


# Edwards/Trinity Aquifer – Unique Challenges for LID

Texas Society for Ecological Restoration

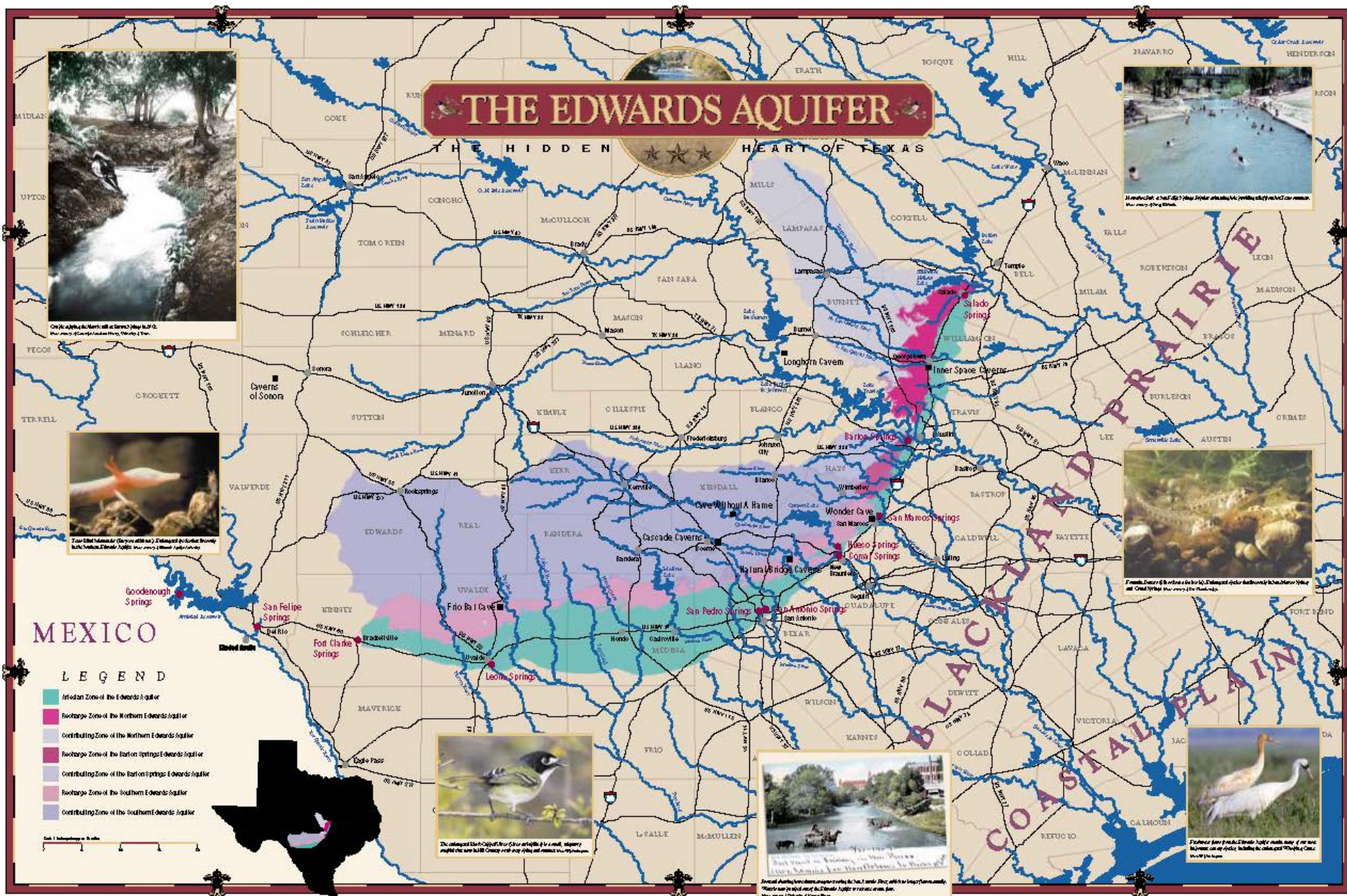
Annalisa Peace | Greater Edwards Aquifer Alliance

A topographic map of Texas and surrounding regions, including parts of New Mexico, Oklahoma, Arkansas, and Louisiana. The map uses color to represent elevation, with browns and tans for higher elevations and greens for lower elevations. The state boundaries of Texas and its neighbors are outlined in white. A specific region in central Texas, representing the Edwards Aquifer, is highlighted in a solid yellow color. The Gulf of Mexico is visible to the south and east of Texas.

