

STATE OF THE HILL COUNTRY

Eight Conservation and Growth Metrics for a Region at a Crossroads

texas hill country
conservation network



ACKNOWLEDGEMENTS

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COMMUNITY

Metric 1: Unincorporated Population

LAND

Metric 3: Developed Land

WATER

Metric 5: Water Consumption

NIGHT SKY

Metric 7: Dark Skies for Stargazing

LAND

Metric 2: Conserved Land

WATER

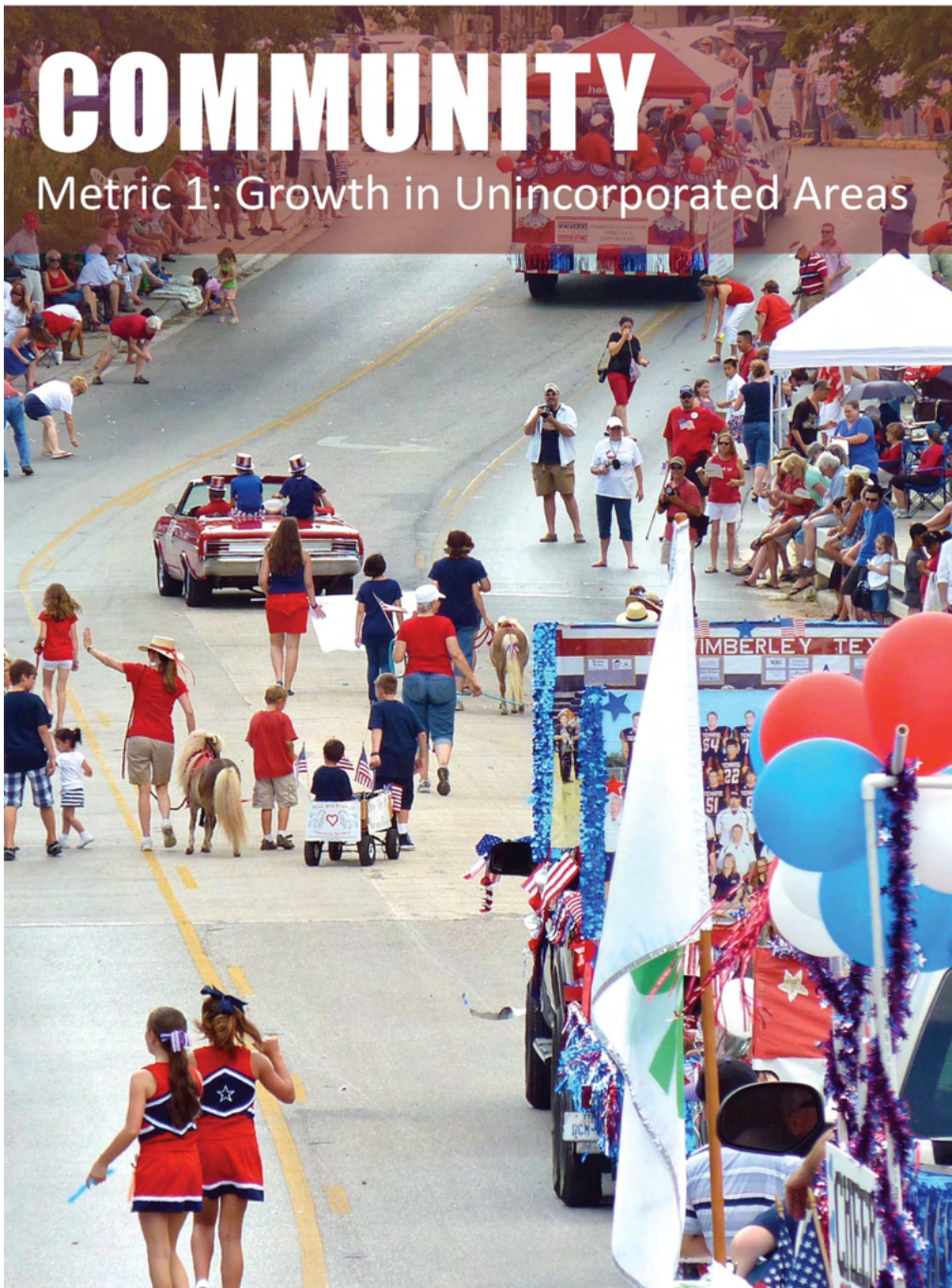
Metric 4: Pristine Streams

WATER

Metric 6: Spring Flow

INVESTMENT

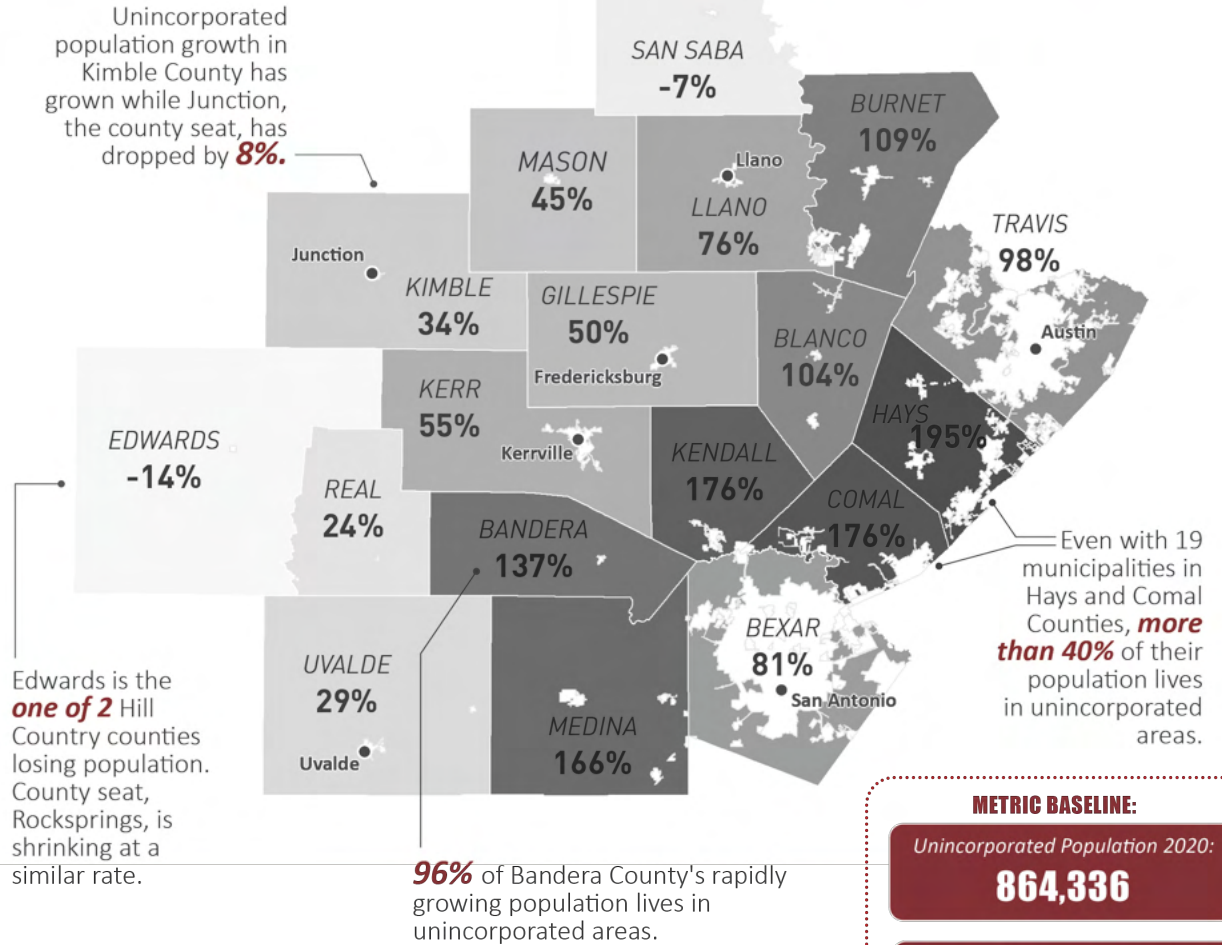
Metric 8: Public Investment
in Land Conservation



POPULATION GROWTH IN UNINCORPORATED AREAS, 1990 - 2020

0 20 mi.

The Hill Country population in unincorporated areas has grown by **103%** since 1990. **Darker shades** indicate faster growth rates by county.



