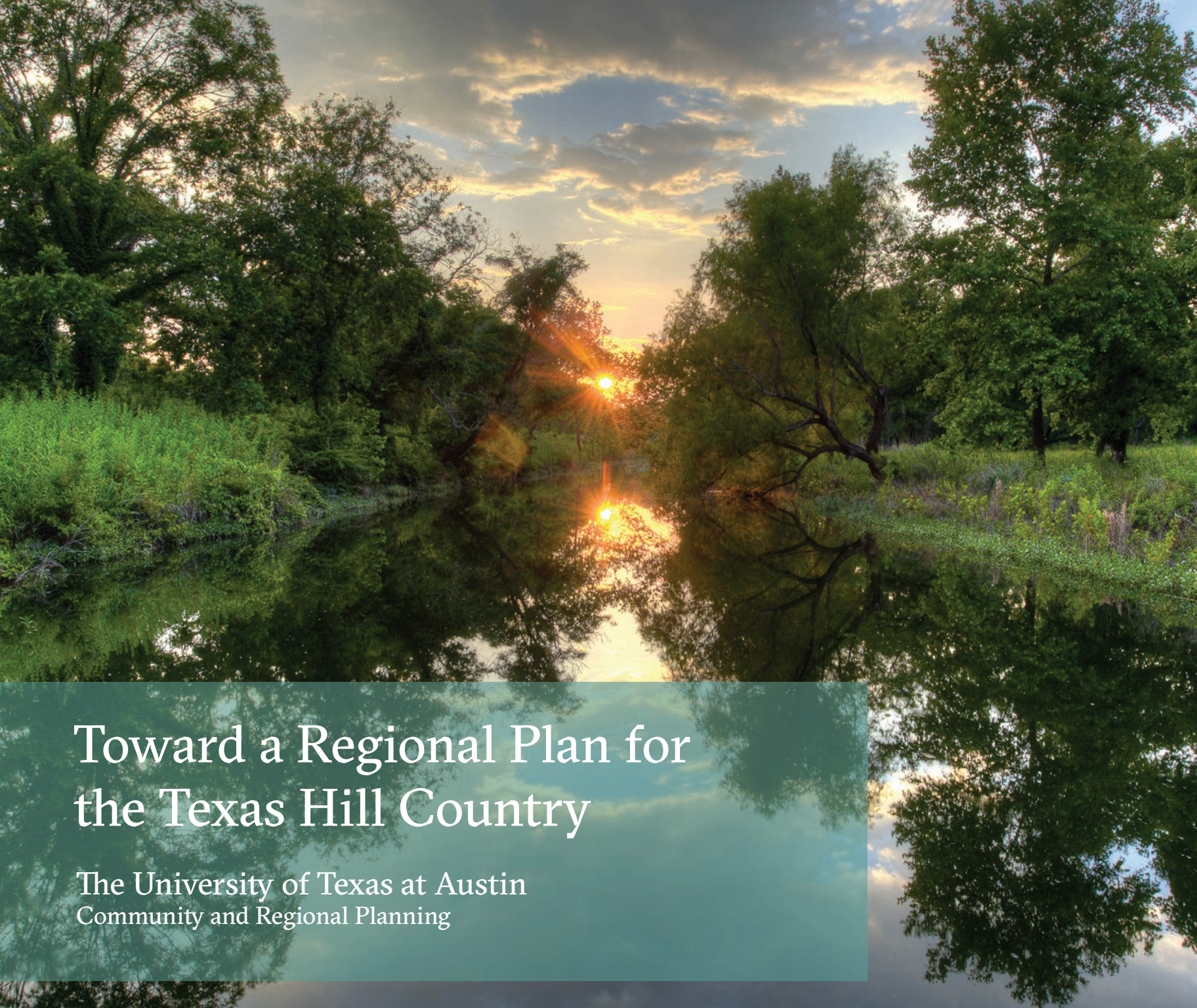

Toward a Regional Plan for the Texas Hill Country

The University of Texas at Austin
Community and Regional Planning

Cover photo: Tom Zinn

The University of Texas at Austin
Community and Regional Planning
School of Architecture

The University of Texas at Austin

The University of Texas at Austin School of Architecture vision is to be the most influential School of Architecture in the world. Our programs are highly regarded because we combine intellectual curiosity and ambition with professional prowess. To maintain and broaden our significance, we must continue to refine this approach to teaching and research, that is, the simultaneous advancement of both theory and practice.

