

Shared Waters Around the World: Conflict, Cooperation, and Clashing Worldviews

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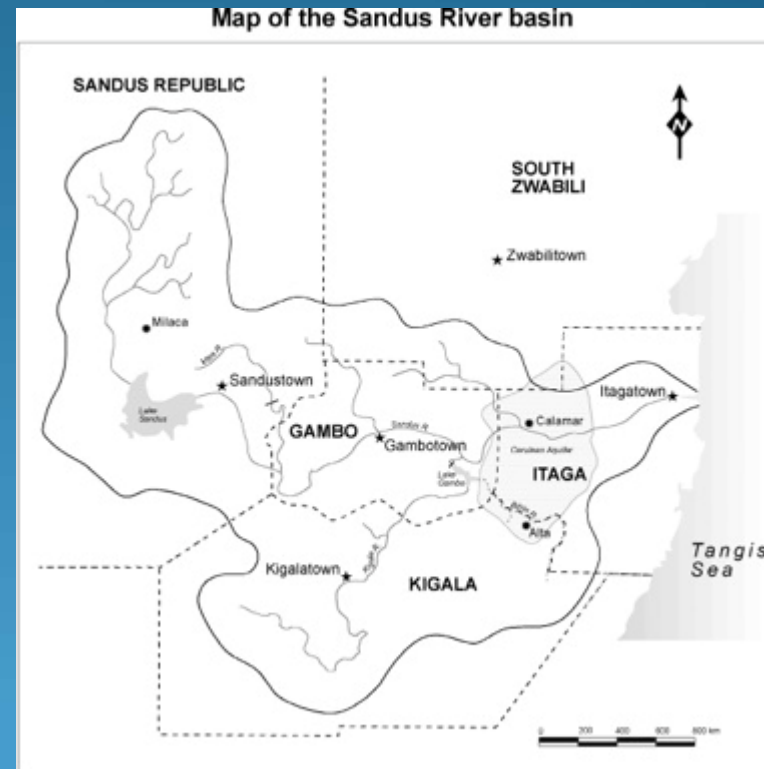
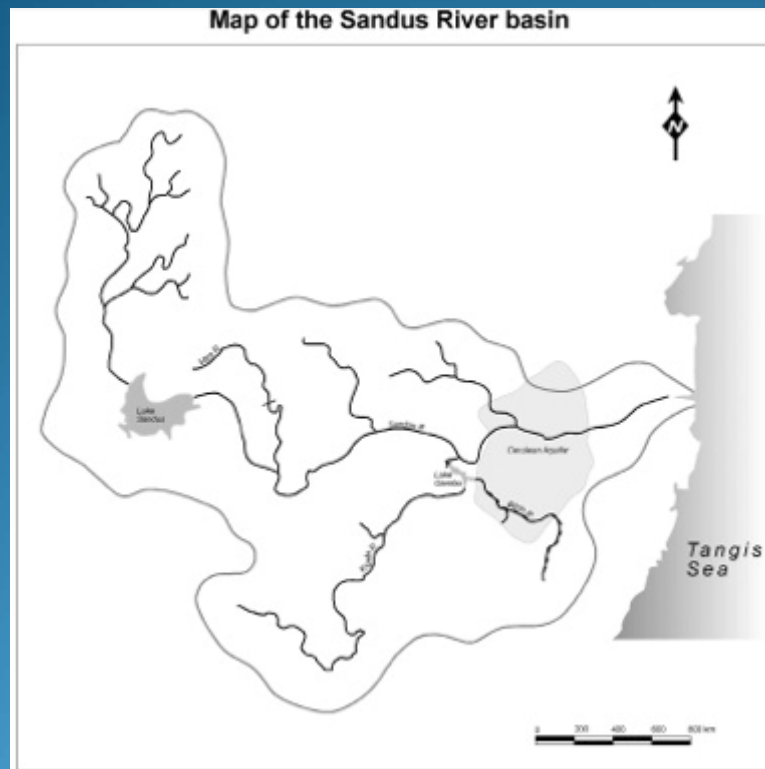
28 February 2018



EMAIL: WOLFA@GEO.ORST.EDU
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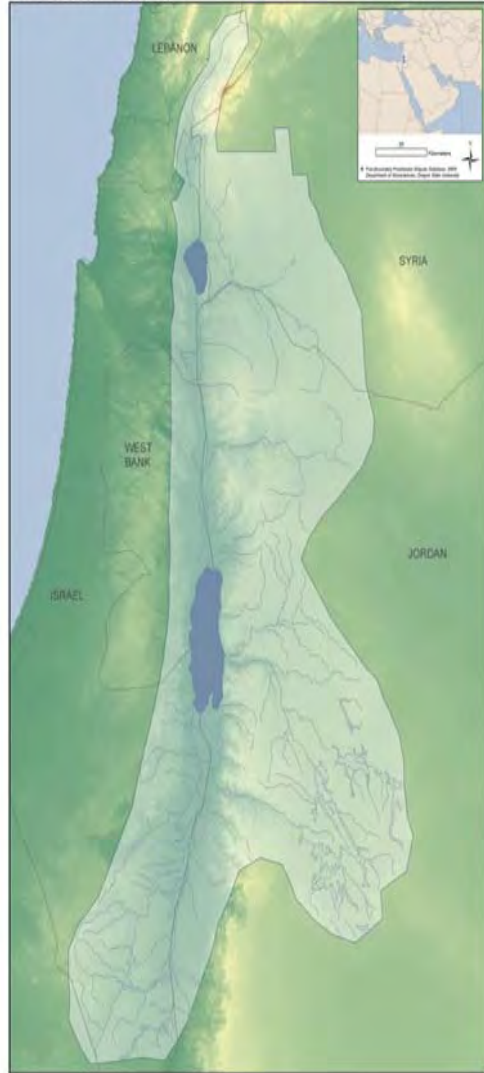
What is Water Conflict Management & Transformation??



What changes when a border is present?

What capacity do we need to address the change?

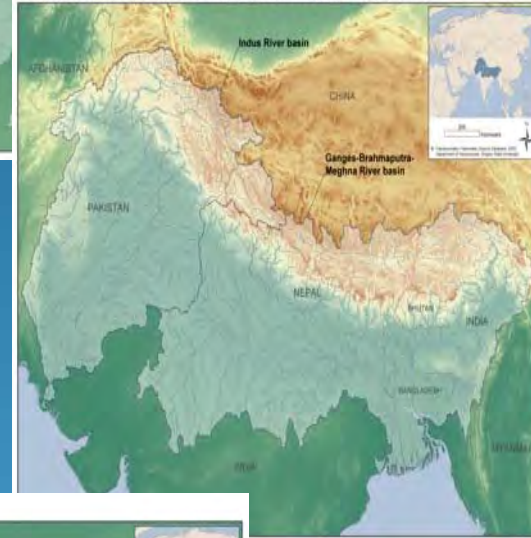
The Jordan River basin



The Tigris-Euphrates River basin



The Indus River and Ganges-Brahmaputra-Meghna River basins



The Aral Sea basin



The Nile River basin

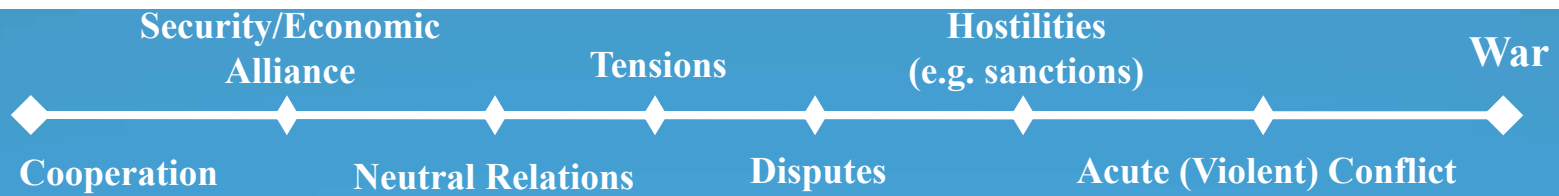
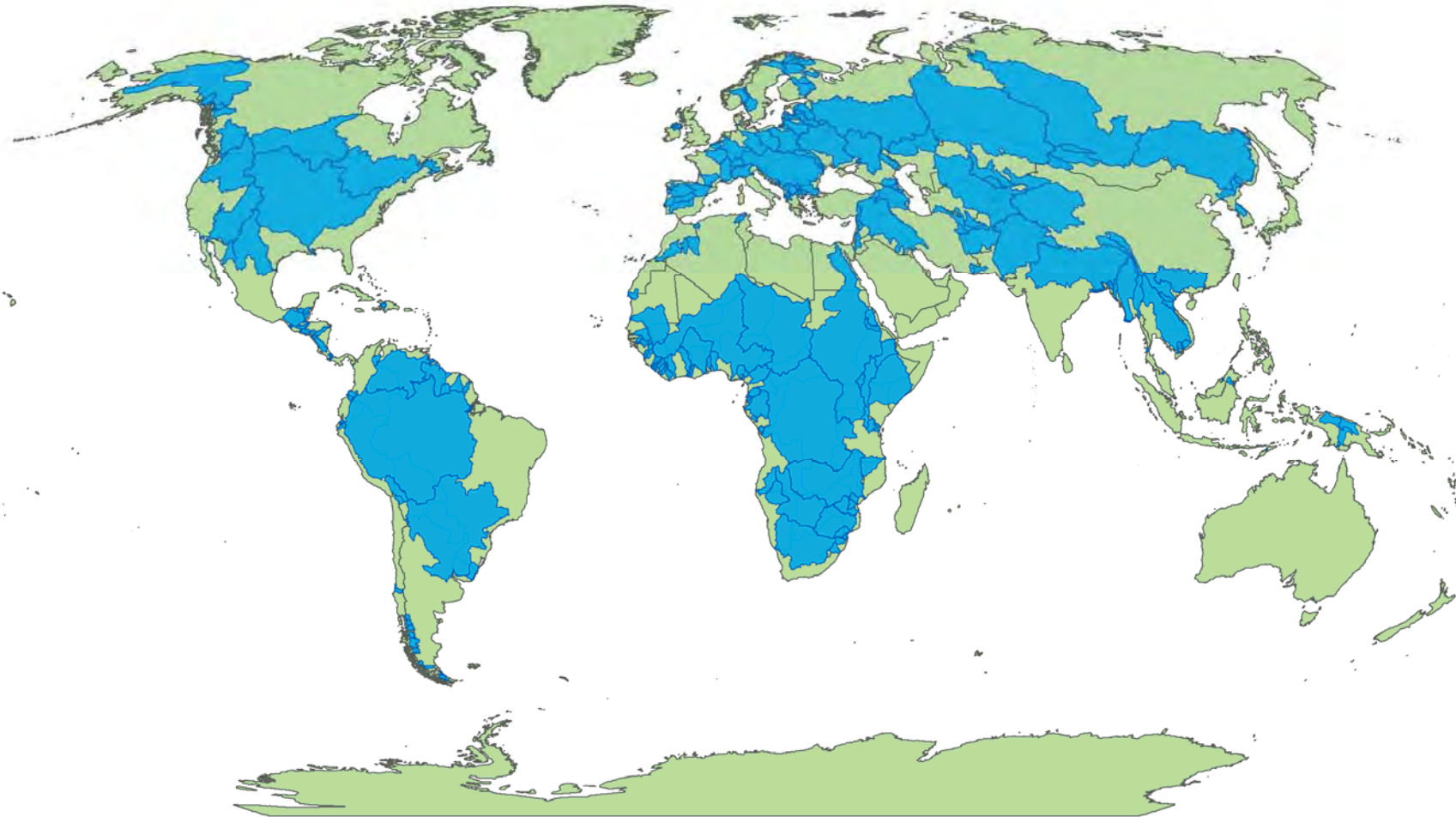


Water and Conflict

“Fierce competition for fresh water may well become a source of conflict and wars in the future.”

