



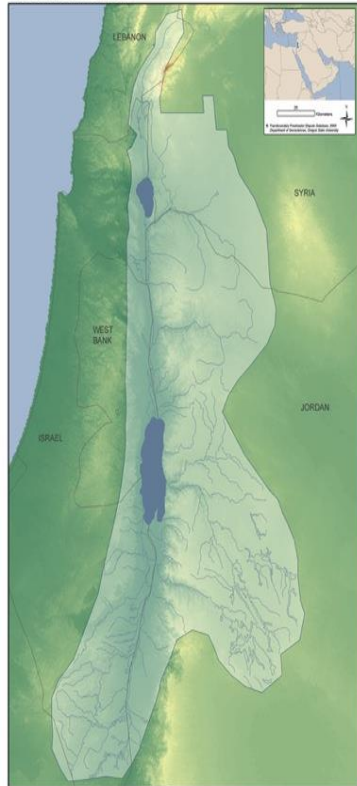
Data and “Prevailing Wisdom”: Conflict and Cooperation over Transboundary Waters

Dr. Melissa McCracken and Dr. Aaron Wolf
WWHGD Working Group Webinar
18 March 2020

What is Water Conflict Management & Transformation??



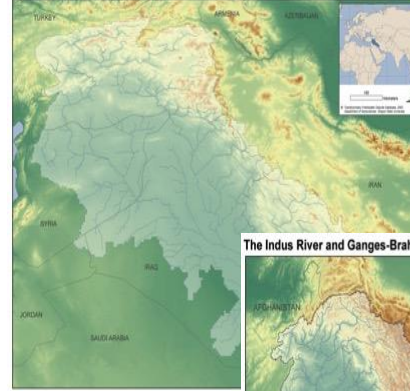
The Jordan River basin



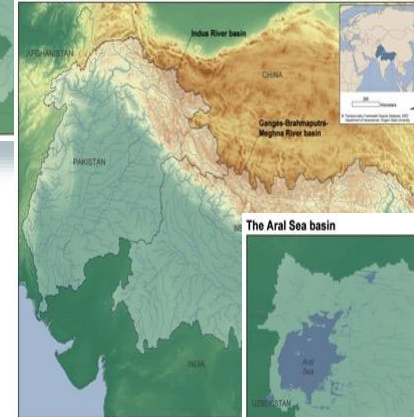
The Nile River basin



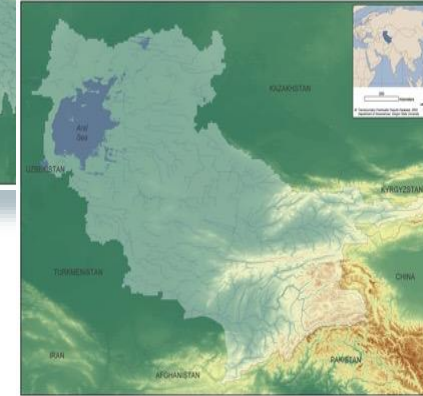
The Tigris-Euphrates River basin



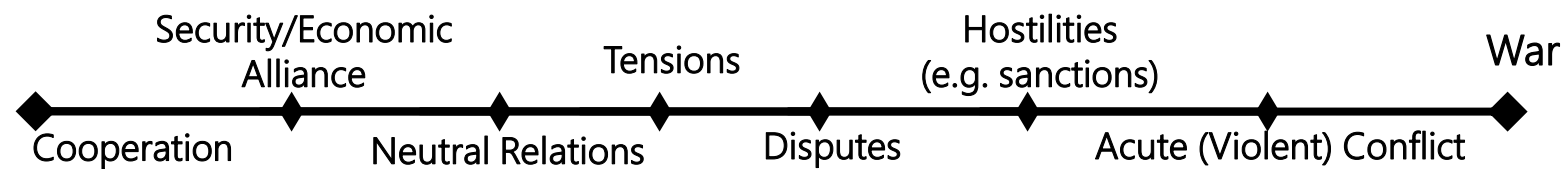
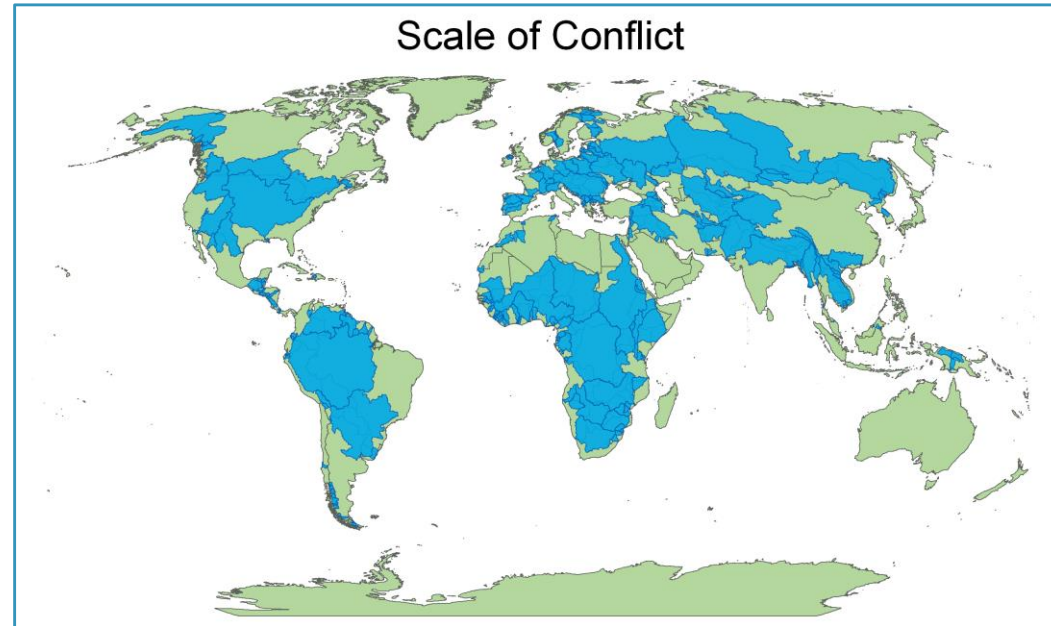
The Indus River and Ganges-Brahmaputra-Meghna River basins



The Aral Sea basin



"Fierce competition for fresh water may well become a source of conflict and wars in the future." – Kofi Annan, March 2001