Expanding our influence rests on four interconnected factors:

1. Like The University of Texas at Austin, the School of Architecture must be strongly grounded in the Austin region and the State of Texas.
2. Although rooted in a particular place, the school must have a national and international reach and consequence.
3. We must be committed to interdisciplinary teaching and research both within the school and across the university.
4. We need to address important societal issues facing the built environment, specifically sustainability, including the aspects of urbanization, energy and resource consumption, and greenhouse gas production.

Formed in 1948, the School of Architecture has been led by Dean Frederick Steiner since 2001. The school includes programs in architecture, community and regional planning, historic preservation, interior design, landscape architecture, sustainable design, and urban design. The Community and Regional Planning (CRP) program has a strong focus on sustainable development processes and practices, seeking development paths that balance growth with improved environmental performance.

Community and Regional Planning Program Studios

The requirements for the Master of Community and Regional Planning degree include a six-credit course in a planning studio. The Planning Studio is an intensive, applied research course in which students apply the skills they have learned to real world planning problems, often in partnership with a key stakeholder. The class operates in a large group dynamic and works collaboratively to develop the project and present it at the close of the course, often to both key stakeholders and to an academic review panel.

Introduction to the Project

The Hill Country Alliance (HCA) presented The University of Texas at Austin School of Architecture (UTSOA) with their collaborative strategy and draft vision for the Texas Hill Country. The Alliance asked UTSOA to use fresh eyes and planning expertise to provide new ideas and strategies for HCA to consider as they work toward a better future for this special region. Dean Frederick Steiner recruited Professor Robert Yaro as Potter Rose Visiting Professor to lead a planning studio to craft this implementation strategy for the Alliance. Mr. Yaro recently retired as president of New York's Regional Plan Association, and has had a long career in planning for large landscapes in other parts of the country. The Potter Rose Professorship in Urban Planning was endowed by Deedie and Rusty Rose of Dallas in 2009. As philanthropists and civic leaders, the Roses have made considerable contributions to arts, architecture, and environmental causes in Texas and beyond. Their goal in creating this position was to engage designers in finding solutions to important planning challenges facing Texas cities and regions. Professor Yaro asked UT Lecturer Meg Merritt and CRP Ph.D. Candidate Jane Winslow to join him in advising the students.

Introduction to the Hill Country Alliance

The Hill Country Alliance (HCA) is a collaboration of people and organizations whose purpose is to raise public awareness and build community support around the need to protect the natural resources and heritage of the Central Texas Hill Country. They held their first meeting in 2004, formalized as a 501(c)(3) nonprofit in 2005 and have experienced steady growth ever since. HCA convenes diverse stakeholders, partners, and elected officials for public outreach, education, and advocacy programs. More than 130 volunteer leaders participate in teams focused on water policy, land conservation, rainwater harvesting, and night sky protection. They have developed extensive mapping resources, concise issue papers, and frequent community events. In only a decade, HCA has already had an extraordinary impact on the region, creating significant public understanding about the threats facing the Hill Country and the actions needed to shape the region's future.

Funding Support

The work of the Hill Country Planning Studio is made possible by generous gifts from Deedie and Rusty Rose, as well as special funding provided by Dean Frederick Steiner and assistance from the Hill Country Alliance.

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HCA Board Members

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Garry Merritt, Vice President
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Karen Huber, Secretary
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Charlie Flatten, Water Policy Program Manager
Shannon Chambers, Communications Manager
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Contents

Figures & Tables

Llano River | Photo: Jim Olive

Terms & Definitions

CAMPO: Capital Area Metropolitan Planning Organization
Metropolitan Planning Organization for the six-county Austin Metropolitan Region: Bastrop, Burnet, Caldwell, Hays, Travis, and Williamson Counties

CAPCOG: Capital Area Council of Governments
Voluntary association working as a regional advocate, planner, coordinator and service provider for 10 counties in Central Texas: Bastrop, Blanco, Burnet, Caldwell, Fayette, Hays, Lee, Llano, Travis, and Williamson Counties

