

Challenges for Groundwater Supplies and Resource Management

Kirk Holland, P.G.
General Manager, BSEACD

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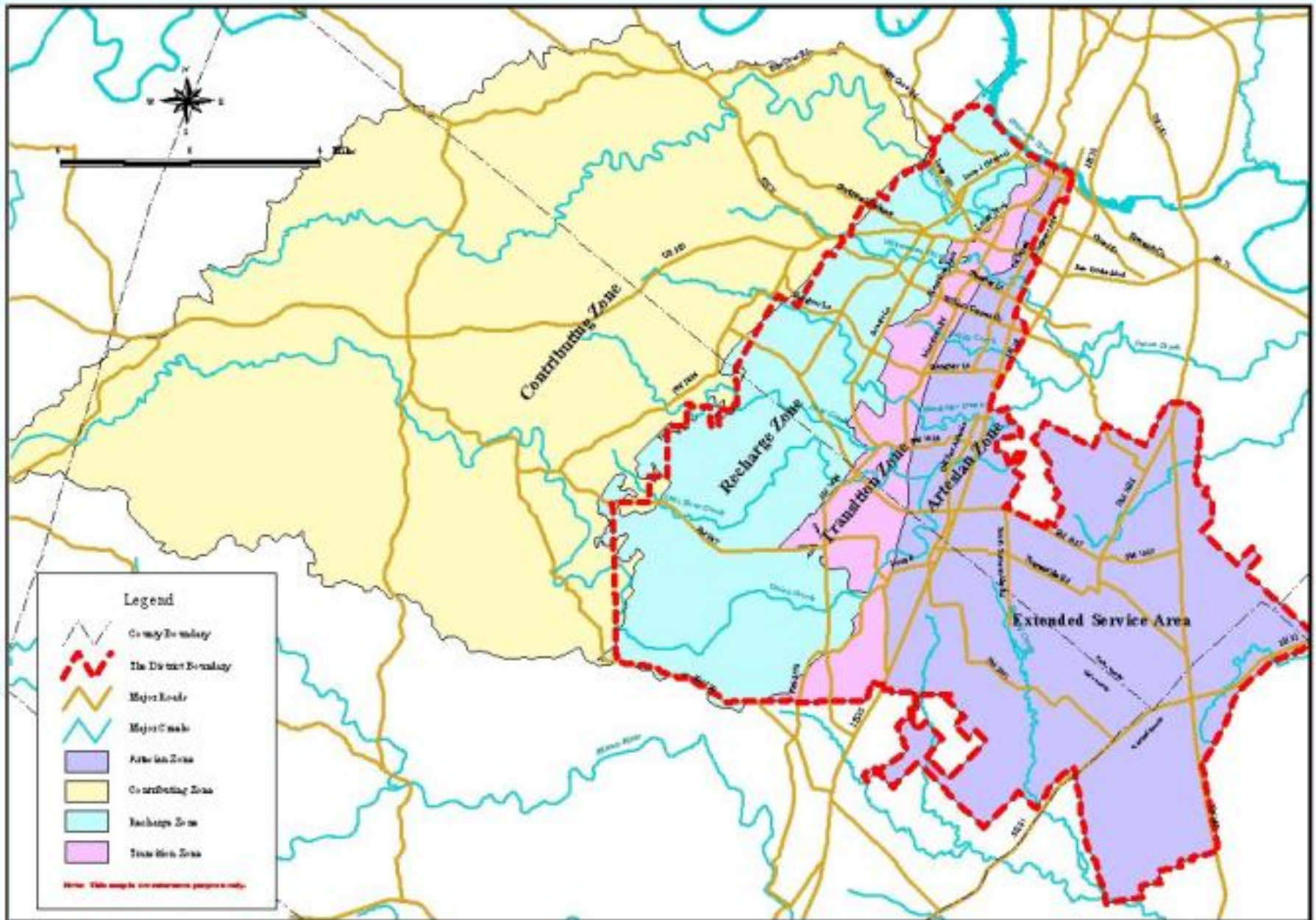
**Barton Springs
Edwards Aquifer**
Conservation District

Assessing Challenges From Three Inter-related Groundwater Perspectives

1. The Resources Viewpoint
2. The Users Viewpoint
3. The Institutions Viewpoint

The Groundwater Resources in the Barton Springs Zone

- Barton Springs Segment of the Edwards Aquifer (the freshwater “Barton Springs Aquifer”)
- The Saline Edwards Aquifer
- The Trinity Aquifers Underlying the Edwards
- Minor Aquifers Overlying the Edwards



Hydrological Zones of Barton Springs Segment of the Edwards Aquifer



The Barton Springs / Edwards Aquifer Conservation District

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Challenges From the Groundwater Resources Standpoint

- Relatively small, karstic aquifer:
 - Vulnerable to droughts of even short duration: requires equitable, readily deployable, and effective drought management plans
 - Vulnerable to pollution: requires point-source and nonpoint-source controls in *both* CZ and RZ, but existing authorities are varied in coverage and effectiveness

Challenges From the Groundwater Resources Standpoint

- Firm-yield demand exceeds sustainable freshwater supply:
 - Currently authorized withdrawals by well/land owners are only meeting existing demands
 - Higher use during even non-drought periods will accelerate onset of next drought
 - Water use fees are order-of-magnitude less than resource value, leading to preferential use over any available alternative supplies.