The Transboundary Freshwater Dispute Database

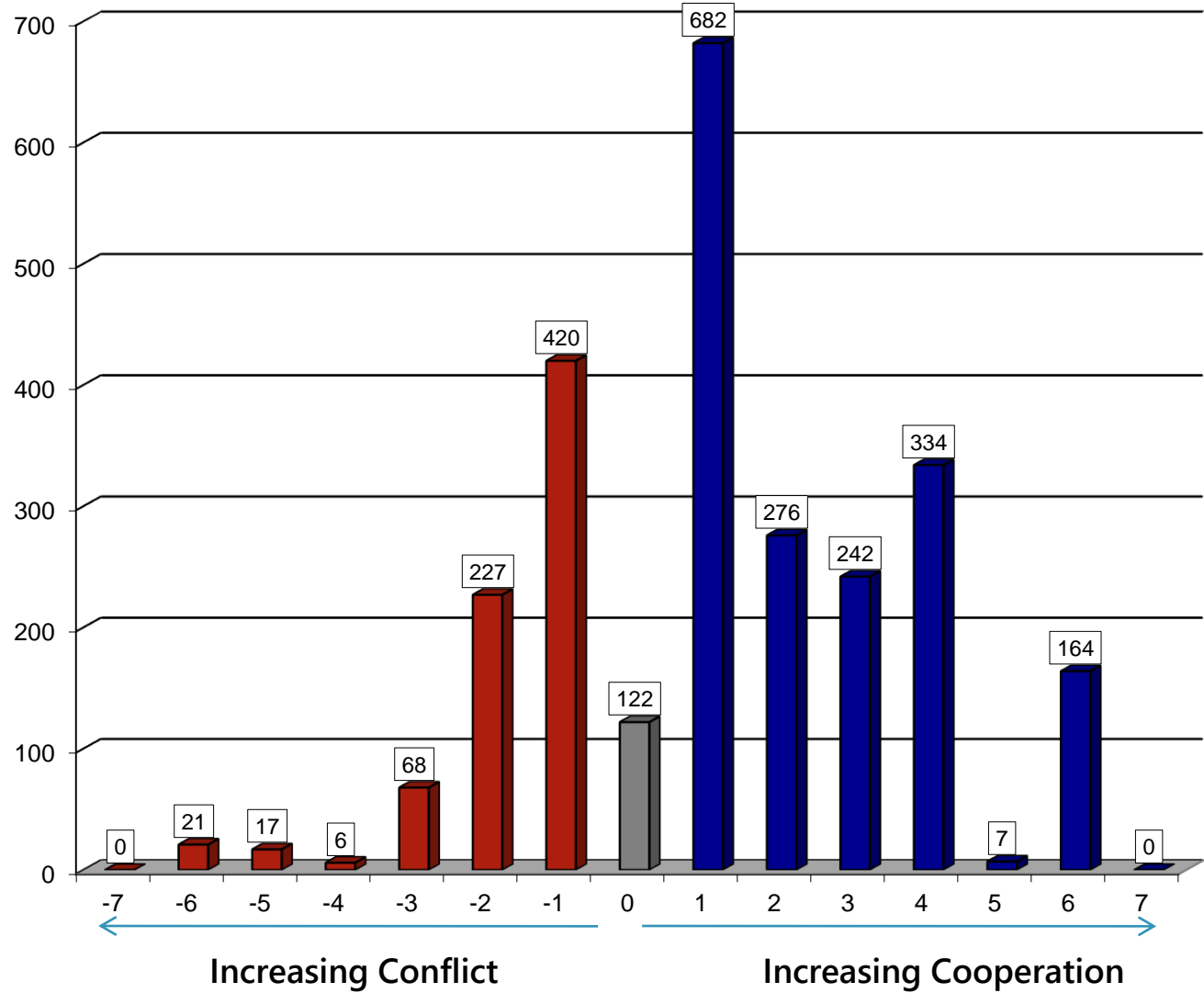


*A Project of Oregon State University
and the Northwest Alliance for Computational Science*

- Reference to 3,600 water-related treaties (805-1997)
- Full-text of 700+ treaties and 40 US compacts, entered in computer database through 2019.
- Detailed negotiating notes (primary or secondary) from fourteen case-studies of water conflict resolution
- Bibliography of "State of the Art" of water dispute resolution literature
- News files on cases of acute water-related disputes
- Indigenous methods of water dispute resolution



Number of Events by BAR Scale 1948-2008



- -7=Formal War
- -6=Extensive Military Acts
- -5=Small-scale Military Acts
- -4=Political/Military Hostile Acts
- -3=Diplomatic/Economic Hostile Acts
- -2=Strong/Official Verbal Hostility
- -1=Mild/Unofficial Verbal Hostility
- 0=Neutral, Non-significant Acts
- 1=Mild Verbal Support
- 2=Official Verbal Support
- 3=Cultural, Scientific Agreement/Support
- 4=Non-military Econ., Techno., Indust. Agreement
- 5=Military, Econ., Strategic Support
- 6=International Water Treaty
- 7=Unification into One Nation

Source: De Stefano, L., P. Edwards, L. de Silva and A. T. Wolf 2010. "Tracking Cooperation and Conflict in International Basins: Historic and Recent Trends." *Water Policy*. Vol 12 No 6 pp 871–884. Adapted with permission of the authors.

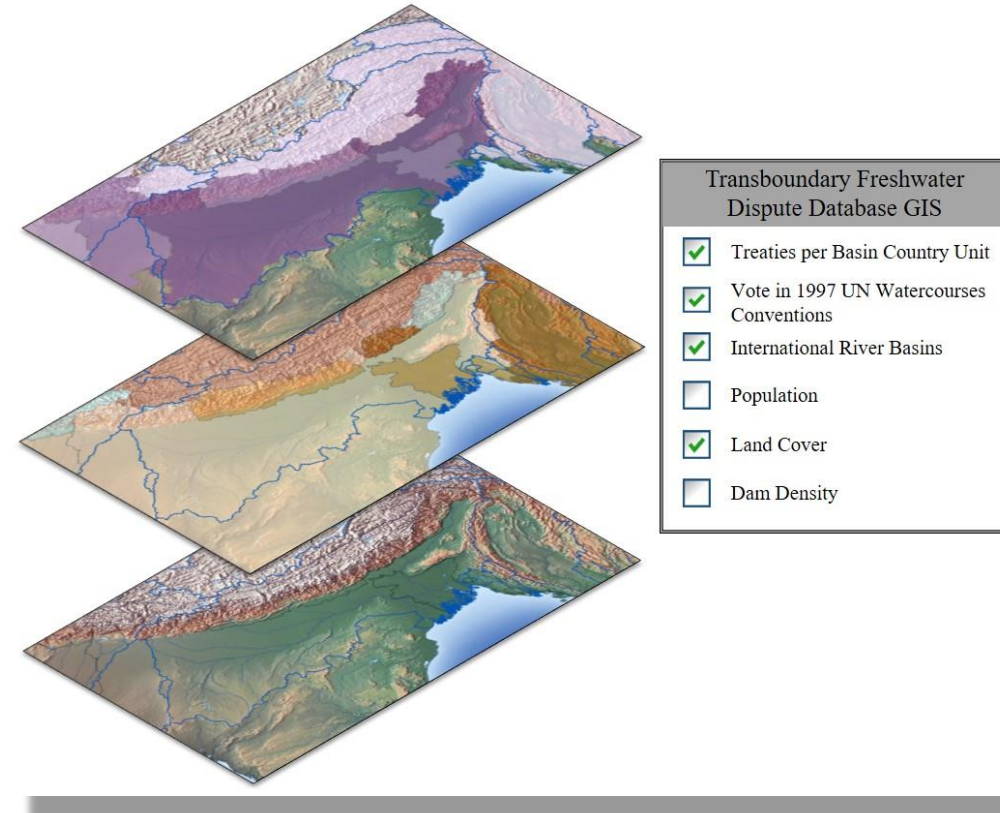


Three things we learned from data:

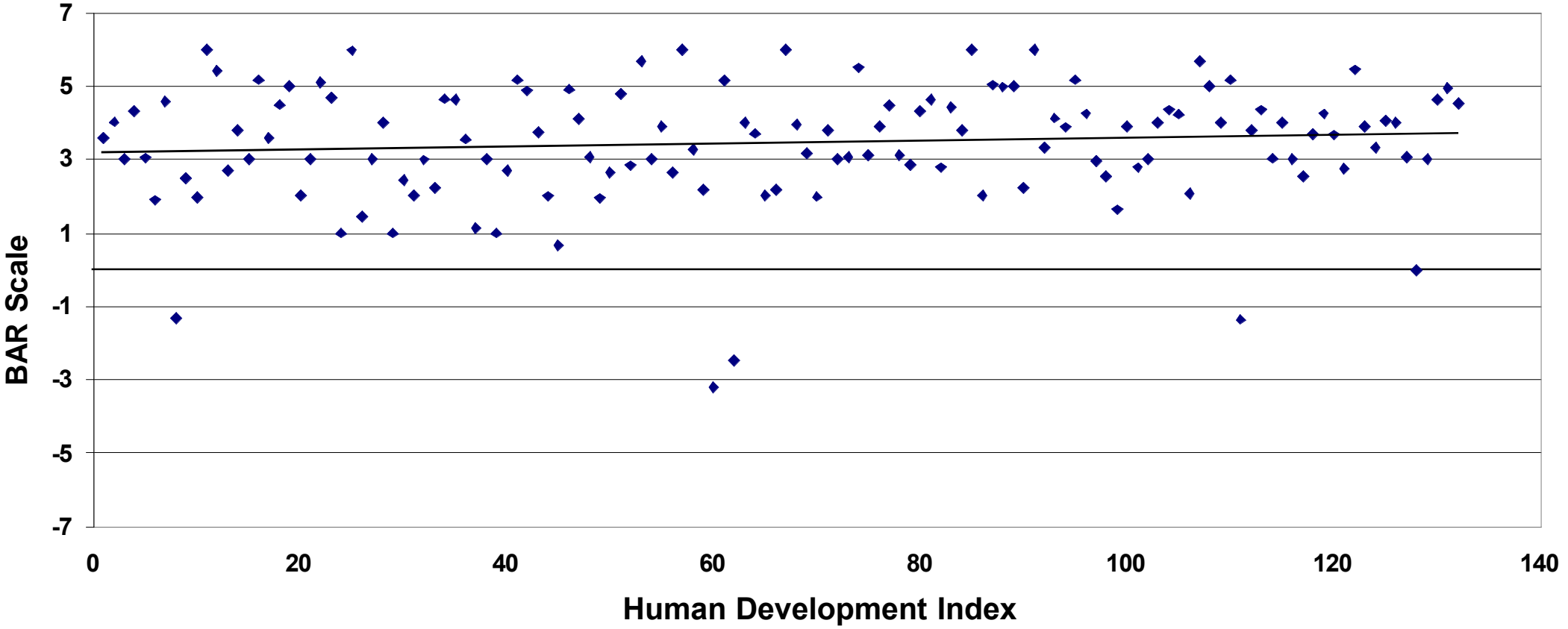
1. Cooperation is prevalent.

Indicators of conflict include:

- Climate
- Water stress
- Population
- Level of development
- Dependence on hydropower
- Dams or development *per se*
- “Creeping” changes:
 - general degradation of quality
 - climate change induced hydrologic variability



Human Development Index Vs. BAR Scale (By Country)



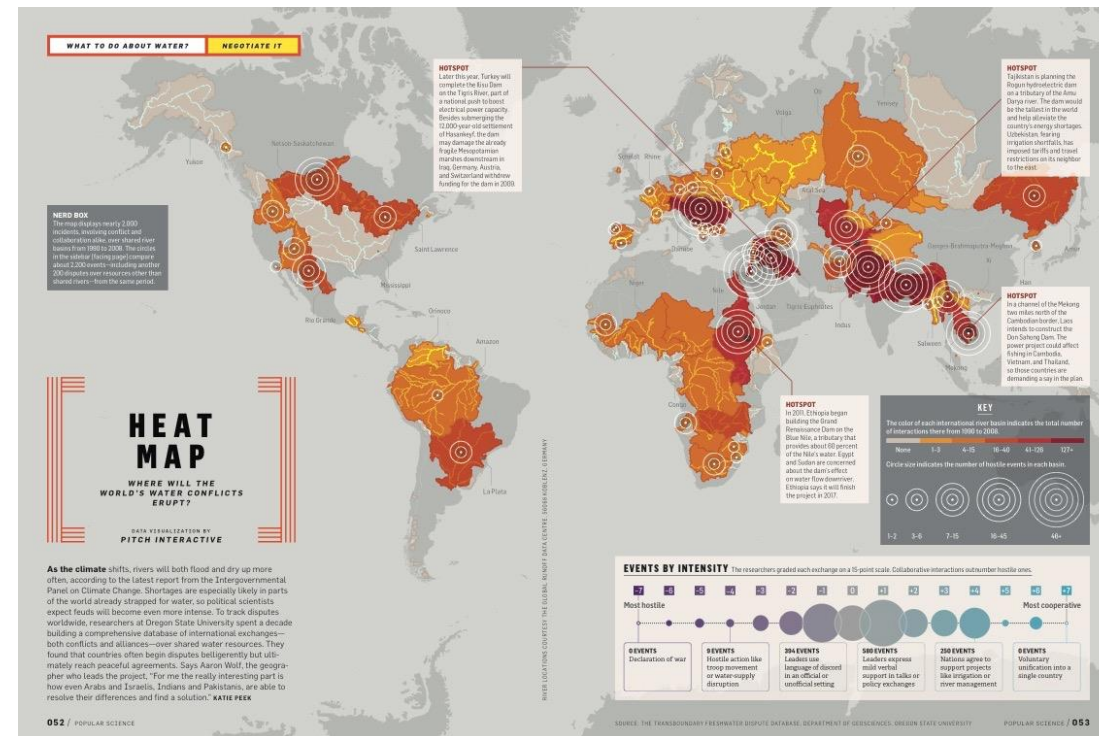


BASINS AT RISK: Working Hypothesis

“The likelihood of conflict rises as the rate of change within the basin exceeds the institutional capacity to absorb that change.”

Early Warning for Hot Spots

Primarily upstream dams in the absence of an agreement about how to deal with their impacts.





Three things we learned from data:

1. Cooperation is prevalent.
2. Indicators are not what we thought.



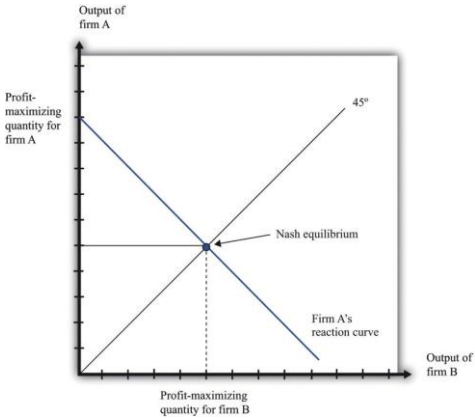
Three things we learned from data:

1. Cooperation is prevalent.
2. Indicators are not what we thought.
3. Data is not enough.



18 March 2020

Four Worlds in Water:



Mental

Spiritual



Emotional

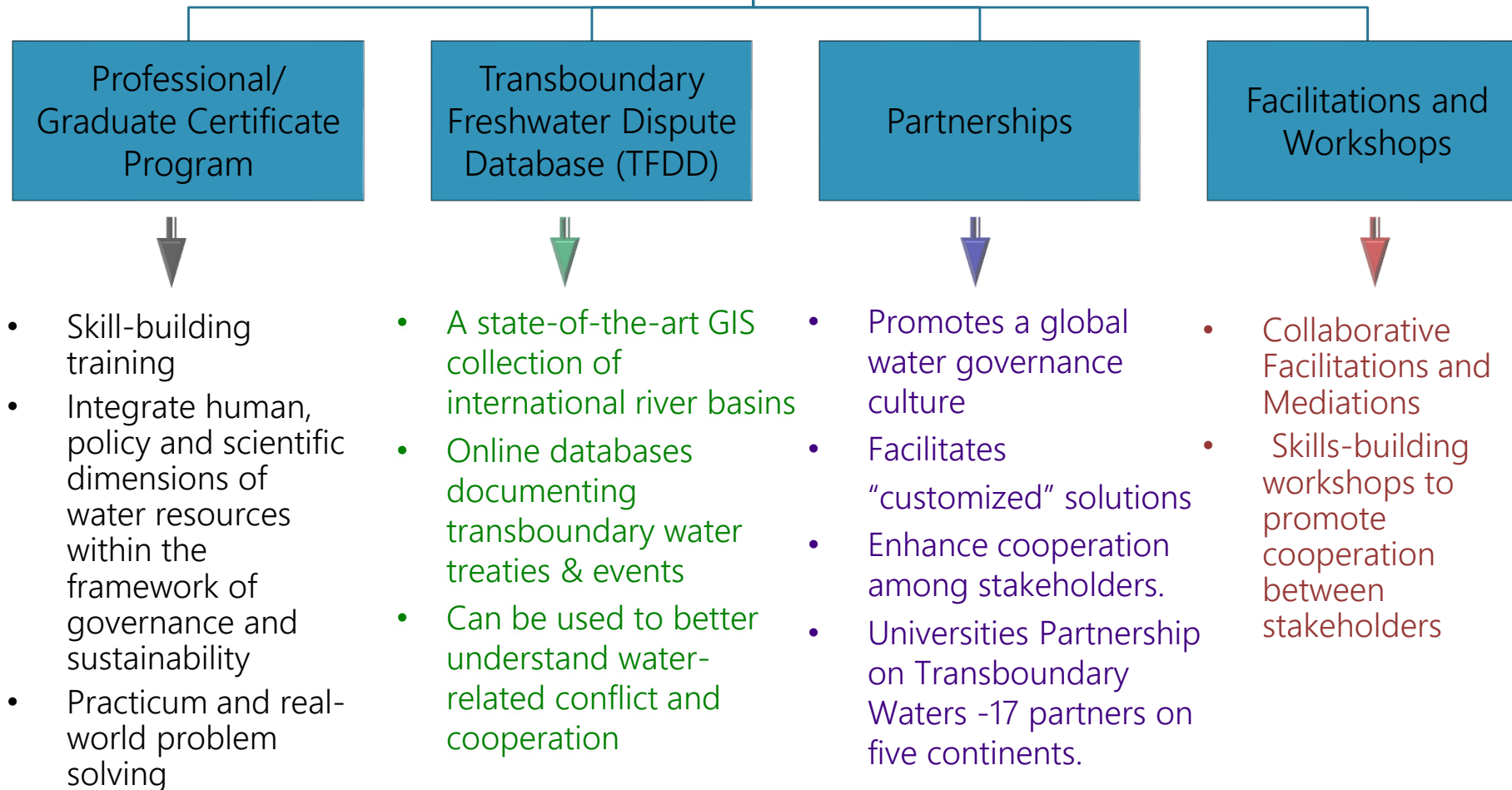


Physical





Oregon State University Program in Water Conflict Management and Transformation



Database Foundations

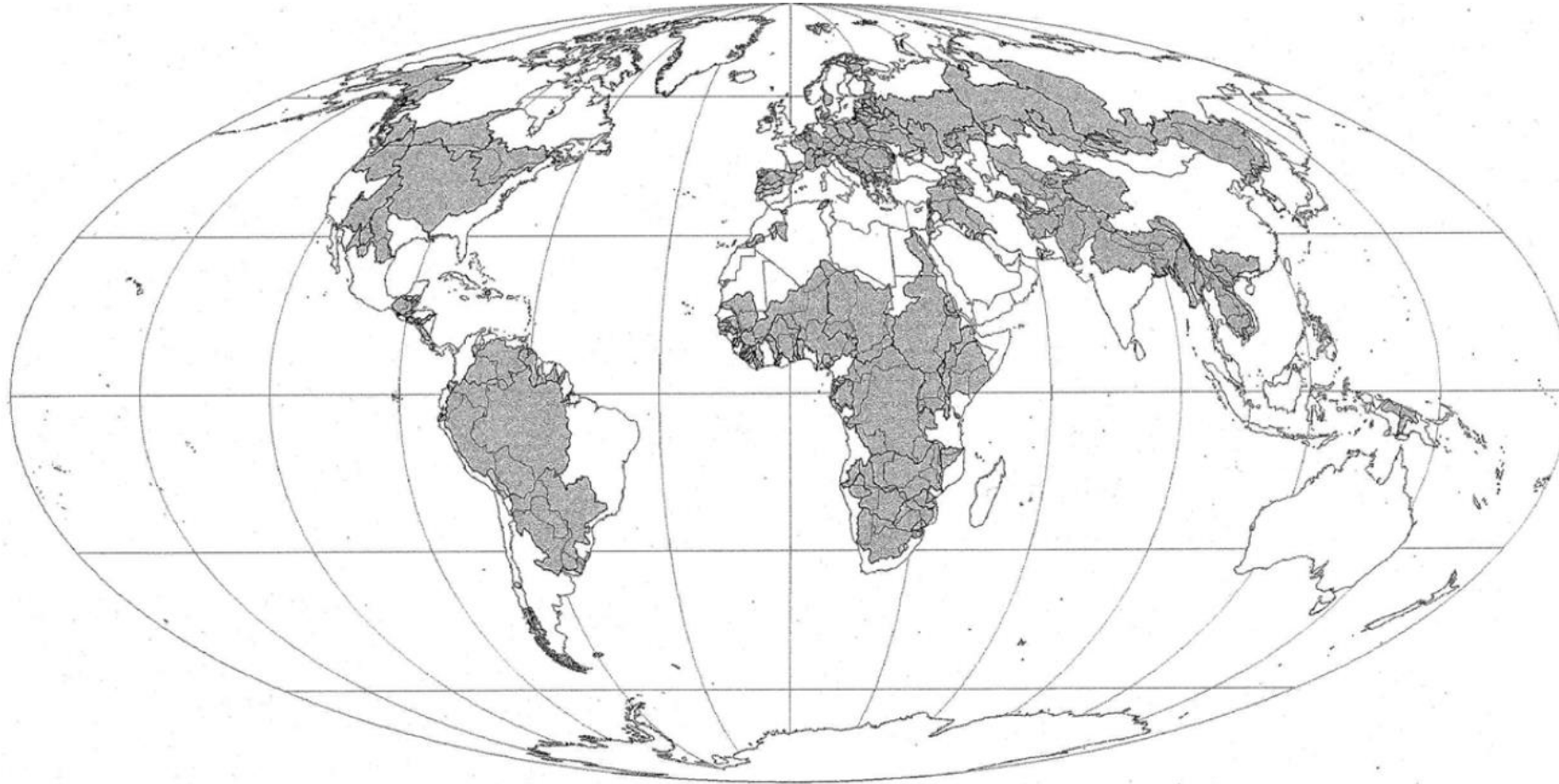


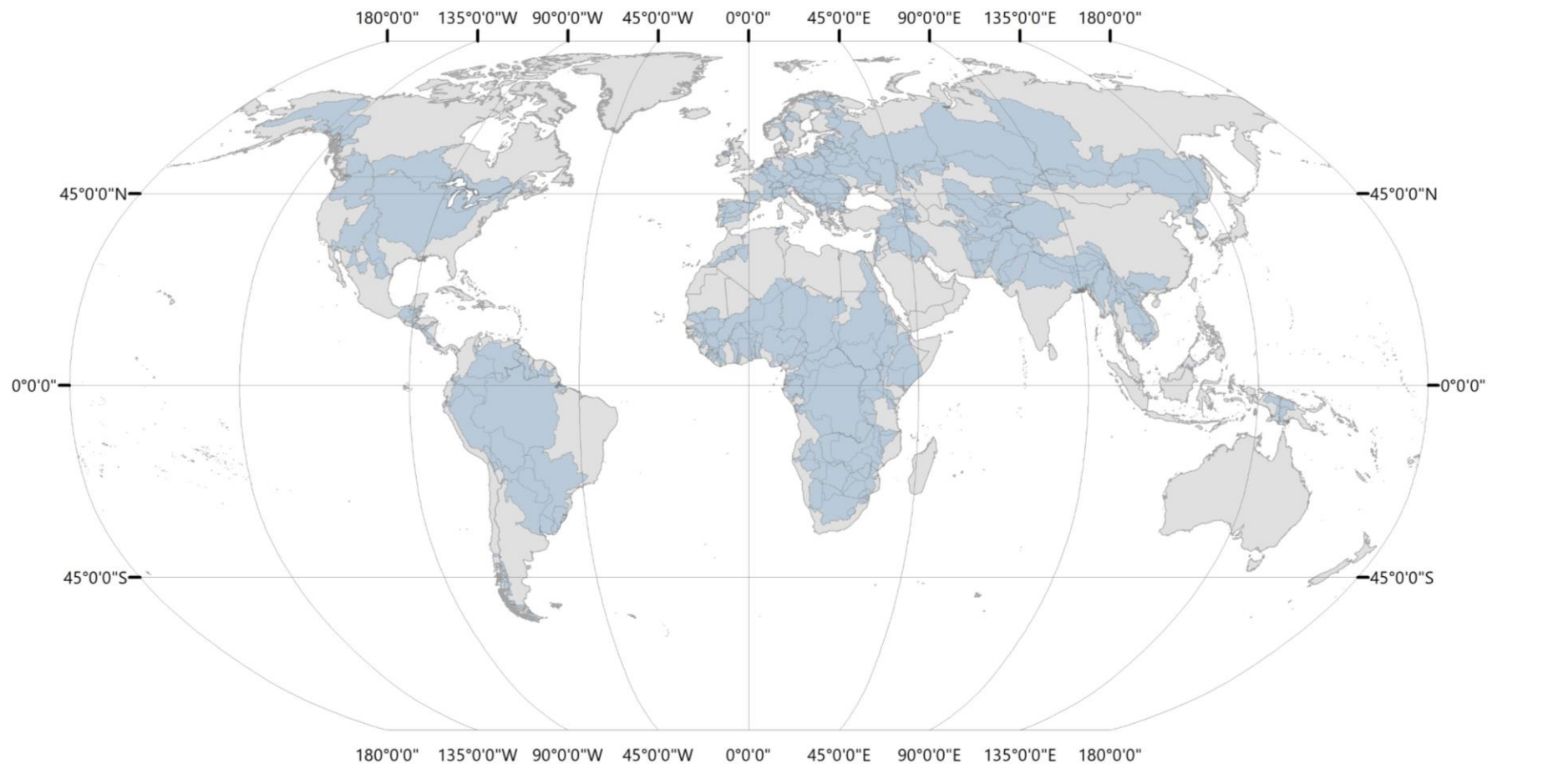
Figure 1. International basins.

Wolf et al. 1999. "International River Basins of the World." *International Journal of Water Resources Development* 15 (4): 387-427.

Database Foundations



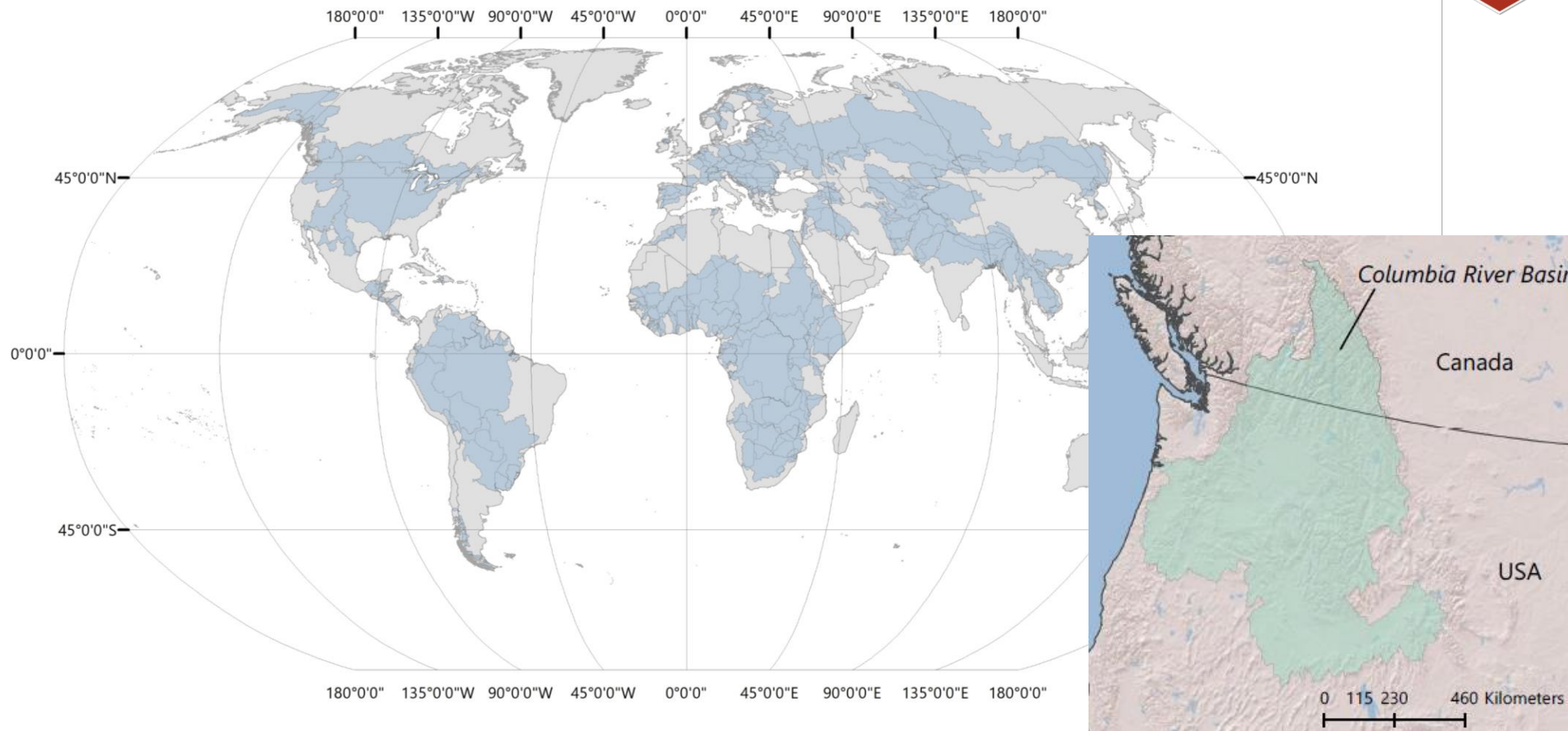
18 March 2020



© 2018 Transboundary Freshwater Dispute Database
Oregon State University
Cartographer: Melissa McCracken
Robinson Projection



Database Foundations



© 2018 Transboundary Freshwater Dispute Database
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Cartographer: Melissa McCracken
Robinson Projection

Spatial Database



Home Events Treaties Unit Layer ▾ Topic Layer ▾
Download Facebook Refresh Info Tutorial

310 selected out of 310 records | [Reset All](#)

Basin Selected:
Please Select a Basin

Population Density (per km²) per Basin

Land Area per Basin (km²)

Others

Number of Dams in the Basin:

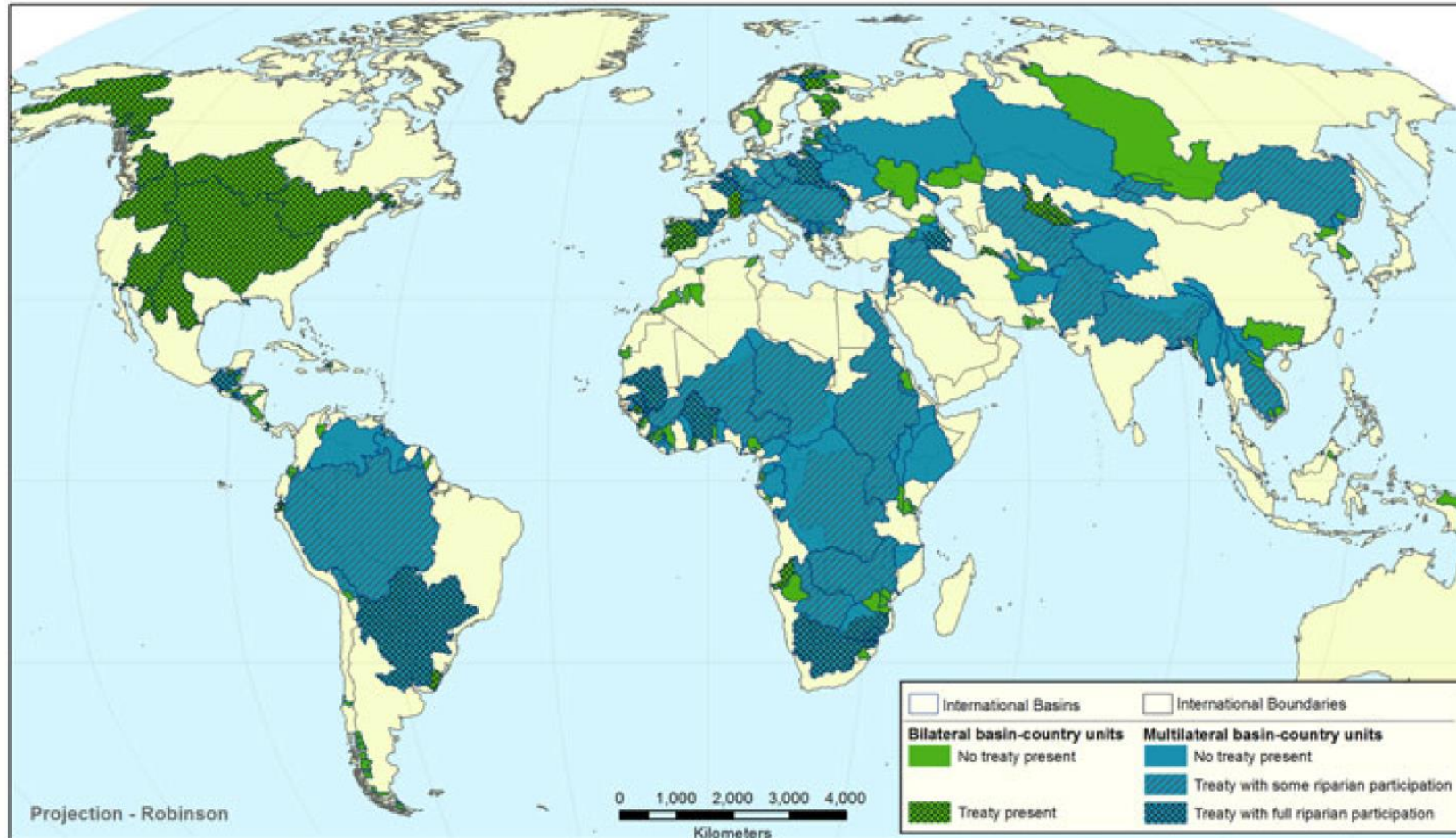
Distribution of Landcover by Basin

Search Database...

Basin Name	2012 Population Density (per km ²)	2015 Population Density (per km ²)	2020 Population Density (per km ² projected)	Existing Dams	Planned/Proposed Dams	Country Name
Adige						
ADIG	146	127	129	8	0	Italy
ADIG	14	7	7	0	0	Switzerland
Akpa						

<https://transboundarywaters.science.oregonstate.edu/content/transboundary-freshwater-spatial-database>

International Freshwater Treaties Database



Giordano et al. 2013. "A review of the evolution and state of transboundary freshwater treaties." *International Environmental Agreements: Politics, Law and Economics*. 14 (3).

Fig. 2 Treaty coverage (at least one treaty present) and riparian participation at the basin-country level for bilateral basins (*shades of green*) and multilateral basins (*shades of blue*)

International Freshwater Treaties Database



Entry ID	BCCODE	BCODE	Basin Name	CCODE	Country Name	2016 Update ID	Document Name	Date Signed	Signatories	DocType
1737	SHLD_NLD	SHLD	Schelde	NLD	Netherlands					
1737	SHLD_NLD	SHLD	Schelde	NLD	Netherlands					
1732	SHLD_FRA	SHLD	Schelde	FRA	France					
1732	SHLD_FRA	SHLD	Schelde	FRA	France					
1610	RHIN_NLD	RHIN	Rhine-Meuse	NLD	Netherlands					
1610	RHIN_NLD	RHIN	Rhine-Meuse	NLD	Netherlands					
1557	RHIN_FRA	RHIN	Rhine-Meuse	FRA	France					
1557	RHIN_FRA	RHIN	Rhine-Meuse	FRA	France					
1465	RGNA_USA	RGNA	Rio Grande (North)	USA	United States of					
1465	RGNA_USA	RGNA	Rio Grande (North)	USA	United States of					
1443	RGNA_MEX	RGNA	Rio Grande (North)	MEX	Mexico					
1443	RGNA_MEX	RGNA	Rio Grande (North)	MEX	Mexico					
137	CLDO_USA	CLDO	Colorado	USA	United States of					
137	CLDO_USA	CLDO	Colorado	USA	United States of					
113	CLDO_MEX	CLDO	Colorado	MEX	Mexico					
113	CLDO_MEX	CLDO	Colorado	MEX	Mexico					
1625	RHIN_NOR	RHIN	Rhine-Meuse	NOR	Norway					
1625	RHIN_NOR	RHIN	Rhine-Meuse	NOR	Norway					
1537	RHIN_DEU	RHIN	Rhine-Meuse	DEU	Germany					
1537	RHIN_DEU	RHIN	Rhine-Meuse	DEU	Germany					
1490	RHIN_AUT	RHIN	Rhine-Meuse	AUT	Austria					
1490	RHIN_AUT	RHIN	Rhine-Meuse	AUT	Austria					
233	DANU_DEU	DANU	Danube	DEU	Germany					
233	DANU_DEU	DANU	Danube	DEU	Germany					
208	DANU_AUT	DANU	Danube	AUT	Austria		4 Agreement 1/1/1858		Austria, Bav	9
208	DANU_AUT	DANU	Danube	AUT	Austria		4 Agreement 1/1/1858		Austria, Bav	9
1973	UNKN_FRA	UNKN	Unknown	FRA	France		5 Convention 2/11/1863		France, Dan	2

TFDD Basin and Spatial Information

A. Entry ID
A unique code for identifying each entry in the database, or each basin country unit and treaty combination.

B. BCCODE (text)
Basin Country code that is related to the treaty or agreement (e.g., AMZN_BRA, AMZN is the four-letter code for the Amazon Basin and BRA is the three-letter country code for Brazil).

C. BCODE
Four digit TFDD Basin code for the basin

D. Basin Name
TFDD Basin Name for the above BCODE. If a document addresses multiple TFDD basins, this column only lists the specific Basin name for the specific BCCODE of the entry. Global international agreements are coded as General (GNRL), as are agreements in which no basins are specified. Documents concerning groundwater that cannot be identified as being within an international basin are coded as Groundwater (GRND). Documents where the international basin is not identifiable or the document is missing are coded as Unknown (UNKN).