EAA: Edwards Aquifer Authority
Manages and protects the San Antonio segment of the Edwards Aquifer, which provides drinking water to two million people throughout the Hill Country

GCDs: Groundwater Conservation Districts
Local bodies formed by the Texas Legislature or the TCEQ to manage groundwater

GMAs: Groundwater Management Areas
Areas to manage groundwater resources; cover all aquifers in the state

HCA: Hill Country Alliance
A civic group that seeks to protect and conserve the Texas Hill Country

Home Rule City
A city with a population of more than 5,000 residents, which has adopted a charter to define the local government authority and has broad powers including annexation

MPO: Metropolitan Planning Organization
Decision-making body that oversees transportation planning for urban areas greater than 50,000 people

MUD: Municipal Utility District
Created to supply infrastructure such as water, sewage and drainage to new real estate development in areas outside of a municipal water system

TCEQ: Texas Commission on Environmental Quality
Environmental agency for the State of Texas

TIRZ: Tax Increment Revitalization Zones
A political subdivision of a municipality or county created to implement tax increment financing

TOD: Transit-Oriented Development
Focusing mixed-use development in a compact and connected land use pattern in close proximity to public transportation

TPWD: Texas Parks and Wildlife Department
State agency that manages and conserves natural and cultural resources, including state parks

TWDB: Texas Water Development Board
Issues State Water Plans and finances water development projects listed in the plan

