Geology
The Edwards Aquifer
The Edwards Aquifer Region
San Antonio and Barton Springs Segments

- Contributing Zone
- Recharge Zone
- Transition / Artesian Zone
- Artesian Zone
Contributing Zone

- Also known as drainage area or catchment area
- Covers area of about 5,400 square miles
- Land surface "catches" rainfall and water runs off into streams or infiltrates into the water table aquifer of the plateau

![Typical Cross-Section of the Edwards Aquifer Region](image)
Recharge Zone

- A 1,250 square mile area
- Highly faulted and fractured
- Edwards limestone outcrops at the surface
- About 75% of recharge occurs when streams and rivers cross this permeable area and go underground
- About 25% of recharge occurs when precipitation falls directly on the outcrop
Helotes Creek in Recharge Zone

- Large plates of fractured limestone in the creek bottom, which allow recharge water to go into the Aquifer.
Seco Creek Recharge Project

- Water is purposefully collected and diverted into the sinkhole to increase Aquifer recharge
- Sinkholes can quickly receive large volumes of recharge during rainstorms and transmit the recharge directly into the aquifer
Recharge Zone Fracture

- Edwards limestone outcrop
Annual Recharge to the Edwards Aquifer
1934-2008

Data from: USGS Water Resources Division, San Antonio
Artesian Zone

- Water is confined between two relatively impermeable formations - the Glen Rose formation below and the Del Rio clay on top.
- Flowing Artesian wells and springs exist where hydraulic pressure is sufficient to force water up through wells and faults to the surface.
Artesian Wells in San Antonio

- San Antonio began to rely on artesian wells for its water supply in 1891
- The effect of releasing all this pressure through wells was that springflows began to decline immediately and significantly
Annual Discharge From the Edwards Aquifer by Use
1954-2008

Acre-feet (thousands)

Data from: USGS Water Resources Division, San Antonio
Aquifer Protection

- Edwards water does not require treatment before distribution besides chlorination.
- However, a recent hike in urbanization has caused local concern over the quality of water.
- Many critics point to weak rules issued by multiple agencies since the Texas Water Development Board in 1970.
- Another issue facing the progress of aquifer protection is the cultural attitude towards property rights in Texas.
- With 1.7 million people depending on the Edwards as their primary sources of water, this issue is as pressing as ever.
Jurisdiction Regarding the Contributing Zone

- Neither of the two main protection agencies, the EAA and the TCEQ, have the authority to apply rules in the Contributing Zone.

- The people living on the Edwards Plateau are not Edwards Aquifer water users which complicates the problem of protection.
Expanding Central Texas

- The Hill Country is the most rapidly-expanding area in all of Texas
- The Edwards Aquifer Authority has recently enacted legislation to limit the developers' ability to install impervious cover over the recharge zone
- Environmental officials are trying to avoid the wash of pollutants from streets, cars, and new industry into the aquifer
A Limited Resource

- With rainfall being the only source of recharge for the aquifer we are at the mercy of annual rainfall.
- Low rainfall reduces pressure within the aquifer and at springs.
- Many aquatic and karst dwelling species rely on the Edwards...
Stakes

- What is the economic value of environmental services the Edwards is providing for free? How much are we willing to pay to protect the ability of the Edwards to provide treatment?
- To what extent can we limit development or regulate land use in order to protect Edwards water quality? Will compensation be required, and who will pay?
- What agency has the legal authority and responsibility to develop water quality regulations? How do we deal with competing jurisdictions and agency boundaries that are set up along political, not hydrogeologic lines?
Want to Know More?

- www.AquiferAlliance.org
- www.EdwardsAquifer.net
Works Cited

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