- Kofi Annan, March 2001

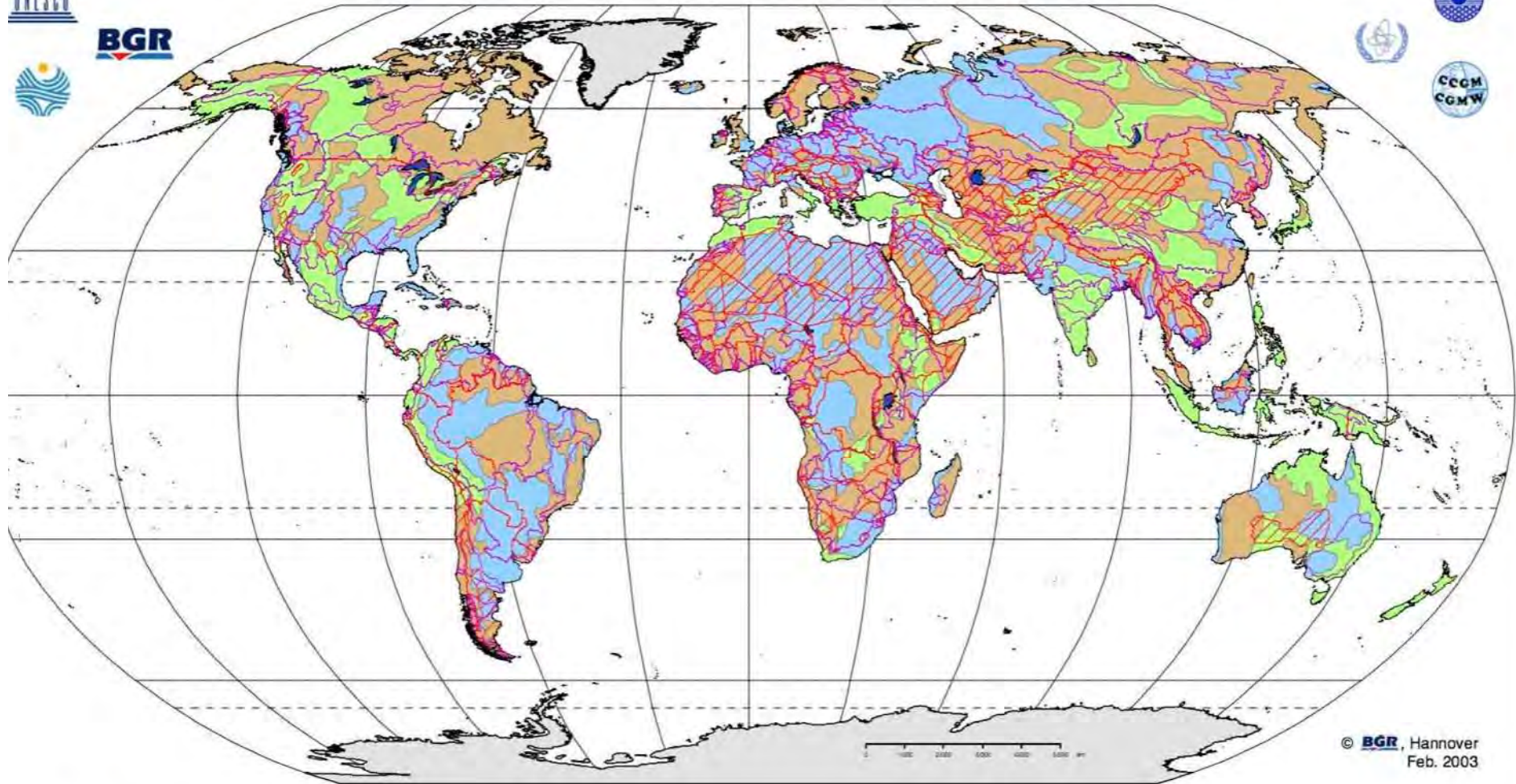
Scale of Conflict



Hydrogeological Regions / Political Boundaries / River Basins / Non-renewed Groundwater



BGR



© **BGR**, Hannover
Feb. 2003

Hydrogeology

- major groundwater basin with highly-productive aquifers
- area with complex structure including some important aquifers
- area with generally poor aquifers, locally overlain by river-bed aquifers

Surface Water

- polar ice
- large freshwater lake
- major river basin

Other Geographic and Climate Features

- political boundary
- non-renewed groundwater resources (rainfall < 200 mm/y)

Topographic base map: OGMW/UNESCO (2000): Geological Map of the World 1:25 000 000, 2nd edition
Preliminary version 1.1, extracted from WHYMAP

The Transboundary Freshwater Dispute Database

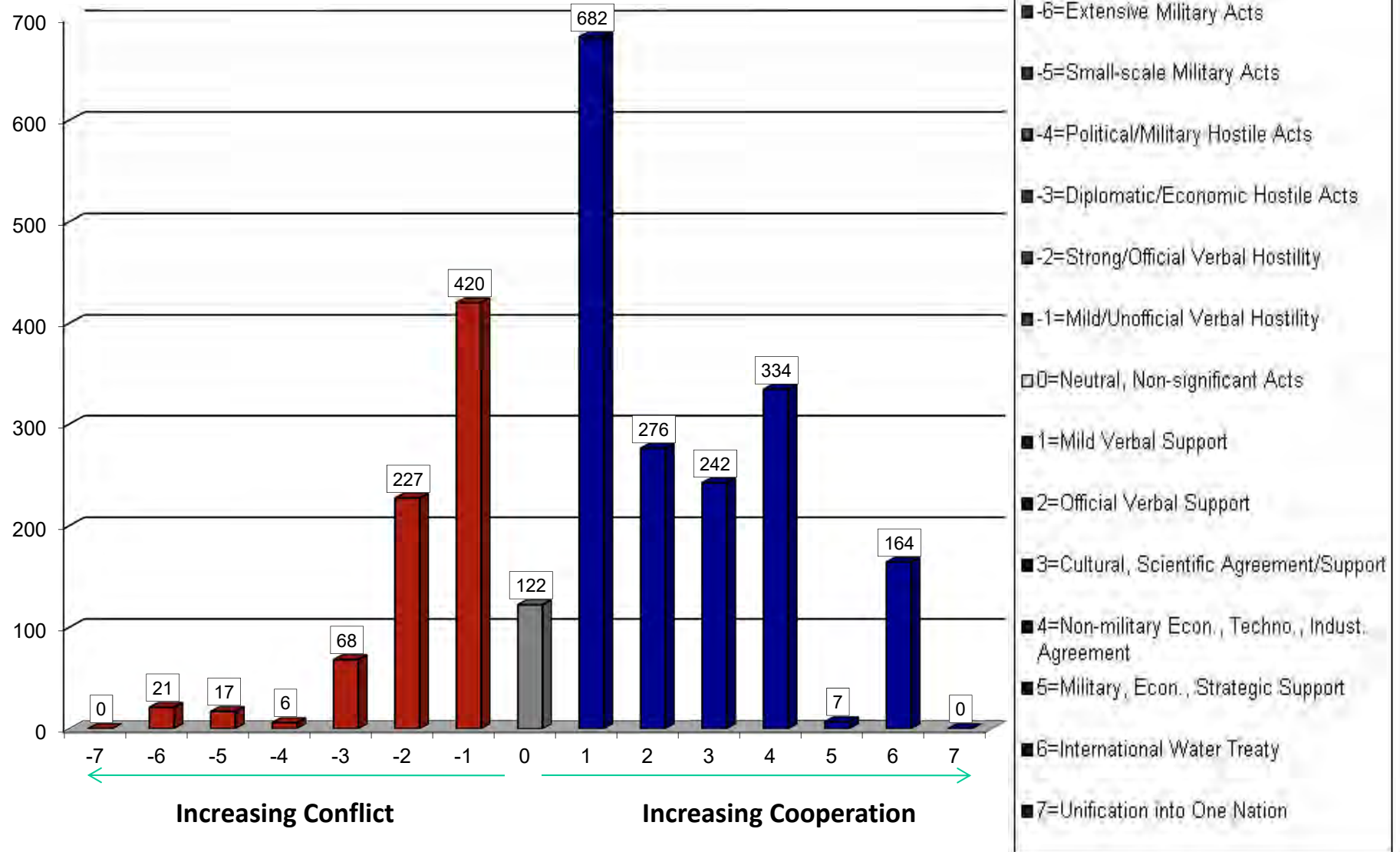
A Project of Oregon State University Department of Geosciences and the Northwest Alliance for Computational Science

- Reference to 3,600 water-related treaties (805-1997)
- Full-text of 400 treaties and 40 US compacts, entered in computer database
- Detailed negotiating notes (primary or secondary) from fourteen case-studies of water conflict resolution
- Annotated 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

DATE	BASIN	COUNTRIES	BAR SCALE	EVENT SUMMARY	ISSUE TYPE
12/5/73	La Plata	Argentina-- Paraguay	4	PRY AND ARG AGREE TO BUILD 1B DAM, HYDROELECTRIC PROJECT	Infrastructure
1/1/76	Ganges	Bangladesh-- India--United Nations	-2	Bangladesh lodges a formal protest against India with the United Nations, which adopts a consensus statement encouraging the parties to meet urgently, at the level of minister, to arrive at a settlement.	Quantity
7/3/78	Amazon	Bolivia--Brazil-- Colombia-- Ecuador-- Guyana--Peru-- Suriname-- Venezuela	6	Treaty for Amazonian Cooperation	Economic Development
4/7/95	Jordan	Israel--Jordan	4	Pipeline from Israel storage at Beit Zera to Abdullah Canal (East Ghor Canal) begins delivering water stipulated in Treaty (20 MCM summer, 10 MCM winter). The 10 mcm replaces the 10 mcm of desalinated water stipulated Annex II, Article 2d until desalinization plant completed	Quantity
6/1/99	Senegal	Mali--Mauritania	-3	13 people died in communal clashes in 6/99 along border between Maur. & Mali; conflict started when herdsmen in Missira-Samoura village in w. Mali, refused to allow Maur. horseman to use watering hole; horseman returned w/ some of his clansmen, attacking village on 6/20/99, causing 2 deaths; in retaliation that followed, 11 more died.	Quantity

Events Database, Example

Number of Events by BAR Scale 1948-2008



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.

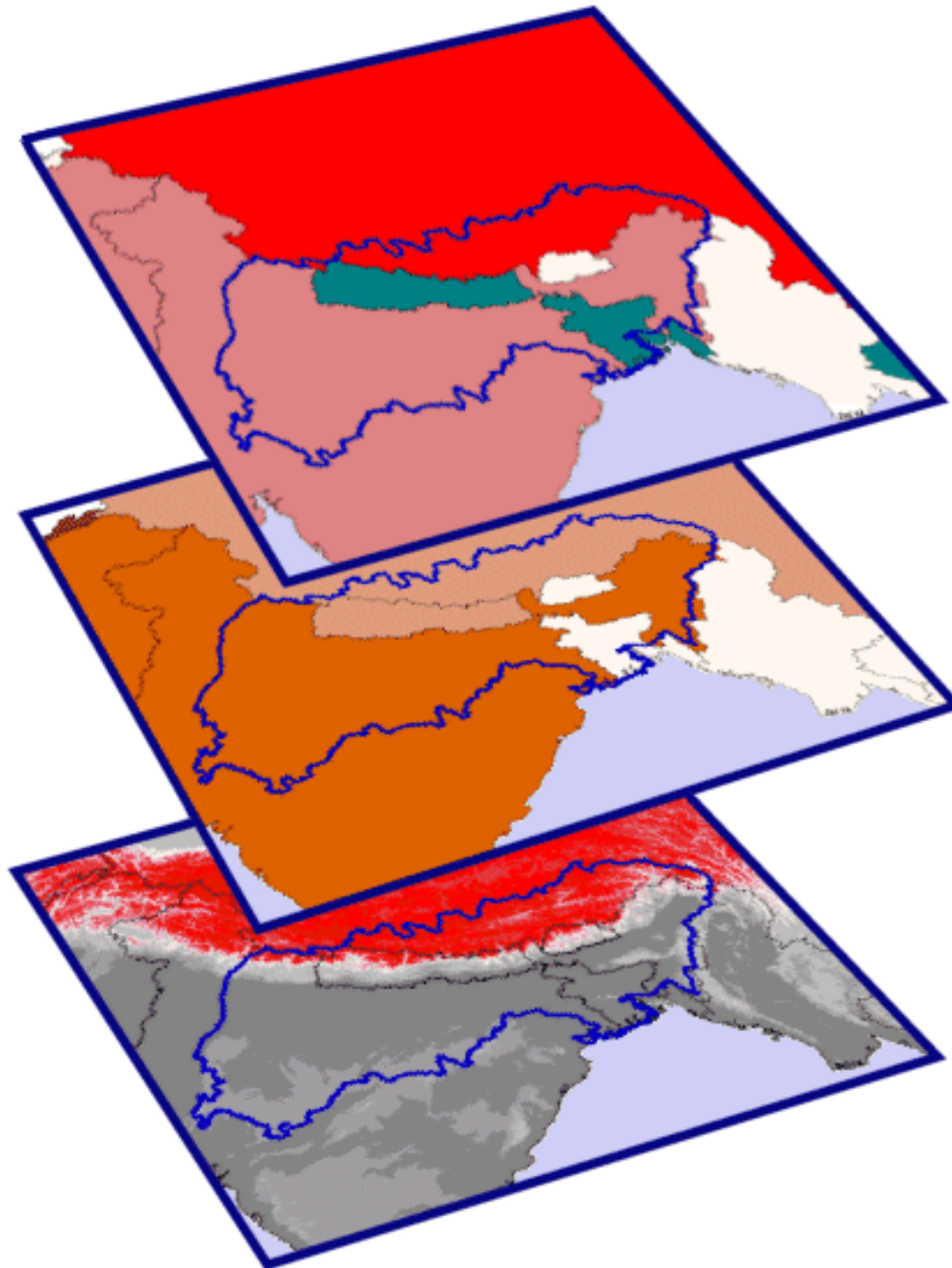
Water Myths and Water Facts

Do the causes of conflict include:

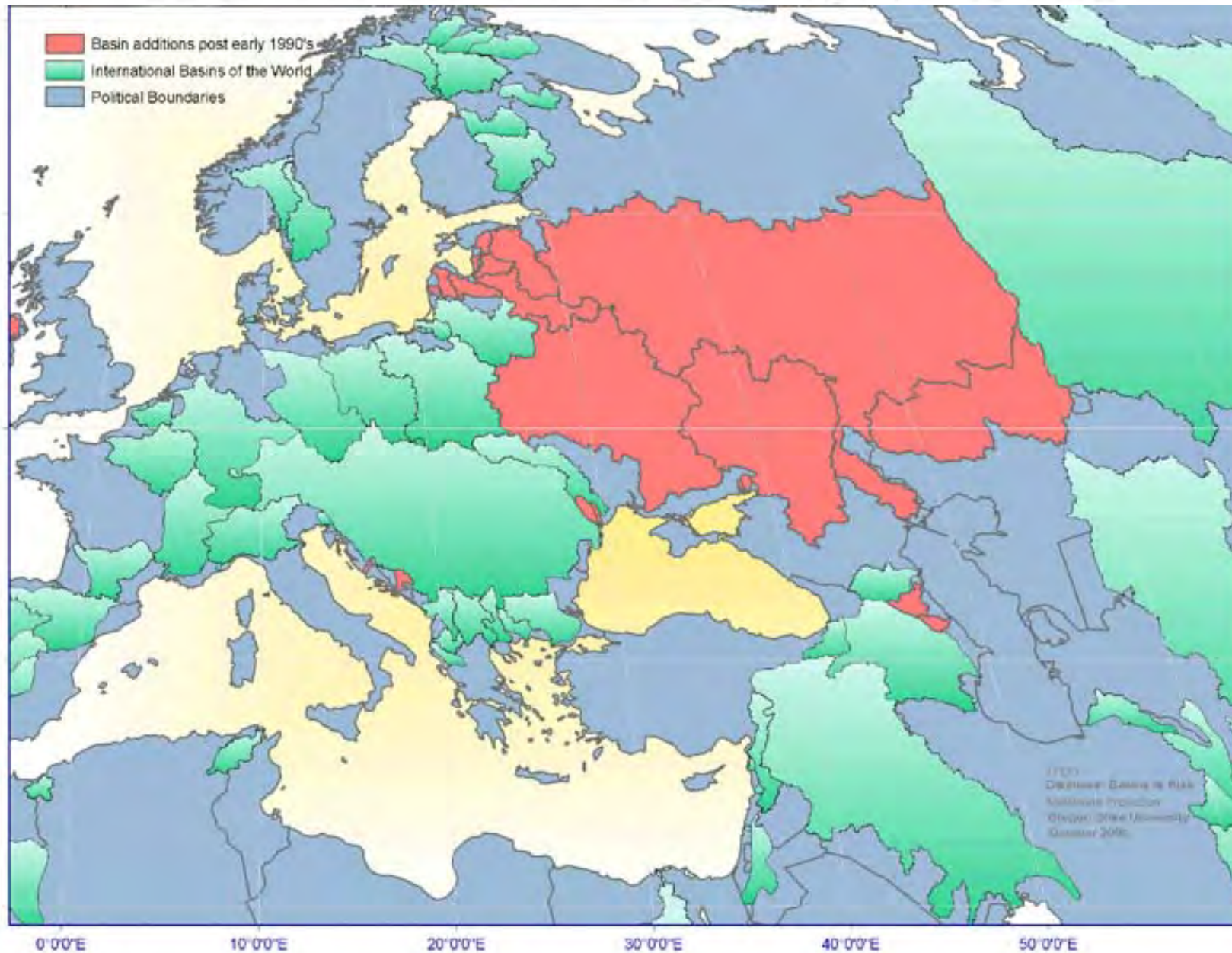
- Climate
- Water stress
- Population
- Level of development
- Dependence on hydropower
- Dams or development *per se*
- “Creeping” changes:
 - general degradation of quality
 - climate change induced hydrologic variability

Basins@Risk GIS

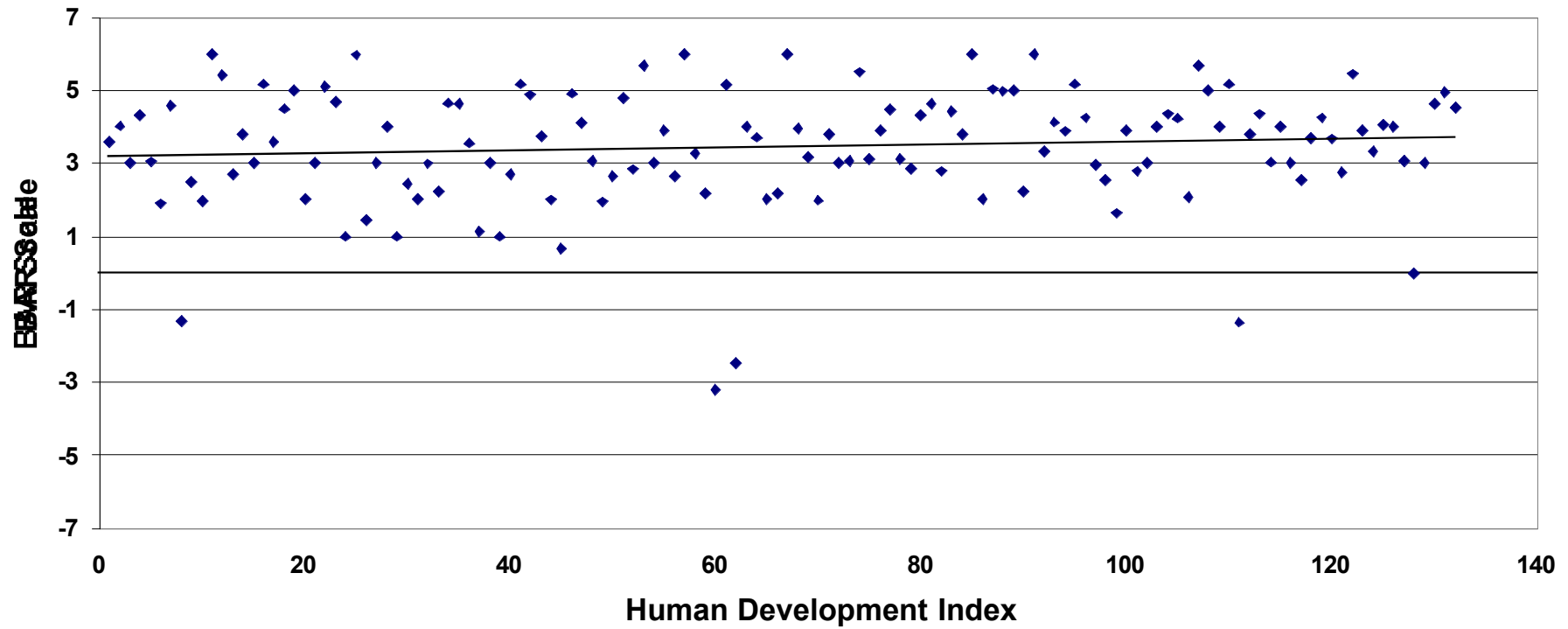
- International Basins (TFDD)
- Vote in 1997 UN Convention (TFDD)
- Ethnic Minorities (GEDS)
- Landcover (EROS Data Center)
- SWSI (Ohlsson)
- Population (NCGIA)
- Elevation (EROS Data Center)



New Countries due to Boundary Changes, 1989-1992

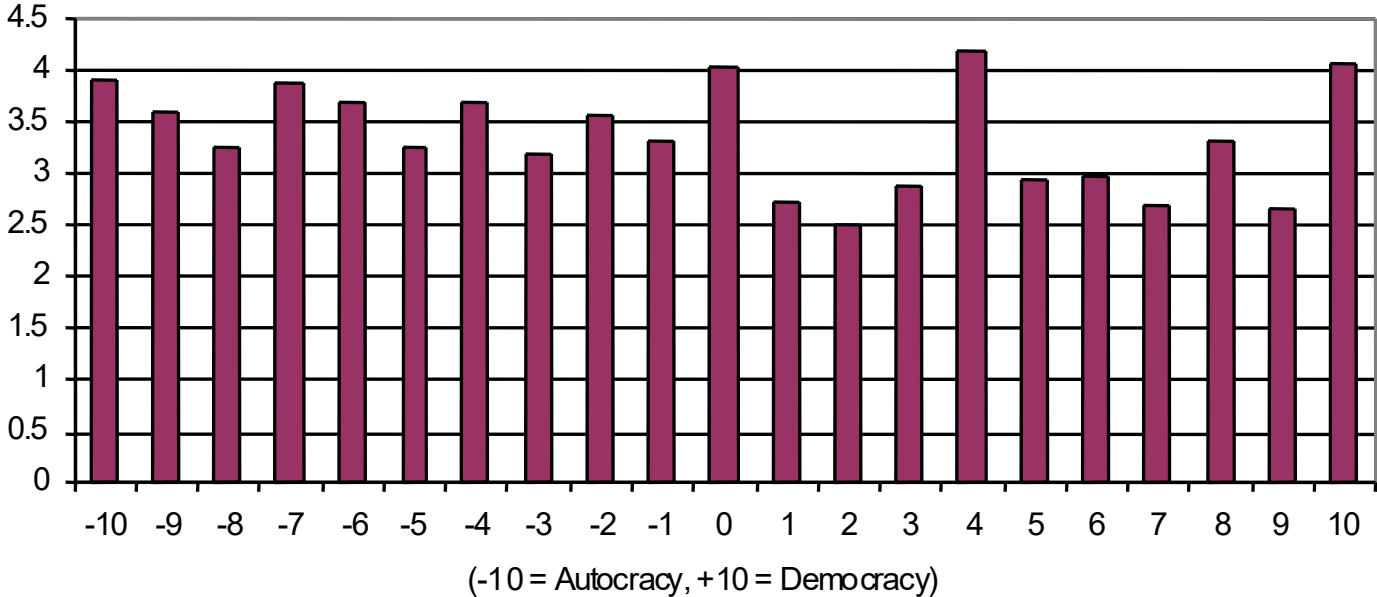


Human Development Index Vs. BAR Scale (By Country)



