

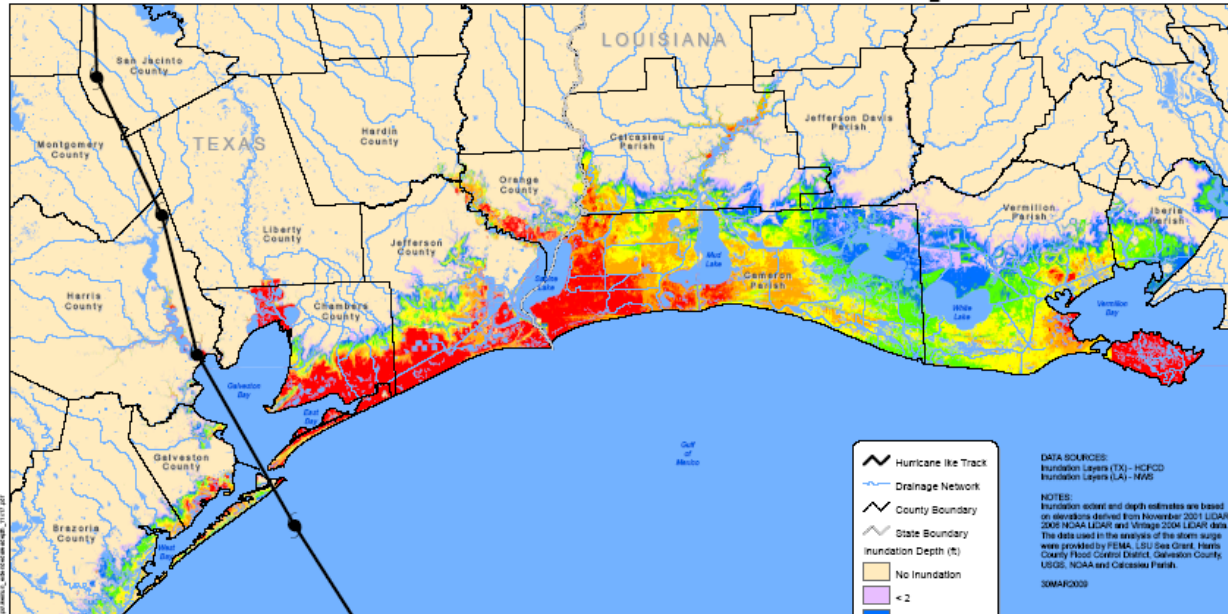
The Texas Hill Country Exchange: Do We/You Want It?

Meeting Conducted By Trinity Edwards Springs Protection Association (TESPA) and Greater Edwards Aquifer Alliance (GEAA)

November 11, 2020



Hurricane Ike Inundation Depth

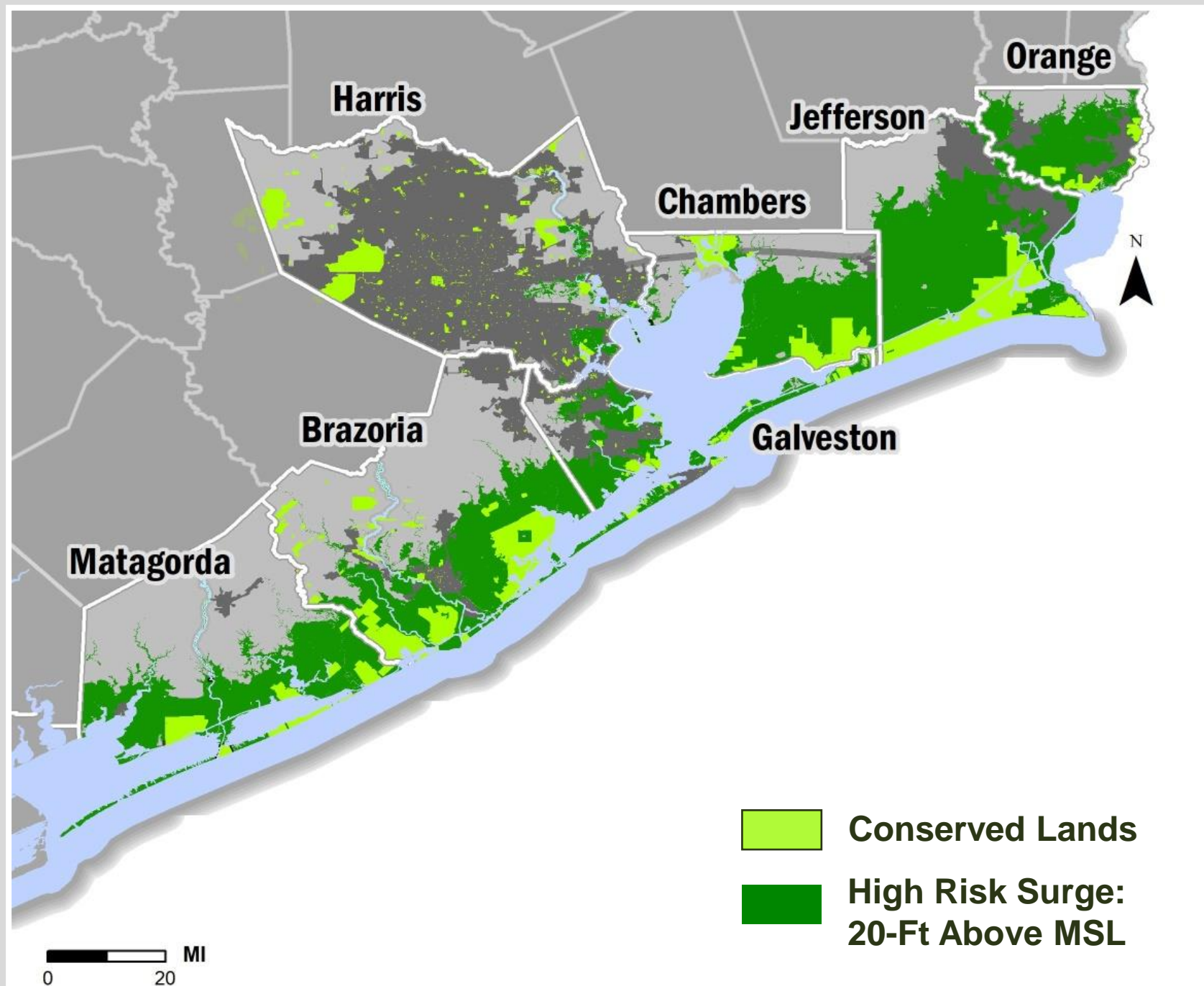


Post Ike Research at Rice University's SSPEED Center

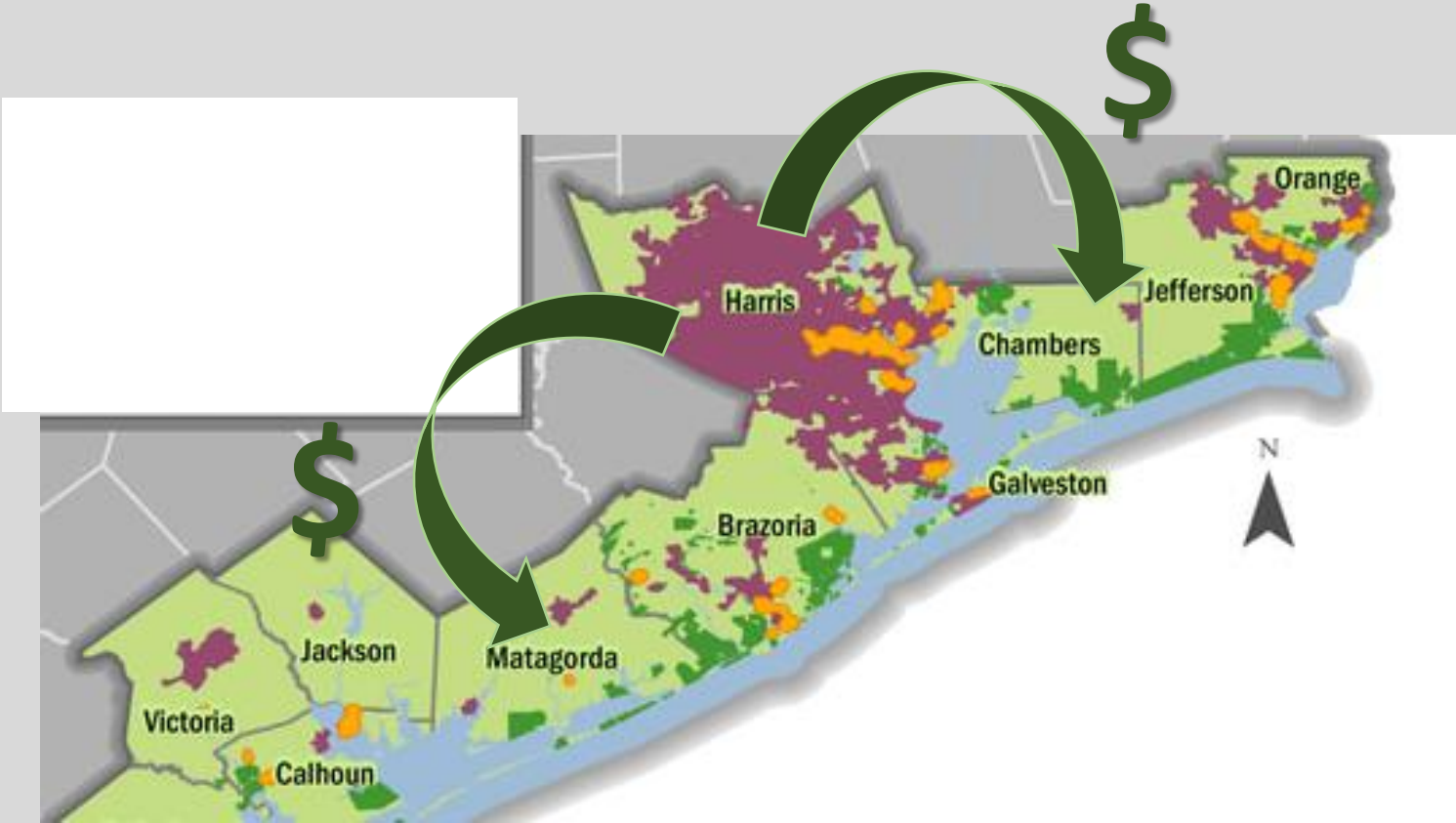


How Do We Protect 2 Million Coastal Acres Lying At Or Below 20 Feet Elevation?