METRIC BASELINE:

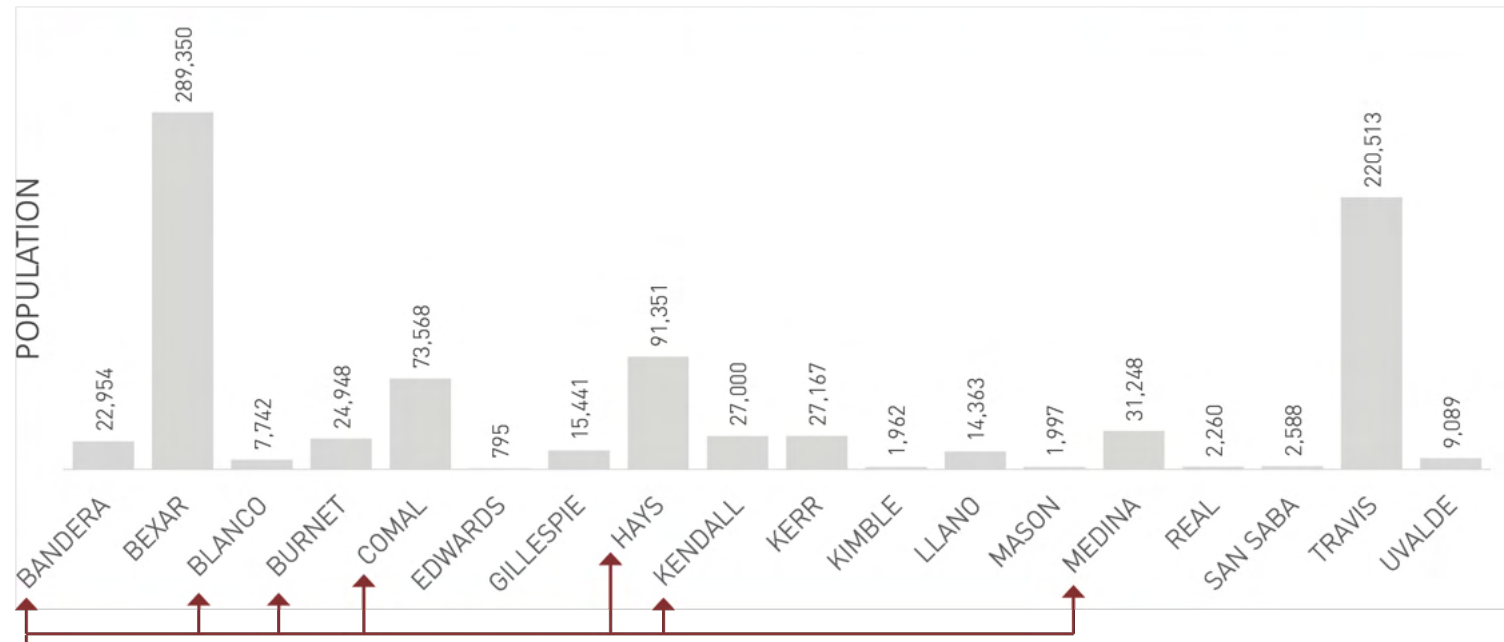
Unincorporated Population 2020:

864,336

30 year Unincorporated Population Change 1990-2020:

103%

POPULATION IN UNINCORPORATED AREAS, BY COUNTY, 2020



Bandera, Blanco, Burnet, Comal, Hays, Kendall and Medina counties have experienced the fastest growth in the Hill Country, with little support.



LAND

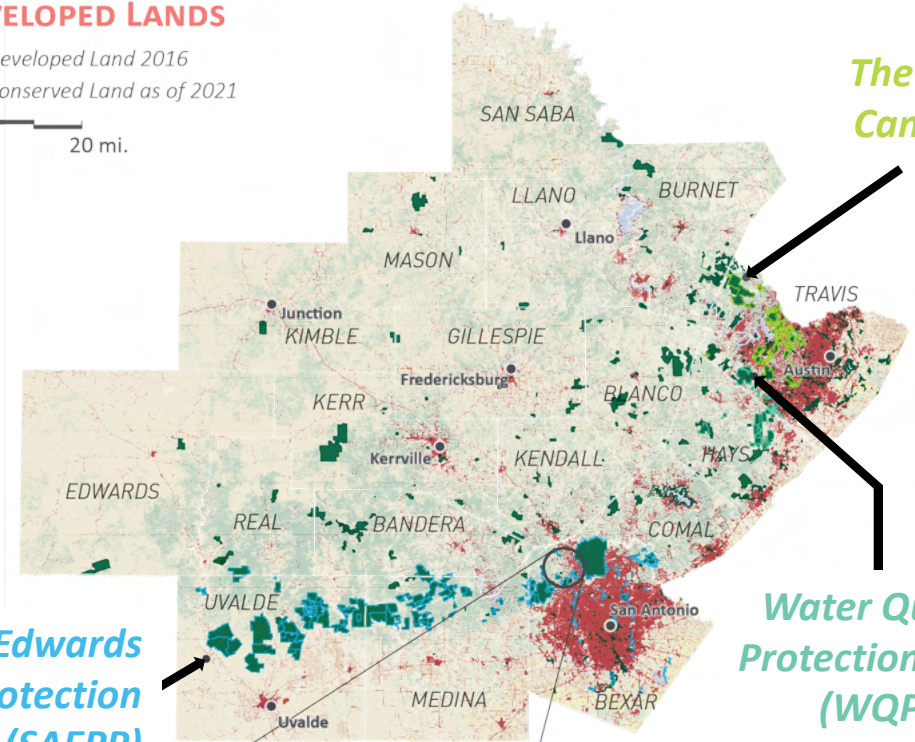
Metric 2: Conserved Lands
Metric 3: Developed Lands



CONSERVED LANDS VS. DEVELOPED LANDS

Developed Land 2016
Conserved Land as of 2021

0 20 mi.



*The Balcones
Canyonlands
Preserve
(BCP)*

*Water Quality
Protection Lands
(WQPL)*

*San Antonio Edwards
Aquifer Protection
Program (SAEPP)*



METRIC BASELINE:

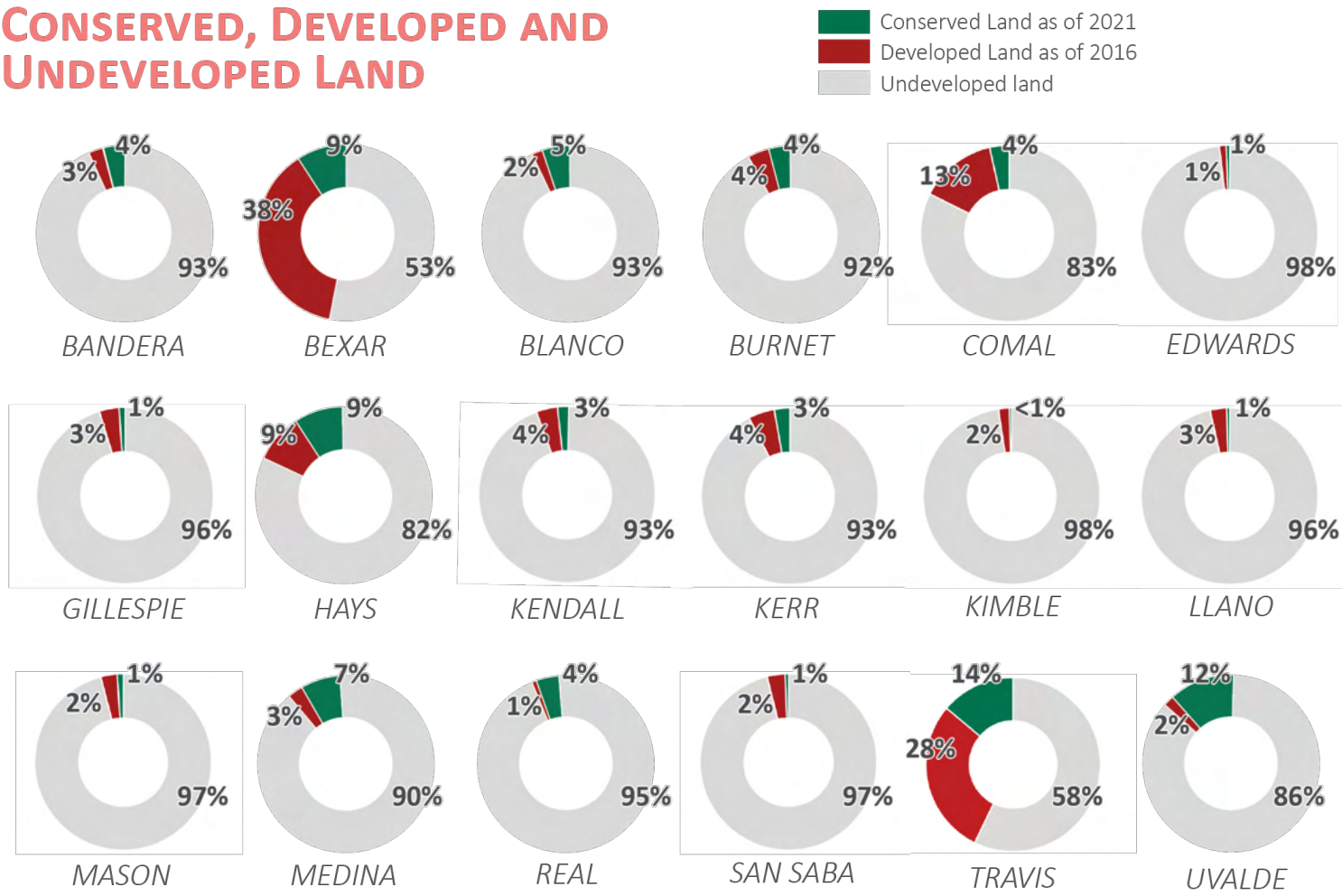
Conserved Land
Acres 2021:

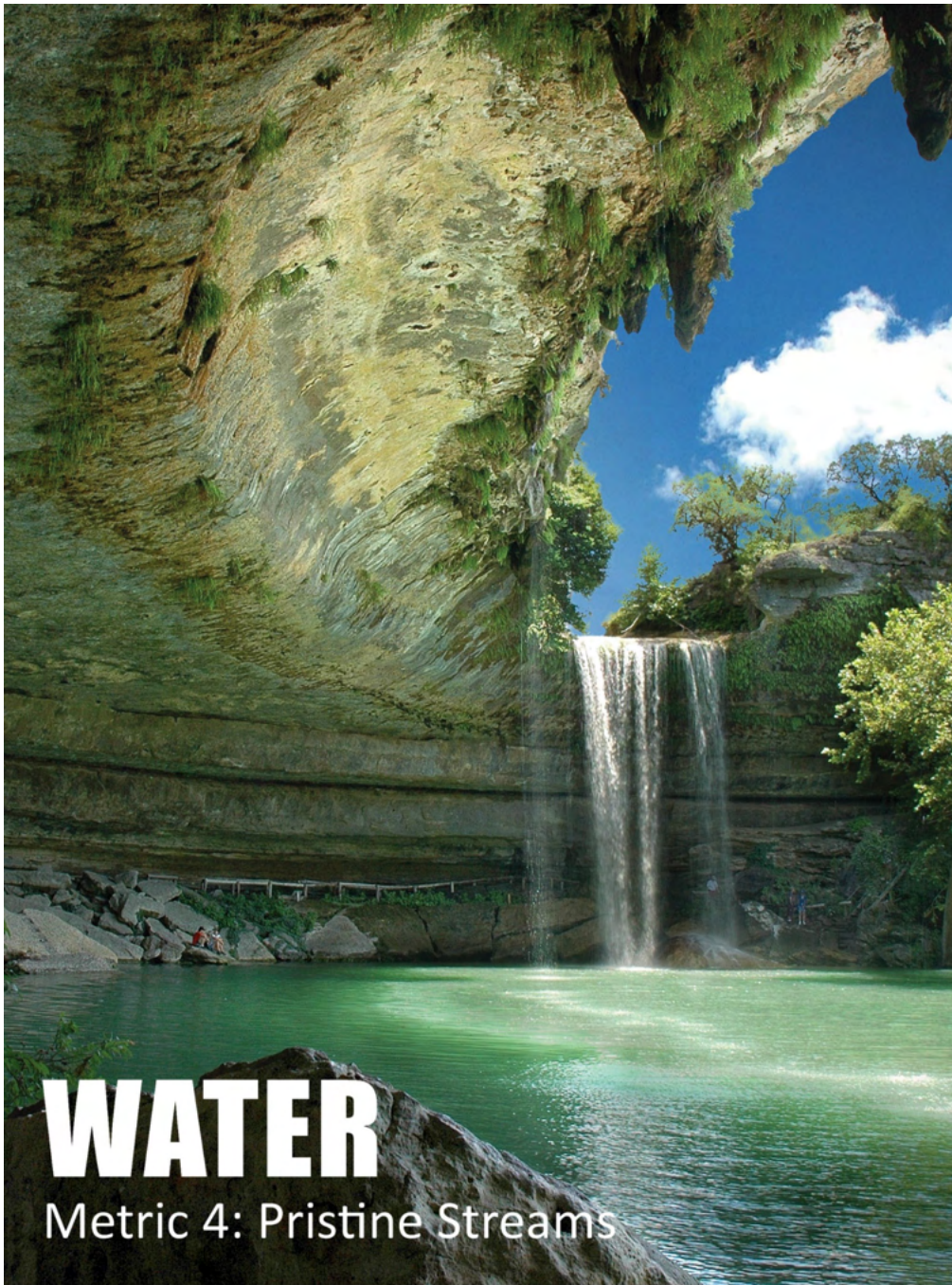
546,301

Developed Land
Acres 2016:

828,066

CONSERVED, DEVELOPED AND UNDEVELOPED LAND



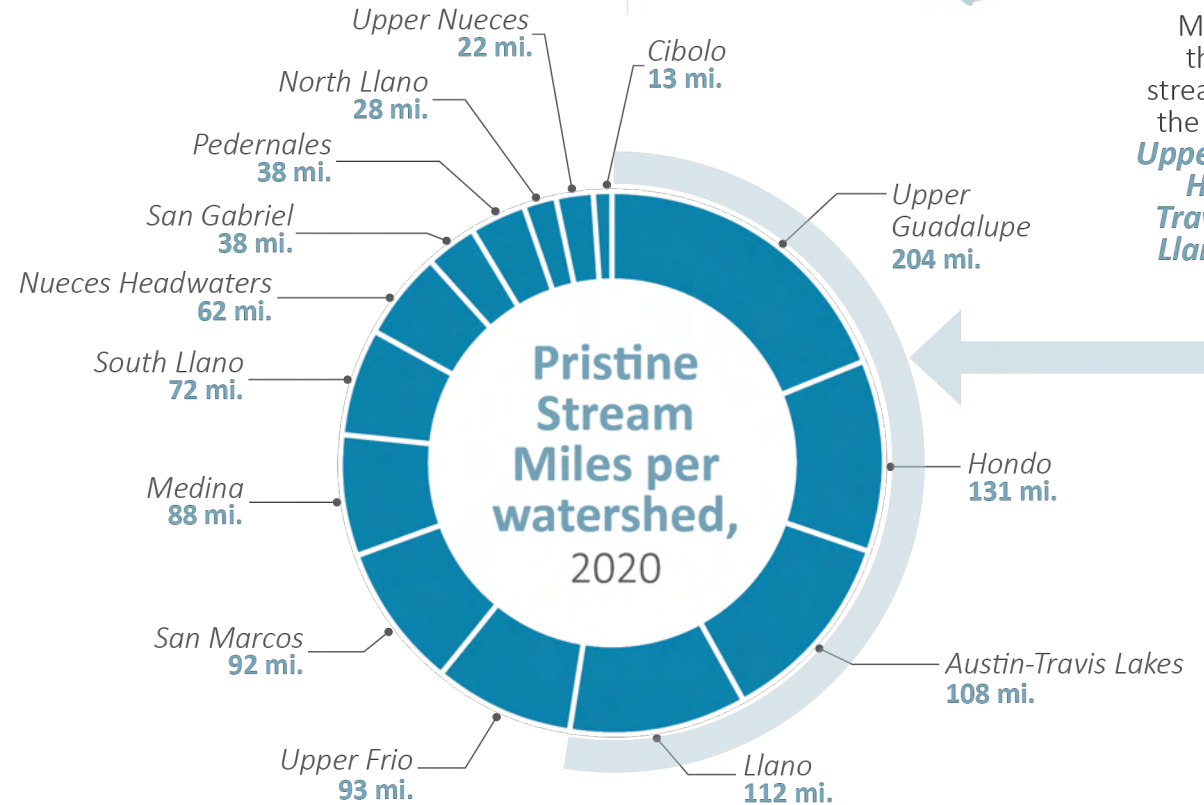
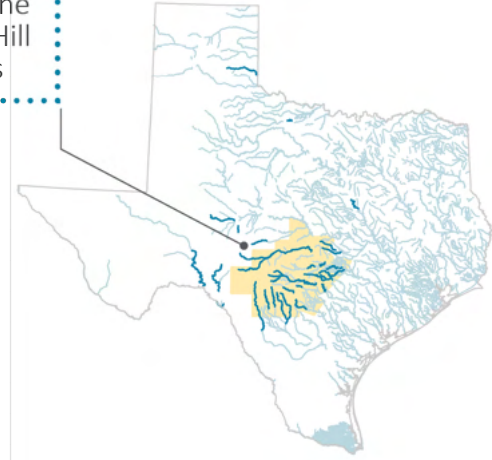


66% of Texas' Pristine Streams lie within Hill Country Counties

METRIC BASELINE:

Pristine Stream miles 2020:

1,142



More than 1/2 of the total pristine stream miles within the region occur in **Upper Guadalupe, Hondo, Austin-Travis Lakes, and Llano** watersheds.

WHAT'S IMPAIRING HILL COUNTRY STREAMS?

Wastewater effluent dumping

from treatment plants



Impervious surface runoff

Including roads and parking lots



Airborn pollutant emissions

from vehicles and power plants



Agricultural runoff

from farming operations



Streams With Watershed Protection Plans (WPPs)

- Cypress Creek (Hays County)
- Dry Comal Creek and Comal River
- Cibolo Creek
- Plum Creek
- Shoal Creek
- Upper Llano River
- Upper San Antonio River
- Upper San Marcos River