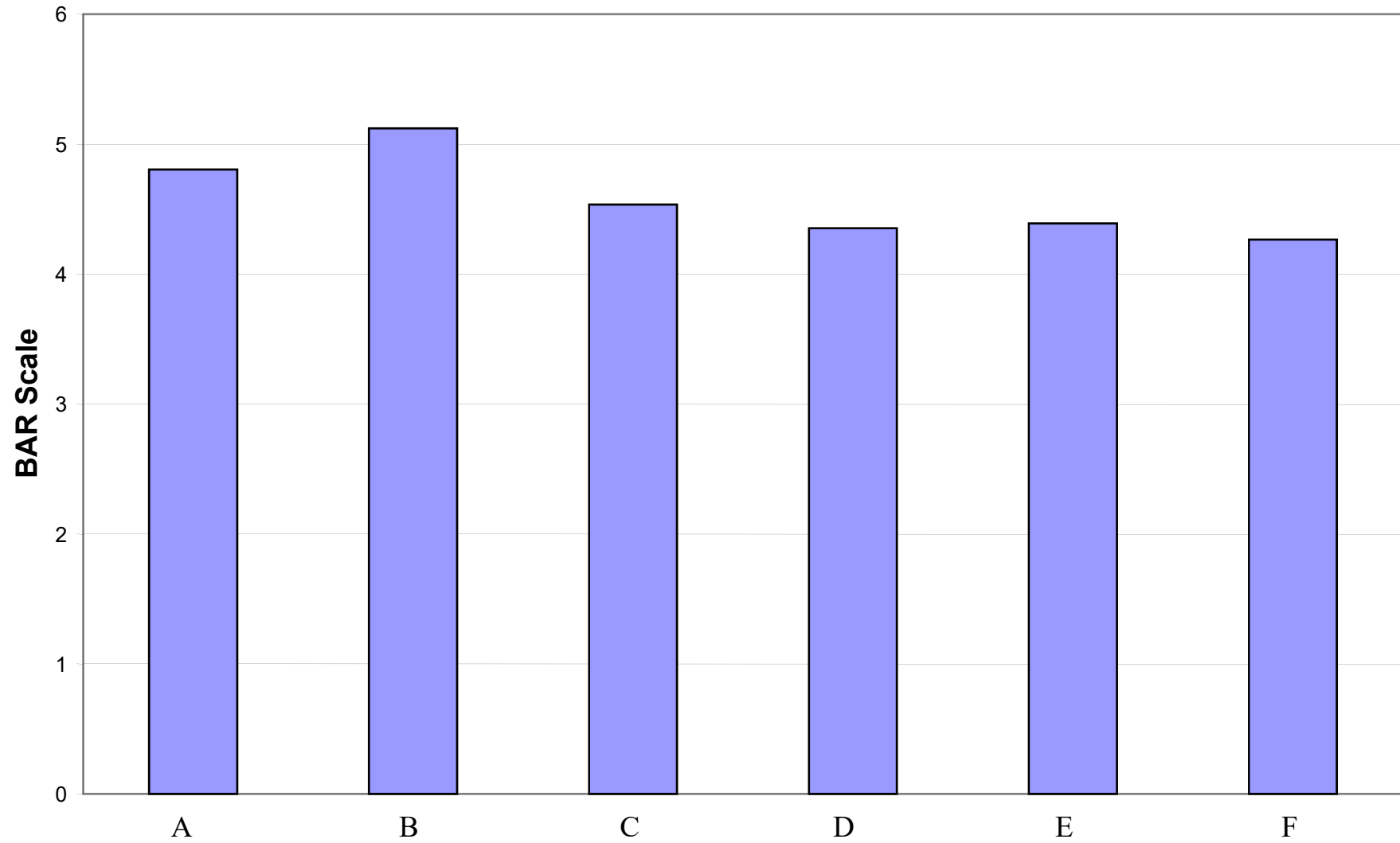


Government Type Vs. Bar Scale



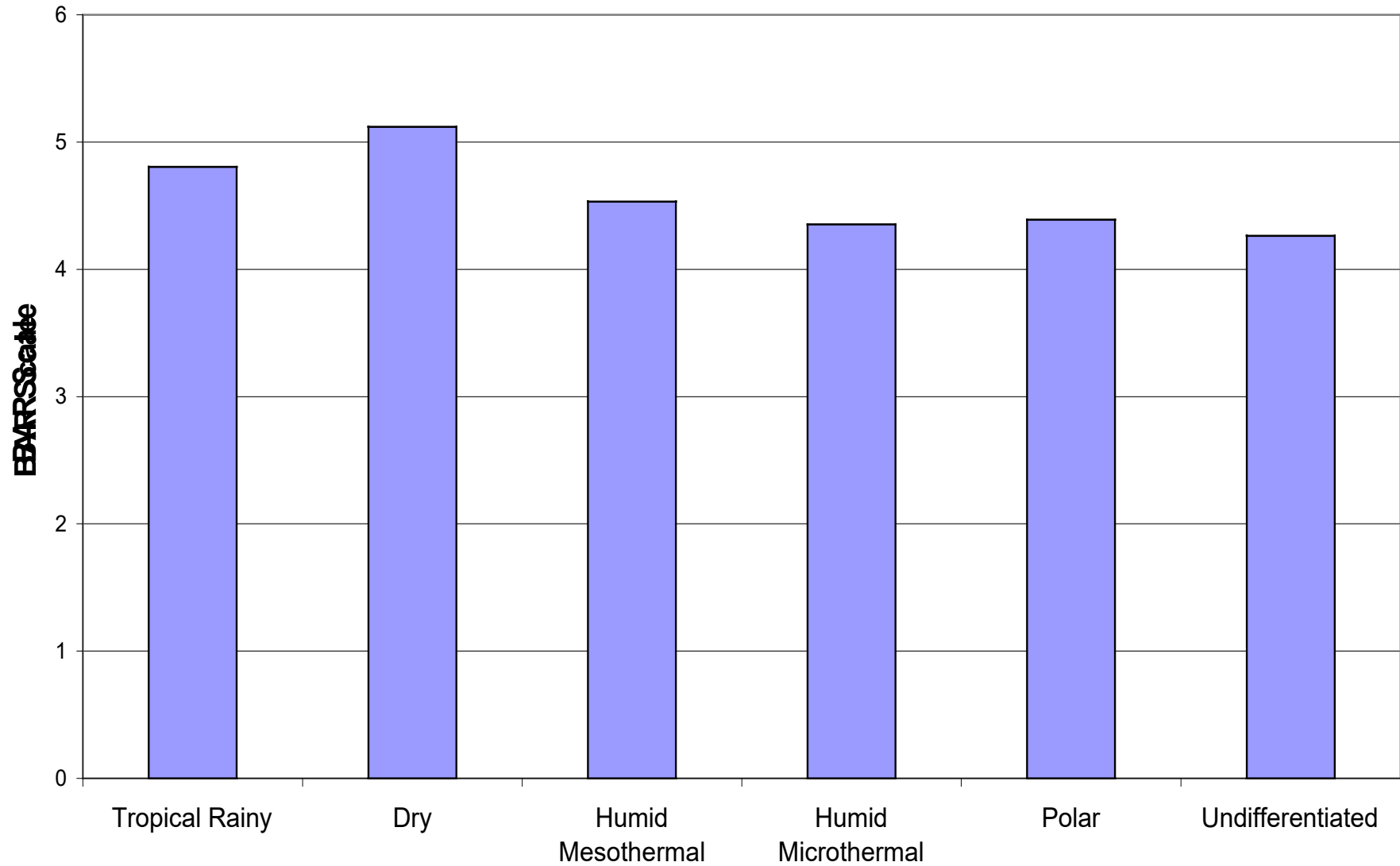


Primary Climate Type Vs. BAR Scale (By Basin)

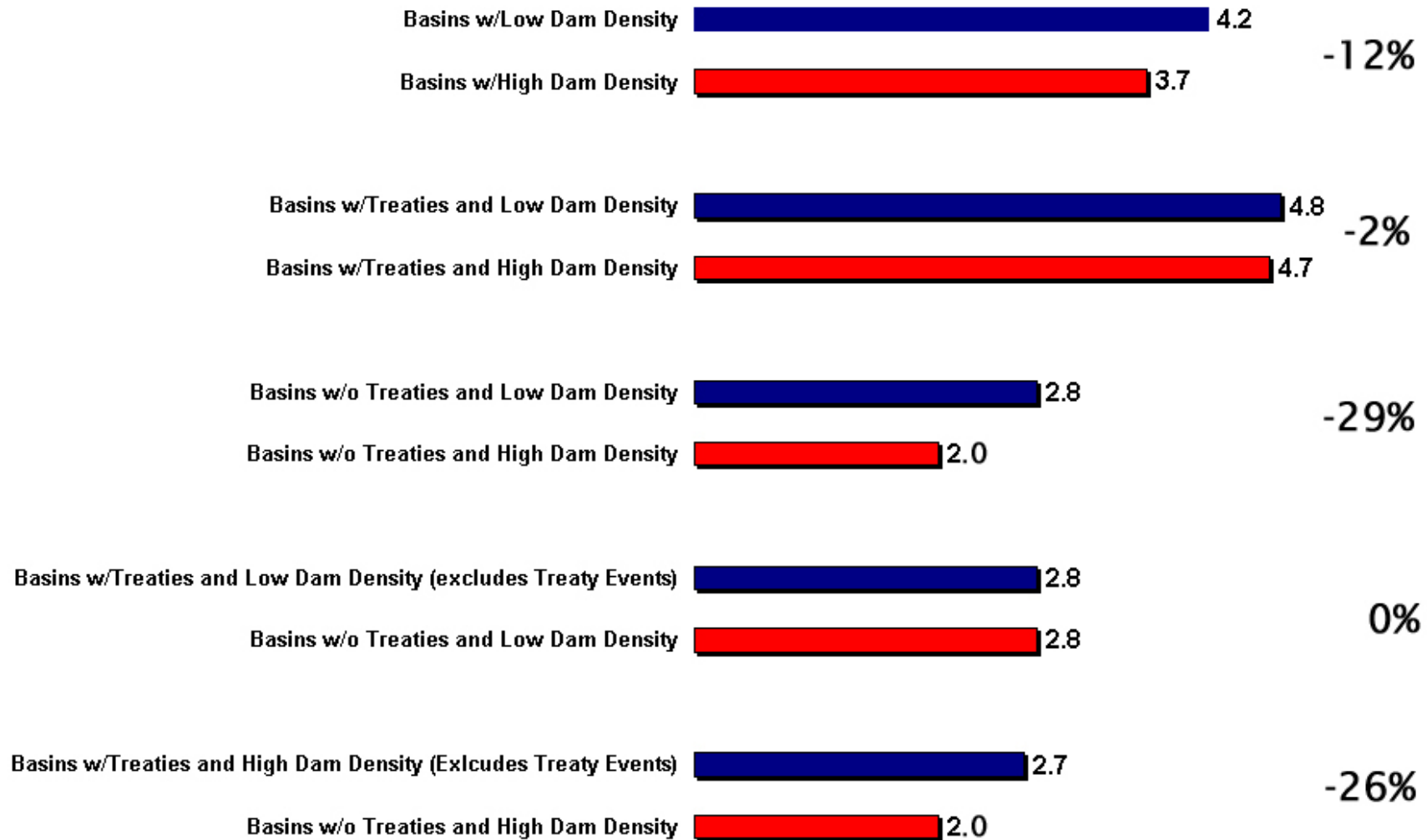




Primary Climate Type Vs. BAR Scale (By Basin)



Development and Institutional Capacity: Basin Setting and Corresponding BAR Scale



BASINS AT RISK: Working Hypothesis

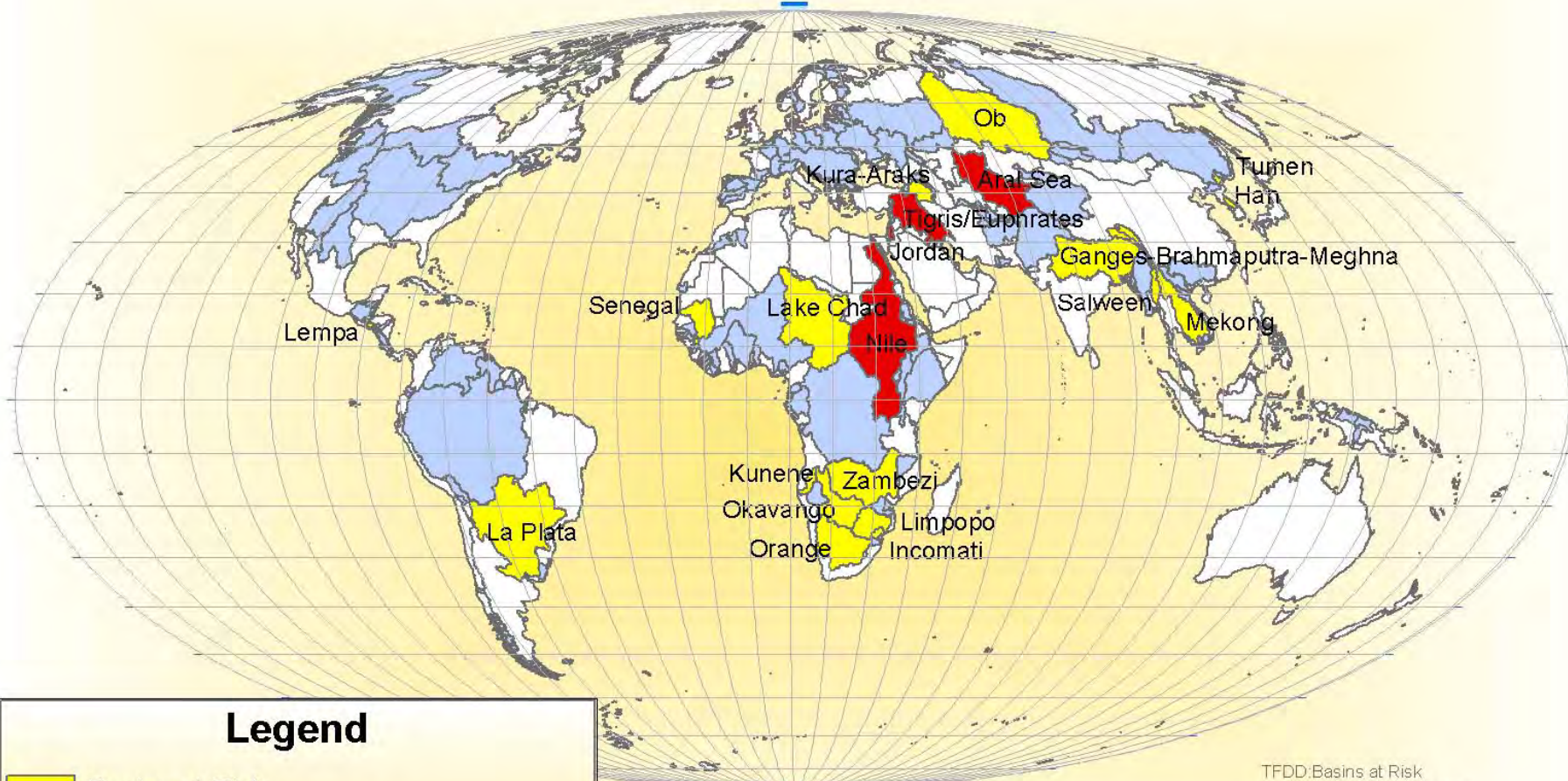
“The likelihood of conflict rises as the rate of change within the basin exceeds the institutional capacity to absorb that change.”

What *are* indicators?

Sudden physical changes or lower institutional capacity are more conducive to disputes:

- 1) Uncoordinated development: a major project *in the absence* of a treaty or commission
- 2) “Internationalized basins”
- 3) General animosity

Basins at Risk

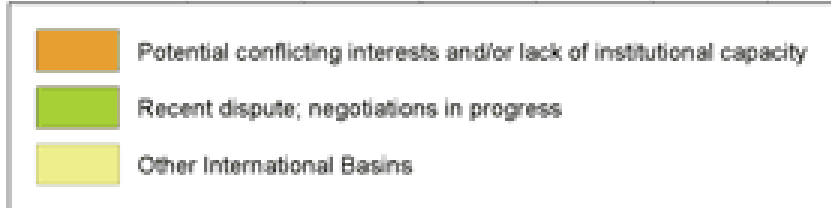
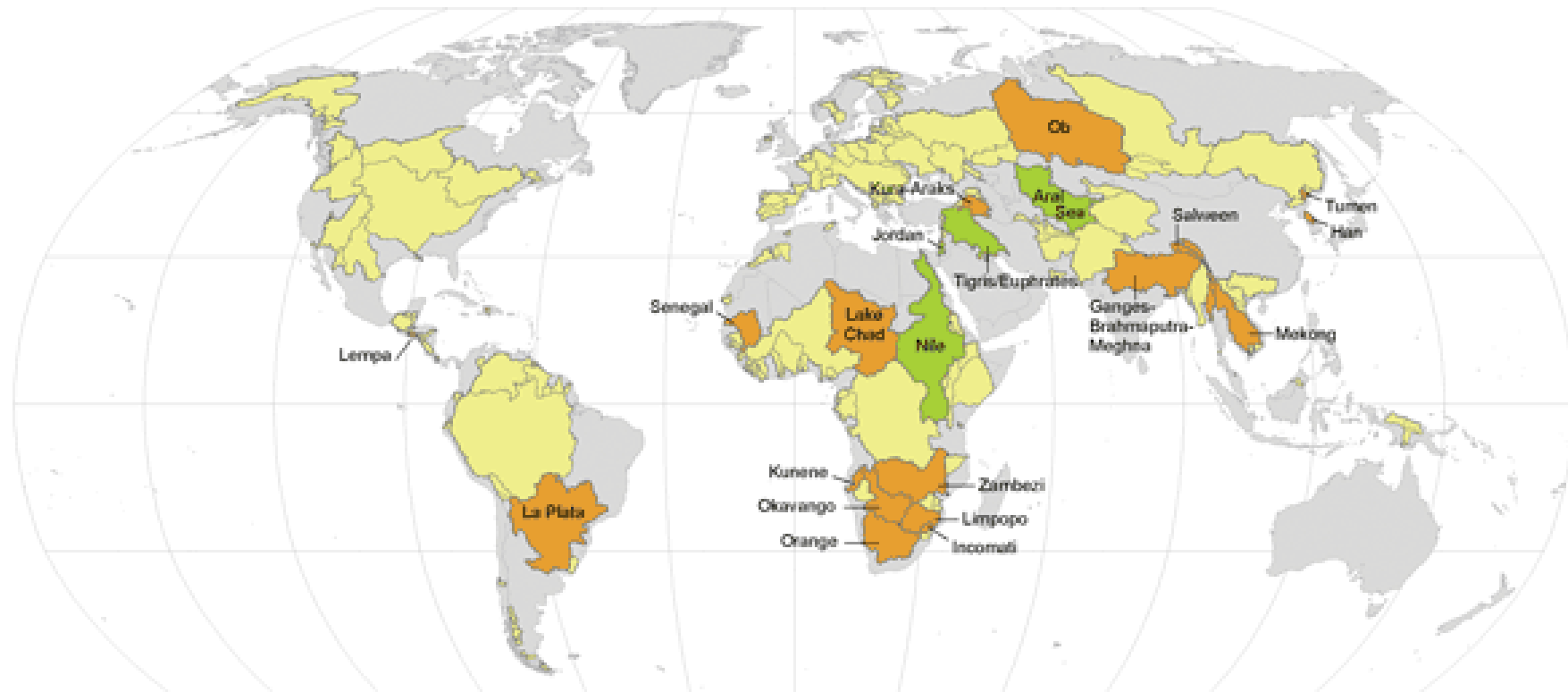


Legend

-  Basins at Risk
-  Political Boundaries
-  International Basins
-  Basins Currently in Dispute/Negotiations

TFDD: Basins at Risk
Department of Geosciences
Oregon State University
Cartography: Greg Fiske
June 2001

Basins Under Observation



© Transboundary Freshwater Dispute Database, 2003
Department of Geosciences, Oregon State University

WHAT TO DO ABOUT WATER?