UTSOA:
The University of Texas School of Architecture

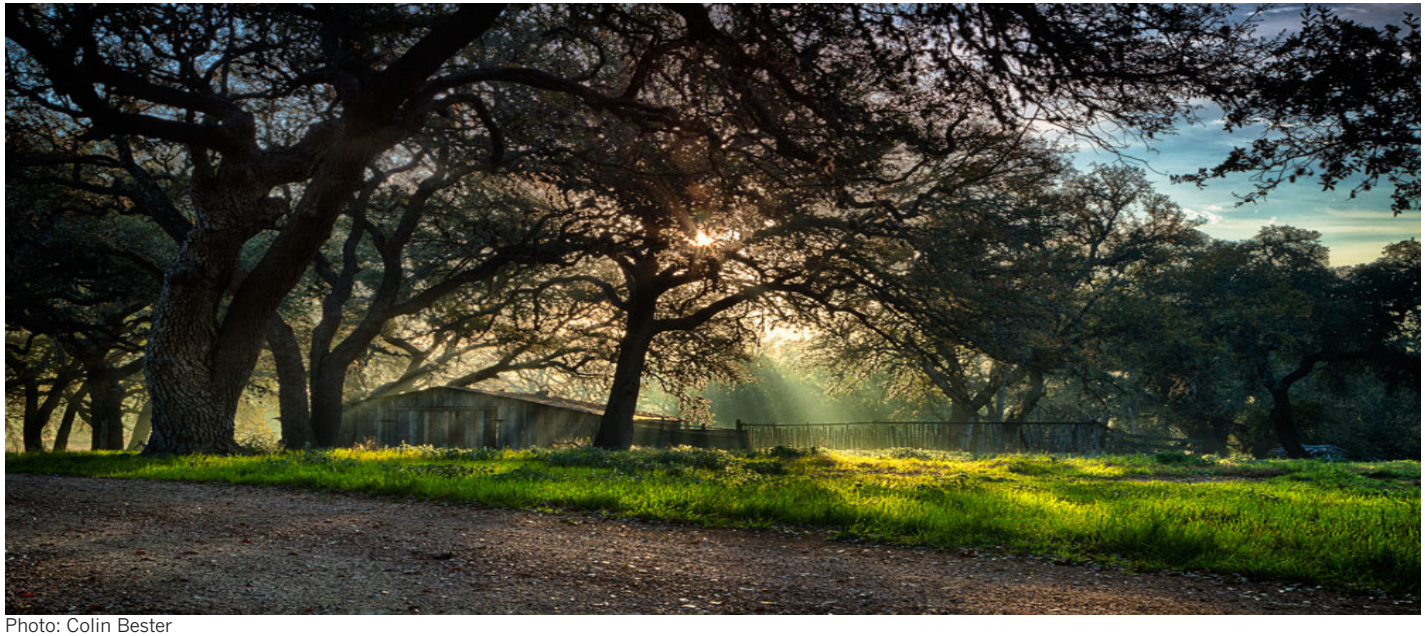


Photo: Colin Bester

Preface

This report summarizes the findings and recommendations of the Hill Country Studio convened by The University of Texas School of Architecture (UTSOA) at the request of the Hill Country Alliance (HCA) in the fall of 2015. HCA is a civic group that seeks to protect and conserve the Texas Hill Country. The Alliance asked the studio to outline strategies that might be used to protect the land and water resources of the Hill Country. This report will provide HCA with a framework for planning and consensus building as they work to protect this special part of Texas.

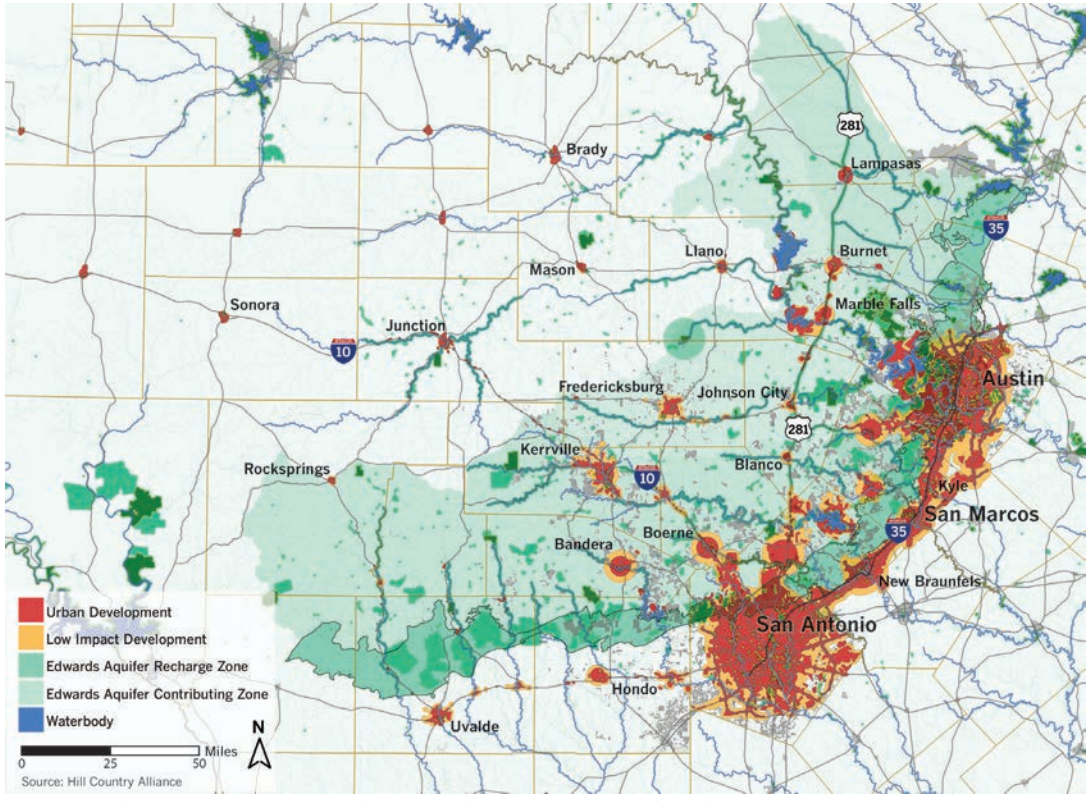


Figure a: Hill Country Draft Vision Map | Source: Hill Country Alliance and Siglo Group

The Alliance provided the studio with a draft "Vision Map," which identifies its preliminary thinking about where development should be encouraged and where conservation measures should be concentrated. The Alliance's draft map calls for the preservation of natural, scenic, historic, and water resources in 17 counties extending westward from the Austin-San Antonio corridor in Central Texas. The two large metropolitan areas and the smaller communities lying between them are among the nation's fastest growing places. As they have grown, suburban sprawl has extended out into formerly rural areas of the Hill Country, threatening its wildlife, scenery, and the water resources upon which the whole region depends.