WATER

Metric 5: Water Consumption

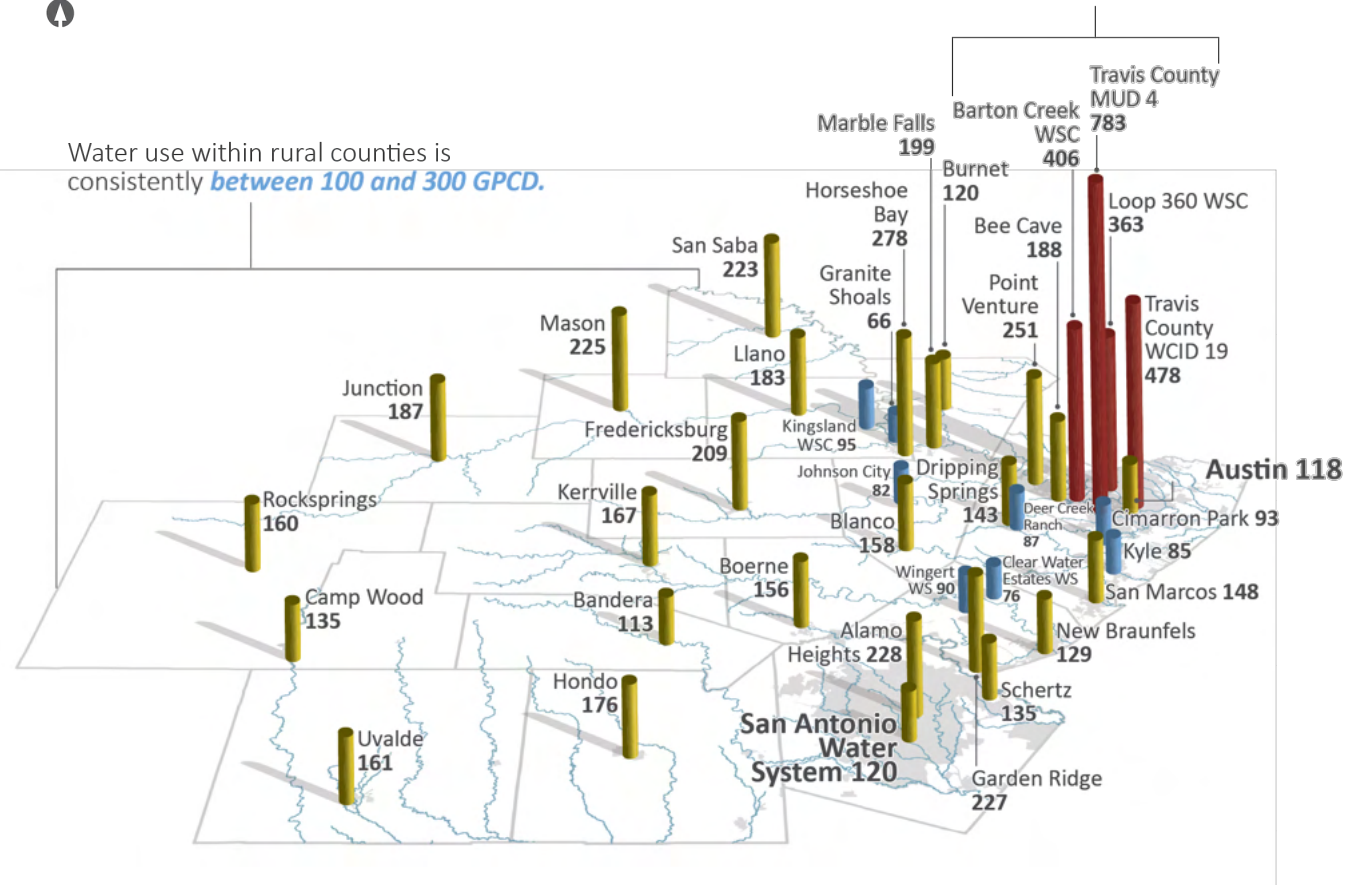
GALLONS PER CAPITA PER DAY BY WATER USER GROUP 2018

Under 100 100 to 300 Over 300



Water use within rural counties is consistently *between 100 and 300 GPCD*.

The highest-consuming Water User Groups are *clustered on the outskirts of Austin*. The City of Austin is one of the lowest per capita water users in the Hill Country.



METRIC BASELINE:

Max GPCD 2018:

783

(Travis County MUD 4)

Average GPCD

2018:

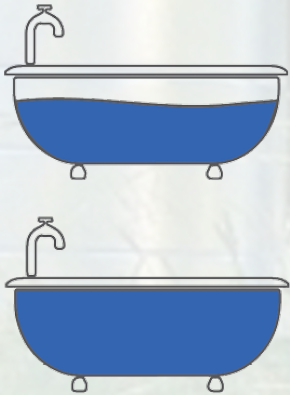
191

GALLONS PER CAPITA PER DAY

120 GPCD

San Antonio

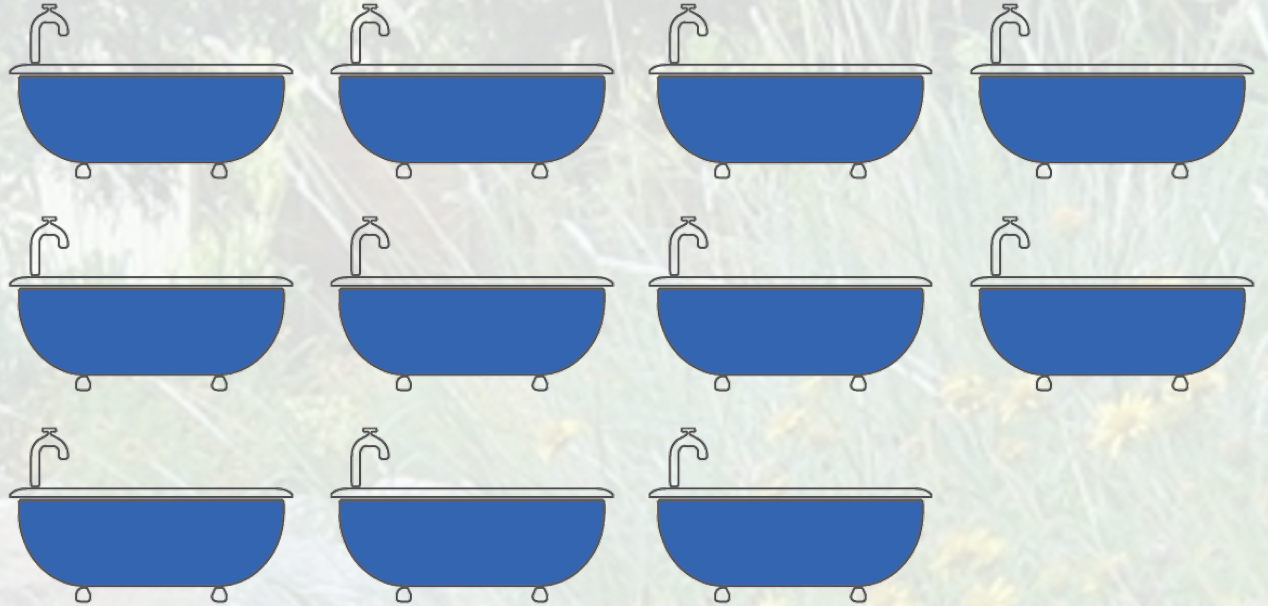
residents use* 120 gallons, or about 1.7 full bathtubs, per day, for each person.



783 GPCD

Travis County MUD 4

residents use* 783 gallons, or about 11 full bathtubs of water, per day, for each person.





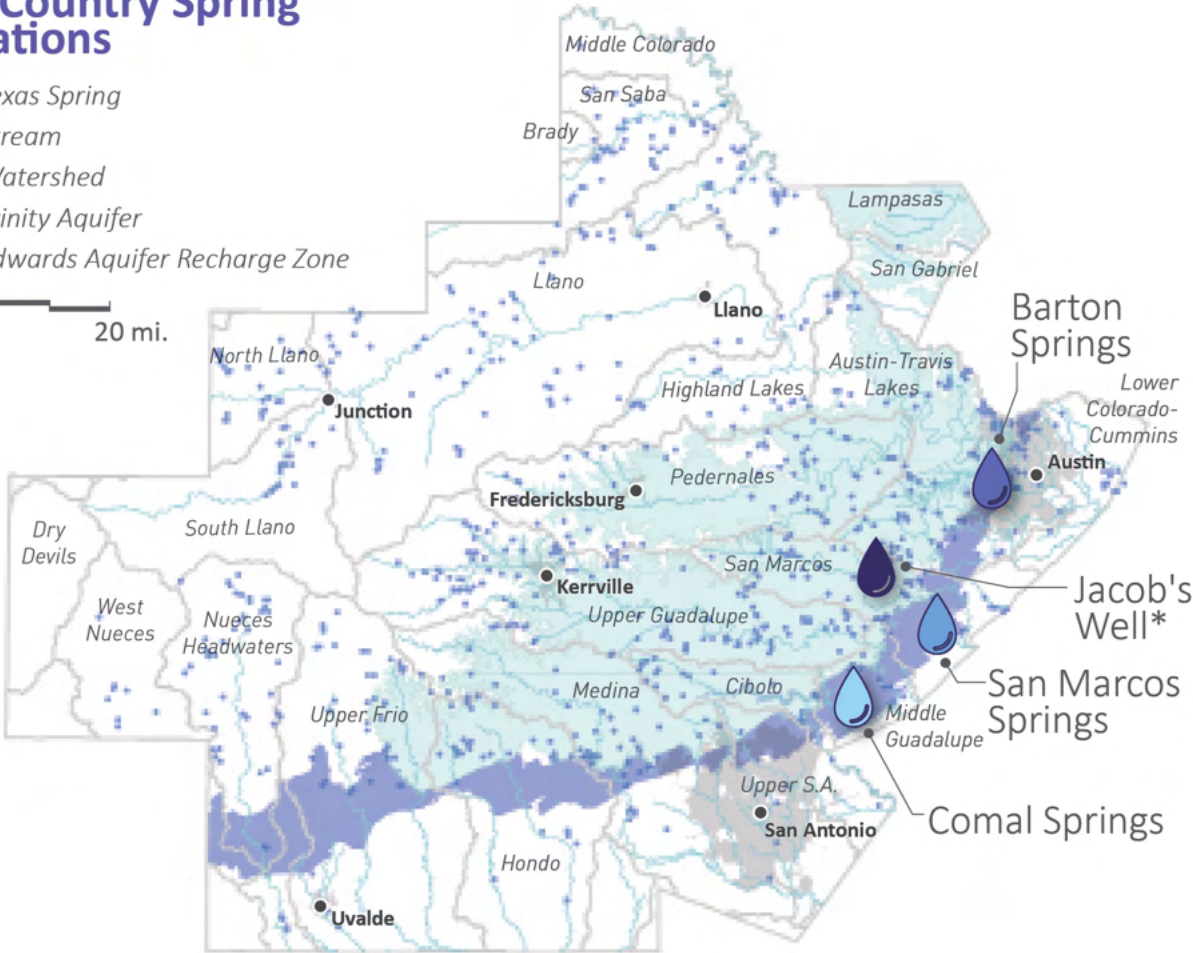
WATER

Metric 6: Spring Flow

Hill Country Spring Locations

- Texas Spring
- Stream
- Watershed
- Trinity Aquifer
- Edwards Aquifer Recharge Zone

0 20 mi.