Majority in Private Ownership



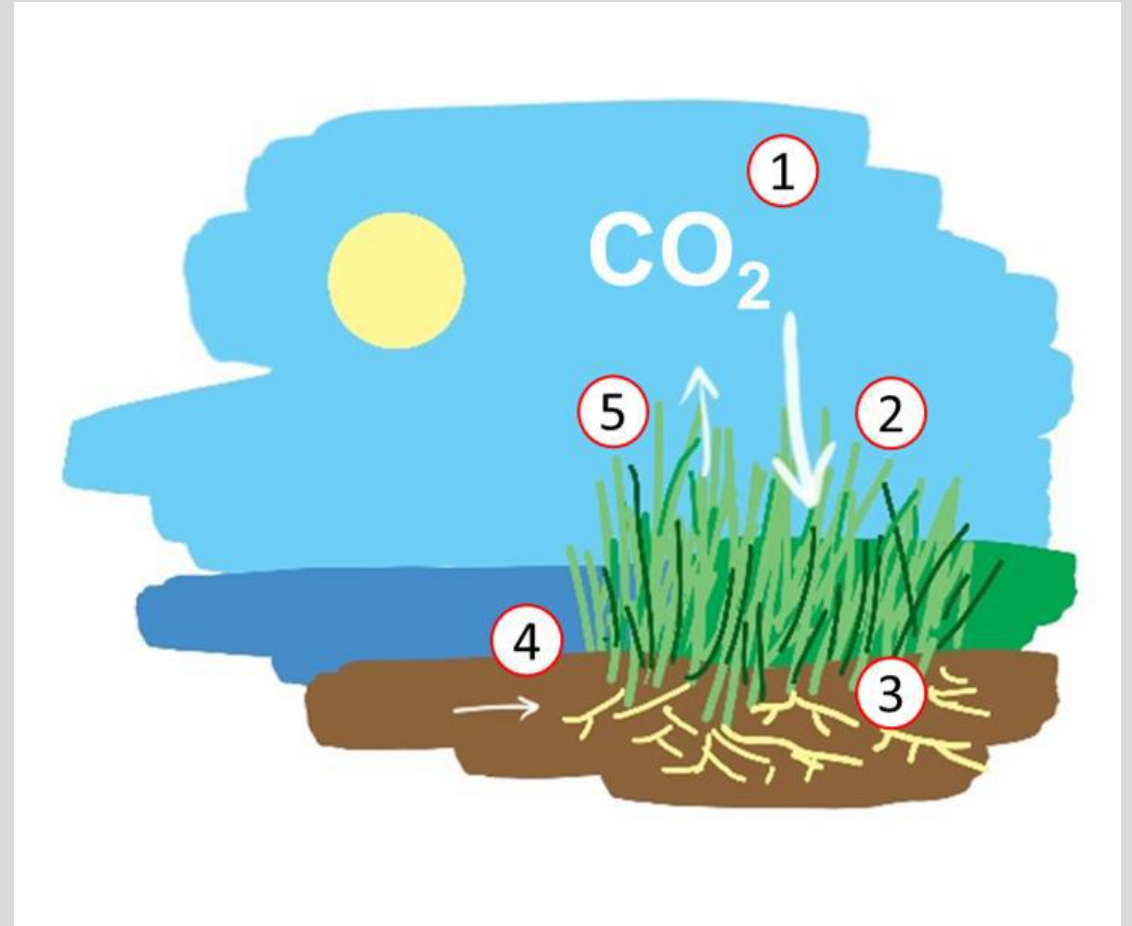
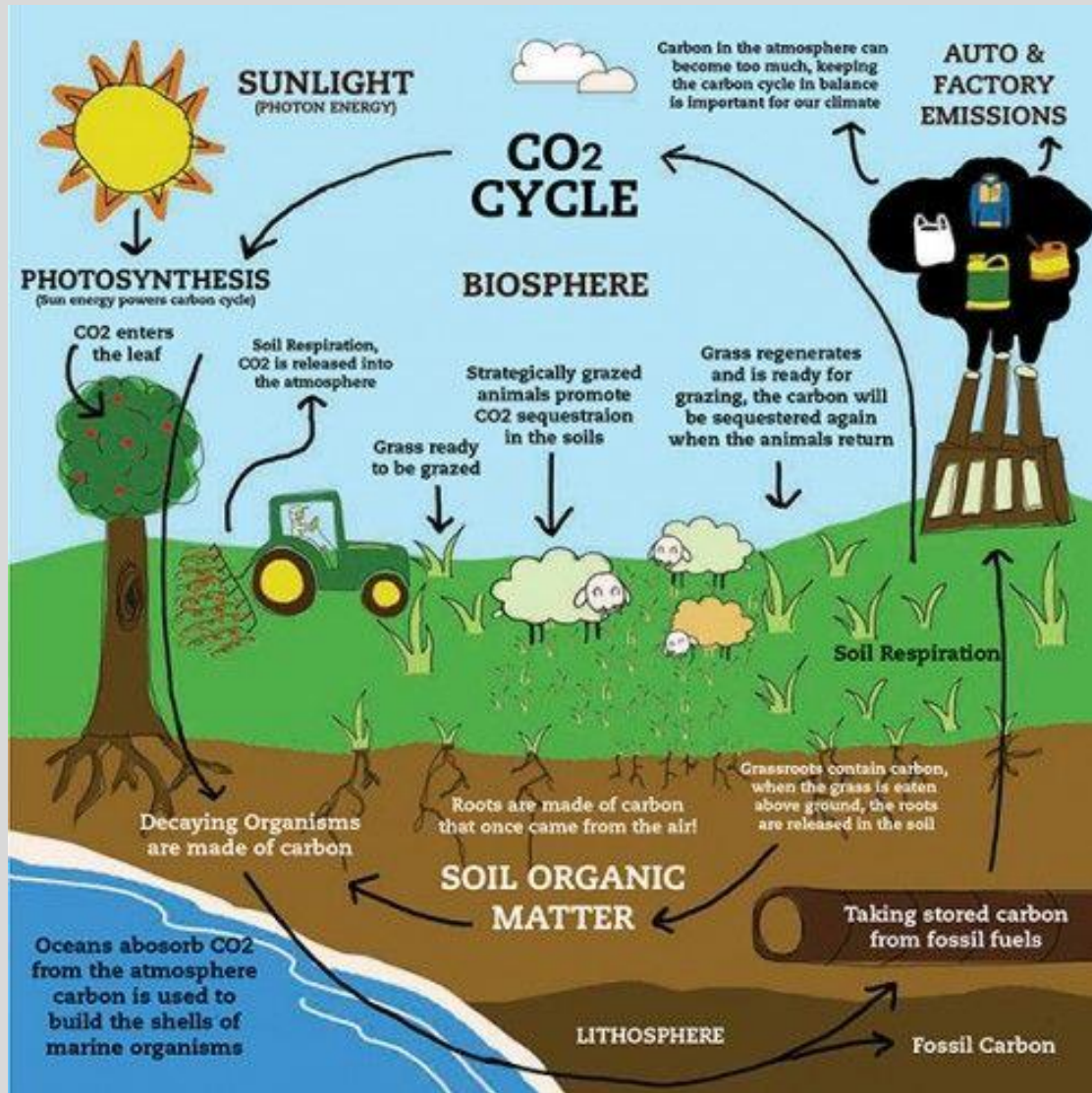
Let's Have A Conversation About Ecology



Ecosystem benefits provided by natural coastal lands

- Storm surge protection
- Flood storage
- **Carbon sequestration**
- Water supply enhancement
- Fishery productivity
- Endangered species habitat
- Neo-tropical migrant bird habitat
- Waterfowl habitat



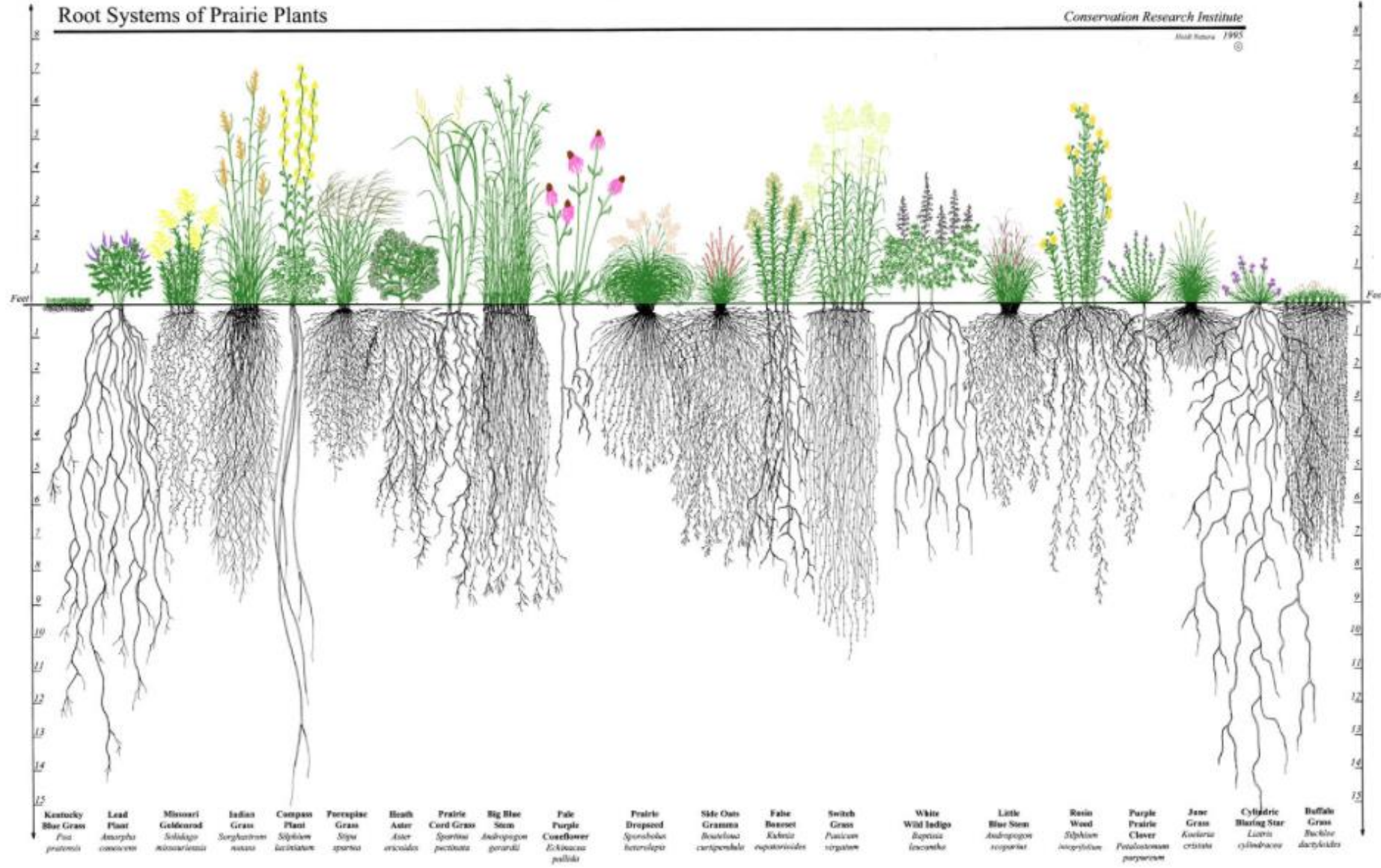




Root Systems of Prairie Plants

Conservation Research Institute

David Boyer 1995



Under the system we designed, ecological services are classed as property rights.
If you generate them and own the property (or have an interest in the property),
you may sell them if you can find a buyer



Stacking To Allow Greatest Landowner Benefits

**\$
To
Property
Owners**

- Water/Flood
- Cattle
- Carbon
- Species
- Coastal Protection



Honor System For Transactions

One or More Referees

No measurement required although research testing is an excellent idea

Sales based upon literature values

No requirement for land management

Voluntary system

Land becomes obligated for 10 years

9/25/2014



TEXAS
COASTAL
EXCHANGE

ECOSYSTEM SERVICES OF THE MID-TEXAS COAST

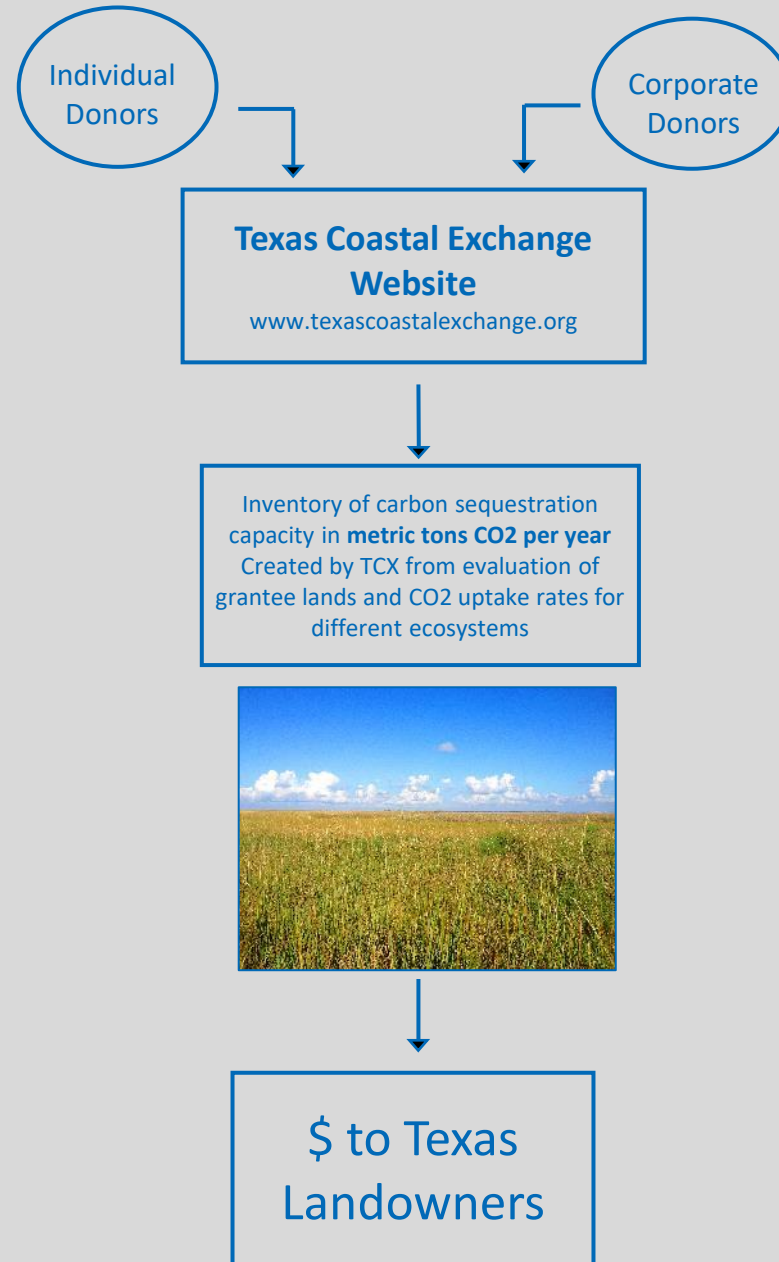


http://www.nature.org/idx/groups/webcontent/@web/@texas/documents/media/prd_027528.pdf
https://ci.staticlickr.com/5/4095/4763846563_fc60fd9e_2.jpg
http://galvbay.org/conservation_system.html
<http://www.houstonatlabon.org/html/ColumbiaBottomlands.jpg>

A review of available literature on the metrics and values of services provided by coastal ecosystems | Jim Blackburn, Courtney Hale, and Avantika Gori

How does it work?

- Establish Inventory
 - We evaluate the C sequestration capacity of the grantees land
 - Wetland type
 - Hydroperiod
 - Soil characteristics
- Currently limited to coastal wetlands – Expanding Into Coastal Prairie and Bottomlands
- Donors contact us
 - Web app functional
 - Funds distributed equally to the grantees in the inventory
 - Corporations know about us
 - Calculate carbon footprint
- We arrange for distribution of fund to the landowners as grants



Pierce Marsh



**Establishing
Carbon
Inventory**

**Pierce Marsh
Owned By
Galveston Bay
Foundation**

2,242 acres

Pierce Marsh Land



**Saleable
Carbon Dioxide
Storage**

**Spartina
alterniflora
Marshland**

1,249 acres



Saleable Carbon Dioxide Storage

Spartina alterniflora Marshland

Marsh - 1142 acres

Restored Marsh - 111 acres

TCX Website

<https://www.texascoastalexchange.org/>



Inventory



Current CO₂ storage capacity:

13,121 metric tons of CO₂

Total land area available for carbon storage:

6,560.5 acres

Click the button below to support natural ecosystems on the Texas coast.