NEGOTIATE IT

NERO BOX
The map displays nearly 2,000 incidents, involving conflict and collaboration alike, over shared river basins from 1990 to 2000. The circles on the map's landing pages comprise about 2,200 events—including another 200 disputes over resources other than shared rivers—from the same period.

HOTSPOT
Later this year, Turkey will complete the Kaya Dam on the Tigris River, part of a national push to boost electrical power capacity. Besides submerging the 72,000-year-old settlement of Hasankeyf, the dam may damage the already fragile Mesopotamian marshes downstream in Iraq. Germany, Austria, and Switzerland withdrew funding for the dam in 2000.

HOTSPOT
Tajikistan is planning the Rogun hydroelectric dam on a tributary of the Amu Darya river. The dam would be the tallest in the world and help alleviate the country's energy shortages. Uzbekistan, fearing irrigation shortfalls, has imposed tariffs and travel restrictions on its neighbor to the east.

HOTSPOT
In a channel of the Mekong, two miles north of the Cambodian border, Laos intends to construct the Don Sahong Dam. The power project could affect fishing in Cambodia, Vietnam, and Thailand, so those countries are demanding a say in the plan.

HOTSPOT
In 2011, Ethiopia began building the Grand Renaissance Dam on the Blue Nile, a tributary that provides about 60 percent of the Nile's water. Egypt and Sudan are concerned about the dam's effect on water flow downstream. Ethiopia says it will finish the project in 2017.

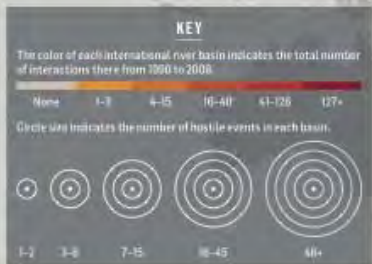
HEAT MAP

WHERE WILL THE WORLD'S WATER CONFLICTS ERUPT?

DATA VISUALIZATION BY
PITCH INTERACTIVE

As the climate shifts, rivers will both flood and dry up more often, according to the latest report from the Intergovernmental Panel on Climate Change. Shortages are especially likely in parts of the world already strapped for water, so political scientists expect feuds will become even more intense. To track disputes worldwide, researchers at Oregon State University spent a decade building a comprehensive database of international exchanges—both conflicts and alliances—over shared water resources. They found that countries often begin disputes belligerently but ultimately reach peaceful agreements. Says Aaron Wolf, the geographer who leads the project, “For me the really interesting part is how even Arabs and Israelis, Indians and Pakistanis, are able to resolve their differences and find a solution.” **KATIE PECK**

WATER LOGO TONS COURTESY THE ALGERIA, KUWAIT, DATA CENTRE, BOGDANLENZ, GERMANY.



“Science without policy is science; policy without science is gambling.”

- Prof. David Grey,
Oxford University



Lesson 1: Ask the right question: Not, “How do I get more data?” but, “What is the LEAST amount of data needed for a reasonably good decision?”



Lesson 2:

Hydro-politics is about hydro

AND politics...

and all politics is local

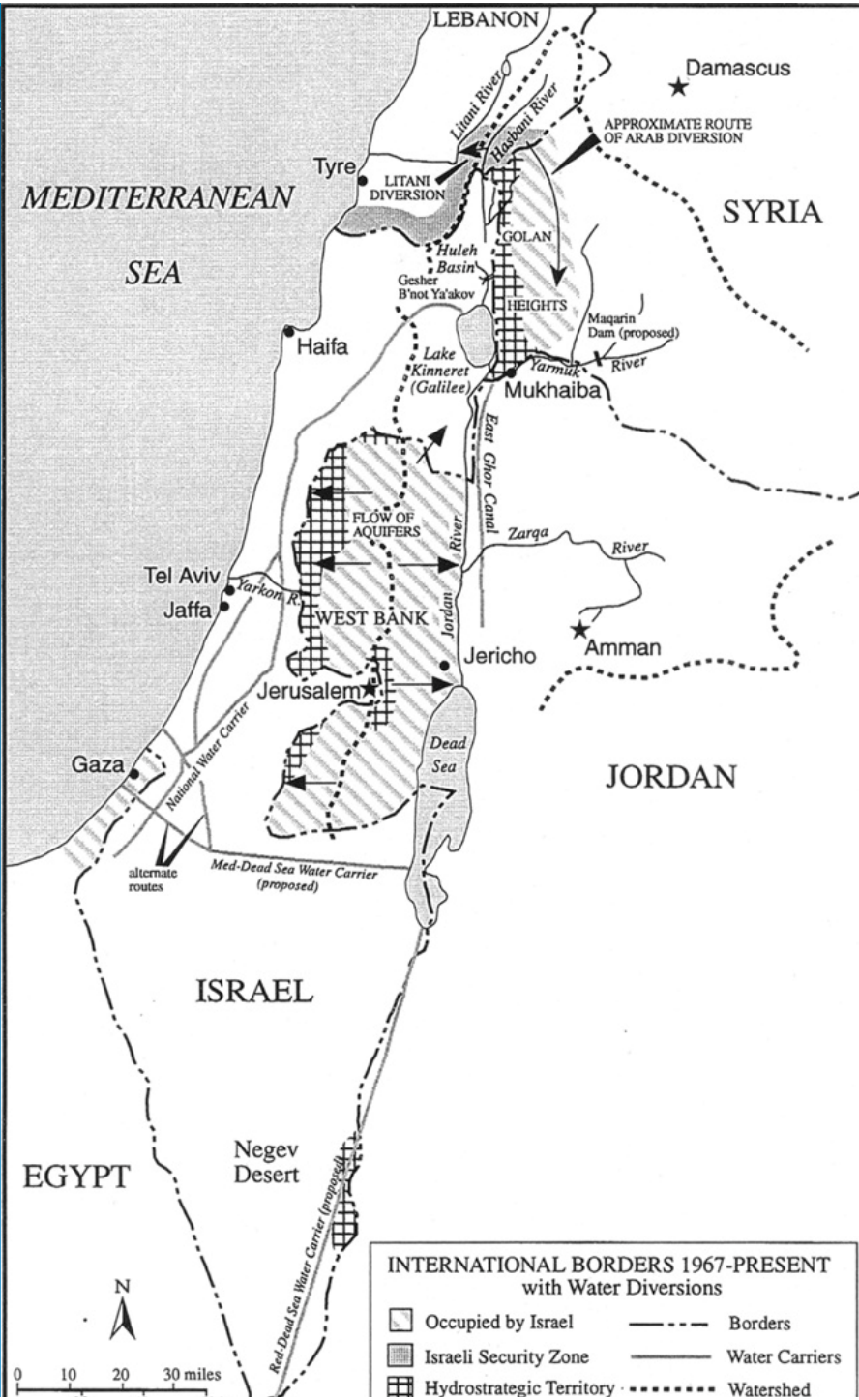
(or, countries don't make
decisions, people do)

**Annex on Article 14(b) to be resolved by the Nile
River Basin Commission
within six months of its establishment**

At the end of the negotiations, no consensus was reached on Article 14(b) which reads as follows: *not to significantly affect the water security of any other Nile Basin State*, all countries agreed to this proposal except Egypt and Sudan.

Egypt proposed that Article 14(b) should be replaced by the following wording:
(b) not to adversely affect the water security and current uses and rights of any other Nile Basin State.





MEDITERRANEAN SEA

EGYPT

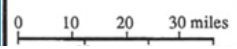
ISRAEL

Negev Desert

LEBANON

SYRIA

JORDAN



INTERNATIONAL BORDERS 1967-PRESENT with Water Diversions

- Occupied by Israel
- Israeli Security Zone
- Hydrostrategic Territory
- Borders
- Water Carriers
- Watershed





Lesson 3: Political Viability

If you get stuck on a problem,
make it bigger...



Dams and Hydroelectric Schemes

Source: UNEP/DEWA/GRID-Europe 2006

Nile Sub-Basins, Dams and Hydroelectric Schemes



Regional Power Development Strategy

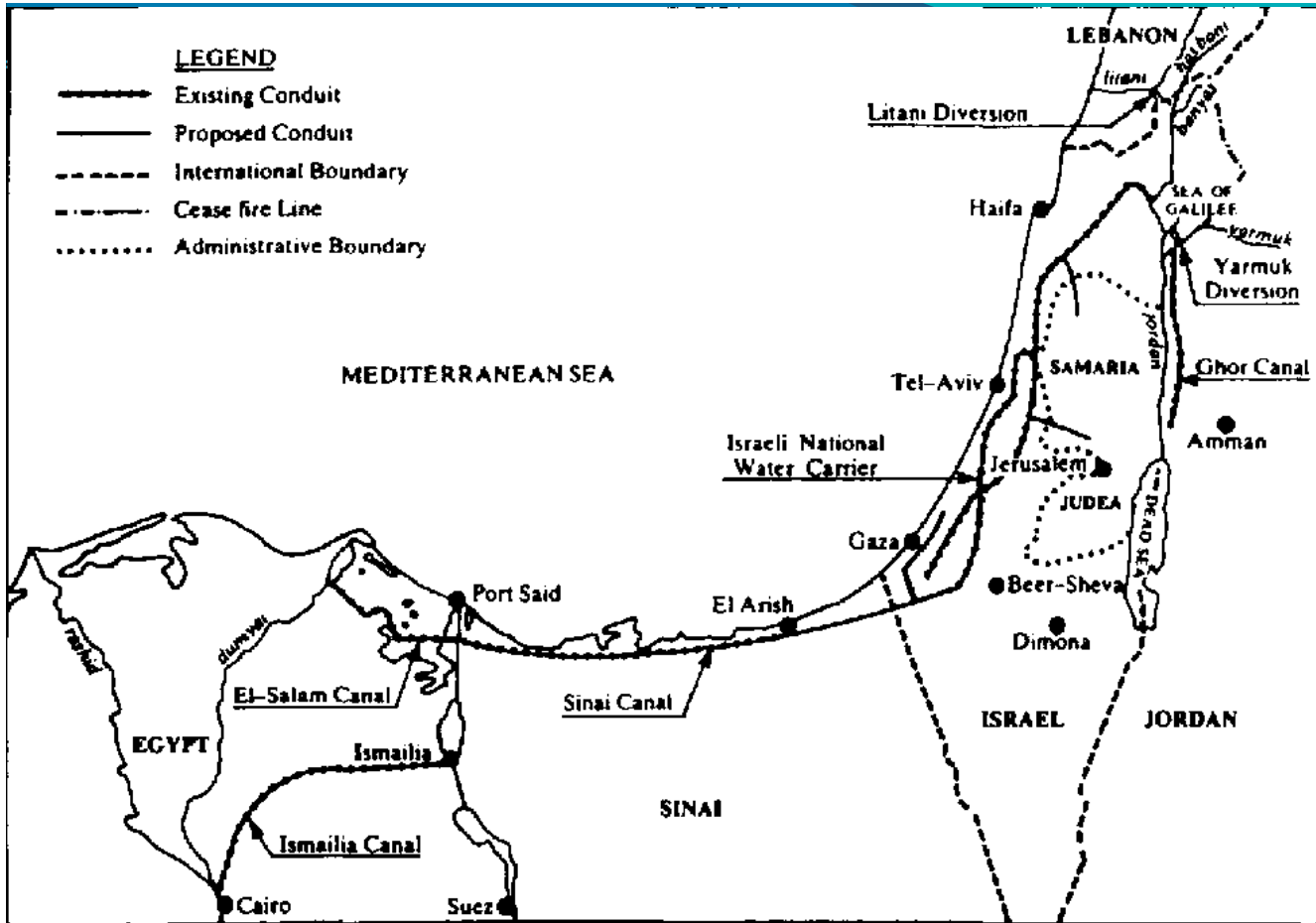
Source: NBI RPTP 2011



Lesson 4:

If you get stuck on a problem,
make it bigger...