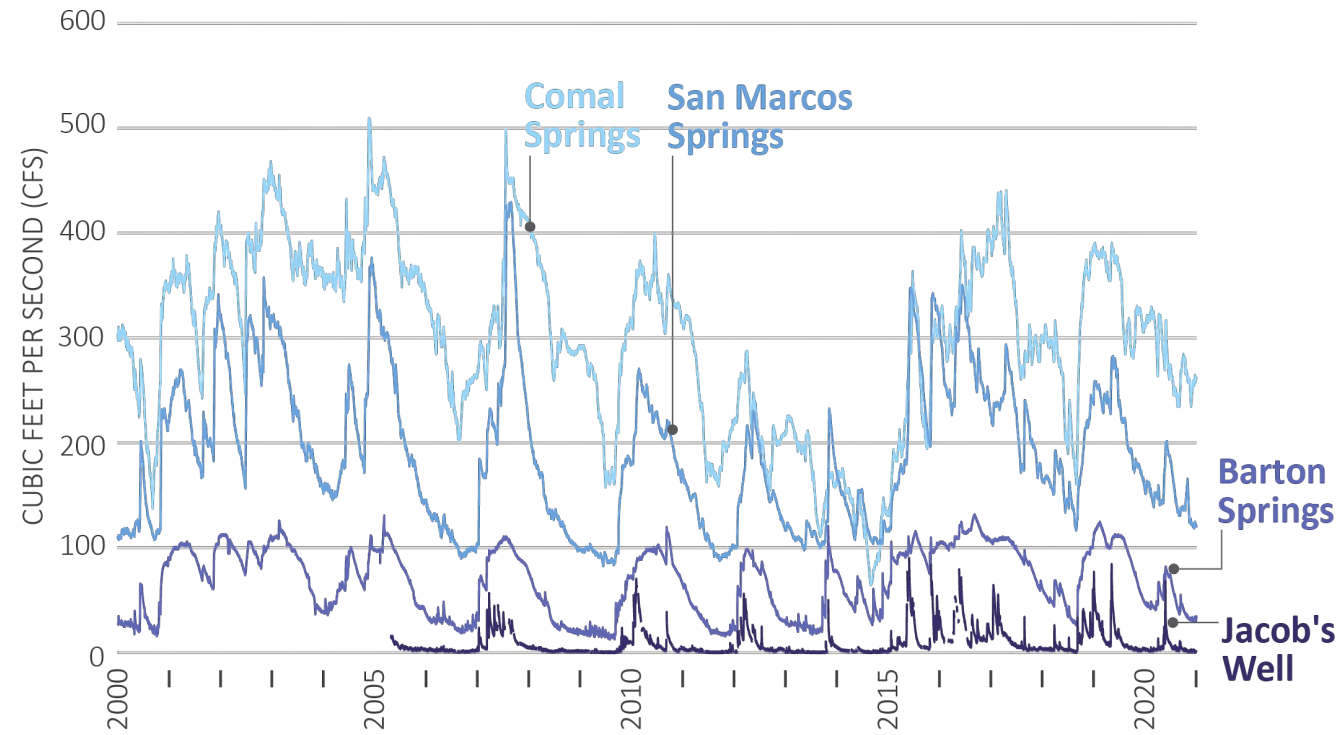


METRIC BASELINE:

COMAL SPRINGS	SAN MARCOS SPRINGS	BARTON SPRINGS	JACOB'S WELL
307 _{CFS}	179 _{CFS}	71 _{CFS}	3.4 _{CFS}

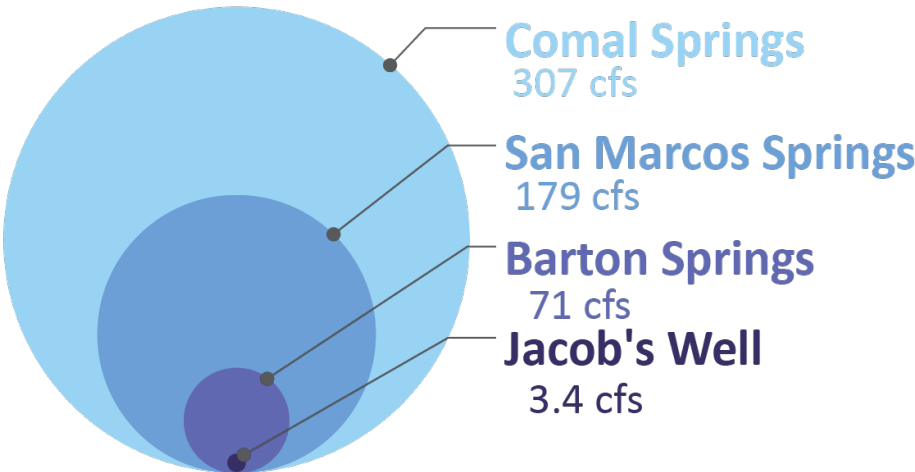
(20 Year Median spring flow 2000-2020 for all springs)

Mean Daily Spring Flow 2000-2020



Median Spring Flow 2000-2020

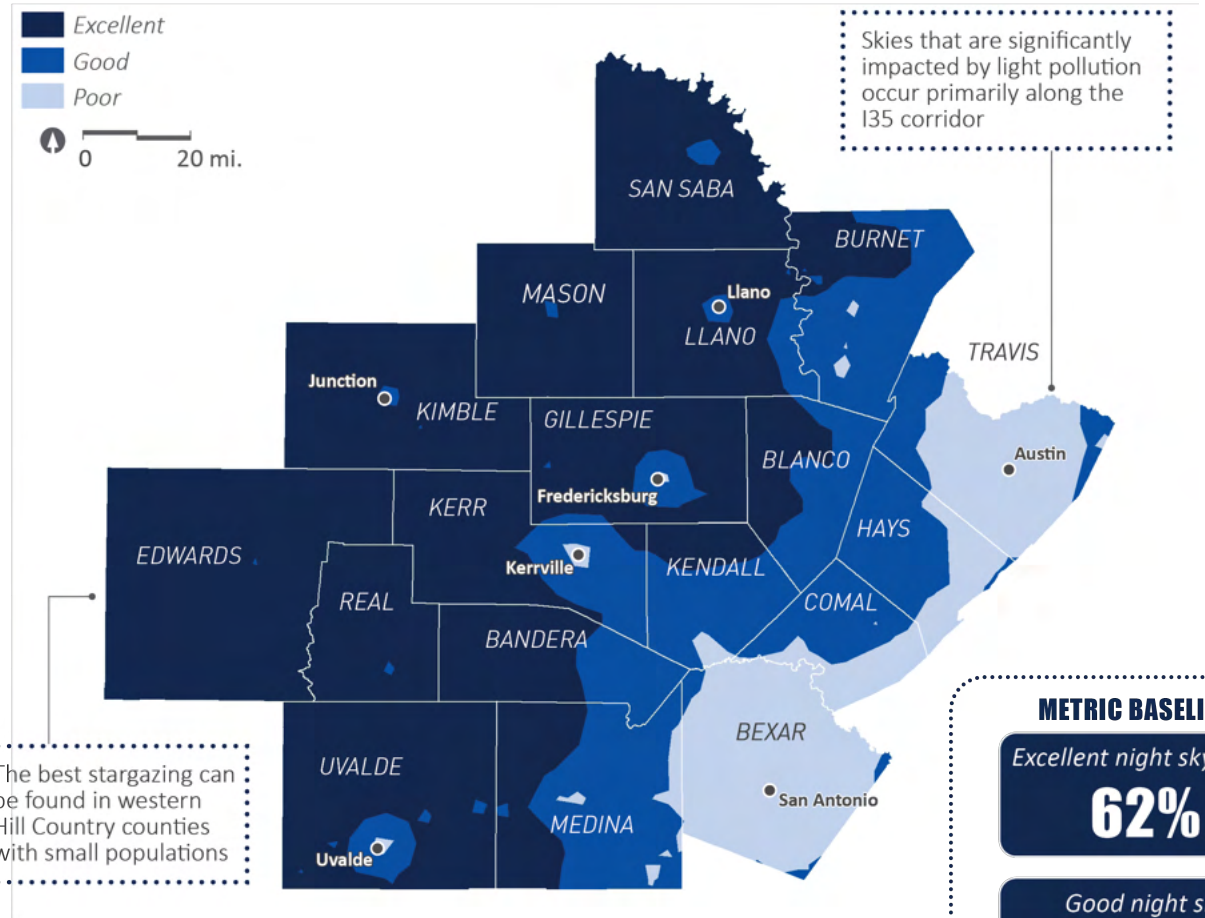
Comal Springs' median discharge is about **32 times** the volume of Jacob's Well.