The studio began its work with a field visit to the Hill Country and meetings with city and county officials, ranchers, and conservationists. Studio participants then prepared case studies on more than a dozen other U.S. regions that have approached large landscape preservation. In many cases these initiatives were led by federal and state agencies, although some were initiated and administered by county governments or voluntary civic groups. This research informed the studio's thinking about the range of options that might be considered for managing growth and conservation efforts in the Hill Country.

The studio has been guided by some of the most respected and knowledgeable practitioners in the fields of urban and regional planning and large landscape preservation in Texas and the nation. Throughout the semester the studio met with key stakeholders, including ranchers, developers, and water, land, and wildlife conservation experts. In October the studio participated in HCA's annual Hill Country Summit in Fredericksburg, where students met with dozens of other stakeholders and residents. This provided an opportunity for the studio to hear from them directly about the issues facing the region and to discuss the role the studio could play in helping to identify strategies to accomplish the vision. The studio continued to meet through the rest of the semester with policy makers and experts, leading up to the Workshop described below.

Hill Country Workshop

The Hill Country Planning Studio, in partnership with The University of Texas at Austin School of Architecture Dean Frederick Steiner, hosted a workshop from November 2-4 to bring together Hill Country stakeholders and local and national experts in regional planning and large landscape conservation to discuss the issues facing the Texas Hill Country today and in the future, as well as strategies to address those issues. Following a tour for out-of-town visitors to the region, workshop participants engaged in two days of large and small group discussions on land and wildlife conservation, water resource management, urban growth management, and related issues. The workshop closed with a large group recap that expressed confidence in Texans' ability and commitment to protect the region's exceptional natural, scenic, and water resources.

Workshop participants offered a breadth and depth of knowledge, experience, and leadership that helped guid the studio's findings and final recommendations, which have been incorporated into this report. While a wide range of thought and analysis was presented, the workshop group drew out a list of major themes and strategies, which are included in the Executive Summary below.

Hill Country at a Glance

Size: 17,760 square miles; 11,366,400 acres[1]
Number of Counties: 17
Percent unincorporated land: 90 percent[2]
State Parks and Natural Areas: 15[3]
Permanently protected land: 3.6 percent[4]
Endangered species: 88[5]
Land value increase, 1997-2007: 215 percent[6]

Population: 3,383,019[7]
Population growth rate, 2000-2010: 25 percent[8]
Portion of Hill Country growth within corridor counties: 96 percent[9]
Projected 2050 population: 6,806,379[10]

Native landscaping | Photo: Andy/Sally Wasowski

Executive Summary

The Texas Hill Country is one of America's most treasured landscapes. Its iconic vistas of rolling hills, spring fed rivers and streams, historic towns and ranches, and abundant wildflowers and wildlife have made it beloved to generations of residents and visitors from across Texas and around the world. In the words of Frederick Steiner, dean of the UT Austin School of Architecture, "If it were anywhere else in the country it would be a national park." However, unlike most other special places, the Hill Country's treasures are fragile and very much at risk. Its limited groundwater resources are mined far faster than they can be replaced by rainfall, its ranches and farms are fragmented by land speculation and subdivisions, while cookie-cutter suburbs sprawl out from the fast-growing Austin and San Antonio metropolitan areas to consume vast amounts of open country.

The region does not yet have the institutions, regulations, and dedicated financial resources needed to protect itself from these threats. The Hill Country Alliance and other civic and conservation groups are working hard to mobilize public attention to these concerns, but they are hamstrung by the absence of effective state, county, and municipal regulations needed to protect the region's land, water, and ecological resources. The state's archaic "Rule of Capture" and water laws that treat surface and groundwater as separate resources make it impossible to protect the region's water supplies. The absence of county planning and zoning regulations in more than 90 percent of the region means that nearly the entire Hill Country is a land speculation "free fire zone." The blind adherence to individual property rights means that everyone's property is at risk due to unregulated land development and abuse of groundwater. Only 3.6 percent of the region's land is currently protected and, unlike most states, Texas has only limited funds available for land conservation. Rather than mobilizing political support for solutions to these problems, the state's political forces are divisive, polarizing, and counterproductive.

