CITY OF AUSTIN

WATERSHED PROTECTION DEPARTMENT

Point Recharge Features

Environmental Commission Retreat
August 9, 2023

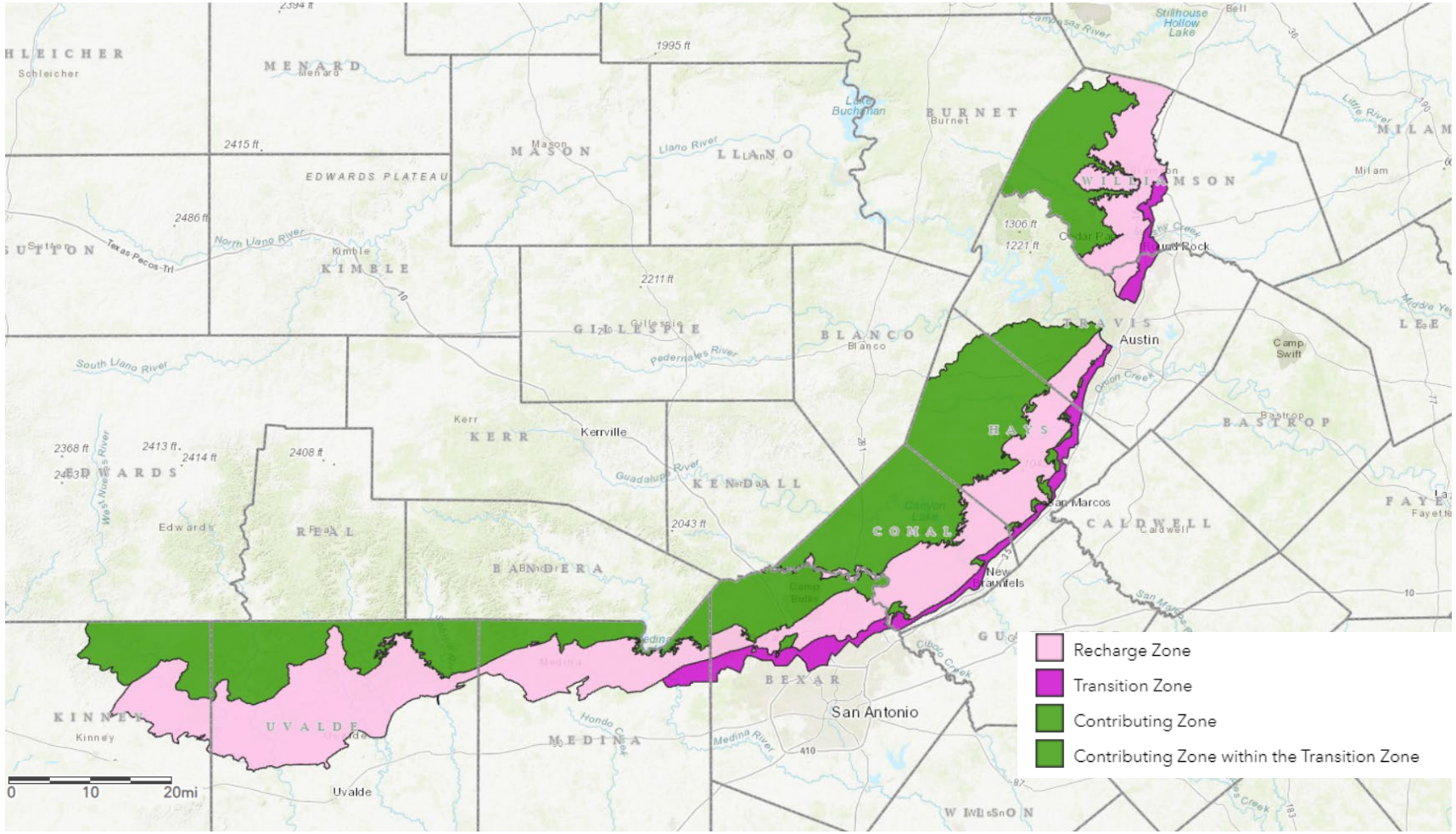
WATERSHED PROTECTION

Edwards Aquifer

- The Edwards Aquifer is a karst aquifer and is characterized by the presence of sinkholes, sinking streams, caves, large springs and numerous highly productive water wells. Karst aquifers are considered triple permeability aquifers: water is contained in the rock matrix, in fractures and faults and in caves and conduits.