DARK SKIES FOR STARGAZING

Metric 7: Night Skies

NIGHT SKY 2015



METRIC BASELINE:

Excellent night sky, 2015:

62%

Good night sky,

24%

Poor night sky, 2015:

14%



What is the Bortle Dark-Sky Scale?

John E. Bortle created the scale in 2001 as a way to help amateur astronomers measure the quality (brightness) of the night sky for a particular location. It uses practical celestial observations to estimate the overall brightness of the sky. There are nine levels; Class 9 indicates the most extreme amount of light pollution, as in the inner city. Big Bend Ranch State Park, an isolated expanse in West Texas, is Class 1. Many Hill Country parks are Class 3; a few are even darker.

International Dark-Sky Communities

- Dripping Springs
- Horshoe Bay
- Wimberly Valley
- Fredericksburg
- Blanco

Dark-Sky Parks

- Enchanted Rock State Natural Area
- South Llano River State Park
- UBarU Camp and Retreat Center

Dark-Sky Developments of Distinction

- Lost Creek (Travis County)
- River Hills (Travis County)

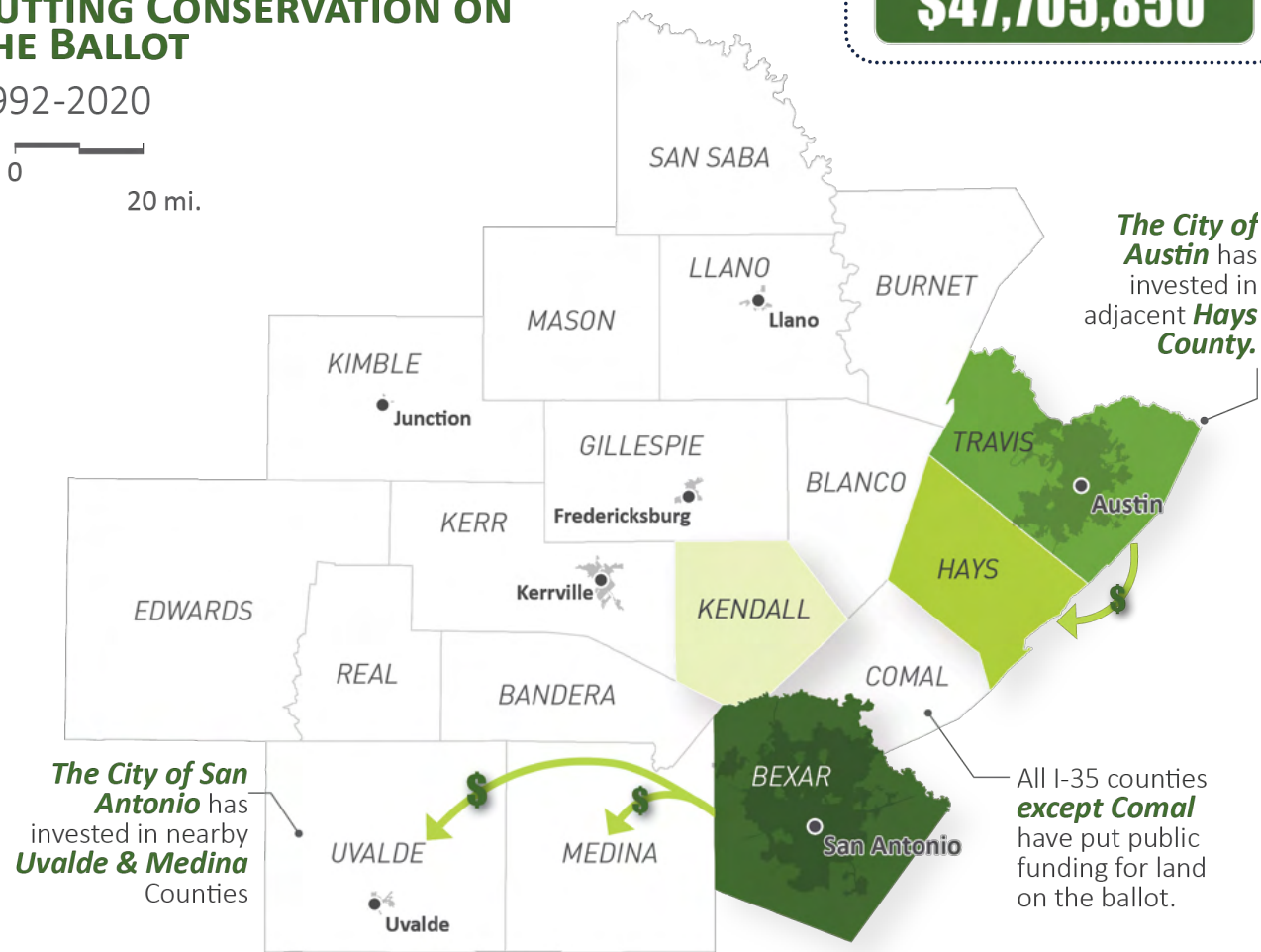


INVESTMENT

Metric 8: Public Investment

PUTTING CONSERVATION ON THE BALLOT

1992-2020



BREAKDOWN OF FUNDS BY COUNTY

HAYS \$112 M

- Hays County \$108.5 M
- San Marcos \$2 M
- Buda \$1 M

KENDALL \$5 M

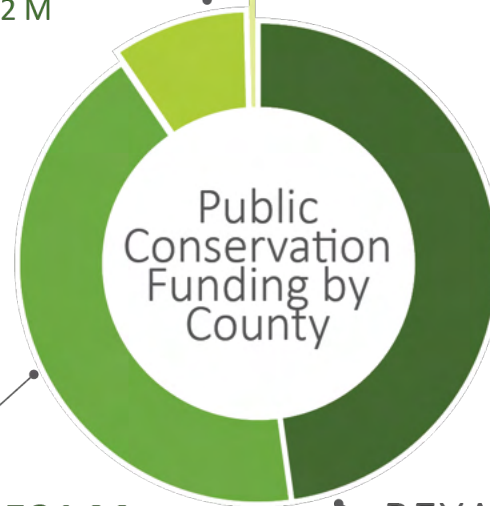
- Kendall County \$5 M

TRAVIS \$521 M

- Austin \$265 M
- Travis County \$244 M
- Bee Cave \$3.5 M
- Leander \$2.5 M
- Pflugerville \$5.6 M