Unless these challenges are successfully addressed, the region's natural, scenic, and water resources could, within a matter of years, be permanently lost to future generations. If this were to happen, it would jeopardize the prosperity not only of the Hill Country itself, but also of the Austin-San Antonio corridor, which depends on the Hill Country for its water and other natural amenities, an important part of the quality of life that attracts people to Central Texas.

New pressures are building as a result of the rapid population growth in the Austin-San Antonio corridor, exacerbating land fragmentation and sprawling development patterns. Current growth patterns threaten the wellbeing of Hill Country communities, the desireability of the cities and towns in the corridor, and the natural systems that

support life throughout the region. Sprawling, auto-oriented development increases traffic congestion while rapid population growth contributes to escalating housing prices. These trends are pushing new development out into formerly rural areas of the Hill Country, where they will destroy the region's scenery and wildlife habitats while threatening water supplies and natural resources. More pavement in upstream areas will increase the frequency and severity of flash flooding throughout the region.

However, another future is possible, one in which a new partnership and a shared destiny is established between the Hill Country and the Austin-San Antonio corridor, in effect redefining the Hill Country as a "Greater Hill Country" that encompasses both the corridor counties and the 13 rural counties to the west. Through this partnership, a fraction of the growing economic resources of the urban corridor would be used to finance a bold program of land conservation,

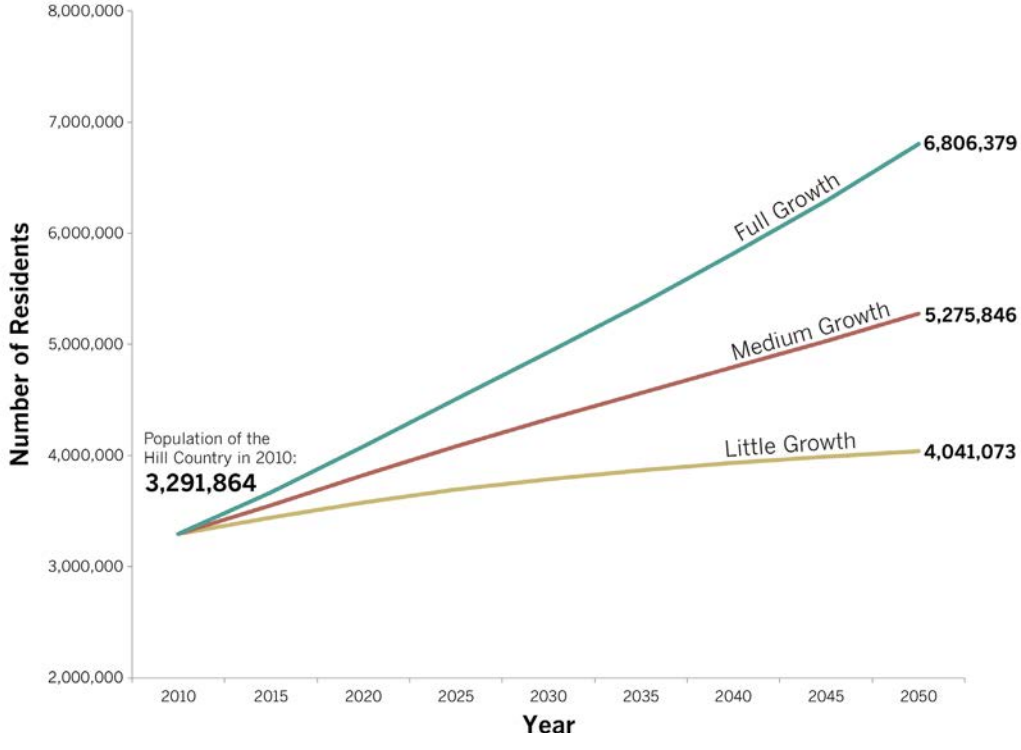


Figure a.1: Hill Country Population Projections

stewardship, and resource protection in the Hill Country. The political power of the urban communities and across the region should mobilize to reform our water and land use laws, and to appropiately fund the institutions necessary to protect the Hill Country.