DONATE

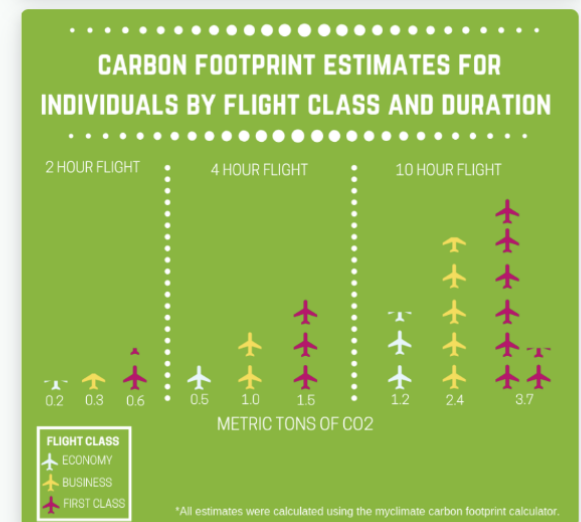
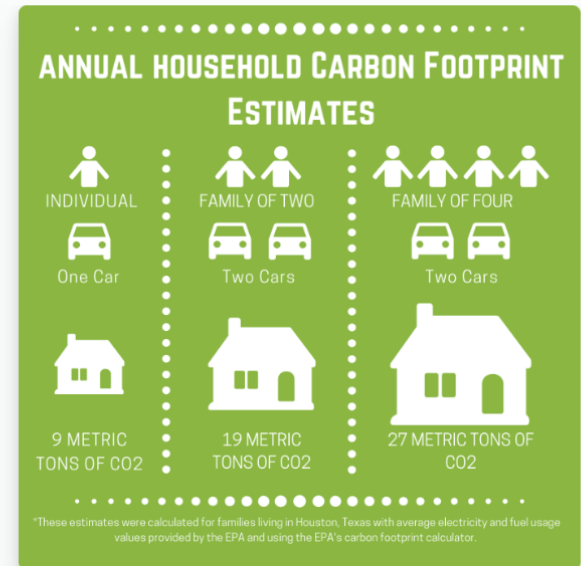
Footprint Calculation and Donation Page

What amount of CO2 storage in natural ecosystems would you like to support for the current year?

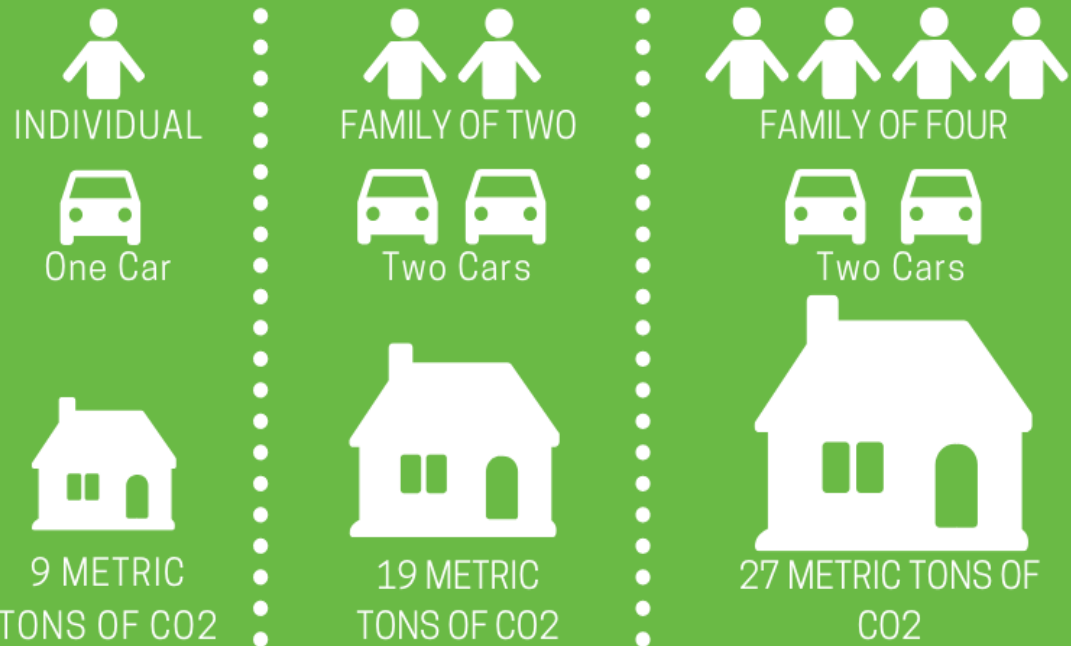
I'd like to support 0 metric tons of CO2 storage.

Your gift of **\$0.00** will support the equivalent of **0** metric tons of CO2 storage. If you still need to calculate your carbon footprint you can find our recommended calculators [here](#).

Next

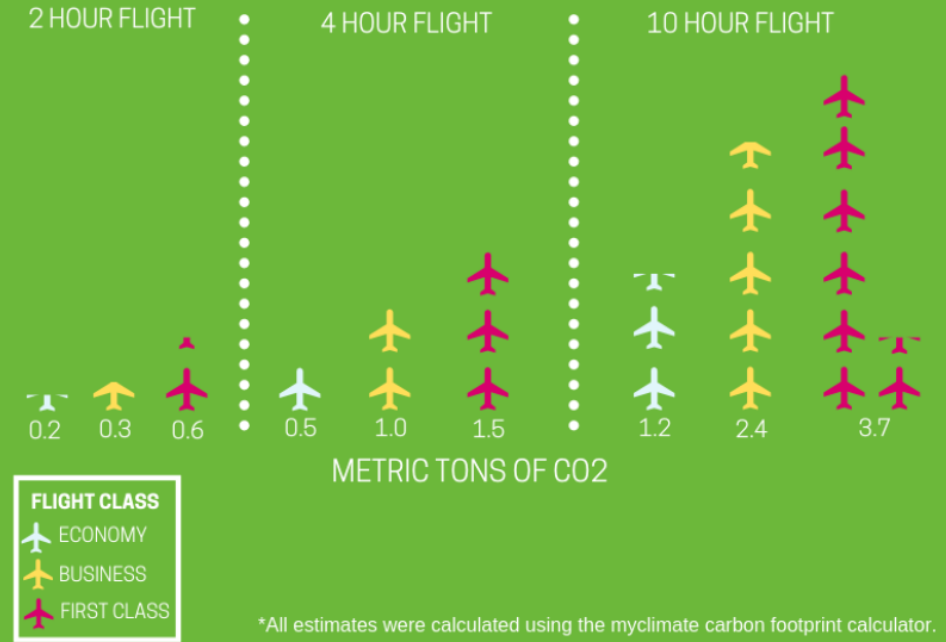


AVERAGE ANNUAL HOUSEHOLD CARBON FOOTPRINTS FOR HOUSTON FAMILIES



*These estimates were calculated for families living in Houston, Texas with average electricity and fuel usage values provided by the EPA and using the EPA's carbon footprint calculator.

CARBON FOOTPRINT ESTIMATES FOR INDIVIDUALS BY FLIGHT CLASS AND DURATION



Carbon Footprint Information on the TCX Website

<https://www.texascoastalexchange.org/>

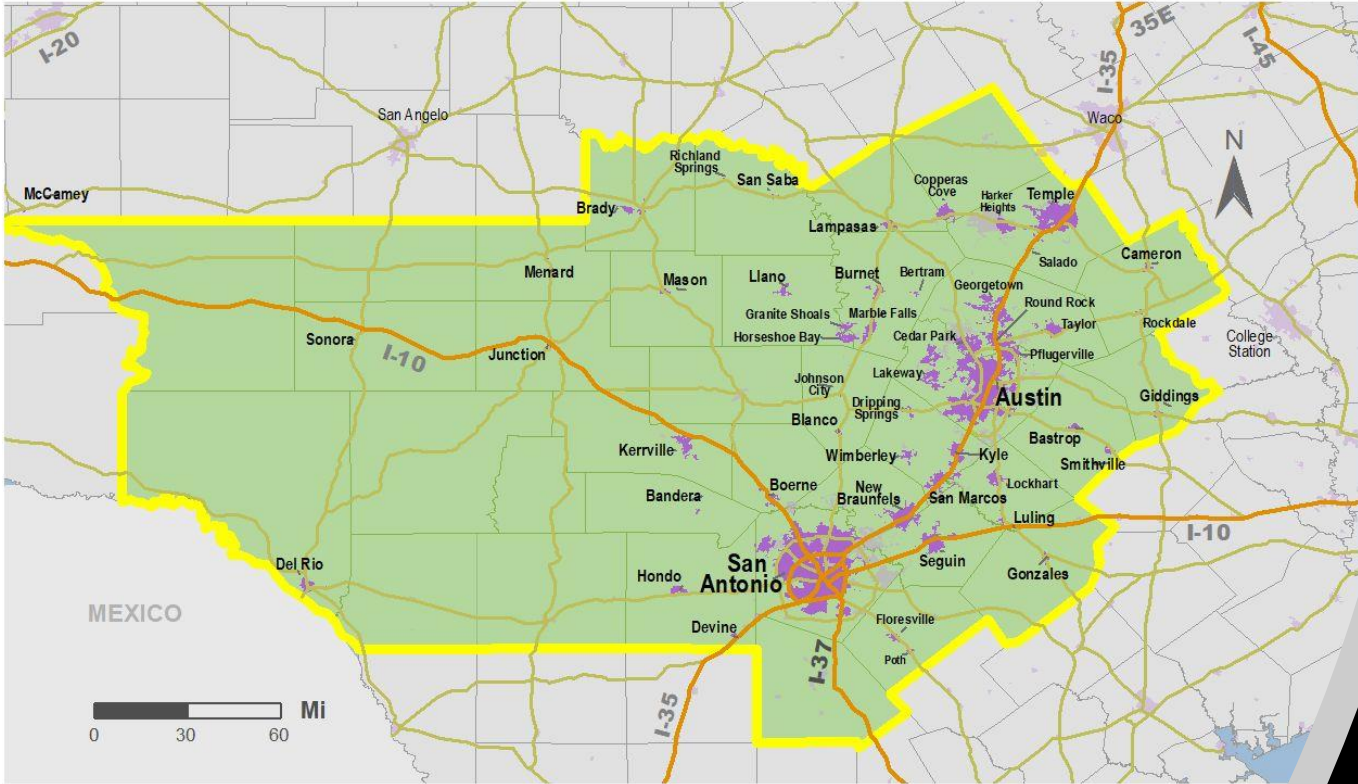
Current Donors

- Kirksey Architects
- 772 Metric Tons
- \$13,896 To TCX @ \$18/ton

Sprint Waste
5,000 Metric Tons
\$100,000 Donation



60 Individuals

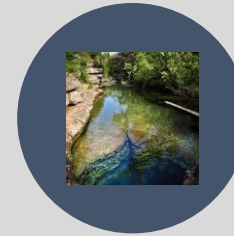


What About a
Texas Hill Country
Exchange
(TXHCX)?

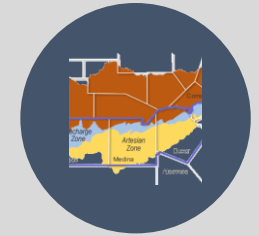
Services That Could Be Traded in the Hill Country