# **Managing Natural Resources in the Heart of Texas: Challenges and Opportunities**

Annalisa Peace  
Greater Edwards Aquifer Alliance

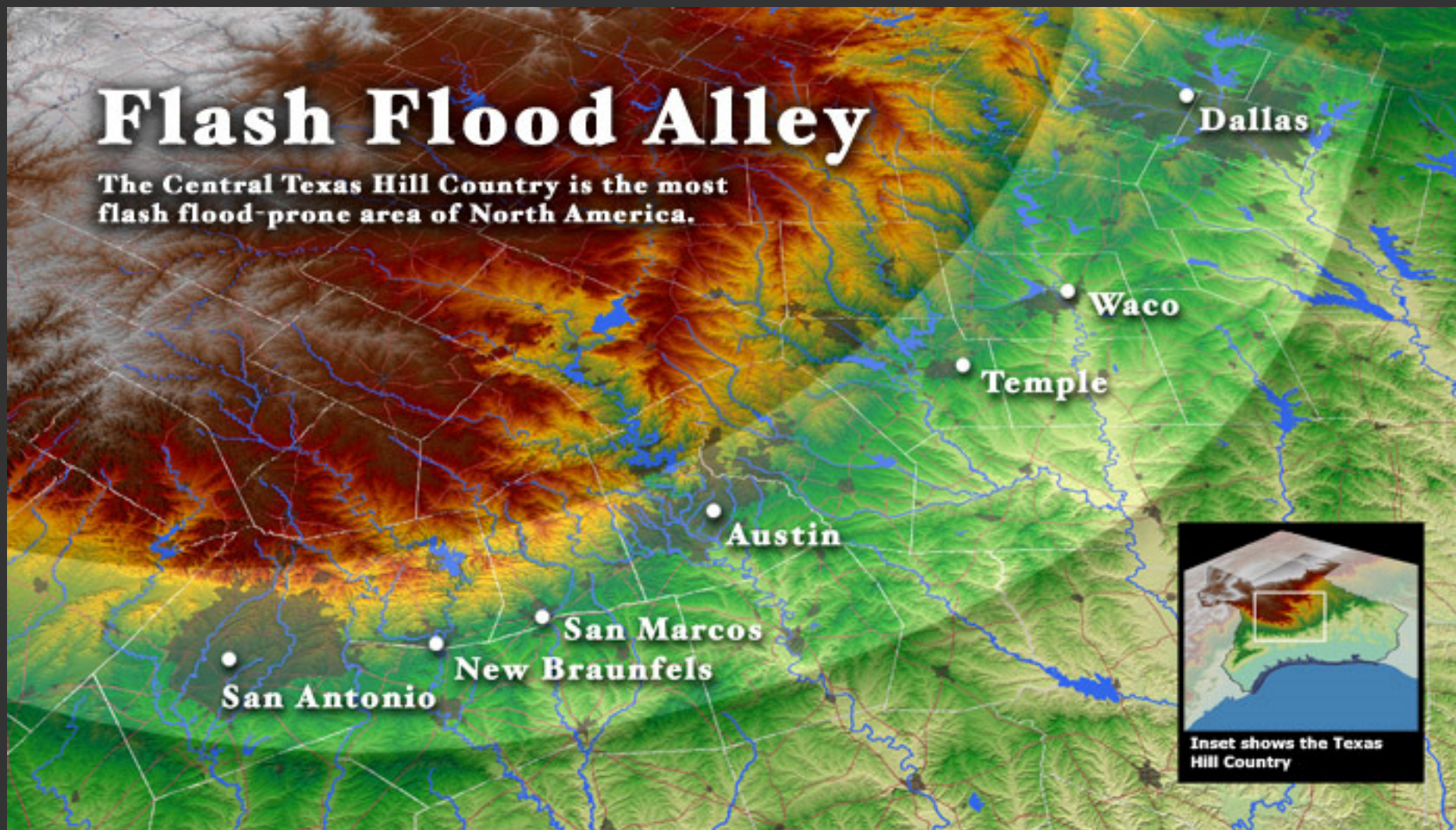






# Flash Flood Alley

The Central Texas Hill Country is the most flash flood-prone area of North America.



The Texas Hill Country is one of the fastest growing areas in the nation:

Fastest Growing Cities in the Nation (U.S. Census Bureau 2015)

