North American Transboundary Groundwater Management
Under Climate Change
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Outline:

- Transboundary groundwater overview
- International governance
- North American groundwater resources
- North American governance
- Climate change
- Case Studies
Transboundary Aquifers

Source: ISARM

Global Groundwater Use

The current total groundwater extractions, by country

Legend

- < 1 km³/year
- 1 - 20 km³/year
- 20 - 100 km³/year
- > 100 km³/year
- No data

Source: ISARM
International Governance

- International Law Association
  - Helsinki Rules on the Uses of the Waters of International Rivers (1966) only addressed aquifers that were hydraulically connected to transboundary rivers
  - Rules on International Groundwaters (1986) and Berlin Rules on Water Resources (2004) more directly address groundwater
  - Guidelines for equitable allocation and management of shared resource. Not legally binding in any way.

- United Nations International Law Commission
  - Adopted by UN, but not ratified by enough member countries
  - Conflict over Article 7, relating to harm done to other watershed users
  - New draft articles presented in 2008 designed to address concerns over Article 7
Approx. 200 million North Americans rely on groundwater for potable water needs

Canada
- 10 million rely on groundwater (approx. 30%)
- Provincially regulated

United States
- State regulated
- Approximately half of the population relies on groundwater for domestic needs

Mexico
- 90% of border communities rely on groundwater, 70% of total pop.
- Federally regulated
US-Canada Aquifer Management

- International Joint Commission
  - Mainly deals with surface water
  - Established by the Boundary Waters Treaty (1909)
  - Conflict over groundwater has not required involvement on the part of the IJC. Issues have been resolved through local cooperation

US-Mexico Aquifer Management

- International Boundary and Water Commission
  - Established in 1889
  - Treaties regarding surface-water allocation signed in 1906 and 1944. Groundwater addressed in 1973 with IBWC Minute 242
  - No specifically mandated policy or way to resolve conflicts.
  - Conflict over groundwater typically resolved on a case-by-case, local level
Climate Change

- Increasing temperatures
  - Decreased snowpack
  - Increased evapotranspiration
  - Decreased recharge
- Precipitation may increase in some areas and decrease in others
- Decrease in surface water supply will increase reliance on groundwater

Case Studies

- Abbotsford-Sumas Aquifer
- Hueco-Bolson Aquifer
- Tijuana-San Diego Aquifer
Abbotsford-Sumas Aquifer

- Shallow, unconfined, sand and gravel aquifer in WA and BC
- Water supply for 10,000 in US and 100,000 in Canada
- Over-pumping and nitrate contamination are main concerns
- Environmental regulators from WA and BC cooperate to manage aquifer and deal with contamination issues

Hueco-Bolson Aquifer

- Water supply for El Paso and Ciudad Juarez
- El Paso uses Rio Grande surface waters and groundwater, Juarez relies primarily on groundwater
- Serious over-pumping and salinity concerns
- 40 year groundwater management plan exists for El Paso. No such plan for Juarez
Tijuana-San Diego Aquifer

- Most use in Mexico
- Severely contaminated, sea-water intrusion issues, raw-sewage dumping in Tijuana River
- Cooperation involves wastewater treatment plant construction and transboundary study.

A Single Question Of Intense and Overwhelming Importance

- Are the existing mechanisms for groundwater management sufficient, or should there be more rigorous standards?