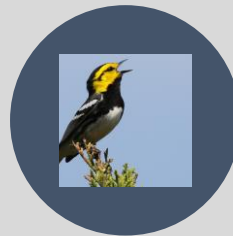
CARBON STORAGE



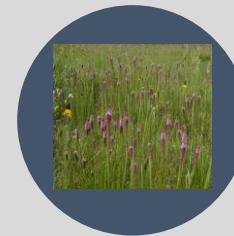
SPRINGS PROTECTION



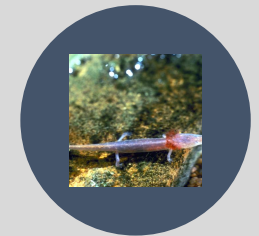
RECHARGE
PROTECTION



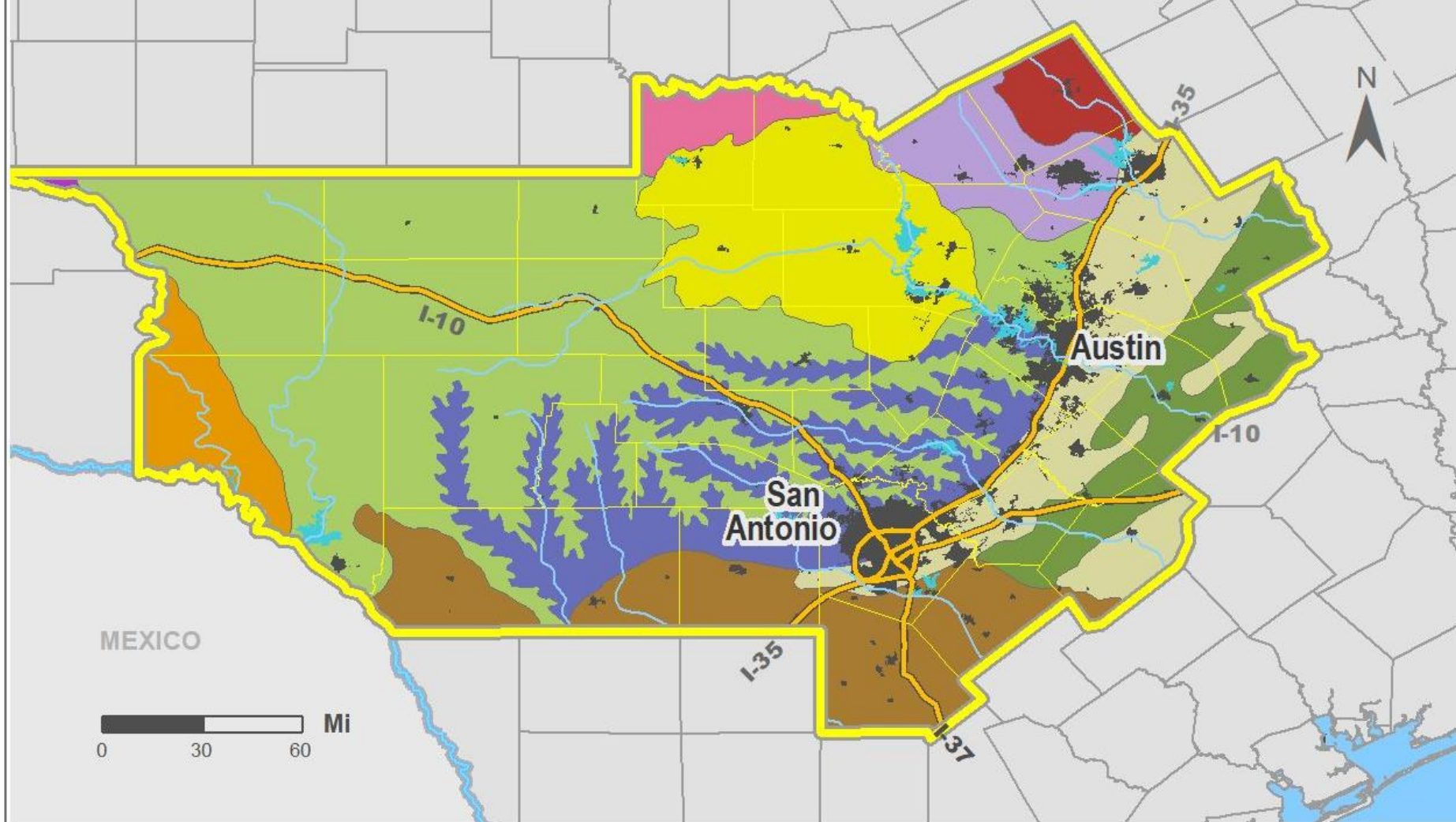
ENDANGERED SPECIES
PROTECTION



STORM WATER
RUNOFF PROTECTION

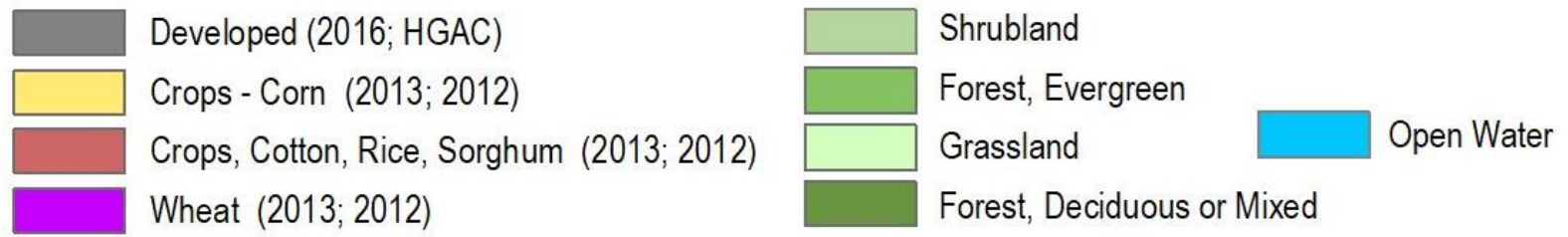
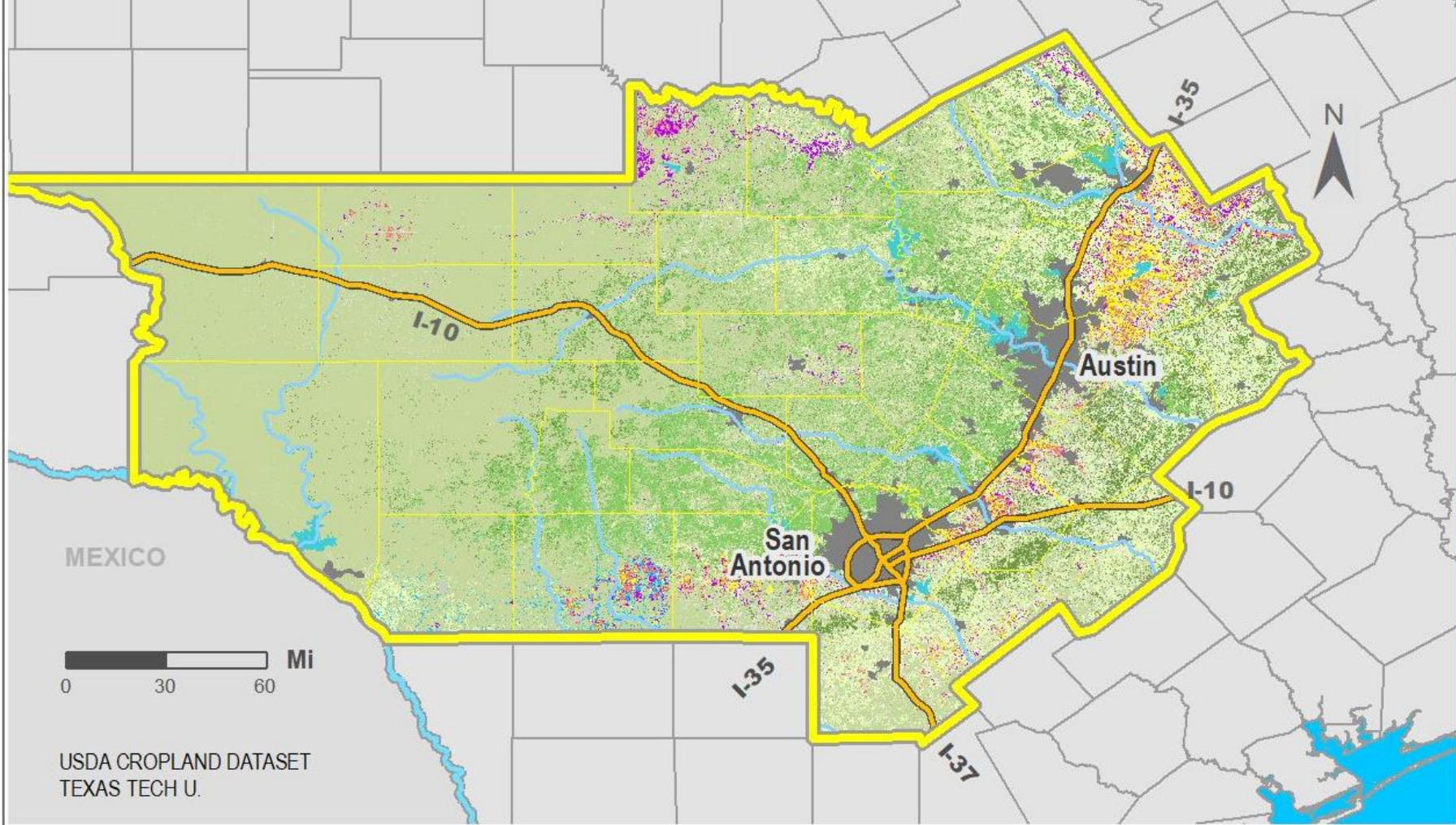


ENDANGERED SPECIES
PROTECTION



- | | | | |
|--|--|--|--|
|  balcones canyonlands |  grand prairie |  mesquite plains |  Water features |
|  blackland prairie |  lampasas cut plain |  oak woodlands | |
|  brush country |  live oak-mesquite savanna |  stockton plateau | |
|  desert scrub |  llano uplift | | |

TEXAS NATURAL REGIONS (HGAC)



SOURCE: Cropland data: Texas Tech University, Center for Geospatial Technology; based on data from United States Department of Agriculture National Agricultural Statistics Service. Developed areas: HGAC, 2016. Cadastral boundaries: US Census TIGER files. Interstates: Texas Tech University.

TEXAS STATEWIDE ASSESSMENT OF FOREST ECOSYSTEM SERVICES

A comprehensive analysis of regulating
and cultural services provided by Texas' forests



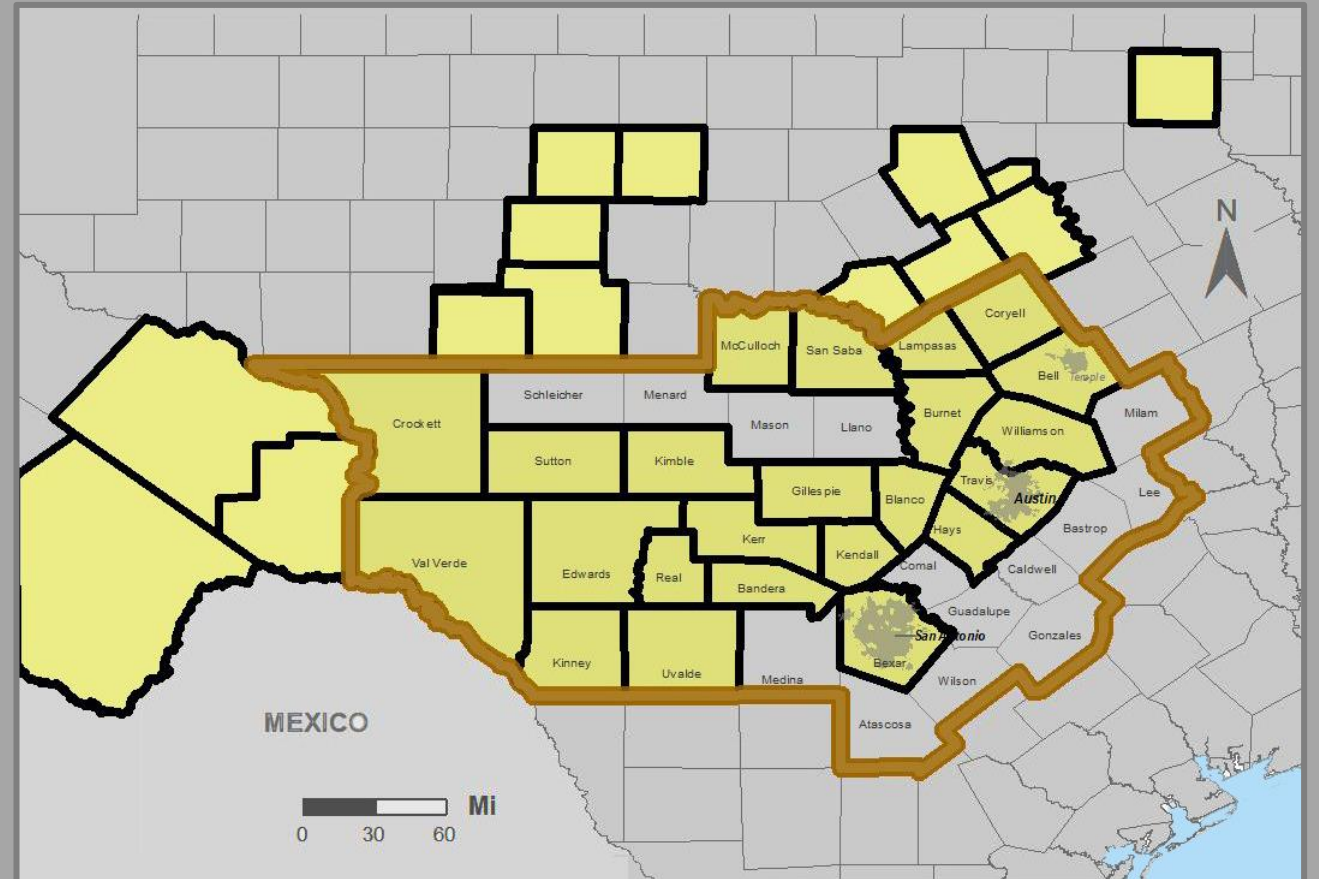
October 2013



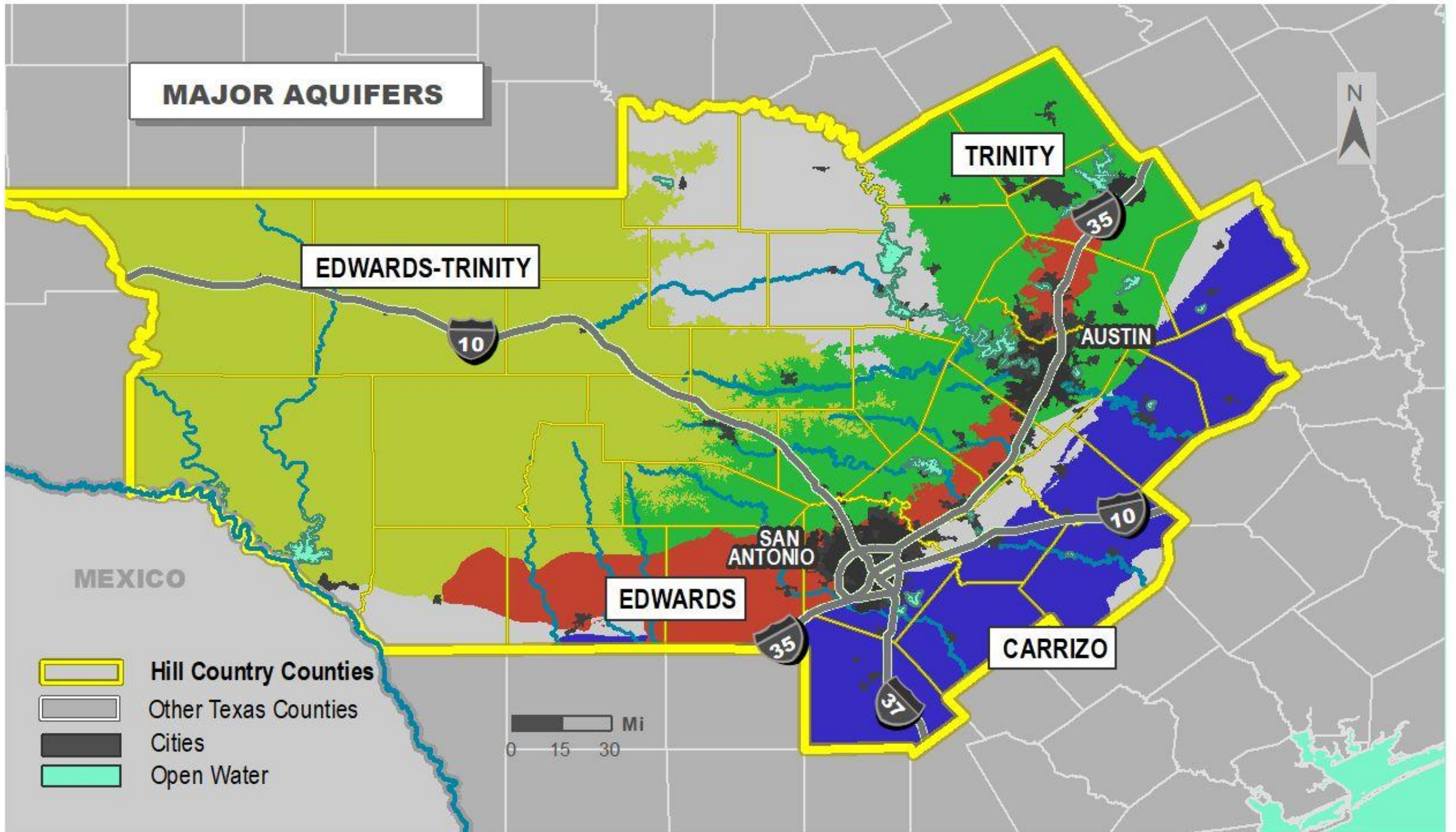
Table 18. Selected annual accumulation rates for total above ground live carbon by forest type.