BEXAR \$583 M

- San Antonio \$579 M
- Bexar County \$4 M



Benefits



Parks & Recreation



Watershed Protection



Open Space



Wildlife Habitat



Conservation Easements

CONSERVATION FUNDS PASSED BY HILL COUNTRY VOTERS

1992-2020

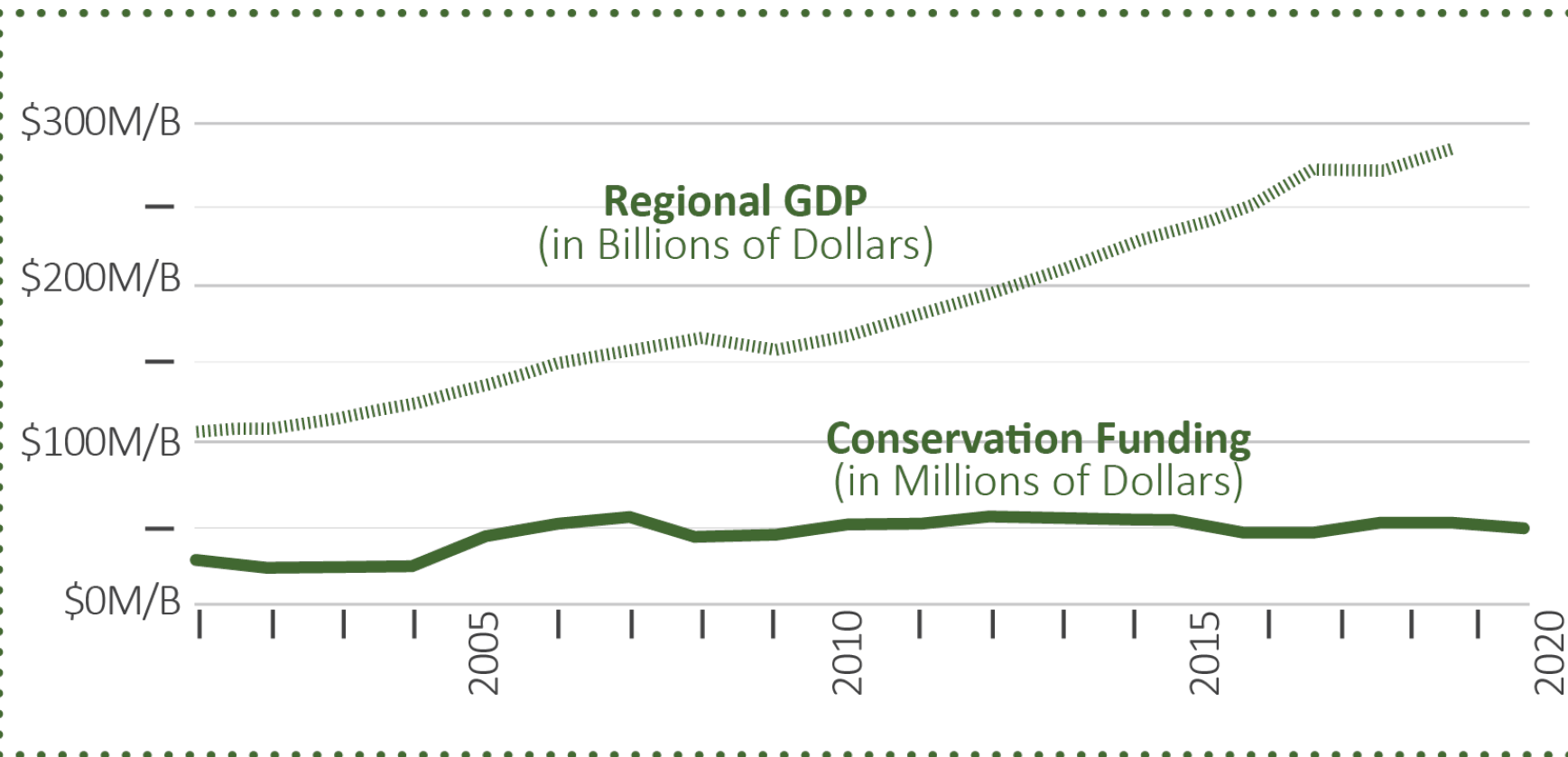


Total funds passed:

\$1,220,247,967

10 YEAR AVERAGE CONSERVATION FUNDING VS. REGIONAL GDP

2001-2020



PURCHASING POWER

The market value of potential parklands has **more than tripled since 1998**. Therefore, a conservation dollar today can only purchase less than one third of what it could then. These lands will be even more expensive to conserve in the future.

1998



2018

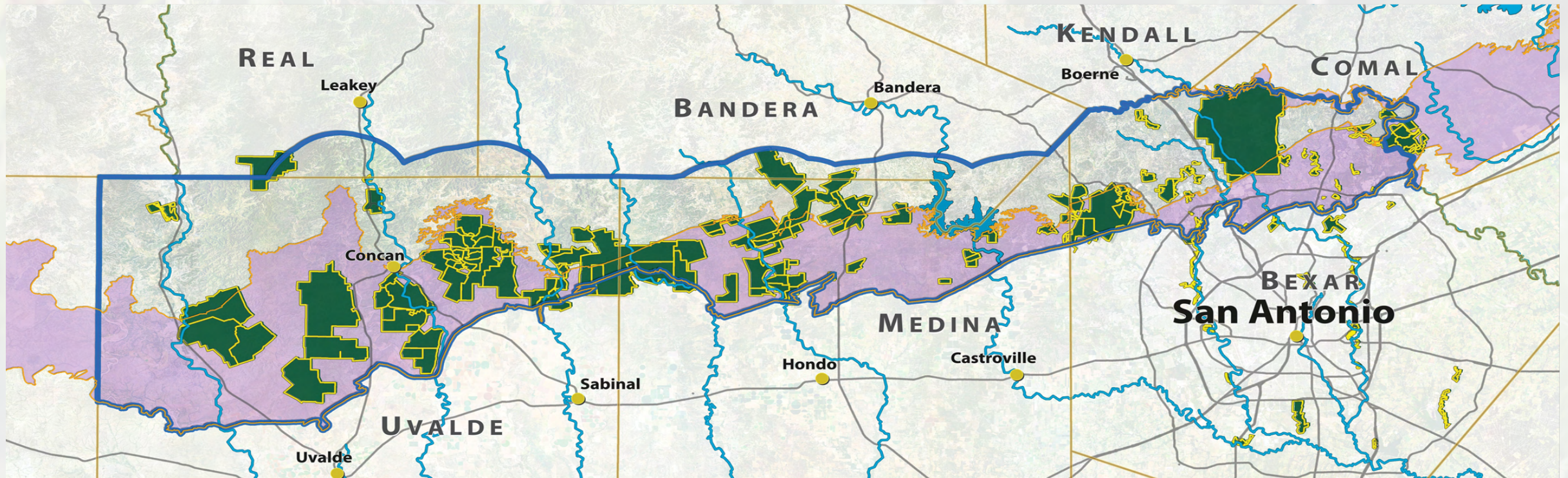


CASE STUDY:

San Antonio Edwards Aquifer Protection Program

- Sales tax funds conservation easements and property acquisition
- Multiple counties
- Two decades of preservation

EDWARDS AQUIFER PROTECTION PROGRAM PROTECTED LANDS



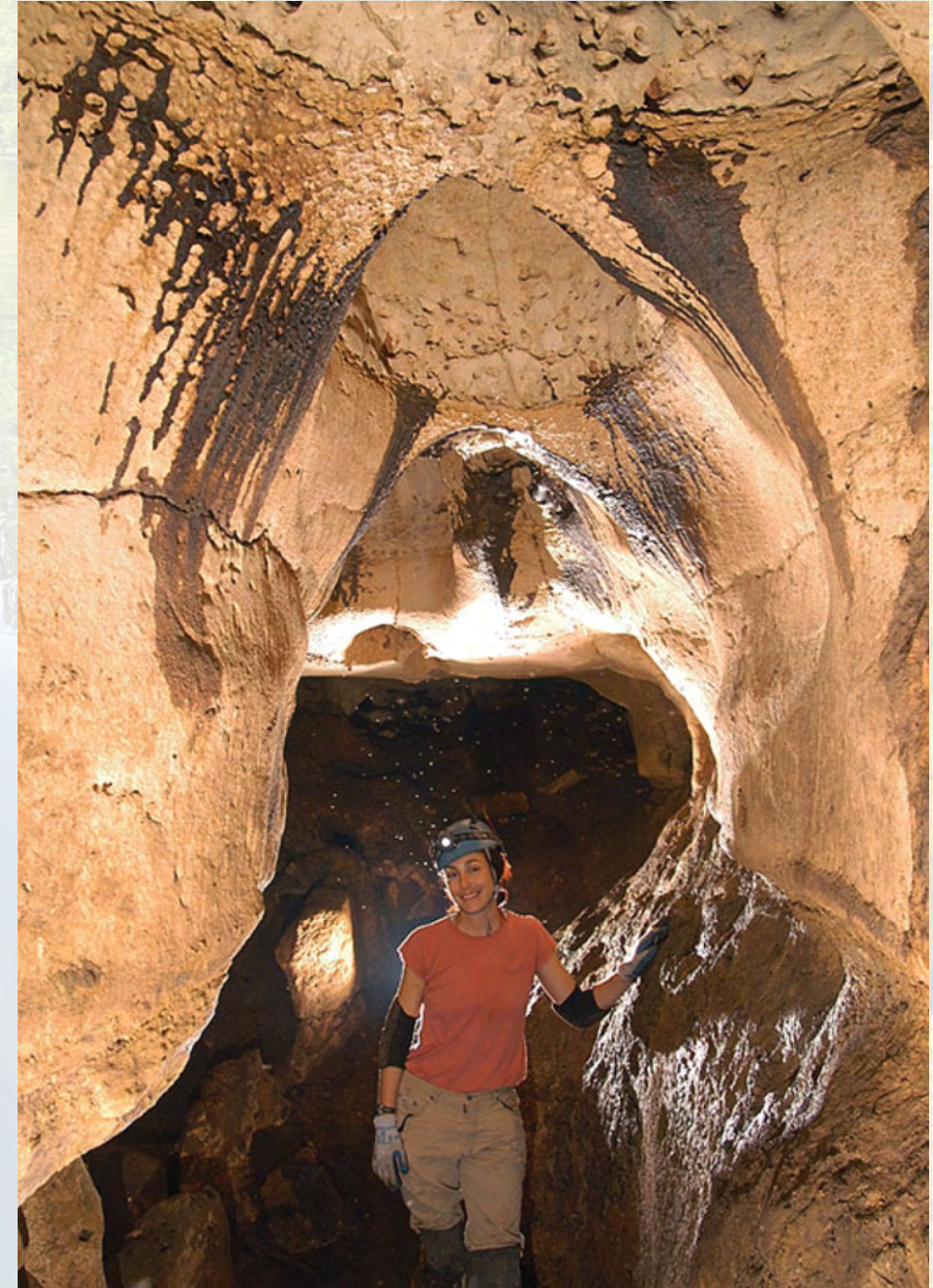
Area of Interest Protected Land Edwards Aquifer Recharge Zone



CASE STUDY:

Jacob's Well Groundwater Management

- Middle Trinity Aquifer
- Private Stewardship
- Research and Monitoring
- Coordinated Management
- Public Conservation
- Future



A photograph of two young spotted deer standing in a field of tall grass and wildflowers. The deer are facing forward, and the background is slightly blurred. The text "-THANK YOU-" is overlaid in the center.