Challenges from the Groundwater Resources Standpoint

- “New” recharge sources need further evaluation as to significance:
 - Blanco River recharge during low aquifer levels
 - Bypass from SA segment to BS segment during low aquifer levels
 - “Urban recharge” sources in developing CZ and RZ
 - Leaking pressurized treated water mains
 - Leaking wastewater interceptor lines
 - Septic tanks and OSSFs

Uncertainties from the **Alternative** Groundwater Resources Standpoint

- Capacity of saline Edwards to yield sufficient water for desalination purposes
- Potential for saline Edwards to serve as a reservoir for ASR
- Possible injection zones for desalination concentrate
- Yield and water quality of Middle and Lower Trinity Aquifers, and their variability
- Potential for impacts to freshwater Edwards due to injection to or extraction from saline Edwards

Challenges from the Groundwater Users Standpoint

Four “User” types present unique challenges:

- Exempt well users
- Non-exempt well users
 - Historical Use wells
 - Conditional Use wells
- Endangered species

Challenges from the Groundwater Users Standpoint

Exempt Wells:

- Not subject to permit-defined withdrawal limitations
- Not an issue in BSEACD but a large issue in CZ
 - BSEACD has low definitional threshold already and exempt use is decreasing: no change needed
 - Outside BSEACD, growing use of exempts and is not effectively regulated in CZ: reduced recharge

Challenges from the Groundwater Users Standpoint

Non-exempt Historical Use Wells:

- Subject to “reasonable, fair” regulation that can limit production, to some point
- More than 90% of current production in BSEACD is regulated in this way
- Need to reduce firm-yield demand or increase supply to achieve sustainable yield: How?
- Currently being assessed by Board and SAC:

Challenges from the Groundwater Users Standpoint

Evaluating Options for Reducing Historical Use:

- Market-based Strategies
 - Cap and Trade
 - Expand Temporary Transfer Permit Program
 - Cap and Retire
 - Advance Conservation Commitments

Challenges from the Groundwater Users Standpoint

Evaluating Options for Reducing Historical Use:

- Regulatory- or Permitting-based Strategies
 - Right-sizing Production Permits – Permanent
 - Right-sizing Production Permits with Reservation Permits – Temporary
 - Proportional Adjustment
 - Current authorities
 - Differential adjustments based on type of use
 - Mandatory ERP Curtailments

Challenges from the Groundwater Users Standpoint

Non-exempt Conditional-Use Wells:

- Only type of permit now available to Edwards users
- Interruptible supply: not amenable to be sole PWS; also limited volume now available
- Bottom line: users must diversify sources to meet increasing demand
- Availability of alternatives may not reduce pumpage of Edwards during drought voluntarily:
 - Increase water-use fees; now at legislatively mandated ceiling
 - Require *substantive* conservation-tier pricing by PWS providers.

Challenges from the Groundwater Users Standpoint

Endangered Species “Users”:

- Protection of two species required by federal law; protective measures specified in HCP and federal permit
- Human needs do not trump E/S needs
- E/S life requirements well studied, but uncertainty still exists
- Relation between D.O. and springflows at low discharges is critical but poorly established (would require DOR to recur)
- Habitat Conservation Plan in progress
 - Efficacy of measures only proven at risk of population extirpation
 - Unknowns need further evaluation: climate change impacts, antagonistic effects of herbicide and pesticide use in CZ and RZ, and dynamic hydrologic/hydrochemical characteristics at extremely low springflows.

Challenges from the Groundwater Users Standpoint

BSEACD also evaluating options for increasing *supply* (for all users/uses):

- Recharge-enhancement facilities
- Import water from reservoirs and wells in other aquifers
- Desalination, ASR
- Effluent re-use
- Issue: Longer-term, rather expensive solutions that may have other adverse effects
- Issue: No guarantee of *substitution* by users

Challenges from the Groundwater Institutions Standpoint

- Most uncertain and contentious dimension of groundwater management
 - Groundwater in Texas is private property, and Texas is a strong private property state
 - Texas already doesn't have enough water to meet its projected population growth
 - Inherent conflicts among groundwater ownership, demand to serve economic and population growth, and groundwater management imperatives will only increase with time.

Challenges from the Groundwater Institutions Standpoint

- GCDs are “preferred groundwater management entity”:
 - But their authority is prescribed and rather limited
 - Cannot directly mandate behavior change in users
 - Compliance with DFCs are now the focus of planning and permitting:
 - MAGs are now only *one* consideration a GCD must consider but are key to protecting this aquifer’s users
 - DFC compliance here can be demonstrated only at risk of extirpation of federally protected E/S

Challenges from the Groundwater Institutions Standpoint

- Impact of recent Texas Supreme Court decision is indeterminate now:
 - But will likely make *additional* regulation more difficult and financially risky for GCDs
 - BSEACD believes Court decision requires no change in what we are doing now:
 - Others will confirm that belief over next several years
 - Real concern is amount of time and dollars that may be required in such confirmations and that are then not available for effective groundwater management.

Challenges from the Groundwater Institutions Standpoint

- Summary of institutional challenges:
 - Local groundwater management must find way to balance needs for producing more water regionally and accomplishing local imperatives
 - Failure to do so will likely create political pressures for “going in another direction” to manage privately owned groundwater in Texas, and that may well mean a non-sustainable future for certain local aquifer systems, including our own.



Contact Info

kholland@bseacd.org

District Office: (512) 282-8441

1124 Regal Row, Austin, TX 78748

Website: www.bseacd.org