Forest Type	Ton(US)/ac/yr	Metric tons/ac/yr
Pine Natural	1.43	1.30
Pine Planted	1.21	1.09
Hardwood-Pine	1.12	1.01
Hardwood-Upland	0.98	0.89
Hardwood-Bottomland	1.12	1.01
Hardwood-Riparian	1.21	1.09
Hardwood-Other	0.80	0.73
Juniper	0.94	0.85
Mesquite	0.83	0.75
Other	0.62	0.57

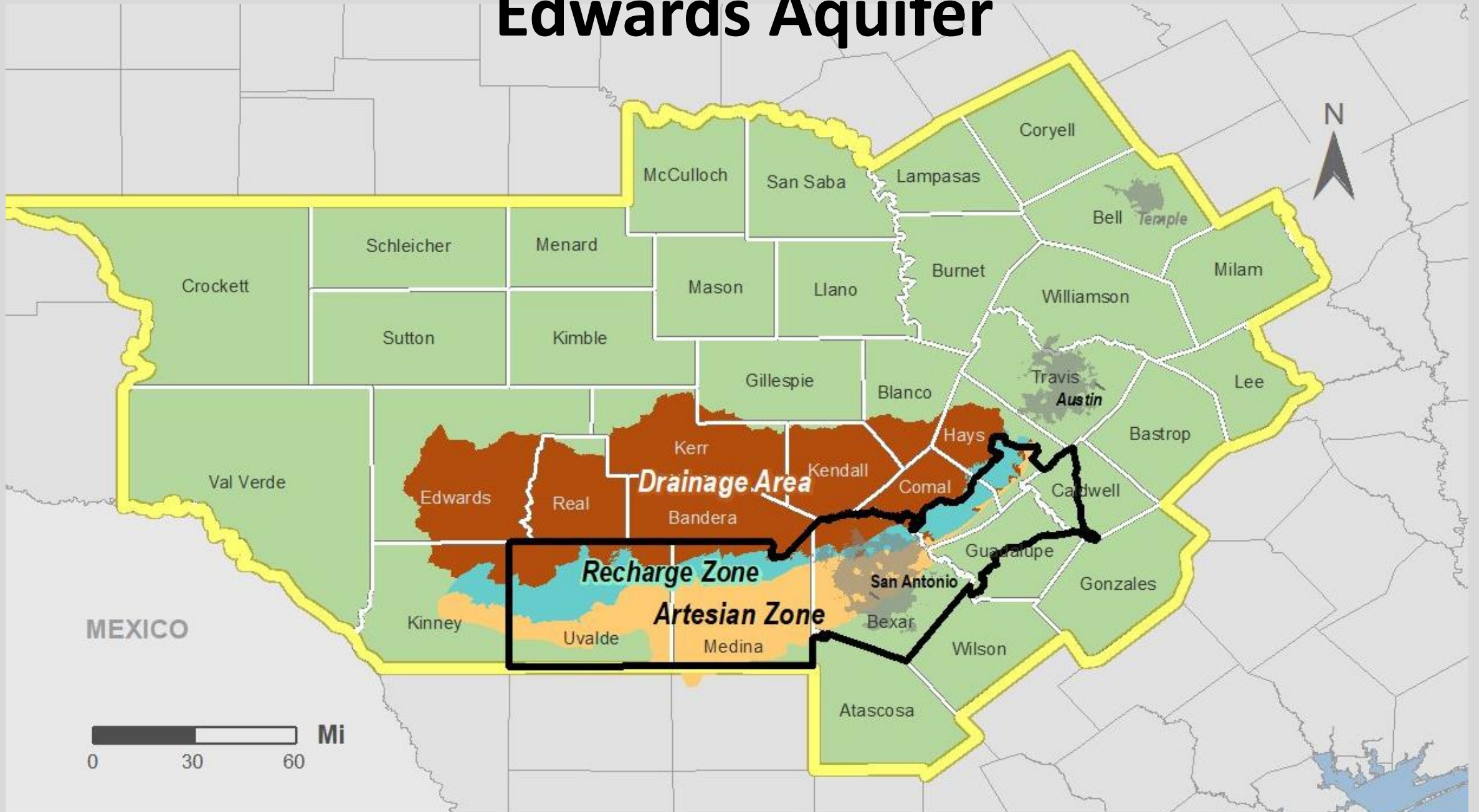
Black Capped Vireo Range

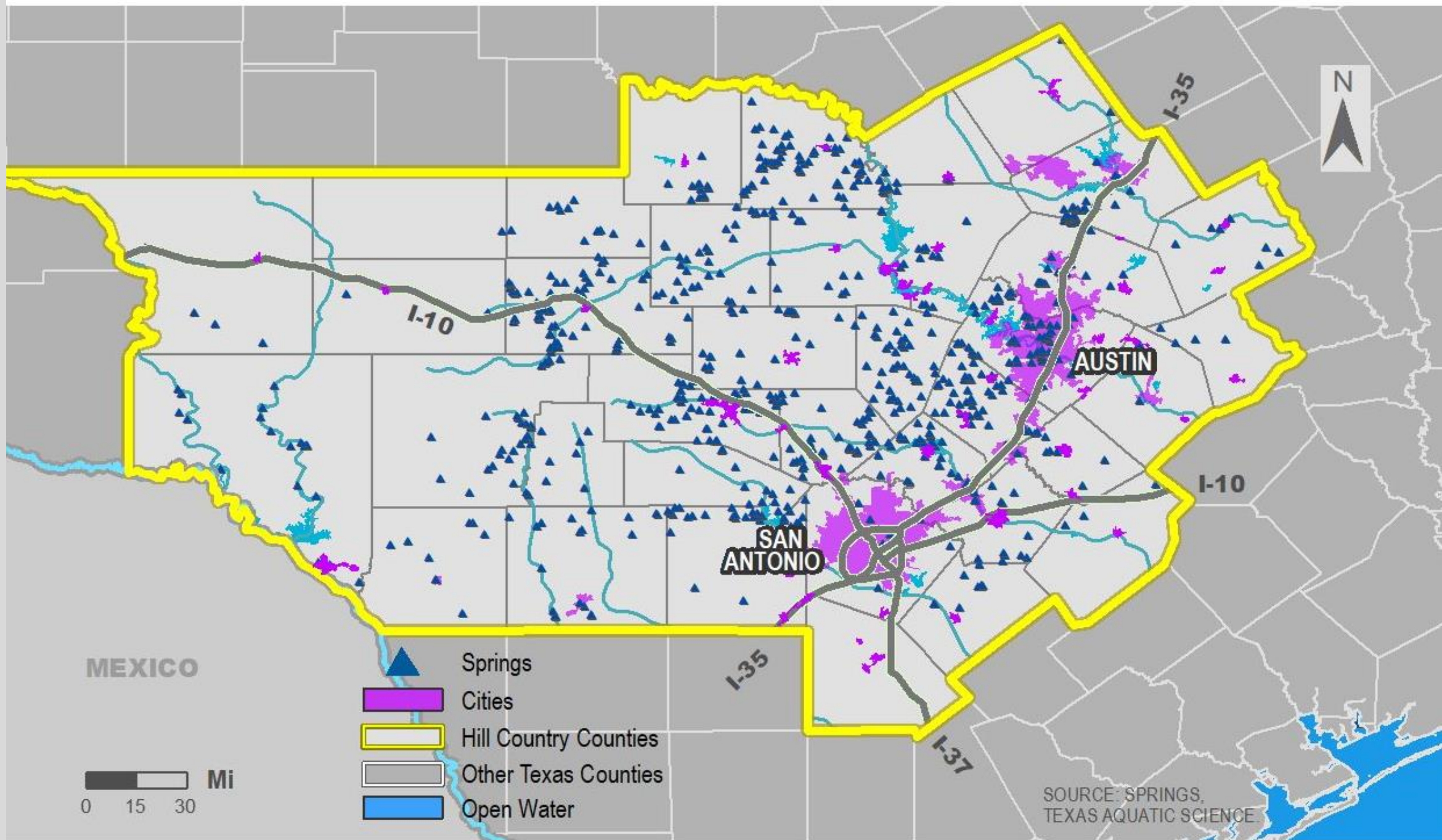


MAJOR AQUIFERS



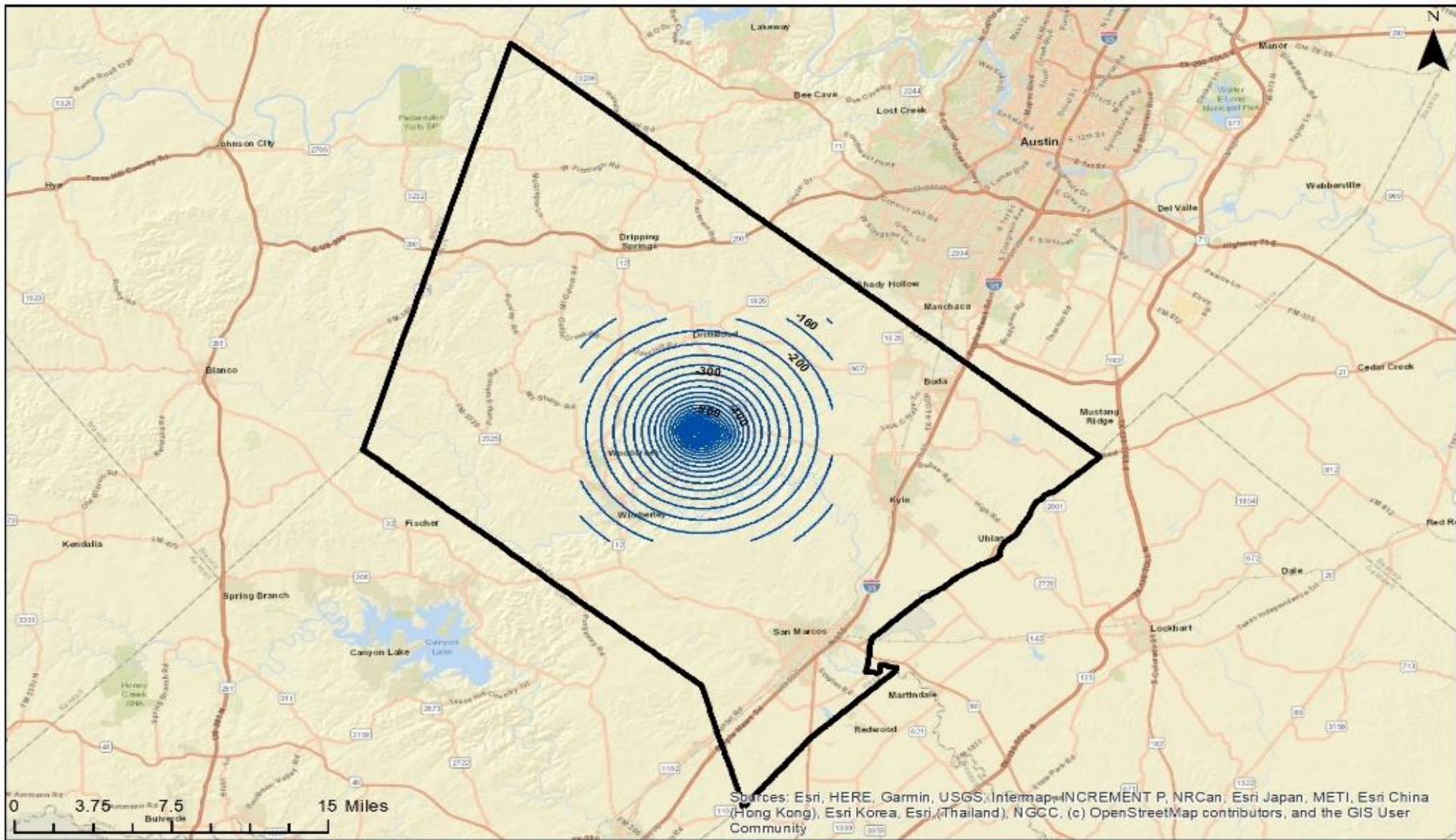
Edwards Aquifer







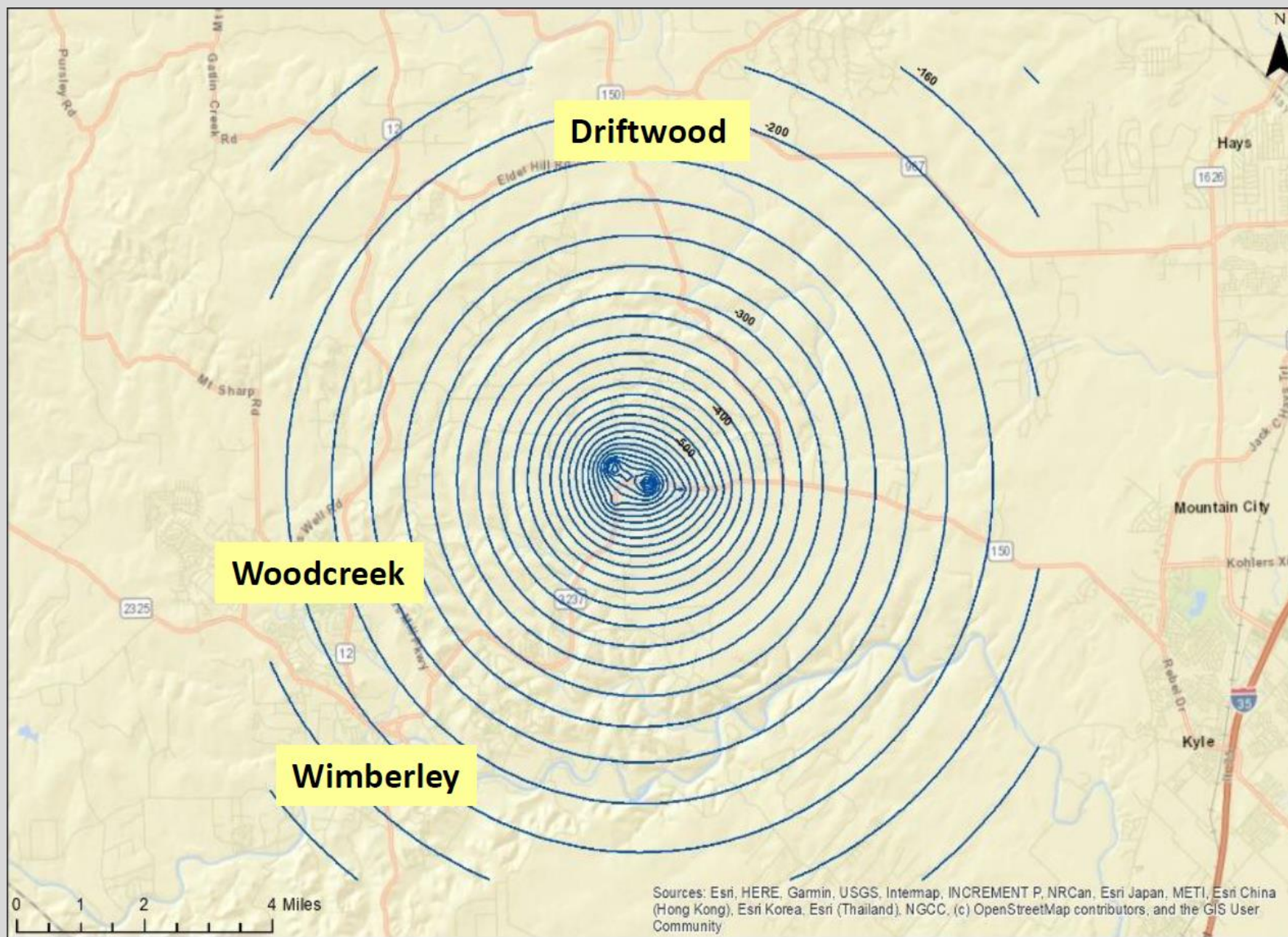