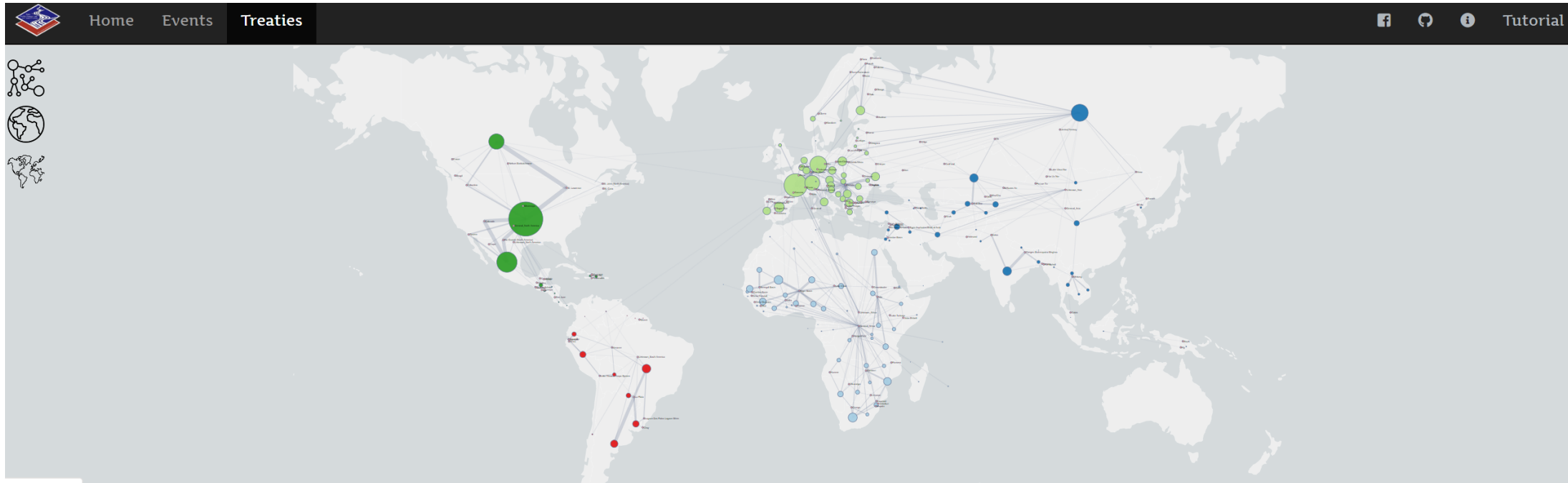
E. CCODE
Three digit TFDD country code of the Basin Country Unit

F. Country (Country_name)
Name of the country associated with the CCODE

G. 2016 Update ID
A unique code for identifying each document in the database.

<https://transboundarywaters.science.oregonstate.edu/content/international-freshwater-treaties-database>

International Freshwater Treaties Database



Treaties Search...

Basin	Country	Description	DateSigned	IssueArea
Aral Sea	Afghanistan	Protocol between the Union of Soviet Socialist Republics and Afghanistan on the joint execution of works for the integrated utilization of the water resources in the frontier section of the Amudarya river	25/06/1958	N.A.
Helmand	Afghanistan	Terms of reference of the Helmand River Delta Commission and an interpretive statement relative thereto agreed by conferees of Afghanistan and Iran	07/09/1950	Water Quantity
Indus	Afghanistan	Treaty between the government of Afghanistan and His Britannic Majesty's Government for the establishment of neighbourly relations	22/11/1921	Water Quantity Navigation
Danube	Albania	Agreement between the government of the Federal People's Republic of Yugoslavia and the government of the People's Republic of Albania concerning water economy questions together with the statue of the Yugoslav-Albanian Water economic commission and with he protocol concerning fishing in frontier lakes and rivers.	05/12/1956	Hydro-power/Hydro-electricity
Lake Prespa	Albania	Agreement between the Government of the Hellenic Republic and the Government of the Republic of Albania on the establishment of the permanent Greek-Albanian commission on transboundary freshwater issues	03/04/2003	Joint Management Technical Cooperation/Assistance
Vijose	Albania	Agreement between the Government of the Hellenic Republic and the Government of the Republic of Albania on the establishment of the permanent Greek-Albanian commission on transboundary freshwater issues	03/04/2003	Joint Management Technical Cooperation/Assistance

International Water Events Database



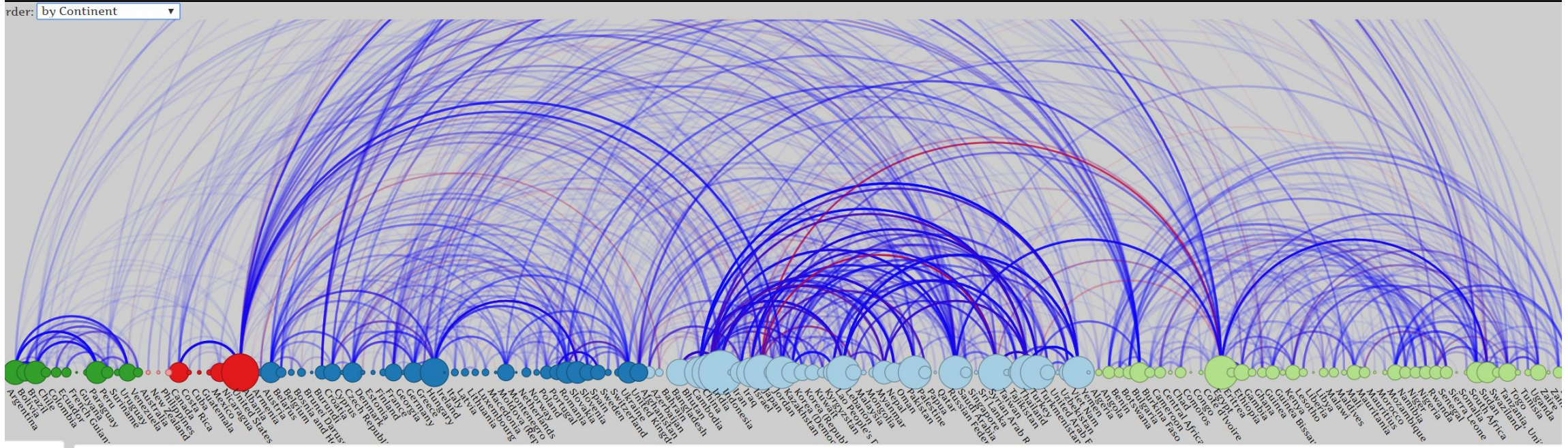
DYAD_CODE	BCode	NUMBER_OF_BASINS	LOCATION	CCODE1	CCODE2	IRM1	IRM2	BCCODE1	BCCODE2	COUNTRY_LIST	NUMBER_OF_Countries	COPDAB_SCALE	BAR_Scale
EGY_INT	NILE	1	NILE	EGY	INT	M	M	NILE_EGY	NILE_INT	Egypt (inte	1	5	3
IND_PAK	INDU	1	Indus	IND	PAK	I	R	<p><i>DATE</i> This field indicates the date (or closest approximation thereof) of when an event occurred. All dates are entered in a month/day/year format. For meetings or events covering a period of days, often the last date of the event is used, with additional date information covered in the event summary or comments fields. If only a year is available for the event date, it is still entered in the database in a month, day, year format and the convention 01/01/year is used. If only a month and year are available, the 1st or 15th of the month is used as the day. A note is placed in the comment field that the date is an approximation.</p> <p><i>DYAD_CODE</i> This field is a concatenation of the fields CCode1 and CCode2, in that order.</p> <p><i>BCode</i> A four letter code indicating the basin in which the event occurred. See the BAR Master Codes.xls file for the key to the basin codes.</p> <p><i>#_OF_BASINS</i> The total number of basins associated with an event. A "99" indicates 'basin not specified'.</p> <p><i>LOCATION</i> More specific information (beyond the basin identification) of where an event occurred.</p> <p><i>CCODE1 and CCODE2</i> These fields contain the three letter country codes for the countries involved in an event. For each pair of actors, the country code used in the CCode1 column is the one that comes first alphabetically, based on the country codes. See the BAR Master Codes List.xls file for the key to the country codes.</p>					
IND_PAK	INDU	1	Indus	IND	PAK	I	R						
FRA_ITA	ROIA	1	ROIA	FRA	ITA	R	I						
CZS_GBR	DANU	1	DANUBE	CZS	GBR	M	M						
HUN_YGF	DANU	1	DANUBE	HUN	YGF	M	M						
HUN_ROM	DANU	1	DANUBE	HUN	ROM	M	M						
HUN_USR	DANU	1	DANUBE	HUN	USR	M	M						
USR_YGF	DANU	1	DANUBE	USR	YGF	M	M						
ROM_YGF	DANU	1	DANUBE	ROM	YGF	M	M						
ROM_USR	DANU	1	DANUBE	ROM	USR	M	M						
AUT_YGF	DANU	1	DANUBE	AUT	YGF	M	M						
AUT_ROM	DANU	1	DANUBE	AUT	ROM	M	M						
AUT_HUN	DANU	1	DANUBE	AUT	HUN	M	M						
AUT_CZS	DANU	1	DANUBE	AUT	CZS	M	M						
HUN_USA	DANU	1	DANUBE	HUN	USA	M	M						
CZS_USA	DANU	1	DANUBE	CZS	USA	M	M						
ROM_USA	DANU	1	DANUBE	ROM	USA	M	M						
GBR_HUN	DANU	1	DANUBE	GBR	HUN	M	M						
GBR_YGF	DANU	1	DANUBE	GBR	YGF	M	M						
GBR_ROM	DANU	1	DANUBE	GBR	ROM	M	M						
GBR_USR	DANU	1	DANUBE	GBR	USR	M	M						
USA_YGF	DANU	1	DANUBE	USA	YGF	M	M	DANU_US.DANU_YG	Austria--Cz	8	7	1	
USA_USR	DANU	1	DANUBE	USA	USR	M	M	DANU_US.DANU_US	Austria--Cz	8	7	1	