#1: San Marcos – 2015 population growth rate 7.9%

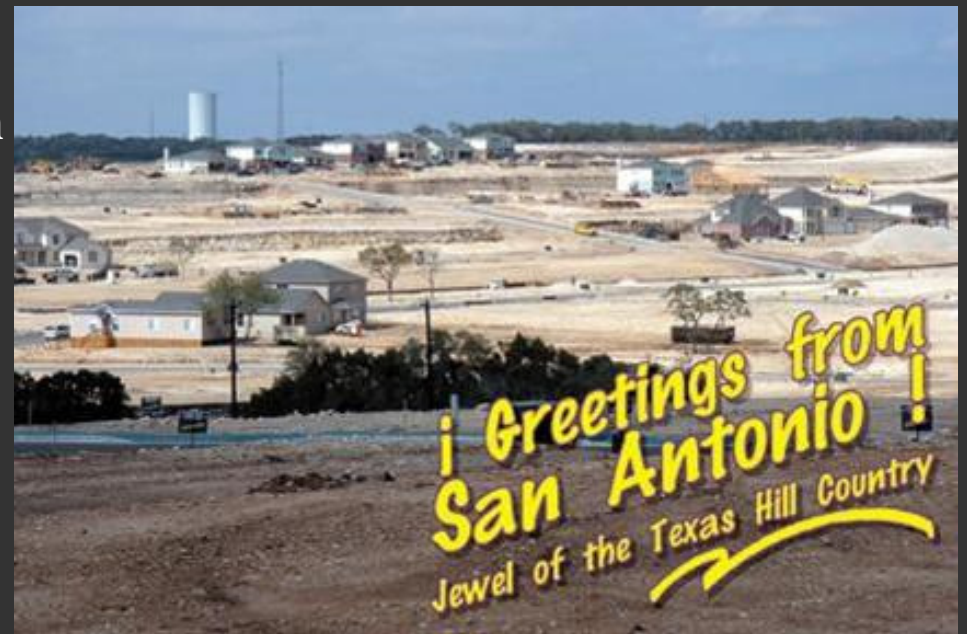
(Since 2010, the city's population has increased by 30 %)

#4: Austin - 2015 Population Growth Rate: 2.5%

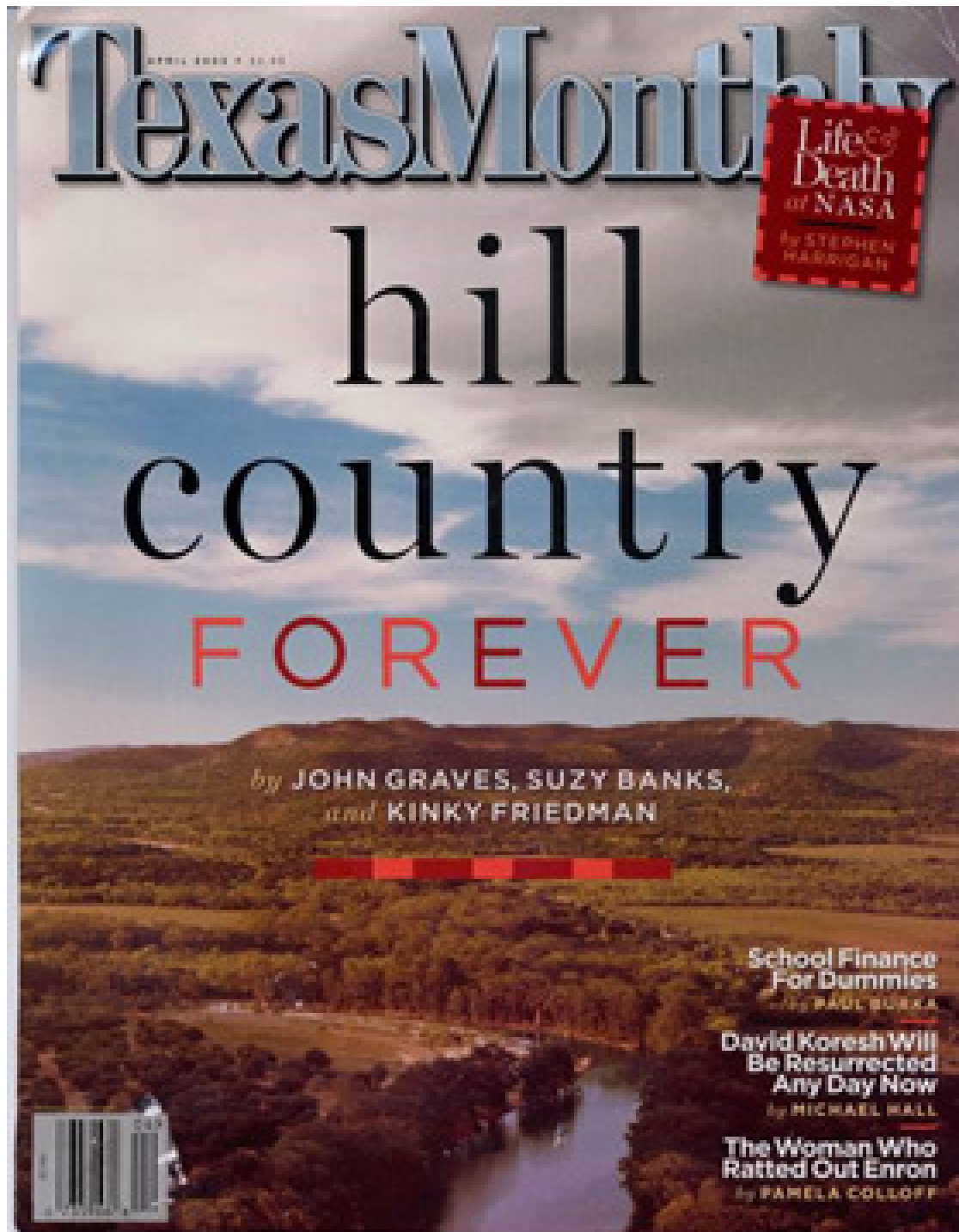
#5: San Antonio - 2015 Population Growth Rate: 1.8%