Annual Payment for In
Situ Groundwater Around
Springs Like Jacobs Well



Legend

-  Hays_County
-  CC_Contours_TTIM_30years_20ftContours_5Miles_2.5MGD
-  World Street Map

Cow Creek in respect to Hays County
Pumping Rate: 2.5 MGD
Pumping Time: 30 Years

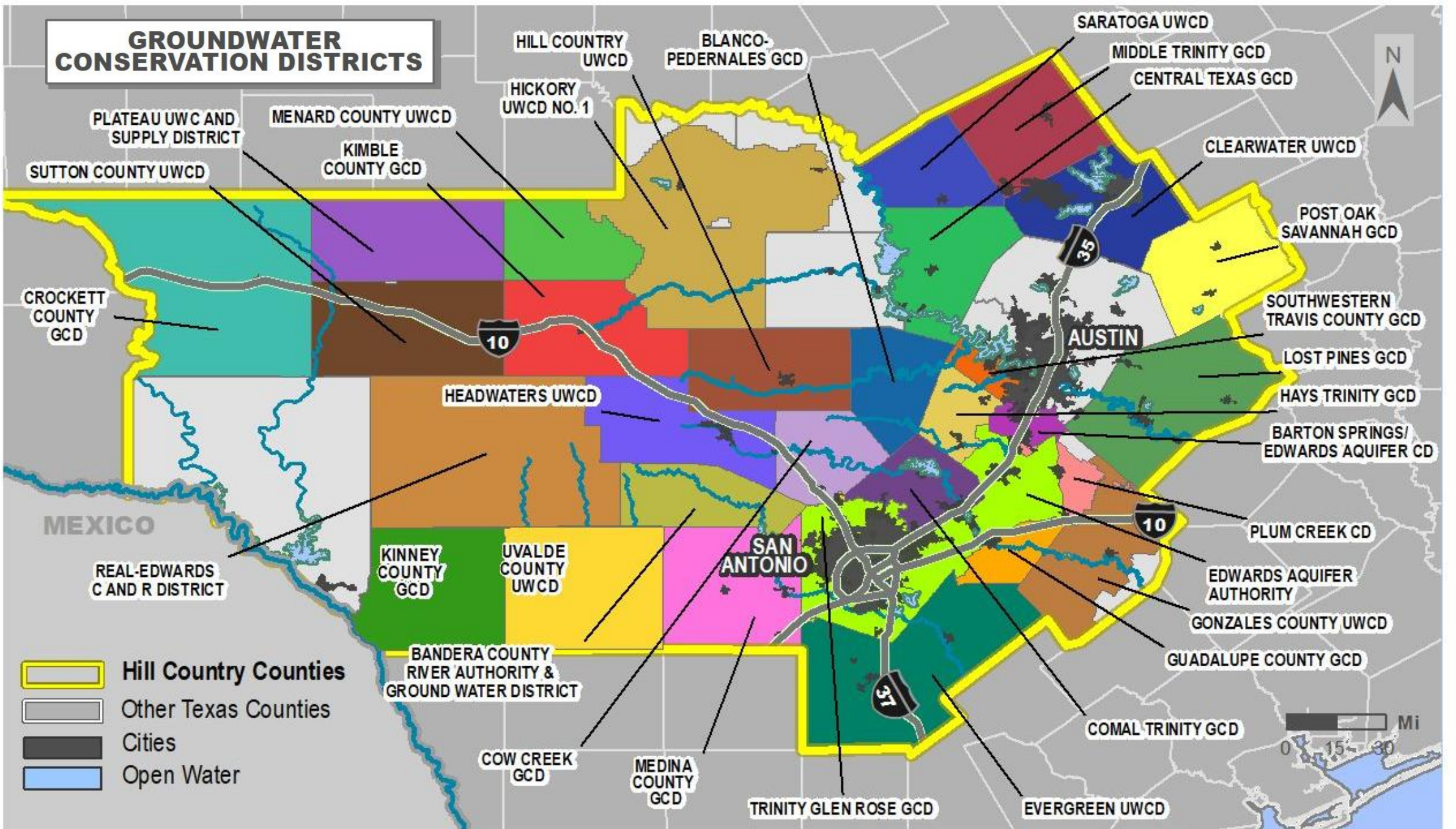


Legend

- CC_Contours_TTIM_30years_20ftContours_5Miles_2.5MGD
- World Street Map

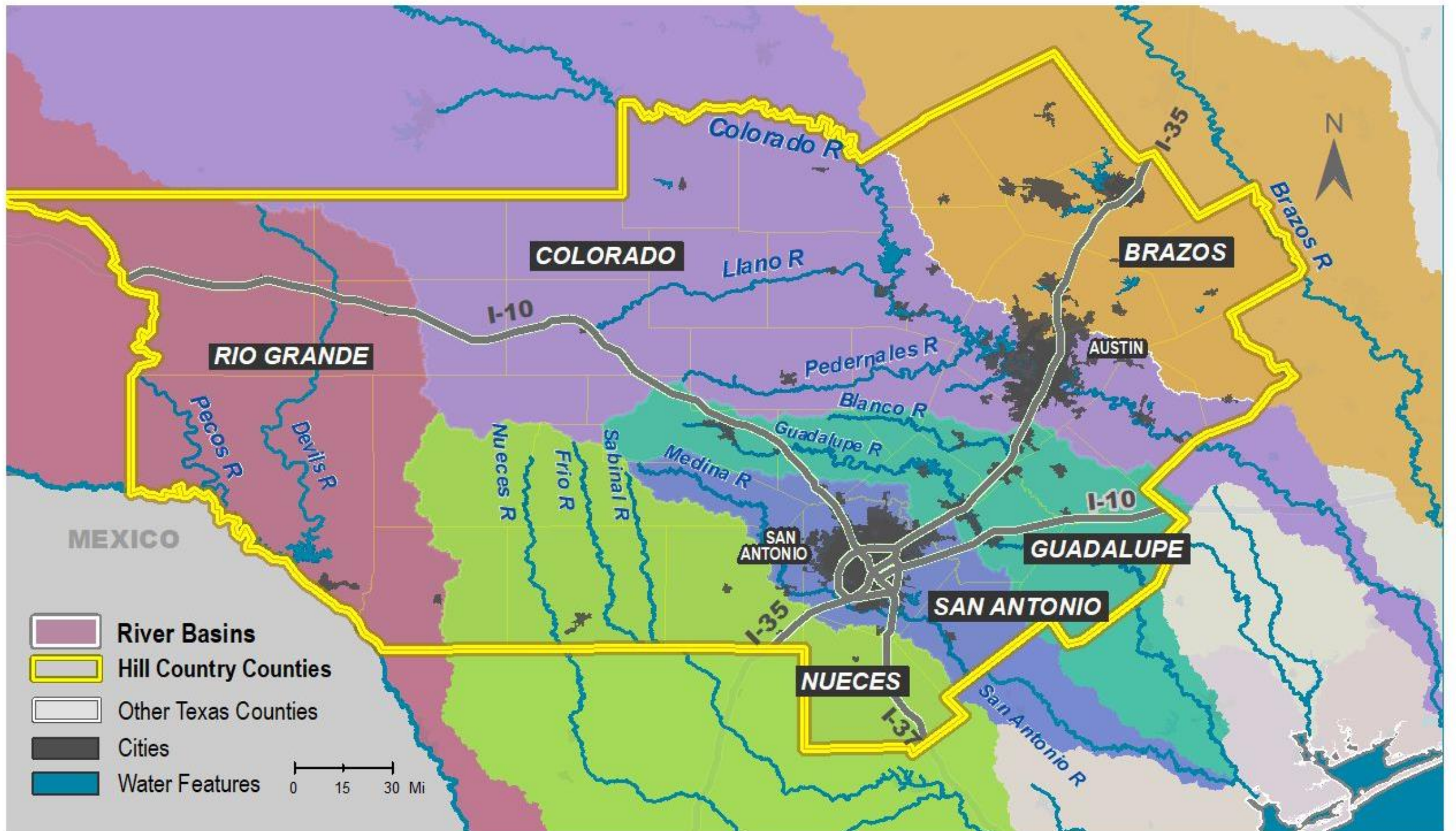
Cow Creek
 Pumping Rate: 2.5 MGD
 Pumping Time: 30 Years