International Water Events Database



Home
 Events
 Treaties

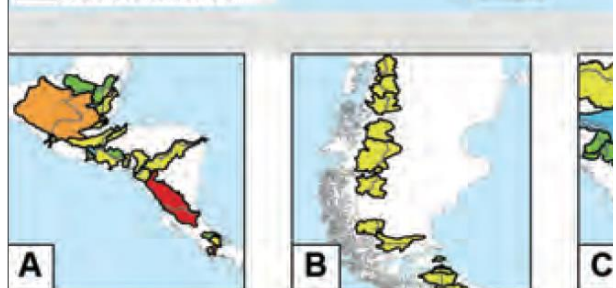
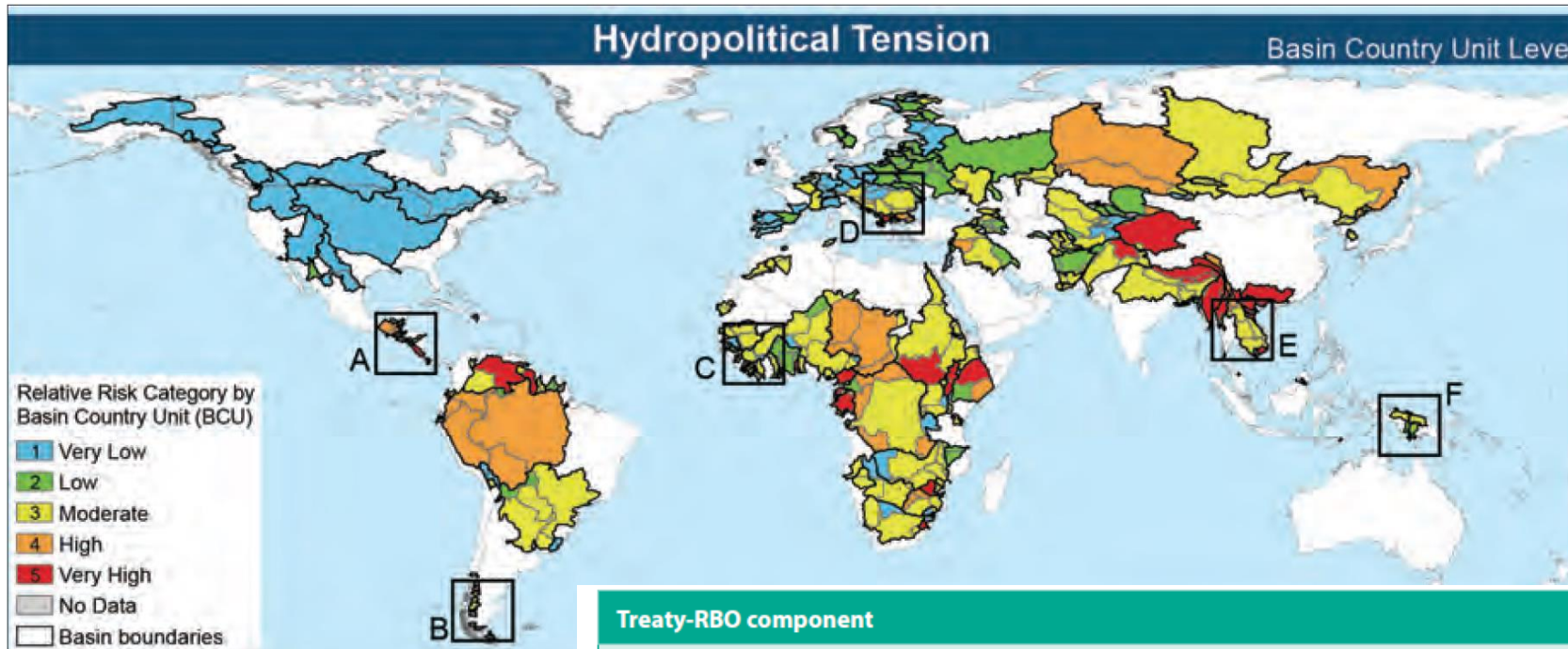
 Tutorial



Events

Basin	Country 1	Country 2	Description	Scale
NILE	EGY	INT	Egypt lays to four foundation stone of Aswan hydroelectric plant	3
Indus	IND	PAK	The "Standstill Agreement" between India and Pakistan expires and in the absence of a new agreement India discontinues the delivery of water to the Dipalpur Canal and the main branches of the Upper Bari Daab Canal.	-3
Indus	IND	PAK	At an Inter-Dominian conference between India and Pakistan held in Delhi on 3-4 May 1948 India agreed to resume the delivery of water to Pakistan through the Dipalpur Canal and the main branches of the Upper Bari Daab Canal. India maintained however that Pakistan could not claim any share of those waters as a matter of right. An agreement was signed later referred to at the Delhi Agreement.	3
ROIA	FRA	ITA	Italy and France build dam on Roya River in exchange for ceded land	4
DANUBE	CZS	GBR	Austria Czechoslovakia Great Britain France Hungary Romania Yugoslavia (former) United States and Soviet Union meet for Danube conference on administration of Danube River	1
DANUBE	HUN	YGF	Austria Czechoslovakia Great Britain France Hungary Romania Yugoslavia (former) United States and Soviet Union meet for Danube conference on administration of Danube River	1
DANUBE	HUN	ROM	Austria Czechoslovakia Great Britain France Hungary Romania Yugoslavia (former) United States and Soviet Union meet for Danube conference on administration of Danube River	1
DANUBE	HUN	USR	Austria Czechoslovakia Great Britain France Hungary Romania Yugoslavia (former) United States and Soviet Union meet for Danube conference on administration of Danube River	1
DANUBE	USR	YGF	Austria Czechoslovakia Great Britain France Hungary Romania Yugoslavia (former) United States and Soviet Union meet for Danube conference on administration of Danube River	1

Using the Data: Hydropolitical Tension



Treaty-RBO component	Possible value
At least one water treaty	0/1
At least one treaty with an allocation mechanism	0/1
At least one treaty with a flow variability management mechanism	0/1
At least one treaty with a conflict resolution mechanism	0/1
At least one river basin organization	0/1
Total possible value for a basin-country unit	0 to 5

Thank you!



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<https://transboundarywaters.science.oregonstate.edu/content/transboundary-freshwater-dispute-database>