Managing Hidden Treasures Across Frontiers: International Law for Transboundary Aquifers

Gabriel Eckstein
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Session 5
Legal Instruments
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Whose water is it?
Groundwater: A hidden treasure?

Globally groundwater supply comprises:

- 30% of all fresh water resources
- 98% of liquid fresh water resources

Global groundwater use

- Provides ~1/2 of humanity with freshwater for everyday uses such as drinking, cooking and hygiene
  - 60% to 99% of drinking water for Europeans
  - 50% to 97% of drinking water for Americans
- 40% of water used by industry
- 20% of water used in irrigated agriculture

The most extracted natural resource in the world (982 km$^3$ in 2015)

Source: Shah 2006.
Challenges: growing water stress

By 2025, if present water consumption trends continue, 5 billion people will live in areas where it will be impossible or difficult to meet basic water needs for drinking, cooking, and sanitation.
Challenges: Water scarcity

- **800 million** = number of people worldwide do not have access to adequate, clean, drinking water

- **2.5 billion** = number of people do not have adequate sanitation

- **8 million** = number of deaths annually result from diseases caused by lack of clean water and sanitation (dysentery, cholera, typhoid, etc.)

- **One-half** = proportion of the world’s hospital beds that are used for people suffering from a water-related disease

- **80** = number of countries (with more than 40% of world’s population) that by mid-1990s, had experienced serious water shortages

- **One-third** = proportion of global population living in countries with moderate-to-high water stress (where water consumption exceeds 10 percent of renewable freshwater resources)
Challenges: Where and how many?

Proposed US-Mexico Transboundary Aquifers/Basins

Legend
- Confidence Level: Reasonable
- Confidence Level: Some
- Confidence Level: None
- Confidence Level: Reasonable and/or Some (depending on bordering aquifer)

1. Tijuana-San Diego
2. La Rumorosa-Tecate-Jacumba Valley
3. La Rumorosa-Tecate-Darwin Valley
4. Valle de Mexico-Impperial Valley
5. Valle San Luis Rio Colorado-Yuma
6. Sonoyta-Papago-San Simon Wash
7. Nogales-Santa Cruz
8. Santa Cruz-Santa Cruz
9. San Pedro-San Pedro (Naco-Bisbee)
10. Rio Agua Prieta-Douglas
11. Los Moscos-Hachita
12. Joselita Ortiz de Dominguez, Mimbres
13. Las Palmas-Mimbres
14. Conejos Medanos, Mesilla Bosque
15. Valle de Juarez, Hueso Bosque
16. Rio Conchos-Ignacio
17. Presa La Amistad-Edwards Trinity
18. Allende-Piedras Negras-Carrizo
20. Bajo Rio Bravo-Yegua Jackson

Red numbers (2, 6, 10, 13, 16) indicate a region of two clustered aquifers bordering only one aquifer in the other country.
Red letters (A, E) indicate a region of 2 or 3 clustered aquifers bordering only one aquifer in the other country.
*6 & 10 include two aquifers that were counted in original 18 transboundary aquifers (Table 1)
Challenges: Where and how many?

273 international watercourses

>600 transboundary aquifers and aquifer systems globally
Challenges: What happened/is happening?
Challenges: Different TBAs

[Diagram of different TBAs showing state boundaries and water flow across borders.]

TAMU Texas A&M University School of Law
Challenges: Sovereignty

State A

Discharge from transboundary flow

INTERNATIONAL BOUNDARY

Recharge contributing to transboundary flow

Local flow systems

State B

Transboundary flow direction
Challenges: Little experience

Few examples of and limited experience with cooperation over transboundary aquifers

<table>
<thead>
<tr>
<th>TB River/Lakes</th>
<th>TB Aquifers</th>
</tr>
</thead>
<tbody>
<tr>
<td>273 Worldwide</td>
<td>~600 Worldwide</td>
</tr>
<tr>
<td>+3600 treaties (since 805 AD)</td>
<td>5 treaties</td>
</tr>
<tr>
<td>2 global framework agreements</td>
<td>No global framework agreements</td>
</tr>
</tbody>
</table>
Challenges: Little experience