U.S. Census Bureau - Resident Population Estimates for the 100 Fastest Growing U.S. Counties With 10,000 or More Population in 2010: April 1, 2010 to July 1, 2013

#10 – Kendall County	13% growth
#14 – Hays County	12% growth
#17 – Williamson County	11.5% growth
#31 – Travis County	9.4% growth
#34 – Comal County	9.2% growth
#44 – Guadalupe County	8.9% growth

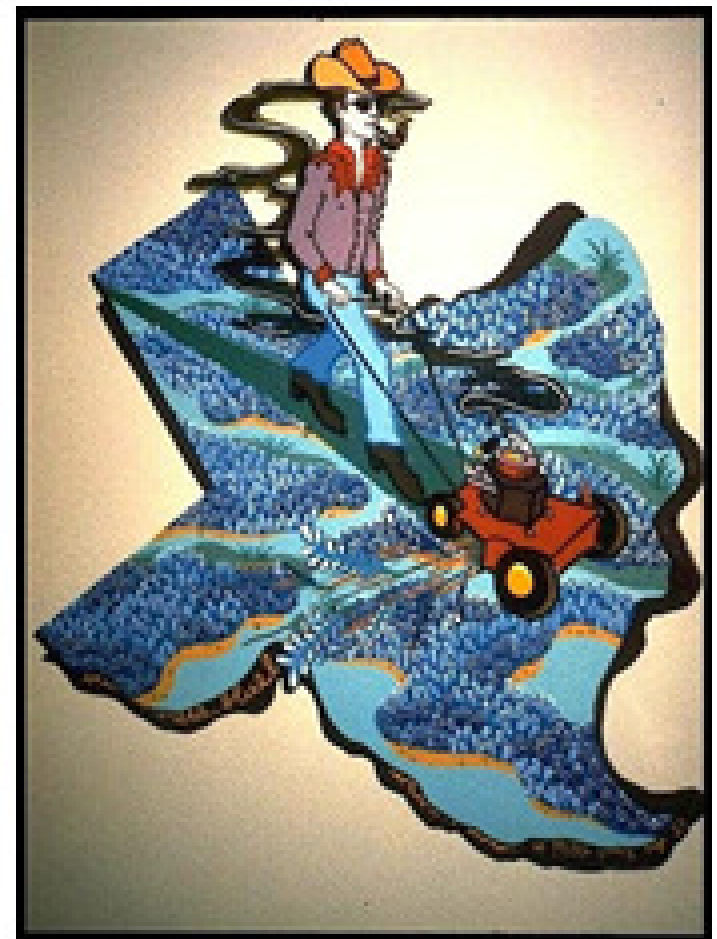






A poll taken in the 1990's by Texas Monthly found that 80% of Texans want to retire to the Hill Country.

We are literally loving the Hill Country to death.