...or smaller



Mideast pipelines

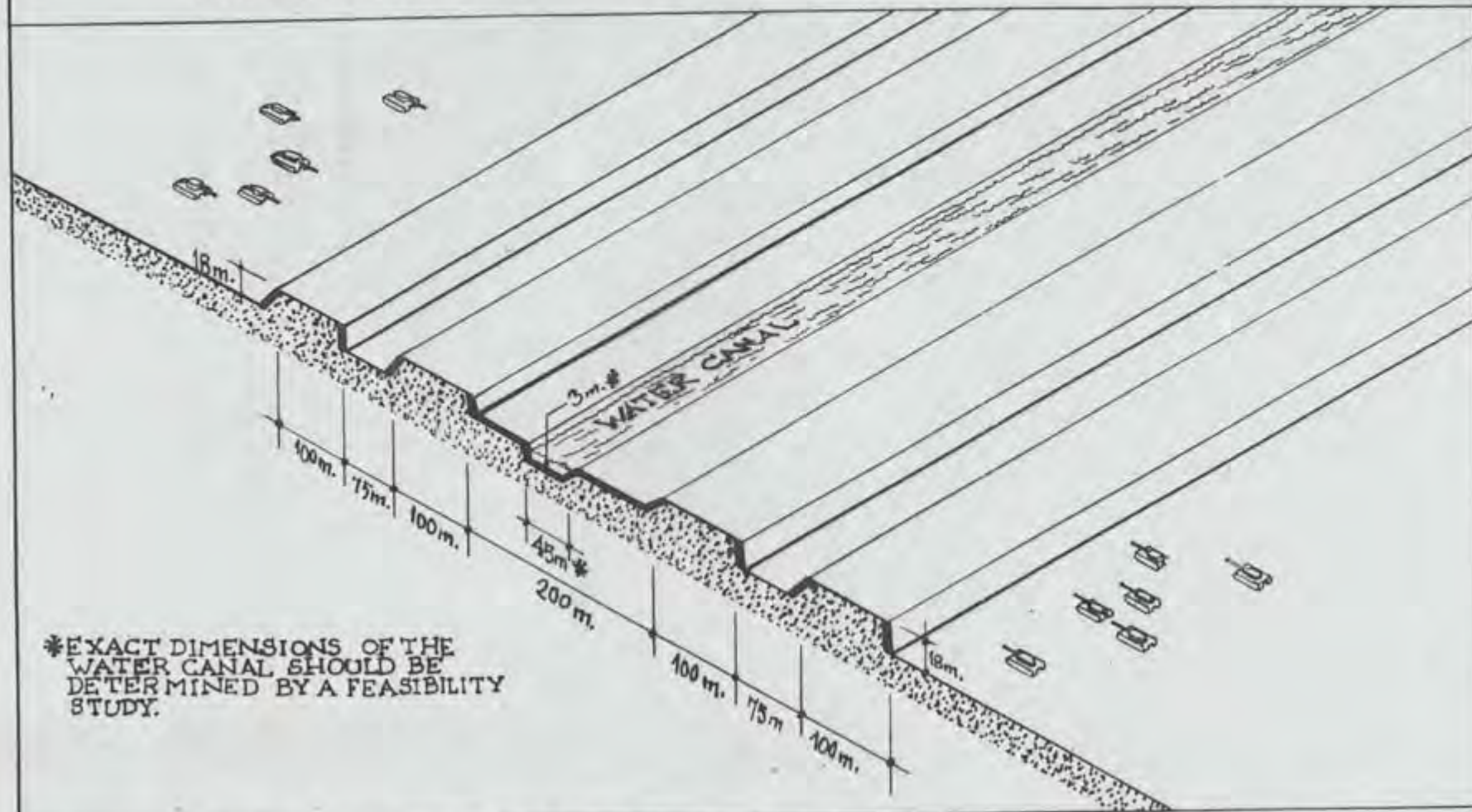
They are teaming up to construct four parallel pipelines in the Mediterranean Sea capable of carrying crude oil, natural gas, water more than 500 miles into the heart of the Mideast.



Source: FSRI

GUS D'ANGELO / The Chronicle

PEACE CANAL ON THE GOLAN HEIGHTS
ISOMETRIC VIEW OF WATER CANAL / TANK BARRIER / SECTION



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Region Under Study.

Source: Oak Ridge National Labs (1967)

Desalination: The New Regional Water Supply Alternative for Israel, Jordan, Gaza, and the West Bank

Key

- Existing Israeli National Water Carrier
- Existing King Abdulah Canal

New supplies from desalination could easily reach 1 Bcm per year

- Israel** sea water desalination facilities (developed in stages dictated by demand) adjacent to existing power plants
- Gaza** sea water desalination facility adjacent to proposed power plant
- Bet Shean** possible brackish water desalination plant (50 Mcm p/yr.) – could serve Israel, Jordan or Palestinians
- Hisban** possible brackish water desalination plant (30-50 Mcm p/yr.) – would serve Amman

Other New Supplies and Cooperative Opportunities

Cooperative Agreement to share the Sea of Galilee for mutually beneficial storage, distribution and water quality improvement purposes

Two cooperative Sea of Galilee projects are proposed to maximize inter-dependent opportunities:

- Yarmuk Diversion** – 50-100 Mcm p/yr. of new fresh water and storage for Jordan, could be linked to development of new supplies elsewhere from desalination
- Kinneret Bypass** – Possibility that would improve water quality for Israel, reduce pumping, with no related reduction in quantity

- Enlarged Conveyance System to Amman**
- Disi Project** – New Jordan supply (100 Mcm from southern aquifer)

- **New supplies could be delivered almost anywhere in the region if cooperative agreements, water banking and creative water exchanges are employed**
- **Potential for resolution of present water conflicts will be greatly enhanced**
- **Private sector can be employed to develop many of the required components**



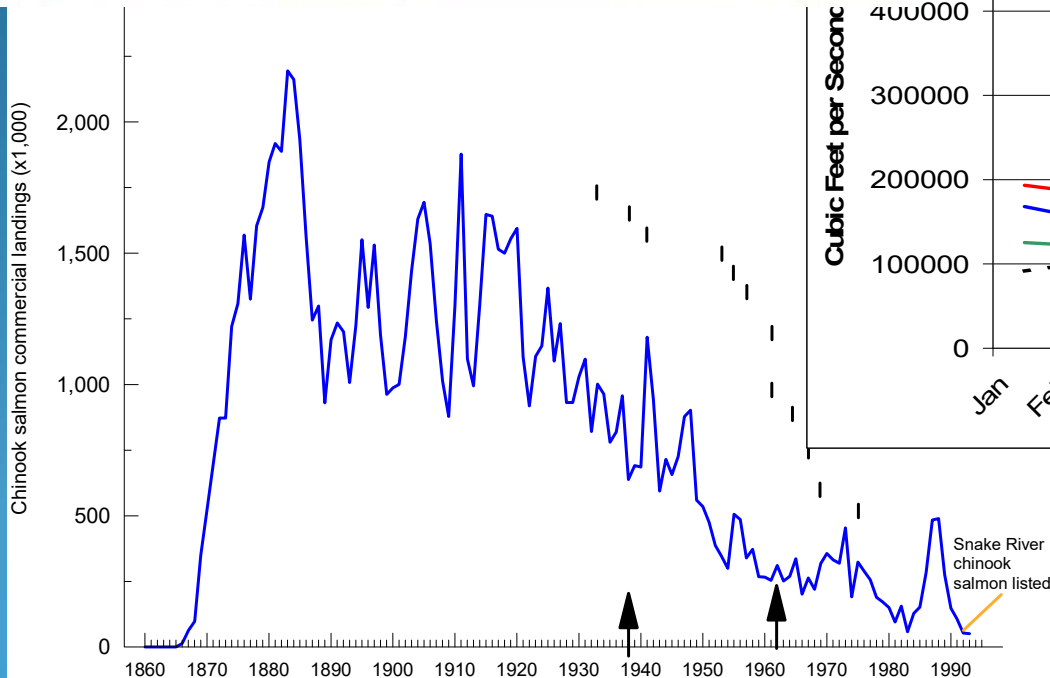
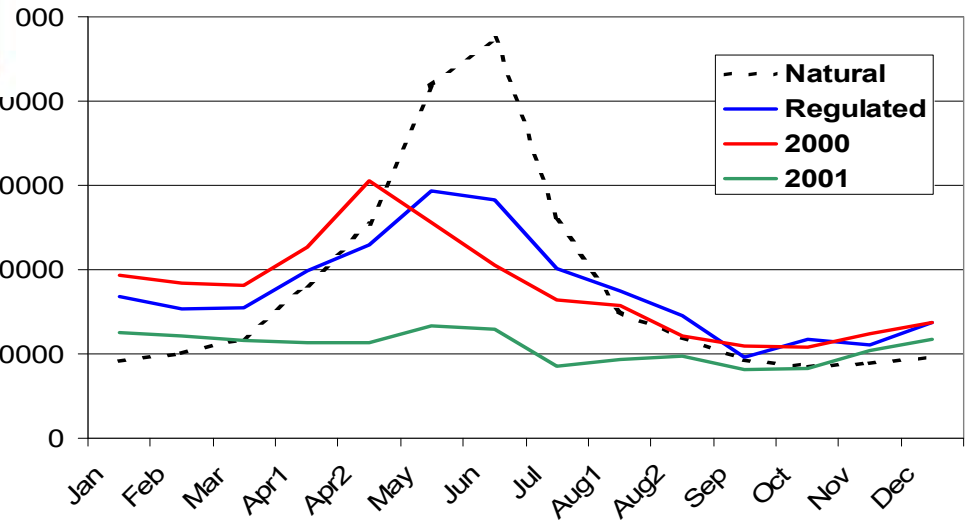
LESSON 5:

Don't forget the spirit –
and fun! – of water:

Elevating the
conversation



2000 & 2001 Flows at The Dalles -- compared to average






River Festivals



We drink it. They live in it.
We all rely on it.



#DefendWater

 alabamairiversalliance



River Festivals



Water is sexy!!



GET YOUR OWN WATER BOTTLE

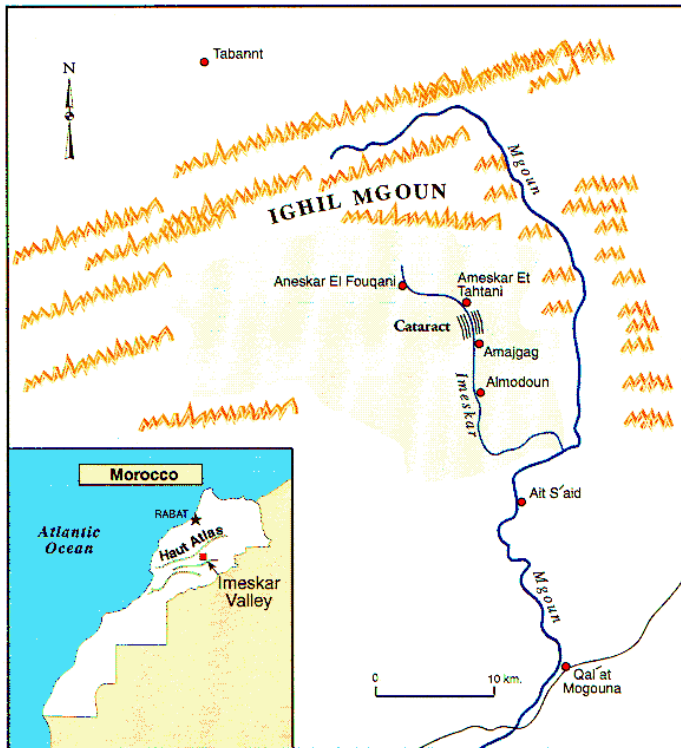
specialty signed by
Matt Damon
Water.org Co-founder

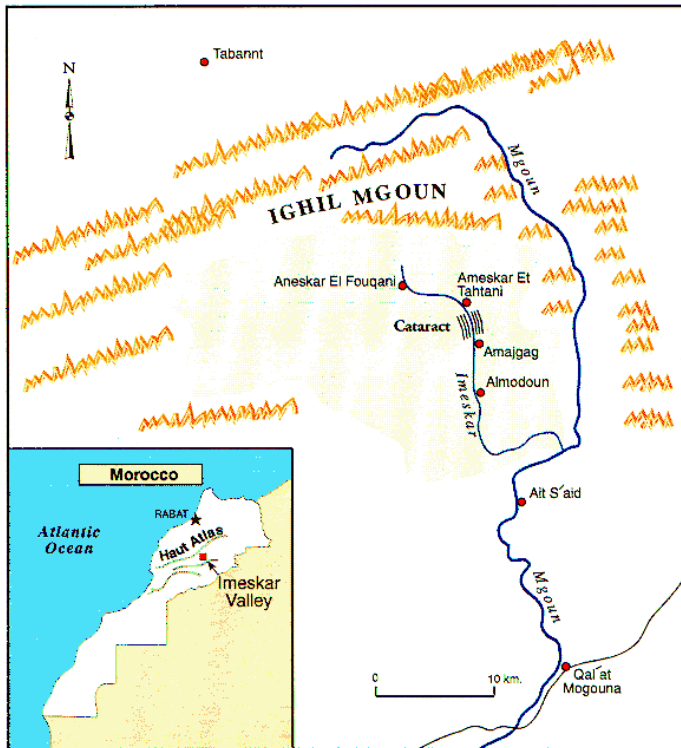
For a limited time, you can bid on Water.org's CamelBak water bottles photographed by co-founder Matt Damon. All proceeds help Water.org bring clean water to people around the world.