• Reference to springs or wells – as secondary or tertiary issue – in treaties from 1800s and early 1900s

• Interrelated groundwater recognized in watercourse agreements – as secondary issue
  – in European treaties since mid-1900s
  – UNECE Water Convention (1992)
  – UN Watercourses Convention (1997)
Challenges: Little experience

**Formal International Agreements Over Transboundary Aquifers**

- 2009 Agreement on the Guarani Aquifer

- 2002 Establishment of a Consultation Mechanism for the Northwestern Sahara Aquifer System
- Nubian Sandstone Aquifer
  - 2000 Programme for the Development of a Regional Strategy for the Utilisation of the Nubian Sandstone Aquifer System
  - 1992 Constitution of the Joint Authority for the Study and Development of the Nubian Sandstone Aquifer Waters

Challenges: Little experience

Non-binding Local Arrangements Over Transboundary Aquifers

• 1999 Memorandum of Understanding between the City of Juárez, Mexico Utilities and the El Paso Water Utilities Public Services Board (PSP) of the City of El Paso, Texas

• 1996 Memorandum of Agreement Related to Referral of Water Right Applications between the State of Washington as represented by the Department of Ecology and the Province of British Columbia as represented by the Minister of Environment, Lands and Parks
Challenges: Little experience

**UNGA Draft Articles on the Law of Transboundary Aquifers**
- Prepared by the UN International Law Commission
- UNGA commended articles to UN Member States as “guidance for bilateral or regional agreements and arrangements for the proper management of transboundary aquifers”
- 19 draft articles

**UNECE Model Provisions on Transboundary Groundwaters**
- Prepared under the auspices of the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes
- Provide interpretative guidelines for and facilitate the implementation of the UNECE Water Convention with regard to groundwater bodies
- 9 model provisions
Trends: International law of transboundary aquifers

**Procedural Law Trends in the International Law of Transboundary Aquifers**

- **Regular exchange of data and information**
  
  “Aquifer States shall, on a regular basis, exchange readily available data and information on the condition of their transboundary aquifers or aquifer systems, in particular of a geological, hydrogeological, hydrological, meteorological and ecological nature and related to the hydrochemistry of the aquifers or aquifer systems, as well as related forecasts” (UN Draft Articles – Art. 8)

- **Monitoring**
  
  “Aquifer States shall monitor their transboundary aquifers or aquifer systems” and “should include parameters on the condition of the aquifer or aquifer system as listed in article 8, paragraph 1, and also on the utilization of the aquifers or aquifer systems” (UN Draft Articles – Art. 13)
Procedural Law Trends in the International Law of Transboundary Aquifers

• Prior notification of planned measures
  “Before a State implements or permits the implementation of planned activities which may affect a transboundary aquifer or aquifer system and thereby may have a significant adverse effect upon another State, it shall provide that State with timely notification thereof … accompanied by available technical data and information, including any environmental impact assessment” (UN Draft Articles – Art. 15)

• Creation of an institutional mechanism
  – To facilitate and/or implement the arrangement
  – To carry out tasks authorized under the arrangement
  – “A joint management mechanism shall be established, wherever appropriate” (UN Draft Articles – Art. 14)
Gaps: International law of transboundary aquifers

- Relevance of international [surface] water law principles
- Development of substantive principles of international law
- Exploitation of non-recharging transboundary aquifers
- Transboundary aquifer pollution
- Protections for:
  - functioning of a transboundary aquifer
  - recharge and discharge zones
  - transboundary aquifer-dependent ecosystems
- Cross-border public participation
- Harmonization of metadata and methodologies
Gabriel Eckstein
Professor of Law
Texas A&M University
+1 817 212 3912
gabrieleckstein@law.tamu.edu