Moving Bluebonnets by Mike Pogue

## THE WORLD'S POPULATION, CONCENTRATED

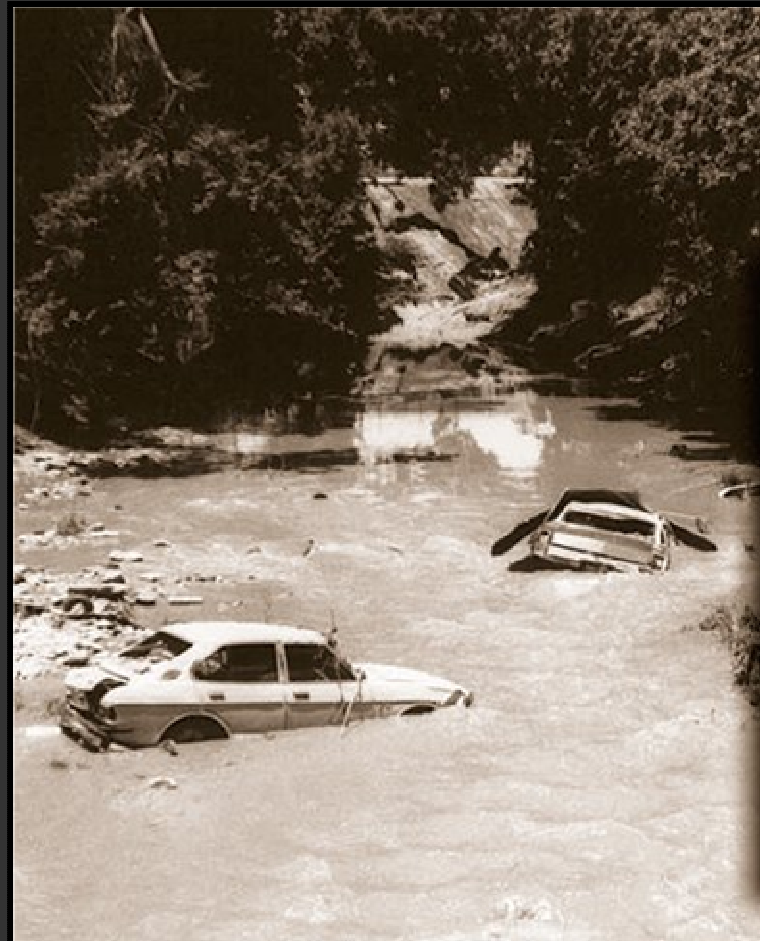
If the world's 6.9 billion people lived in one city, how large would that city be if it were as dense as...



PER  
SQUARE  
MILE

Current land use patterns and delegated regulatory authority do not reflect the value of preserving land for ecosystem services.

Increased Impervious cover on the Edwards Aquifer Recharge Zone increases stormwater flows, erosion, and flooding, requiring cities to spend billions of dollars for stormwater management projects to mitigate downstream flooding.





## Interested in Low Impact Development (LID)?

Attend the U.S. Environmental Protection Agency's

### *Low Impact Development Workshop*



**Date:** February 17 & 18\*, 2009

**Location:** Henry B. Gonzalez Convention Center  
San Antonio, Texas - Rooms 001-003

**Cost:** \$35 per participant  
\*Half day

#### Field professionals will cover the following topics:

- The benefits of LID practices, including:
  - Reduced and delayed stormwater runoff
  - Runoff enhanced groundwater recharge
  - Stormwater pollutant reductions
  - Increased land values
  - Construction Savings
- LID operation and maintenance
- Retrofitting LID practices
- Case study of LID design and construction
- Local incentives for LID
- Municipal codes and ordinances work session

**To register, go to [link].**

For more information about the workshop, email [urbanecologysa@yahoo.com](mailto:urbanecologysa@yahoo.com), or call Carol Fisher or Elena Serna at (210) 320-1457.

Download PDF maps to the event by clicking:

<http://www.sanantonio.gov/convfac/general/directions.asp#ccwd> or  
<http://www.sanantonio.gov/convfac/hbgcc/hbgccfp.asp>



In 2009 GEAA partnered with the EPA and local agencies to launch serious cooperative efforts to facilitate and promote the use of LID locally.

In addition to participation from San Antonio and Bexar County, New Braunfels, San Marcos, and smaller municipalities came to learn about LID.

The results were efforts to incorporate the use of LID into Unified Development Codes region-wide.





# Watershed Stewardship for the Edwards Aquifer Region A Low Impact Development Manual

Greater Edwards Aquifer Alliance

Janet Thome

# **Permanent Stormwater Pollution Prevention Systems within the Edwards Aquifer Recharge Zone in Bexar County, Texas**

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*An Overview and Assessment of Current Regulatory Agency Processes*



**Greater Edwards Aquifer Alliance**  
**February 2010**



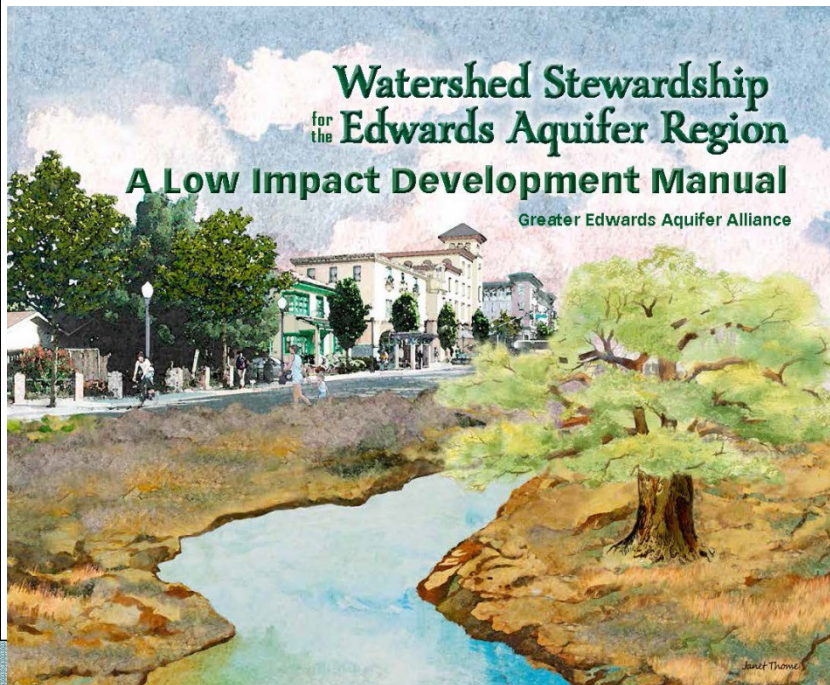
## Regulations permit extensive site modification thus altering the hydrologic regime