GROUNDWATER CONSERVATION DISTRICTS

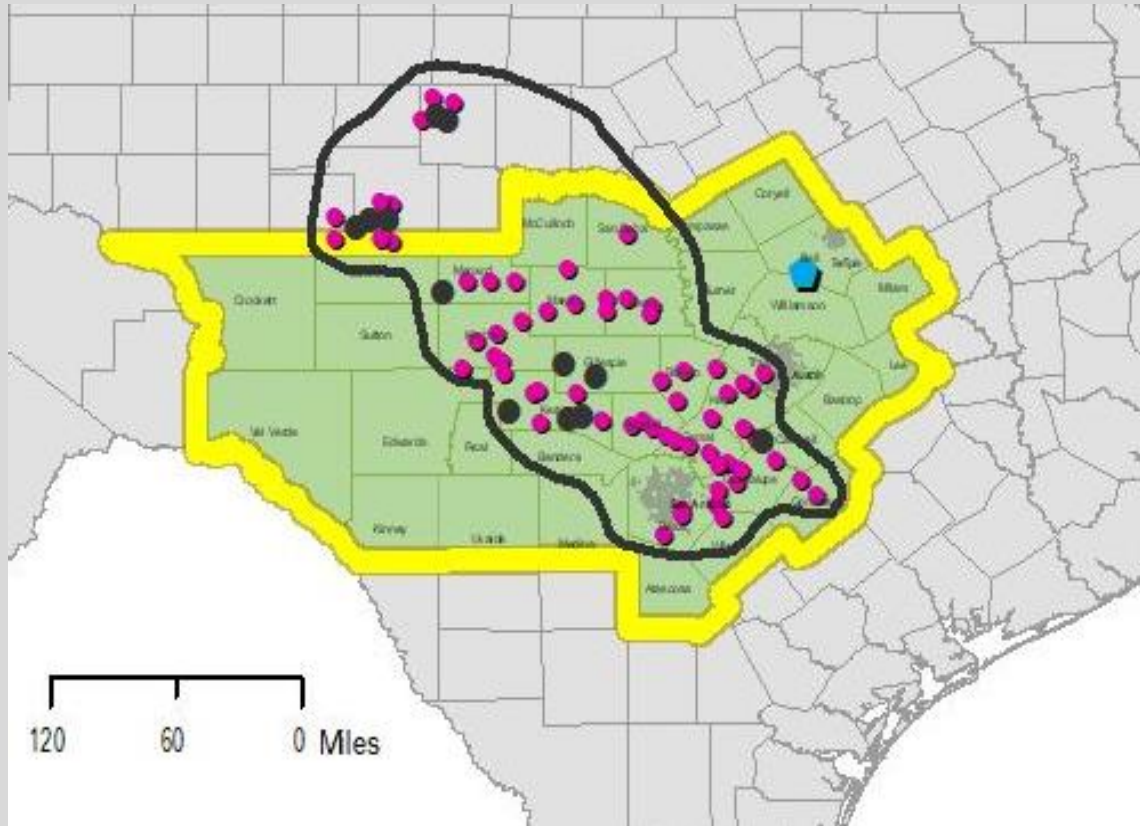


- Hill Country Counties
- Other Texas Counties
- Cities
- Open Water

0 15 30 Mi



Texas Fatmucket



R.G. Howells



Live – Recently dead 1992 - 2009

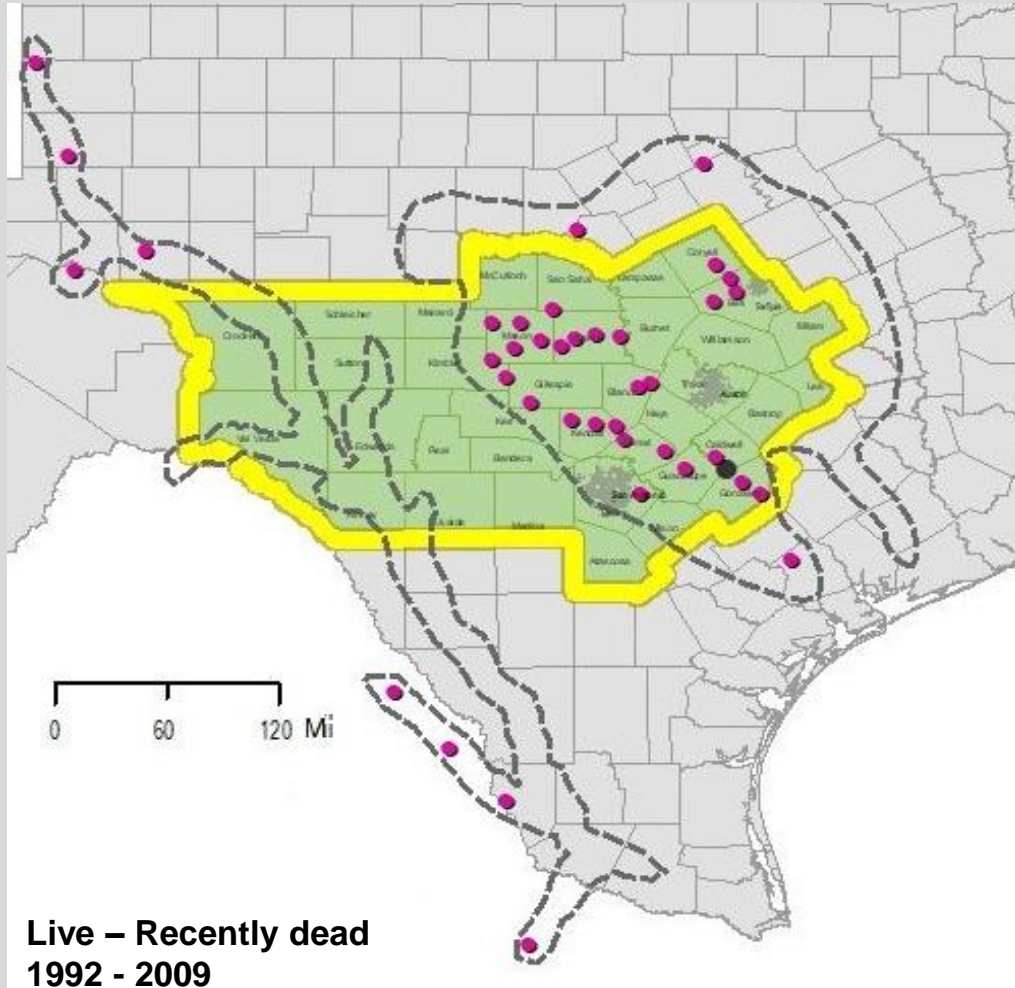


Relatively recently dead – Subfossil 1992 – 2009
& Live – Subfossil < 1992



Questionable Historical Record

False Spike



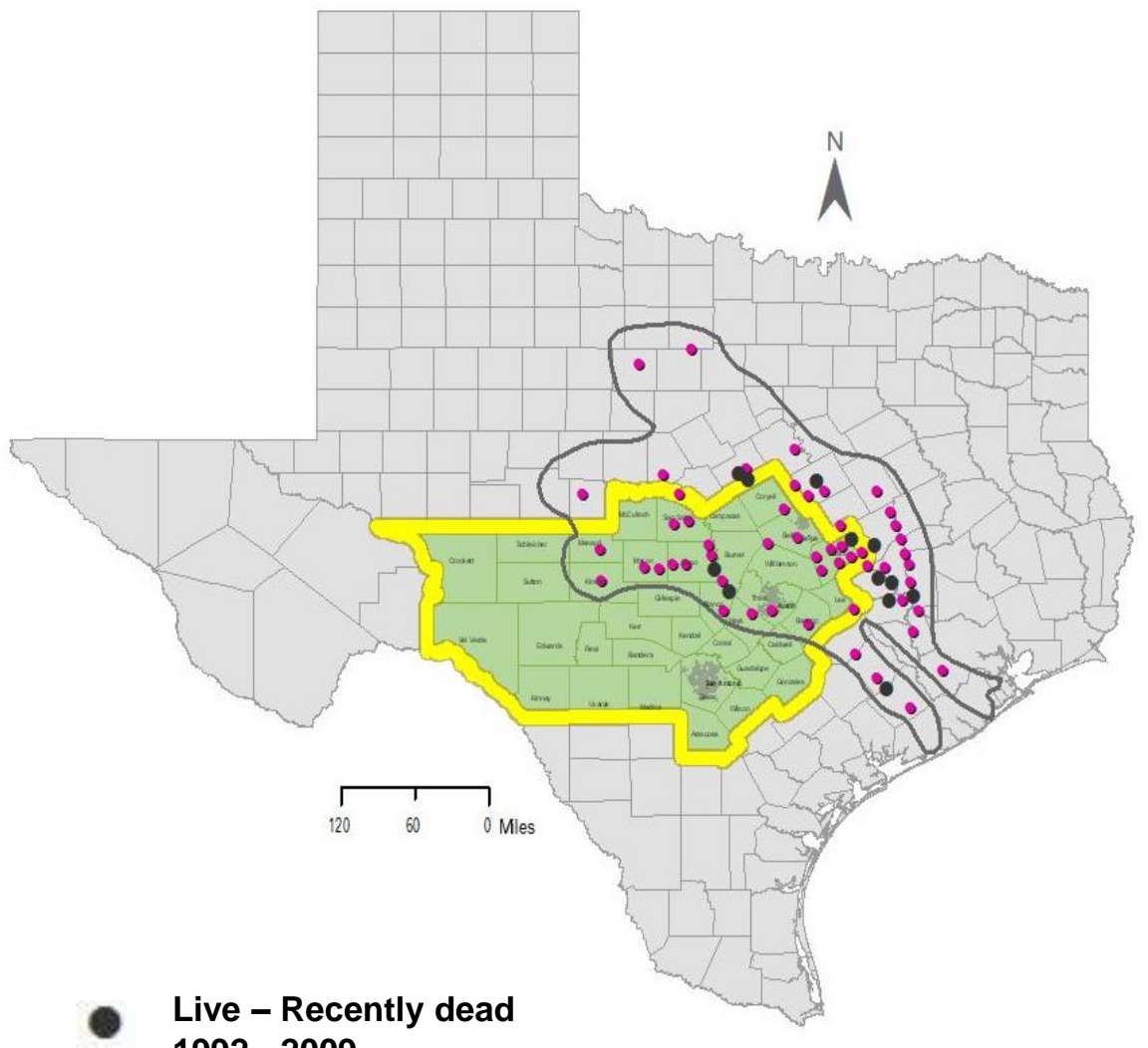
Live – Recently dead
1992 - 2009



Relatively recently dead –
Subfossil 1992 – 2009 & Live – Subfossil < 1992



Smooth Pimpleback

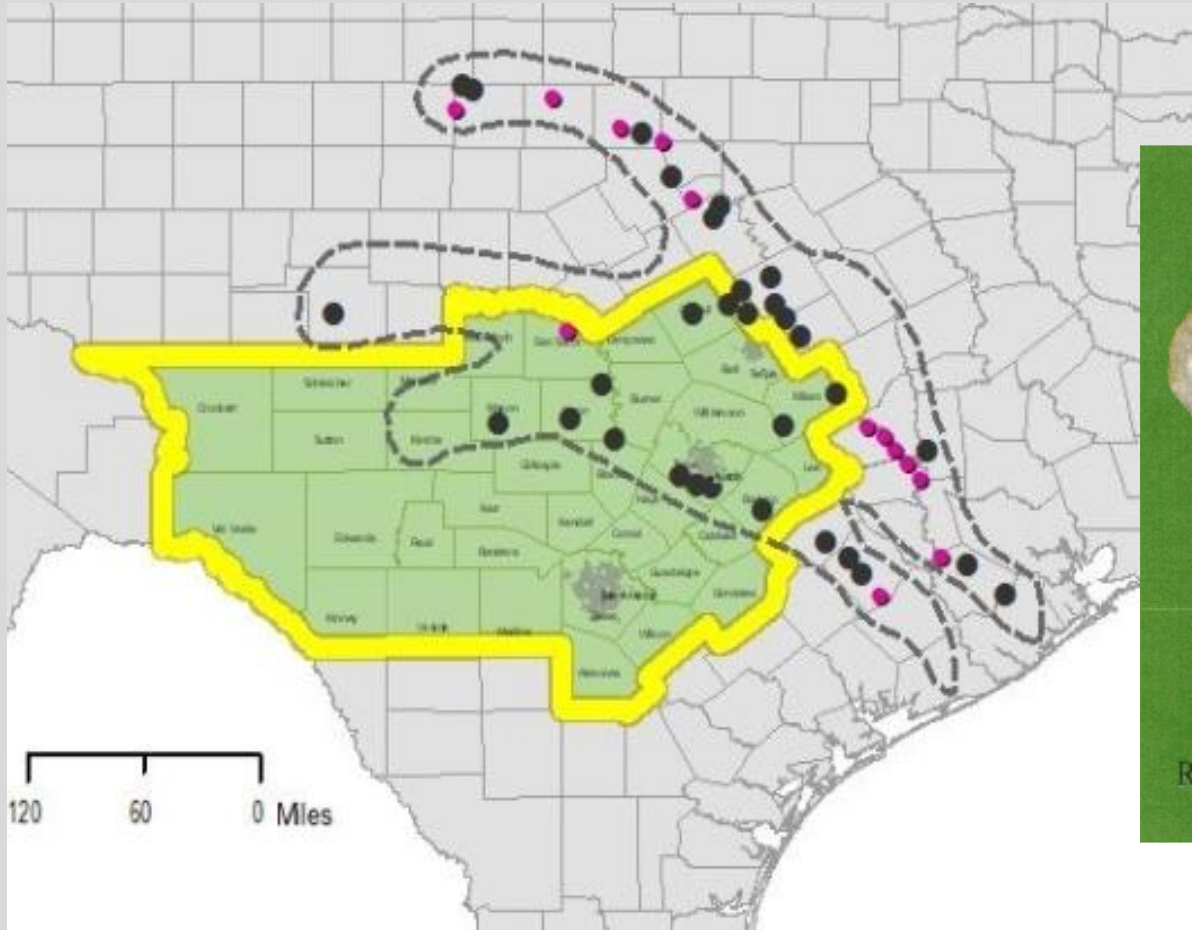


● Live – Recently dead
1992 - 2009

● Relatively recently dead –
Subfossil 1992 – 2009 & Live – Subfossil < 1992



Texas Fawnsfoot

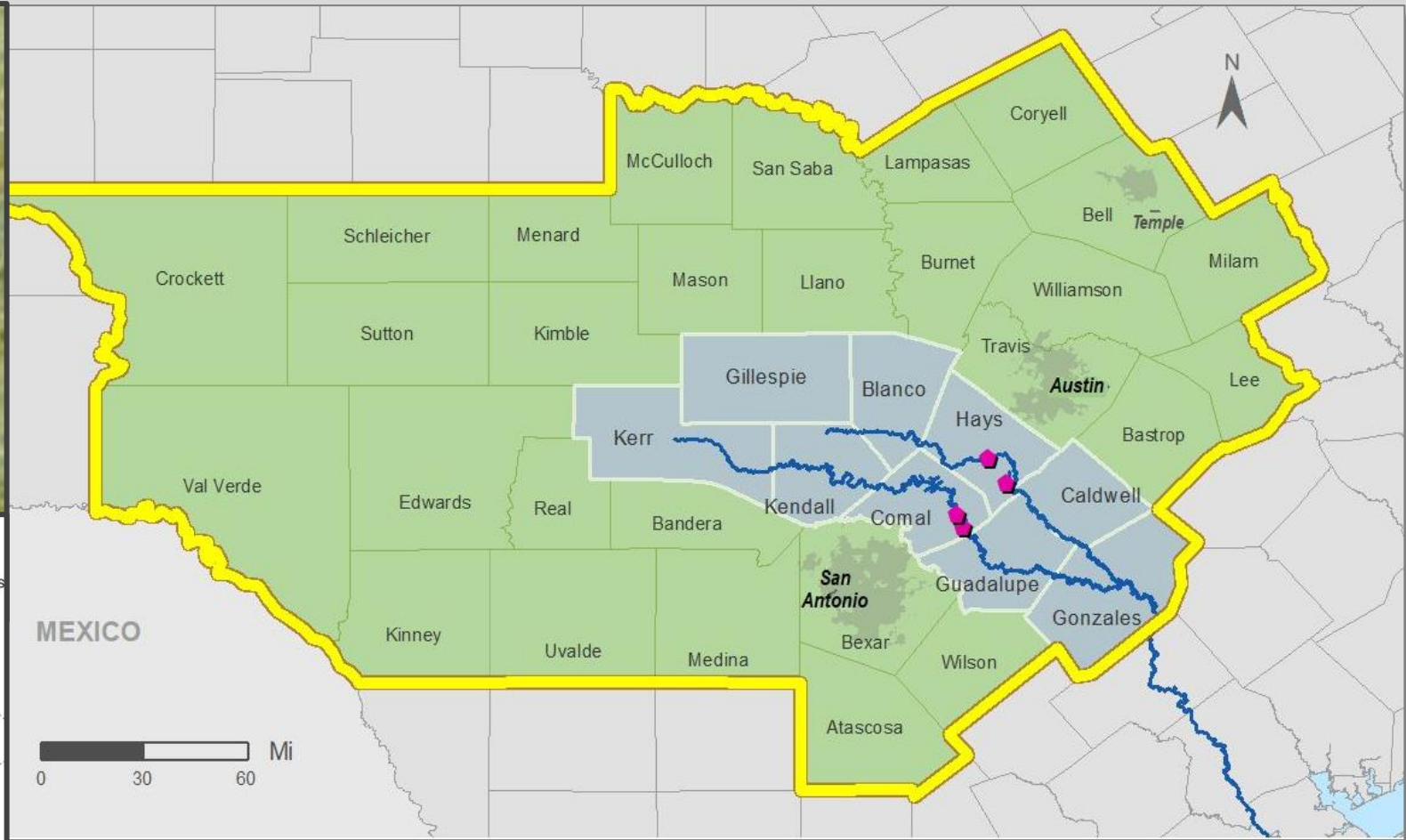
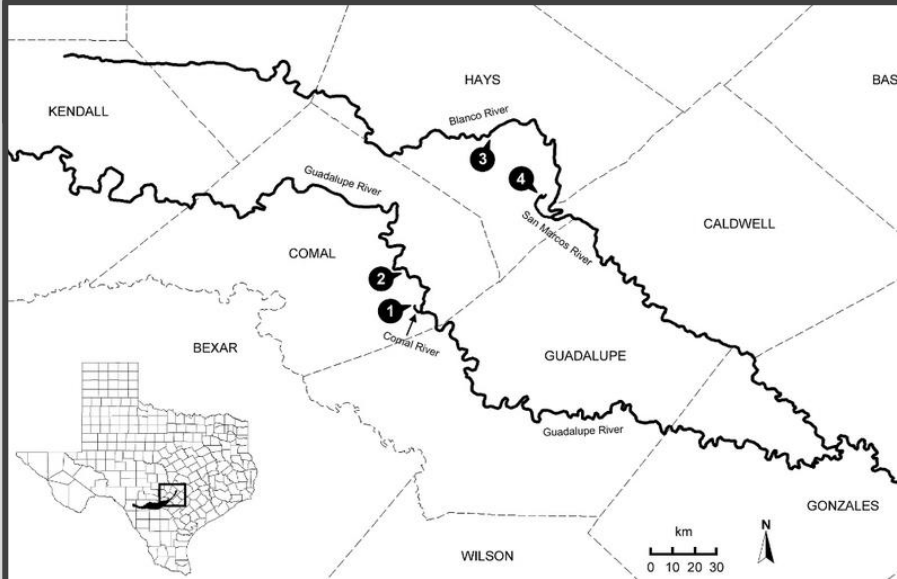