See | Buy A Bottle | Donate

Water.org

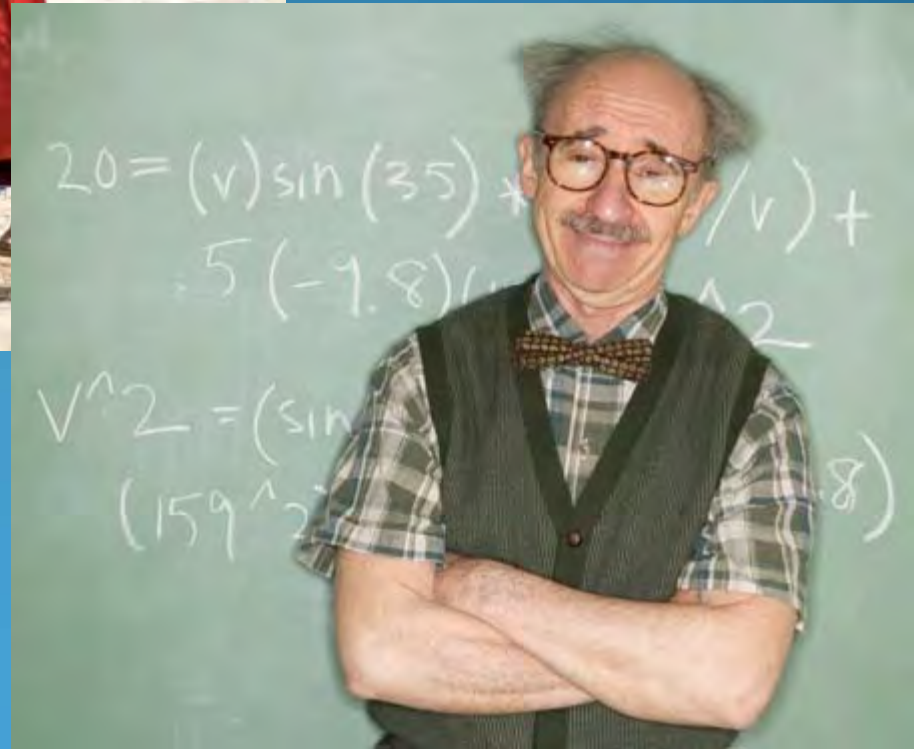
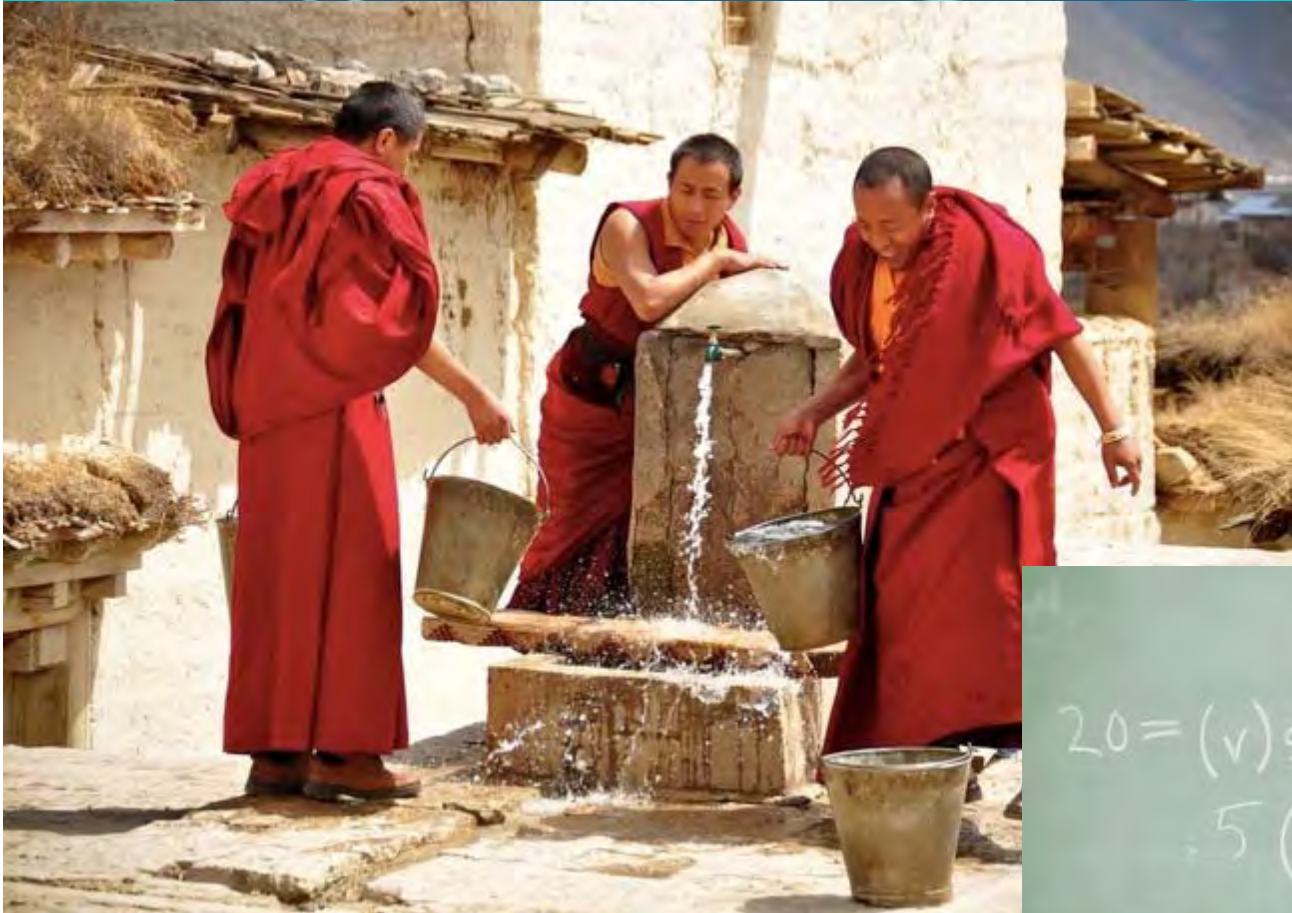






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Egyptian Coptic Church tapped to play the role of mediator in Nile River dispute



Coptic Pope Tawadros II (R), head of the Coptic Orthodox Church, shakes hands with former army chief Abdel Fattah al-Sisi upon Sisi's arrival for a visit the night before Easter, in Cairo, April 19, 2014. Sisi was elected president a month later. (photo by REUTERS)

Four Worlds Framework: Four Needs and Four Claims

NEEDS FOR:

- Intrapersonal
- Interpersonal
- Groups
- Nations

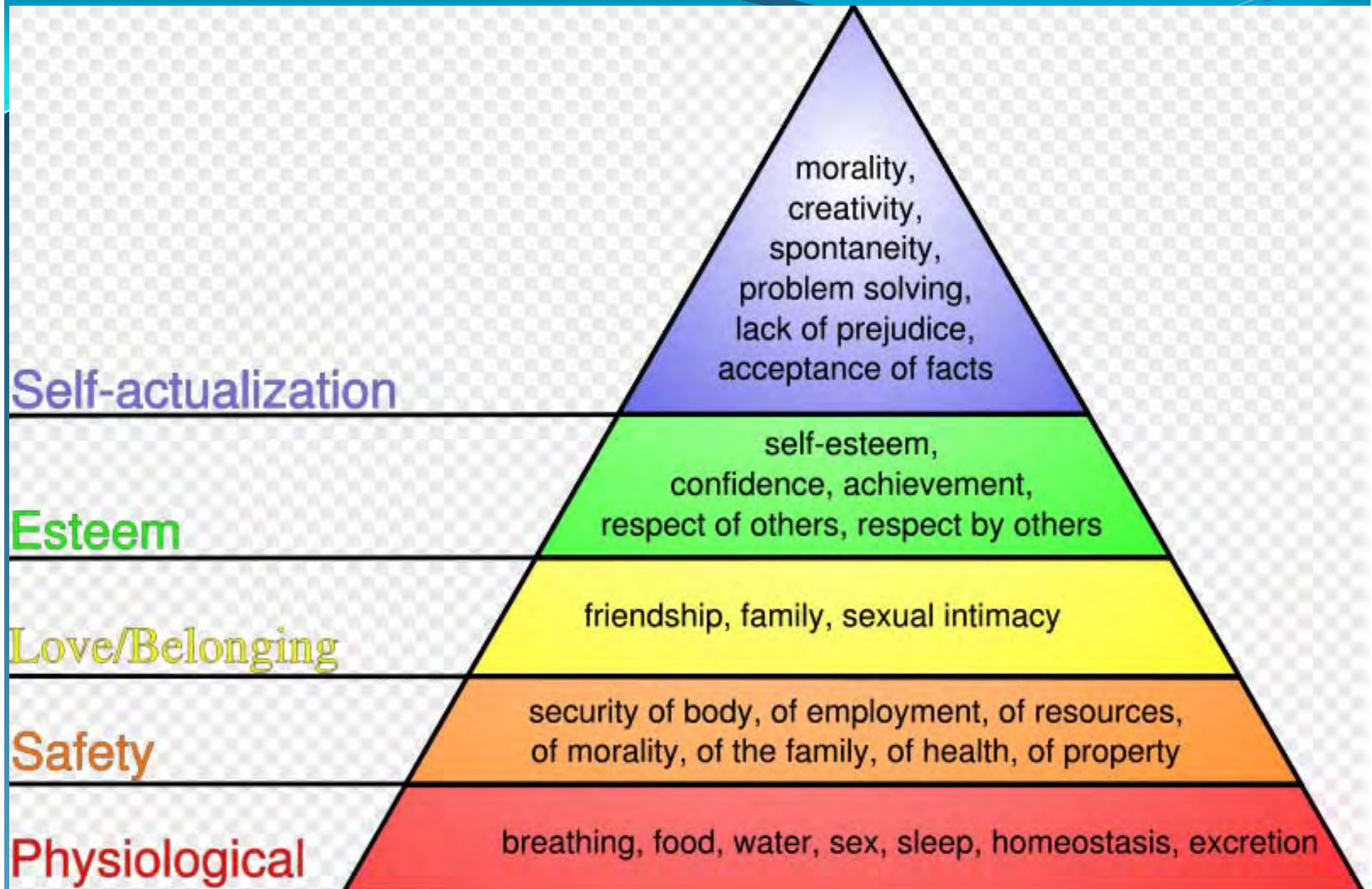


Physical	Positions
Emotional	Interests
Intellectual	Values
Spiritual	Harmony

CLAIMS:

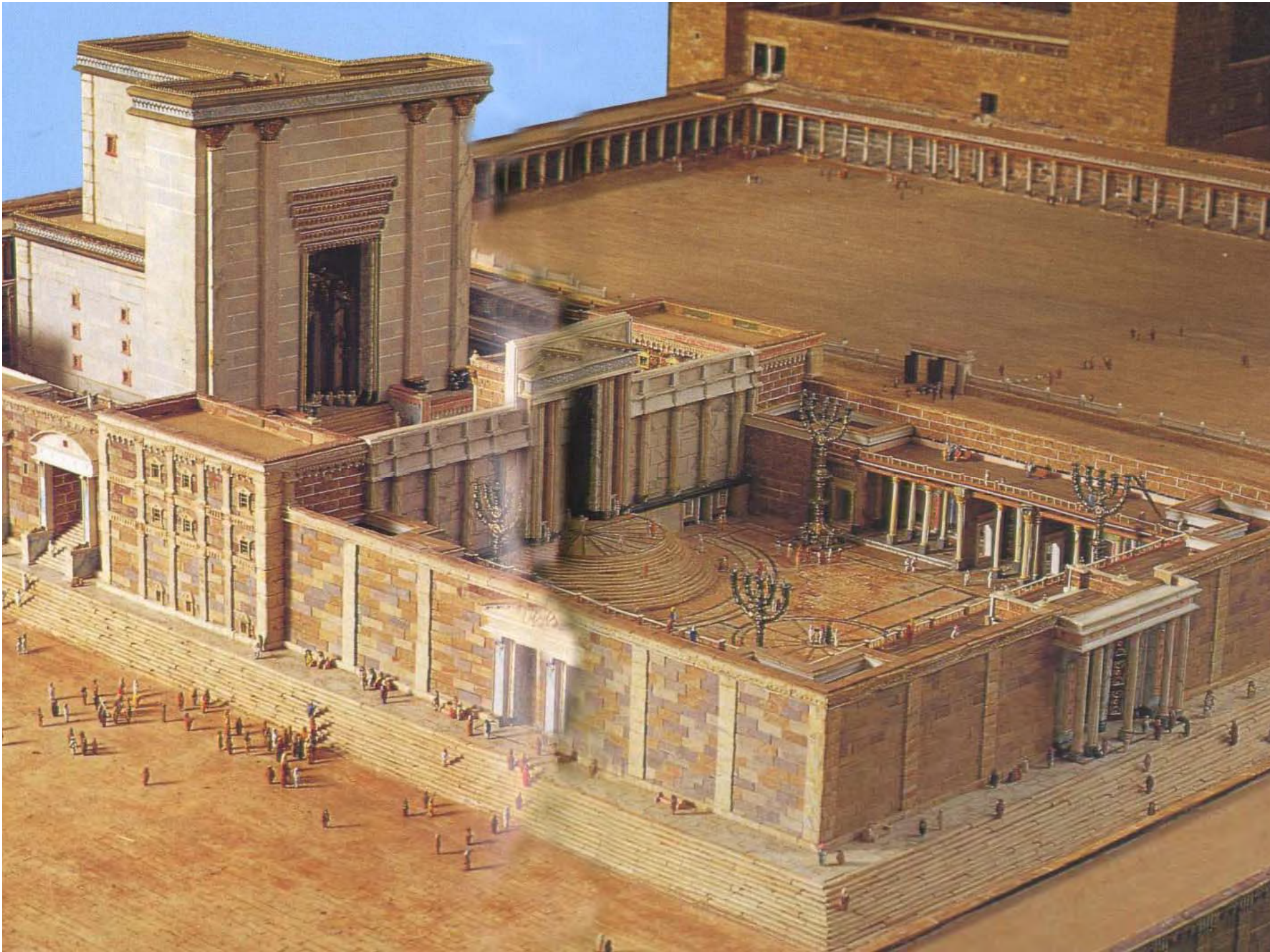
Expressions of
needs in
negotiations





**Basic
Human
Needs**









Vishnu's 4 totems

- mace – physical strength
- lotus flower – glory of existence
- discus – mind chakra
- conch – OM: primeval sound of all creation