- Sand filter is prevalent BMP across the Edwards/Trinity region
- Bexar County (2010) 10 to 15% of ~ 3,000 structural BMPs are persistently non-compliant
- Up to 85% impervious cover allowed in San Antonio
- Up to 100% impervious cover allowed under State Law
- Edwards Rules treat stormwater as a pollutant

# Wells Fargo Environmental Solutions for Communities Grant

## Community Rain Gardens and Under Your Feet Campaign



# Community Rain Gardens

## Partners:

- Wells Fargo Environmental Solutions for Communities  
Initiative of the National Fish and Wildlife Foundation  
\$52,650.00
- San Antonio River Authority  
\$30,000.00
- Edwards Aquifer Authority  
\$15,000.00
- University of Texas at San Antonio
  - College of Architecture
  - College of Civil Engineering
- City of San Antonio
- City Council Districts 8, 9, 10  
and...  
\$9,000.00
  - Home Owners Associations
  - School Districts
  - Native Plant Society of San Antonio
  - Master Gardeners of San Antonio
  - Area Businesses
  - And others



# Community Rain Gardens

## 10 rain gardens/Low Impact Development projects for San Antonio

- The UTSA College of Architecture will deliver a report to inform the siting, signage, and maintenance of future projects – Dec. 2015
- GEAA will deliver report to inform CoSA selection of API LID projects
- First project will be on the northwest campus of UTSA – Spring 2016
- UTSA College of Civil Engineering will work with SARA and EAA to monitor effectiveness of LID in improving water quality
- GEAA will meet with City Council Representatives, Home Owners Associations, School Districts to select sites and design projects
- GEAA will work with SARA, Native Plant Society of SA, Master Gardeners of SA, and Home Owners Associations/Schools to install 9 Community Rain Gardens – 2016
- GEAA will work with HOA's to ensure monitoring and maintenance of projects.

GEAA

Greater  
Edwards  
Aquifer  
Alliance



Our Goal is to go from this...





Greater  
Edwards  
Aquifer  
Alliance



... to this – infiltrating clean rain water into the aquifer, saving water-  
What's not to like?

