mentioned borders indicates (Kauffer Michel 2014a, b).

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Edith F. Kauffer is a Professor and Researcher at CIESAS (Centro de Investigaciones y Estudios Superiores en Antropología Social)-Sureste, Mexico, and Resident of IMéRA (Institute for Advanced Studies) at Aix-Marseille University (2016–2017). She was former coordinator of the researchers' water network on the border between Mexico, Guatemala, and Belize (RISAF) (2003–2016); co-coordinator of the Comparative Research on Regional Integration and Social Cohesion Consortium (RISC) working group on Management of Strategic Resources, Environment, and Society. She is also an associate editor of the journal *Regions & Cohesion* (Berghahn Journals) and is the representative of CIESAS at the consultative council of Diplomatic Historical Documentary Archive of the Mexican Minister of Exterior Relations. She conducts research on transboundary waters and river basins, water policy and politics, hydropolitics, gender and water in Southern Mexico and Northern Central America, and also recently on transboundary river basins in the Mediterranean.