- The interconnected fractures and conduits within the Edwards Aquifer accounts for its extremely high yielding wells and springs. The large interconnected openings in the rock also exhibit a diverse fauna of more than 40 species including eyeless salamanders, shrimp and two species of catfish.

Confirmed Limits of Aquifer



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Importance

- Point Recharge Features are perhaps the most important environmental feature throughout the City of Austin.
- Limited soils help to filter contaminants or pollutants before entering the water table requiring extra diligence in the identification and protection of these features.
- Failures in protection regarding Point Recharge Features have the potential to devastate Edwards Aquifer and the viability of plant, animal, and human life in Central Texas.
- 6 Federally listed Endangered Karst Invertebrate Species located in Austin with an additional 25 Species of Concern

Critical Environmental Features

- Awareness of Critical Environmental Features (CEFs) is paramount for the sustainability of – in the last 30 years, City of Austin staff have identified over 4,780 CEFs; primarily during the site plan and subdivision review process!
- Due to the substantial development over the last 40 years, the City of Austin must be acutely aware of, and preserve, all CEFs.
- Currently over 2,000 <u>known</u> karst CEFs providing significant infiltration and recharge to the aquifer

Understanding Karst Topography

- Karst terrain/topography – dissolution of limestone characterized by underground drainage systems and pathways for surface and groundwater migration over an aquifer.
- Aquifers provide drinking water for roughly 20% of the population of the United States (KWI 2020).
- Understanding subterranean water pathways and their connections will continue to guide land development decisions so the health of the water supply will remain for future use.

Caves

- A cave may be a single, short length of accessible passage, or an extensive and complex network of tunnels with a natural opening formed in the rocks below the surface of the ground large enough for a person to enter.
- Caves may consist of a single connected opening or a series of small or large interconnected chambers.

More Caves

- **Four endangered species habitat and management zone in the Austin region were delineated by Dr. George Veni in 1992.**
  - Zone 1: areas known to contain endangered cave fauna;
  - Zone 2: areas having a high probability of suitable habitat for endangered cave fauna;
  - Zone 3: areas that probably do not contain endangered cave fauna; and
  - Zone 4: areas which do not contain endangered cave fauna.
- **Protection of these areas is paramount to ensure the viability of the endangered species that inhabit the caves.**
  - 6 Federally listed Endangered Karst Invertebrate Species located in Austin with an additional 25 Species of Concern

Endangered Cave Species

Caecidotea reddelli

Eurycea tonkawae

Rhadine persephone

Caves and Point Recharge Features

- **Understanding of the surrounding geology is key!**
  - Edwards limestone is very porous with more surface area allowing for more rapid dissolution.
  - Glen Rose is much more massive restricting the flow.
  - Many point recharge features will occur at geologic contacts where faulting and jointing are most common
- **Surface features and clues are the way to understanding the subterranean geology.**
  - A round circular depression, localized subsidence, or depression anywhere on subject area;
  - Exposed bedrock with clean rounded sides free of sediment or debris;
  - A foundation settling or cracks on roads/pavement on or near the subject area; or
  - A small opening in the ground that rainwater seems to disappear into.
- **Epikarst and 'creature features' can be deceiving**

Rules for Development

Environmental Resource Inventory (ERI – ECM 1.3.0) is required to identify potential presence in areas of high likelihood of containing features.

- Baseline buffer of 150-feet from aperture/cave footprint and up to 300-feet within the catchment area of the feature.
- Administrative Variances in buffers can be granted on a case-by-case basis but never less than 50-feet.

Protection During Construction

- **Limit development around CEFs**
  - Buffers are already in place based upon the Land Development Code and City of Austin Environmental Criteria Manual.
- **Ensure proper stormwater, erosion and sedimentation controls are adequately installed and regularly inspected during construction around the CEF.**
- **Install and maintain fencing around all CEFs or additional areas to be preserved during construction.**
- **If a point recharge feature is discovered during construction, all work must immediately cease, and all mitigation procedures expressed in Section 1.12 of the City of Austin Environmental Criteria Manual are to be followed to prevent the potential discharge of contaminants or pollutants into the water table.**