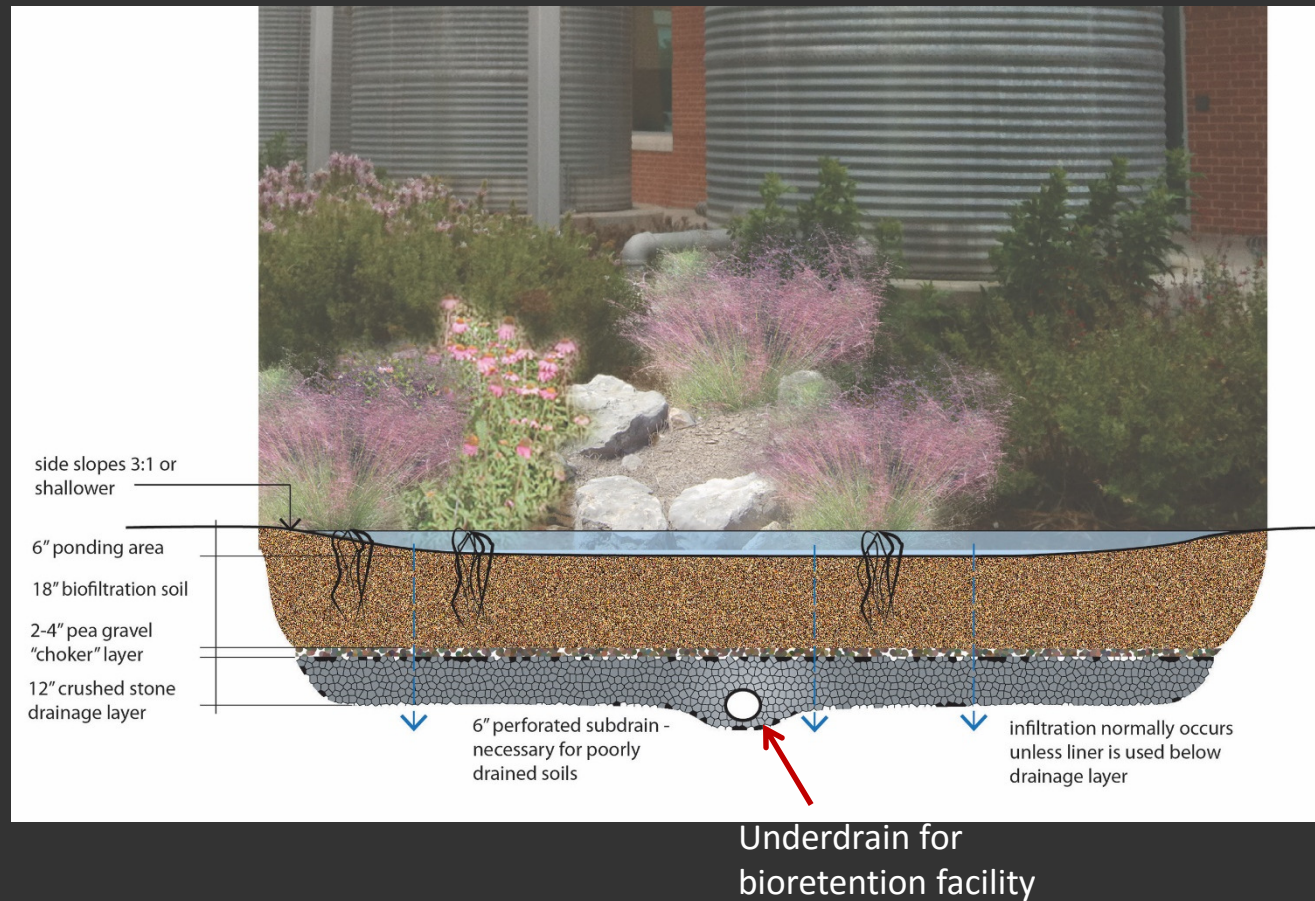


Due to rapid recharge and open channel flow, the Edwards is one of the most prolific aquifers in the world.

Conversely, there is minimal to no filtration of water entering the Edwards. Thus, it is extremely vulnerable to pollution.



## TCEQ regulations require modifications for use of LID



- No direct discharge to Recharge Zone
- Impermeable liners required
- Poor infiltration rates necessitate underdrains



# UTSA Main Campus located in northern Bexar County over EA Recharge Zone





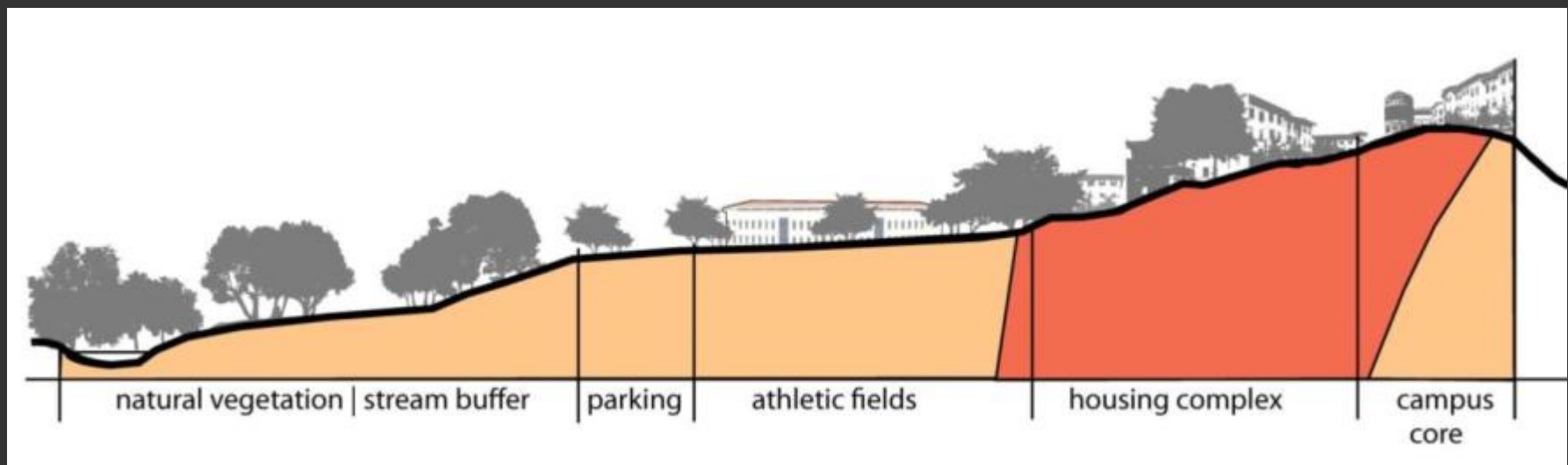
Campus has spectacular views and areas of protected landscape –  
not necessarily integrated with campus activity areas