Four Worlds Framework in Islam

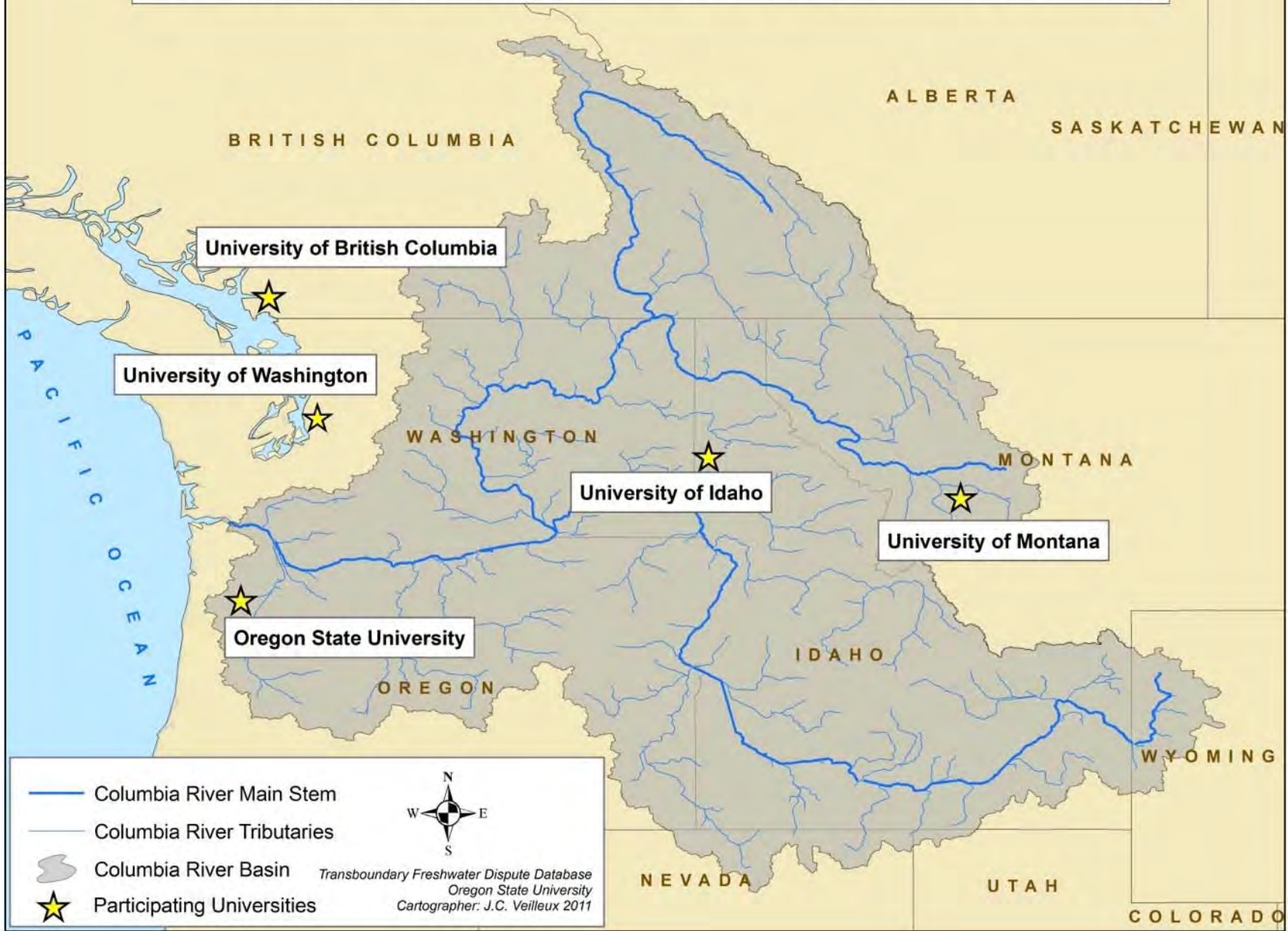
NEEDS FOR:

- Intrapersonal
- Interpersonal
- Groups
- Nations



Physical	Sharia (law)
Emotional	Tarikah (prayer of the heart)
Perceptual	Hakika (truth)
Spiritual	Marifah (attune- ment)

Universities Consortium for Columbia Basin Governance



Maximizing “Benefits”

- The Pacific Northwest recognizes the value of the Columbia River Treaty in facilitating shared water resource management in the Basin to *maximize benefits* to both the United States and Canada.

U.S. Entity Regional Recommendation – December 2013

- The primary objective of the Treaty should be to *maximize benefits* to both countries through the coordination of planning and operations.

Columbia River Treaty Review B.C. Decision – October 2013

Columbia River Basin

Legend

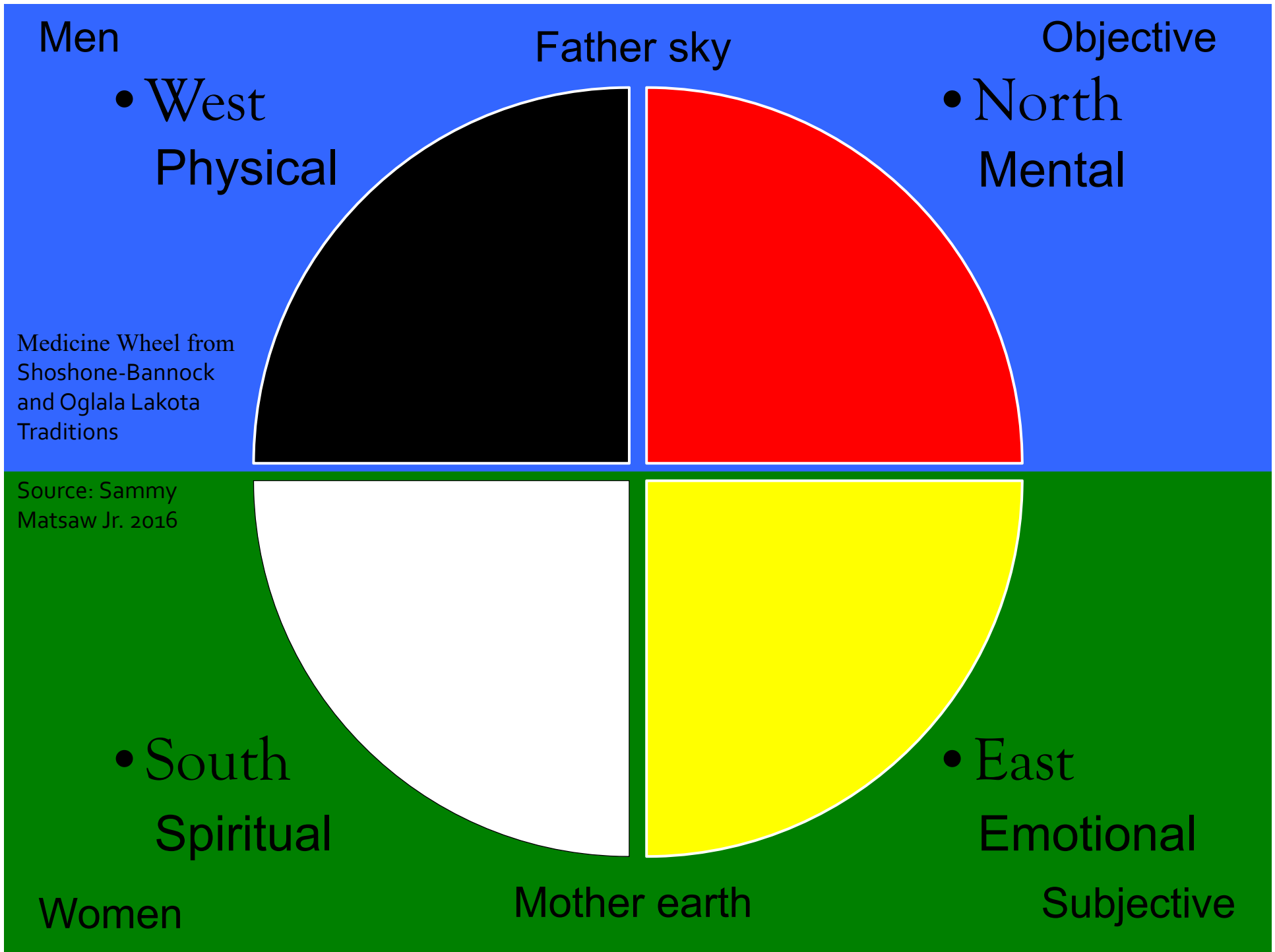
 Indian Reservation

The Lower Columbia River is the reach from Bonneville Dam downstream to the Ocean.

The Middle Columbia River is the reach from Grand Coulee Dam to Bonneville Dam.

The Upper Columbia River is the reach upstream of Grand Coulee Dam.





NATIONAL POLICY STATEMENT

for Freshwater Management 2014

issued by notice in gazette on 4 July 2014

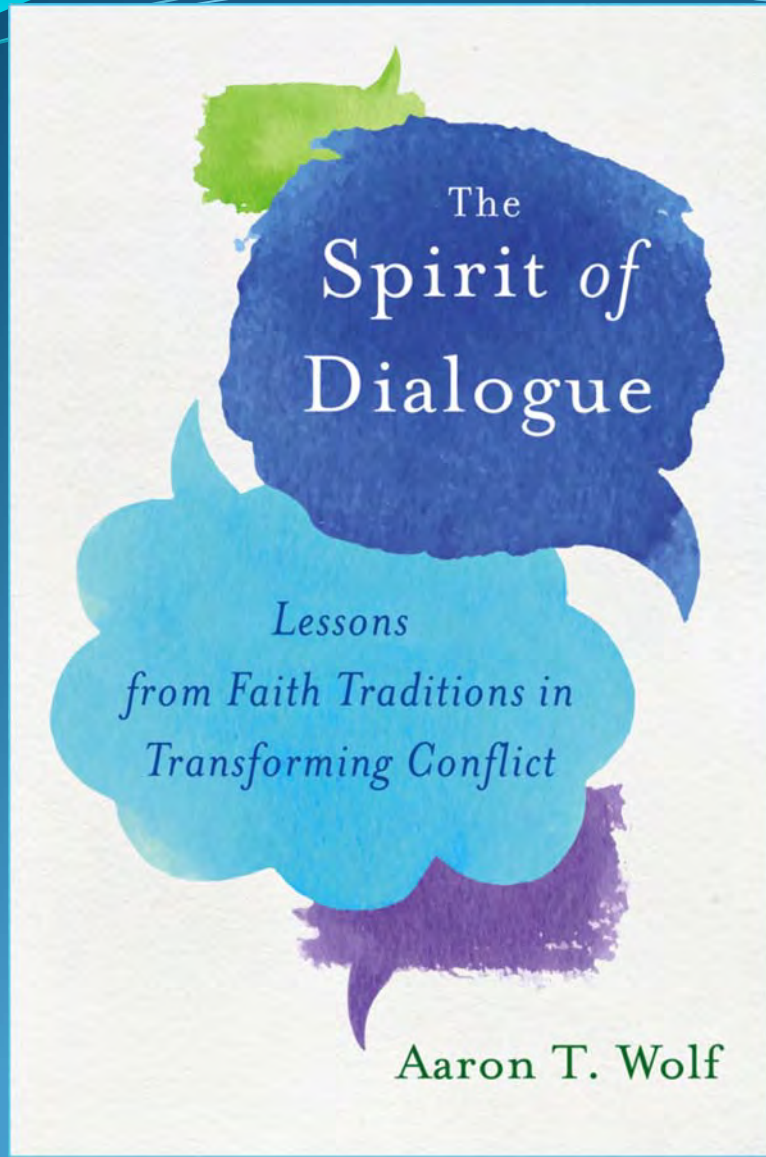
newzealand.govt.nz

NEW ZEALAND NATIONAL POLICY STATEMENT for Freshwater Management 2014

- “Addressing tāngata whenua values and interests across all of the well-beings, and including the involvement of iwi and hapū in the overall management of fresh water, are key to meeting obligations under the Treaty of Waitangi (1840).”
- All things in the natural world have mauri (life force) and wairua (a spiritual dimension). Respect for the spiritual integrity of the environment and the atua (God) that created it will ensure that the taonga (treasure) can be protected and passed on to succeeding generations.

New Directions: Spiritual Aspect of Water

- Whanganui River has legal personhood in NZ, must be treated as living entity; settlement gives standing
 - 2 guardians -- one from the Whanganui Iwi (Maori) trust and one from the crown
- Ganges and Yamuna Rivers in India also received personhood, citing NZ, with three guardians
- Implications for water diplomacy?



Island Press, Fall 2017
Code 4SPIRIT for 20% discount

Lessons from Faith Traditions in Transforming Conflict

- Recognizing mythic stories
- Reframing for shared values
- Spiritual practice of letting go of ownership of ideas
- Using principles to give comfort for progress
- Moving from “either/or” to “and” – the challenge of “sustainability”
- Consensus recognizes the “spark of the Divine”
- Setting and seating



International Freshwater Project Funding
 Copyright © January 2008, Columbia University

Legend	Regions of the funding sources
 > 15 projects and/or fundings; eg. Danube	International
 > 5 projects and/or fundings; eg. Aral Sea, Mekong, Nile	Asia
 > 1 project and/or 1 funding; eg. Colorado, Ganges-Brahmaputra-Meghna	Europe
	North America

Water and Cooperation

“But the water problems of our world need not be only a cause of tension; they can also be a catalyst for cooperation

....If we work together, a secure and sustainable water future can be ours.”

- February 2002

Thank you!