Live – Recently dead
1992 - 2009



Relatively recently dead –
Subfossil 1992 – 2009 & Live – Subfossil < 1992

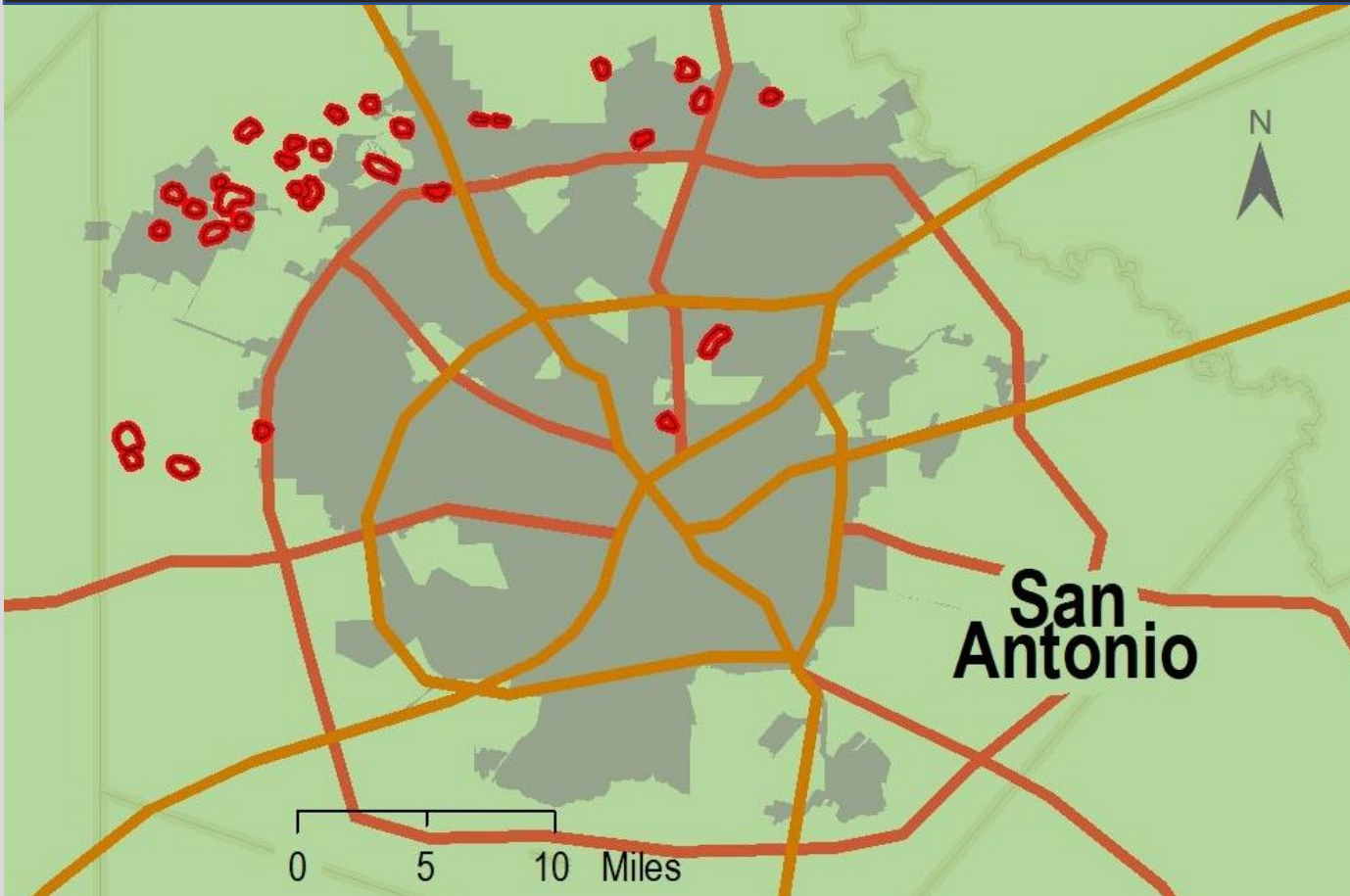
Comal Springs Dryopid Beetle



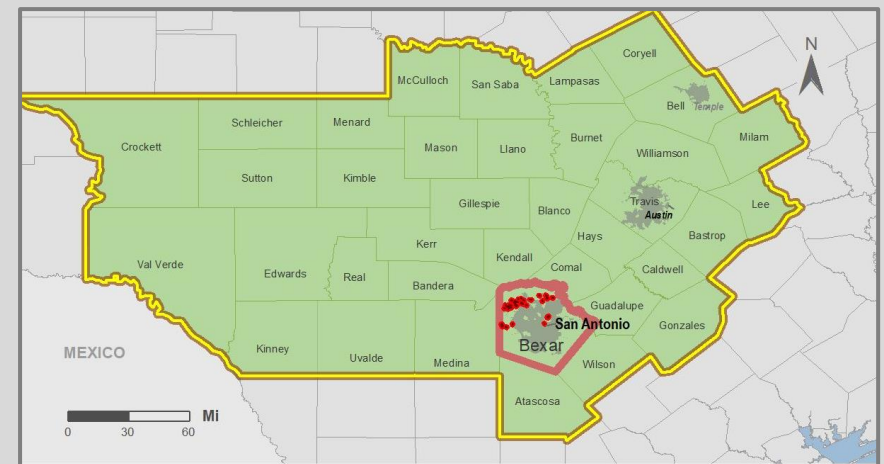
The Comal Springs dryopid beetle was first discovered in 1987 and officially described in 1992 and listed in 1997.

Karst Invertebrates Bexar, Travis and Williamson Counties

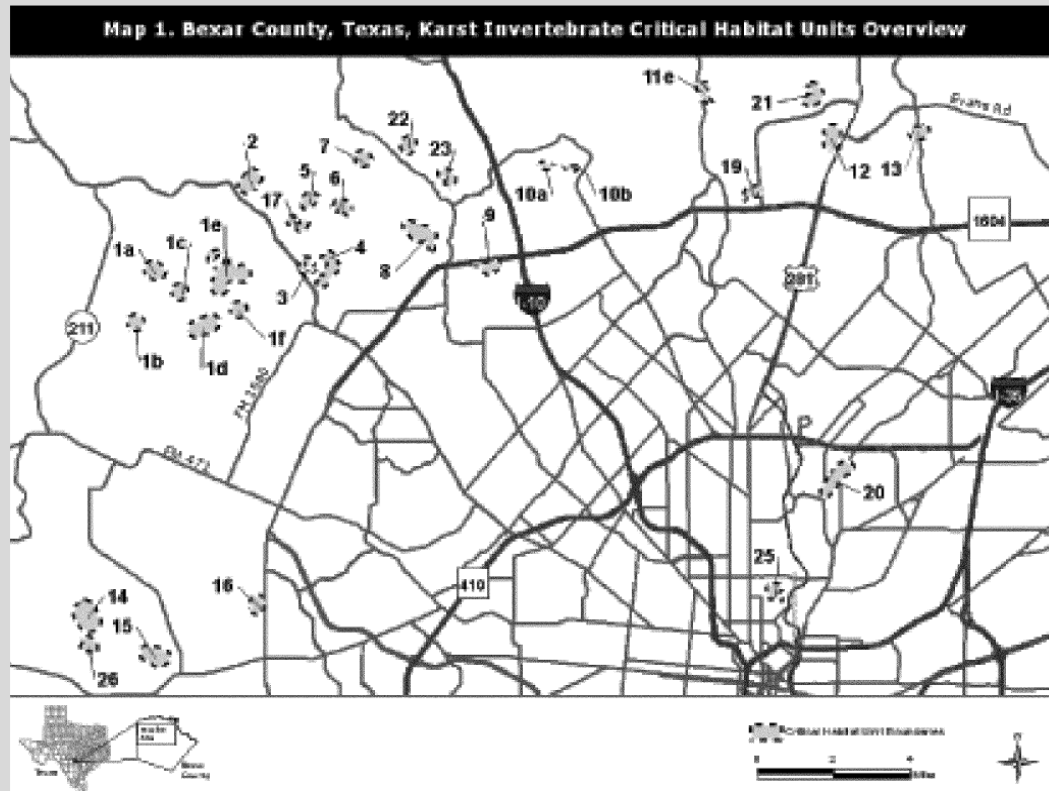
Bexar County, Texas, Karst-Invertebrate Critical Habitat Units Overview



1. The USFWS listed seven karst invertebrates from Travis and Williamson County as endangered in 1994, granting them protection under the Endangered Species Act.
2. Nine additional karst invertebrates from Bexar County were listed as endangered in 2000.
3. Critical Habitat for Bexar County karst invertebrates was designated by the USFWS in 2012.



Karst Invertebrates Bexar, Travis and Williamson Counties

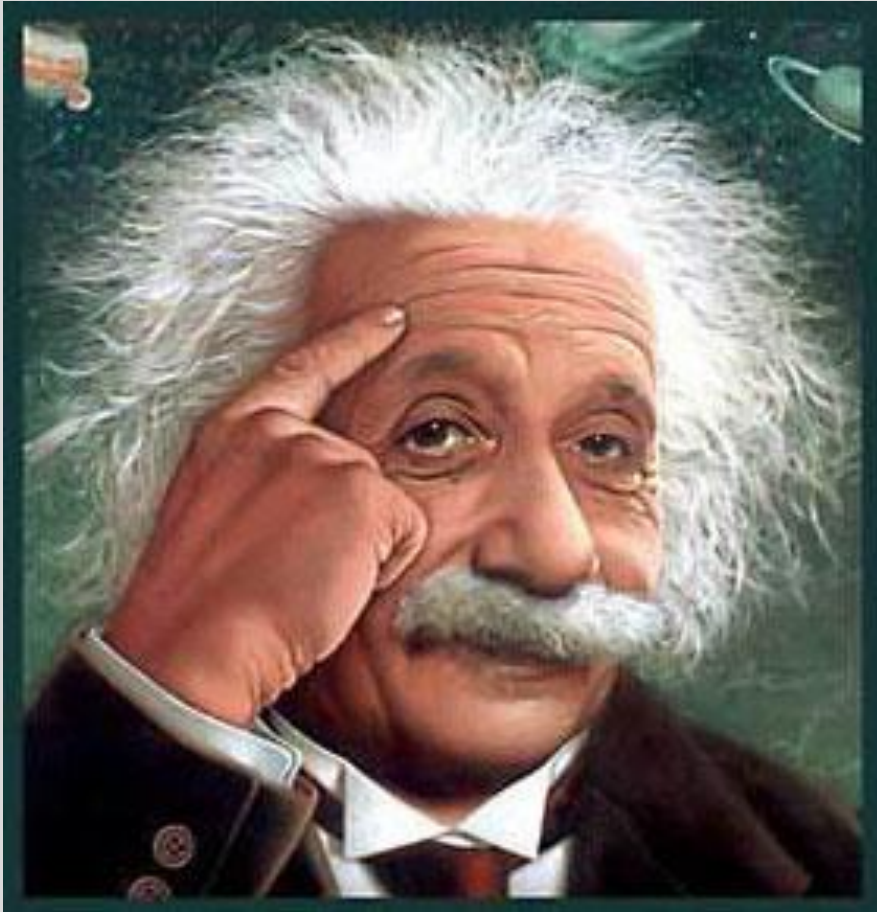


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Will This Be Utilized?

- Key is community acceptance – those of you here today and others getting behind this
- Carbon emitters will use a system with credibility
- This is an ecologically focused approach with the goal of long-term protection of the Texas Hill Country
- Excellent co-benefits for investment
- Carbon is solid – excellent reason for participation
- Springs and Aquifer Recharge Protection solid concepts but less clarity about donors – why would they donate?
- Endangered Species – could work in association with Habitat Conservation Plan
- Stormwater Protection – could work in association with local ordinances

We Need To Do Something Different Than We Have Been Doing



“The world we have created to date as a result of our thinking thus far has problems that cannot be solved by thinking the way we were thinking when we created them.”