# Campus core and planned housing are over the most permeable area of Edwards limestone

LID strategies can integrate with main campus spaces

- Capture rooftop drainage at source for reuse in buildings
- Use bioretention to recharge clean water and create focused habitat areas

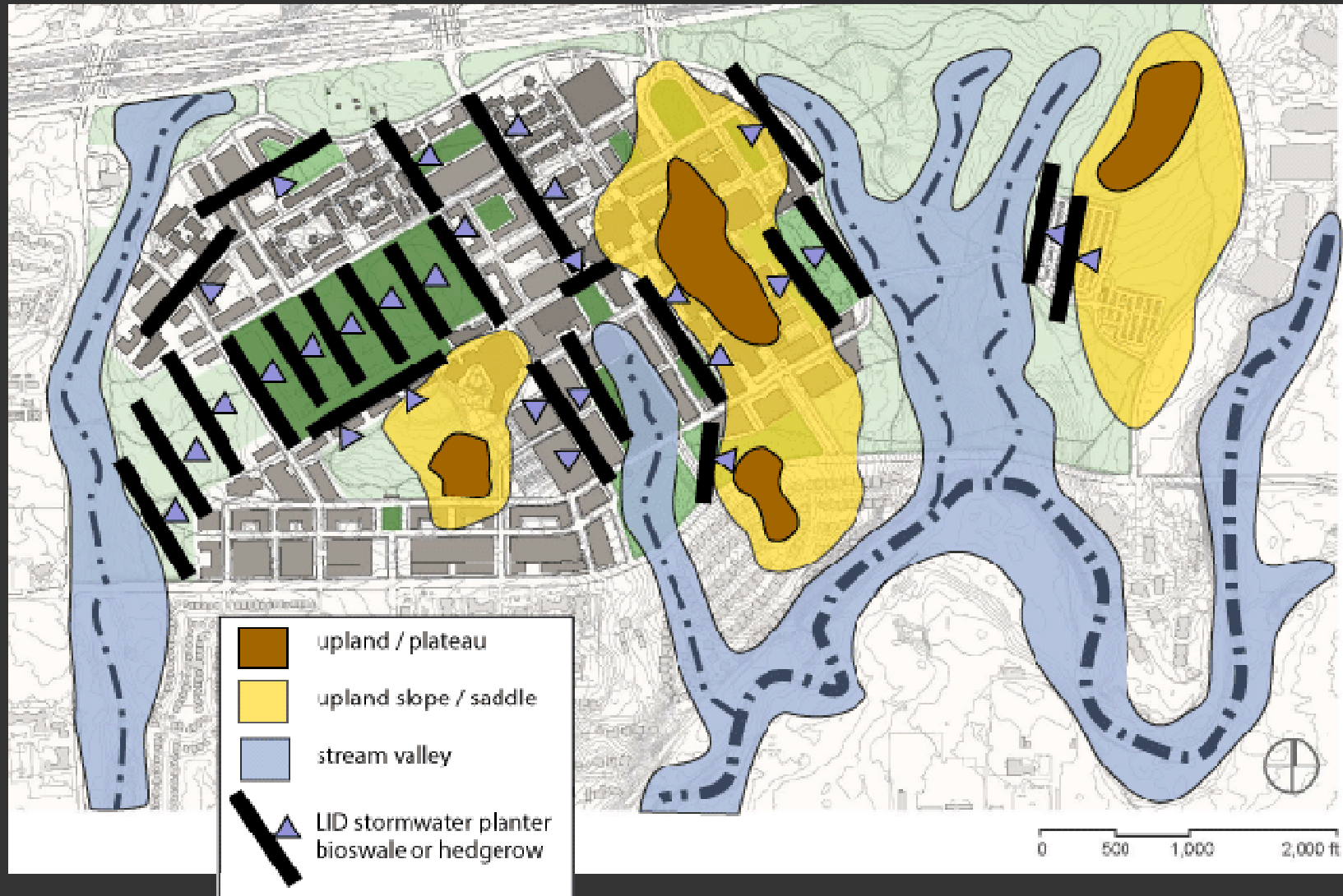




## Relatively clean runoff from walkways and pedestrian plazas can be directed to bioretention facilities



Retrofitting campus with LID features could capture significant amounts of runoff for onsite treatment and stream recharge





## Convert turf swale to bioswale with checkdams



- Slow runoff and retain water for habitat
- Treat recharge water directed to streams



# UTSA master plan





## UTSA plan with LID features