These efforts, if successful, will give shape to a prosperous future, one that preserves the things that people have always loved about this region: close-knit communities, reasonably priced housing, a rich cultural heritage, access to a beautiful countryside, clean air and water, and short commutes for those who want them. These are all at risk under current low-density development patterns, and can only be sustained by focusing continued population and economic growth in livable transit-friendly urban and suburban centers and small towns across the region.

Milky Way in Hunt, Texas | Photo: Todd Abott Winters

1. Create a Hill Country Endowment

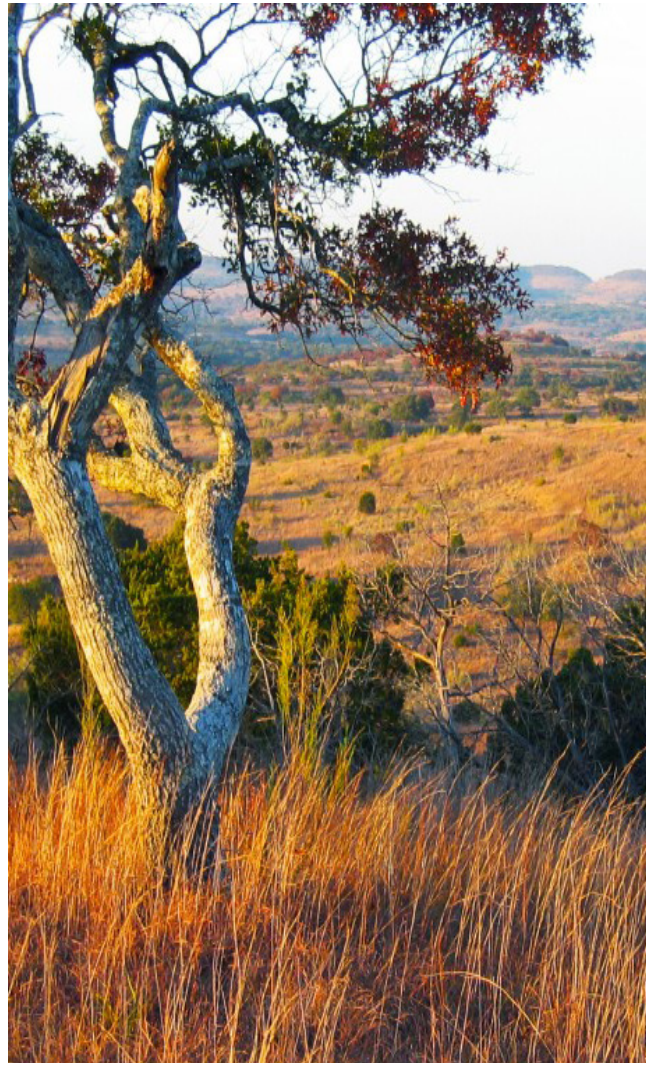
To finance these investments, a Hill Country Endowment (HCE) should be established to promote growth in the right places and patterns, and to protect the region's water and other natural resources. The concept would work as follows: As robust population and economic growth continue in the Austin-San Antonio corridor, a small portion of the increase in economic value, along with other funding sources, would be captured to finance the key infrastructure investments required in urban areas as well as the conservation measures needed in rural areas of the Hill Country. This approach would build on the success of San Antonio's Edwards Aquifer Protection Program and other land conservation initiatives by creating a permanent dedicated fund to support these activities.

Funds from the Endowment will be used to purchase conservation easements, protect aquifer recharge areas, and finance infrastructure in strategically important small towns in the Hill Country. Corridor counties will fund the Hill Country Endowment, knowing that it will ensure abundant, clean drinking water for them by

safeguarding open spaces that contribute to aquifer recharge and protecting surface water from polluted runoff. Endowment funds should also be matched by state and federal land and water conservation funds. Ironically, the federal Land and Water Conservation Fund, established by President Lyndon B. Johnson to promote land conservation in Texas and across the country, has been allowed by Congress to expire. It should be reauthorized and matching funds provided to support Hill Country conservation activities.