-THANK YOU-

texas hill country
conservation network

Fall 2021



SIGLO
GROUP

COMMUNITY

Metric 1: Unincorporated Population

Data Sources

DATA	TYPE	SOURCE*	REPORT DATA DATES	NEW DATA RELEASE
City boundaries	.shp	TXDOT	2018	may require update
County boundaries	.shp	TXDOT	2018	should not require update
City population estimates (1990)	table	TX Demographer	1990	N/A (historical data)
County population estimates (1990)	table	TX Demographer	1990	N/A (historical data)
City population estimates (2020)	table	US Census Vintage Estimates	2020	Annual

*See "Source Links" for more information

Methods

Data Acquisition Notes

- Download: Historical data comes from TX Demographer and most up to date comes from US Census Vintage Estimates - which are estimates based on the 2010 census.
- Data release: Vintage Census Estimates are updated annually. It is recommended to update to actual 2020 Census when available.

Analysis performed using Microsoft Excel and ArcGIS

- 1990 data:
 - Join city population spreadsheet with city boundary shapefile. Use city name as join field
 - Join county population spreadsheet with county boundary shapefile. Use county name as join field.
 - Intersect city boundary with county boundaries
 - Remove portions of city limits that fall outside of county boundaries. Recalculate

- city population using the proportion of the city that falls within the county.
 - Sum city populations by county.
 - Subtract the sum of city population from the county population. The result is the "Unincorporated Population".
- 2020 data:
 - No need to follow the process for 1990 data. Vintage estimate data for "cities" includes a "Balance of XX County" row that is effectively the "unincorporated population" for each county. Find rows for HCA counties and that work is done!

Source Links

Texas Demographer: <http://txsdc.utsa.edu/Data/TPEPP/Estimates/>

US Census Vintage Estimates: <https://www.census.gov/programs-surveys/popest/technical-documentation/research/evaluation-estimates.html>

TXDOT: <http://gis-txdot.opendata.arcgis.com/datasets?t=Boundaries&sort=-updatedAt>

LAND

Metric 2: Conserved Land

Data Sources

DATA	TYPE	SOURCE*	REPORT DATA DATES	NEW DATA RELEASE
TLTC Lands Inventory	.shp	TLTC/Siglo Group	2021	on request
County Boundaries	.shp	TXDOT	2018	should not require update

*See "Source Links" for more information

Methods

Data Acquisition Notes:

- Download: Inquire with Siglo Group for most recent version of spatial data.
- Data release: On request.

Analysis performed using Microsoft Excel and ArcGIS

- Clip 2021 data set to HCA counties.
- Intersect TLTC Lands Inventory with counties - calculate acres conserved per county.
- NOTE: *Conserved Land and Developed Land metrics were assessed together. When calculating acreage, conserved land was given priority over developed. i.e. All conserved land was counted while only developed land that did not overlap with conserved land was counted.*

Sources Links

TLTC Lands Inventory: <http://www.texaslandtrustcouncil.org/index.php/what-we-do/cli> (Inquire with Siglo Group for most recent version of spatial data).

TXDOT: <http://gis-txdot.opendata.arcgis.com/datasets?t=Boundaries&sort=-updatedAt>

LAND

Metric 3: Developed Land

Data Sources

DATA	TYPE	SOURCE*	REPORT DATA DATES	NEW DATA RELEASE
National Land Cover Dataset (NLCD)	raster	MRLC	2016	5 years
County Boundaries	.shp	TXDOT	2018	should not require update

*See "Source Links" for more information

Methods

Data Acquisition Notes:

- Download: Download NLCD from Multi-Resolution Land Characteristics Consortium
- Data release: Released every 5 years with a 2-3 year lag. 2016 data was released in 2019.

Analysis performed using Microsoft Excel and ArcGIS

- Clip NLCD to HCA counties.
- Extract all developed classes (4) from NLCD. This includes classes 21 (Developed, Open Space), 22 (Developed, Low Intensity), 23 (Developed, Medium Intensity), 24 (Developed, High Intensity).

- Intersect developed classes with counties- calculate acres developed per county that do not intersect with conserved land.
- NOTE: *Conserved Land and Developed Land metrics were assessed together. When calculating acreage, conserved land was given priority over developed. i.e. All conserved land was counted while only developed land that did not overlap with conserved land was counted.*

Sources Links

National Land Cover Dataset: <https://www.mrlc.gov/data>

TXDOT: <http://gis-txdot.opendata.arcgis.com/datasets?t=Boundaries&sort=-updatedAt>

WATER

Metric 4: Pristine Streams

Data Sources

DATA	TYPE	SOURCE*	REPORT DATA DATES	NEW DATA RELEASE
Phosphorus stream data	table	TCEQ	Jan 2011- Jan 2021	continuous
TCEQ segments & assessment units	.shp	TCEQ	2021	as needed
Watershed Boundaries	.shp	USGS	2010	should not require update

*See "Source Links" for more information

Methods

Data Acquisition Notes:

- Download: Data was downloaded and processed outside of the scope of this report. A general outline of how it was done is decribed here. Contact Sky Lewey for more information -slewey@nueces-ra.org
- Data release: Data is continuously collected.

Analysis outline:

- Filter CRP data for #665 Phosphorus
- Pristine streams read <.06 at least 90% of the time
- Join data to assessment units- "Look first at segments to see if a classified segment would

qualify. If it does not, then look at assessment units with those segments to see if a particular unit would qualify. This becomes important on rivers like the San Marcos where the upper segment contains discharge and does not qualify as whole, but that segment includes a high profile assessment unit at its uppermost reach that does qualify."- Sky Lewey

Sources Links

Phosphorus stream data: <https://www80.tceq.texas.gov/SwqmisWeb/public/crpweb.faces>

TCEQ segments & assessment units: <https://gis-tceq.opendata.arcgis.com/search?categories=water>

WATER

Metric 5: Water Consumption

Data Sources

DATA	TYPE	SOURCE*	REPORT DATA DATES	NEW DATA RELEASE
Water User Group (WUG)				
Utility GPCD	table	TWDB	2018	annual
WUG Counties	table	TWDB	2016	should not require update

*See "Source Links" for more information

Methods

Data Acquisition Notes

- Download: Click on the "[Summary Estimates, 2016 and Later](#)" link under "Regional Water Planning Water User Group (WUG) Utility GPCD. Click desired year, view report, and then export data to desired format. The WUG counties table was provided through inquiry with TWDB. Likely the same one can be used year to year.
- Data release: There is usually a two year delay in new data release.
- Caveat: Methodology for data collection changed in 2016. Do not include pre-2016 in analysis.

Analysis performed using Microsoft Excel and ArcGIS

- Join WUG Utility GPCD table with WUG counties table to extract data from only HCA counties.

- Select counties that were analyzed within 2016 data. Calculate change between previous and current years.
- In general WUGs that represent large populations, >400 GPCD and <100 GPCD were shown with guidance from HCA. In the future, WUGs displayed could vary depending on new outliers.

Source Links

TWDB: <http://www.twdb.texas.gov/waterplanning/waterusesurvey/estimates/index.asp>

TWDB (Direct to download): https://www3.twdb.texas.gov/apps/reports/WU/SumFinal_UtilityWUGSum

WATER

Metric 6: Spring Flow

Data Sources

DATA	TYPE	SOURCE*	REPORT DATA DATES	NEW DATA RELEASE
Spring Flow	table	USGS National Water Information System	2000-2020	continuous

*See "Source Links" for more information

Methods

Data Acquisition Notes:

- Download: Navigate to [USGS water data mapper](#). Click "Springs" on "Sites" tab. Check "active sites" and uncheck everything else. Zoom to HCA extent, find spring, click on marker then "Access Data". Click "Daily Data" and check the box next to "Discharge". Click "Tab-separated" and enter date range then click "Go". This will lead to results for the selected gage showing mean discharge in cfs, per day for the period of record.
- Data release: Data is updated continuously.

Analysis performed using Microsoft Excel

- Combine mean data from all analyzed gages in Excel. Use to create charts and calculate statistics.
- The years 2000-2020 were analyzed in this report, in order to show contemporary spring discharge trends.

Sources Links

USGS National Water Information System: <https://maps.waterdata.usgs.gov/mapper/index.html>

NIGHT SKY

Metric 7: Dark Skies for Stargazing

Data Sources

DATA	TYPE	SOURCE*	REPORT DATA DATES	NEW DATA RELEASE
Dark sky quality	.shp	Starry Sky Austin	2015	contact Amy Jackson

*See "Source Links" for more information

Methods

- Data was supplied by Amy Jackson with Starry Sky Austin. Contact her for data updates and methods. amy@starryskyaustin.com
- [Source Links](#)
Starry Sky Austin: <https://www.starryskyaustin.com/>

INVESTMENT

Metric 8: Public Investment in Land Conservation

Data Sources

DATA	TYPE	SOURCE*	REPORT DATA DATES	NEW DATA RELEASE
Land Conservation \$	table	HCA	1992-2020	annual
Annual GDP	table	FRED Economic	2001-2019	annual

*See "Source Links" for more information

Methods

Data Acquisition Notes

- Conservation dollar data for this report was provided by HCA from a recent research effort.
 - Research and local knowledge can be used to updated this spreadsheet annually
2. Conservation funding vs. Regional GDP :
- Sum of regional GDP for Austin/Round Rock MSA and San Antonio-New Braunfels MSA. Chart as line.
 - Conservation funding line is the 10 year moving average of total funding per year. Chart as line.

Analysis performed using Microsoft Excel

- Evaluate all counties for conservation funding:
 - Total funding per year
 - Sum county dollars since 1992- show break-down of funding per county

Source Links

FRED- Austin/Round Rock MSA: <https://fred.stlouisfed.org/series/NGMP12420>