In addition to its role in funding infrastructure investments and land and resource protection, the Endowment could also assume the role of a regional planning body, creating an official vision or plan for the Greater Hill Country region and encouraging or requiring that municipal and county plans and regulations are consistent with the regional plan. In this capacity the Endowment would have two critical functions – to coordinate the development of transit infrastructure and support economic growth throughout the region. It would do so in the following manner:

1. Coordinate the development of transit infrastructure around the Lone Star Rail corridor.
2. Support economic growth in the Greater Hill Country.
3. Promote sustainable development practices by:
   - Incentivizing low-impact development in environmentally sensitive lands.
   - Incentivizing transit-oriented development along the Lone Star Rail corridor.
   - Incentivizing model land management practices of private lands.
4. Identify urban utility boundaries.



Brushy Top Ranch in Blanco, Texas | Photo: Texas Land Conservancy

Hill Country Endowment Organizational Structure

In the Texas Hill Country, an easy consensus between all parties is unlikely. However, we believe that the advantages offered by a legally binding agreement far outweigh the costs of protracted negotiations. When complete, this agreement would result in the establishment of the Hill Country Endowment. The roles of the stakeholders would be as follows:

Stakeholders	Key Functions	Role Summary
Rail Corridor Metros	★ Support maintenance of surface water quality and quantity ★ Support efforts along flood prone rivers and streams to reduce flooding risk ★ Supply water for large manufacturers vital to the economy ★ Build support for a regional watershed protection plan ★ Contribute a portion of increasing property values and sales tax revenue to the Endowment	Will play the leading role in providing resources and funding to preserve the Hill Country's water, land, and quality of life values necessary to the continued growth and prosperity of Central Texas
Rail Corridor Small Towns	★ Use Endowment financing to build transit friendly developments ★ Plan to minimize impervious cover and limit sprawl by setting urban utility limits ★ Cooperate with NGOs to conserve land most in need of conservation	Will use Endowment resources to maximize development around rail stops and within municipal boundaries, while protecting sensitive areas in the Edwards Aquifer recharge zone
Rural Small Towns	★ Define rural character through a public process funded by the Endowment ★ Maintain rural character while growing through the use of design guidelines ★ Use Endowment funds for infrastructure improvements	Will use Endowment funds to upgrade outdated infrastructure and create effective development plans for each town's reinvigoration
Counties	★ Participate in identifying lands most suited for development ★ Support efforts to gain more ability to influence development ★ Access capital improvement project funds from the Endowment ★ Partner with large metros to develop a package of attractive developer incentives	Will use Endowment opportunities and relationships to create proactive plans for smarter, less intrusive development patterns in unincorporated areas
Rural Land Owners	★ Take advantage of Endowment educational resources ★ Work with TPWD to improve economic viability of working lands ★ Use Endowment resources and funding to improve and protect ecoloigical function ★ Enhance property values by maintaining the region's scenic beauty	Will manage their lands responsibly and economically by using Endowment funds to subsidize habitat restoration and other important stewardship practices
Developers	★ Use Endowment incentives to densely develop within the urban corridor ★ Enhance the Hill Country's iconic image through conservation developments ★ Reinvigorate Hill Country towns through mixed use development ★ Improve and protect property values by maintaining the region's scenic beauty	Will add to the region's character and liveability by building densely around transit in the urban corridor and more gently across the Hill Country, helping to ensure a positive climate for long-term growth across the region
Non-Governmental Organizations	★ Develop education and outreach programs aimed at various stakeholder groups ★ Launch media campaigns to raise awareness support for the Endowment ★ Connect smaller communities to planning and financial resources ★ Develop a monitoring system to measure and evaluate the Endowment's success at regular intervals	Will shepherd the collective efforts of all stakeholders, providing the glue that keeps them all moving in the same direction, while respecting their rich diversity

Table a: Stakeholder Roles

The Endowment could be funded by earmarking a portion of the increase over time of sales or property taxes, water utility rates, and Tax Increment Reinvestment Zone (TIRZ) funds to capitalize general obligation and revenue bonds. It should be noted that in other regions of the country that have created programs of this kind to protect natural, scenic and other resources, land values have increased in those protected areas; it would be appropriate to capture a small portion of these increased values to help finance the Endowment. While it is impossible to predict what the ultimate funding scheme would be, one possible configuration is illustrated in the chart below:

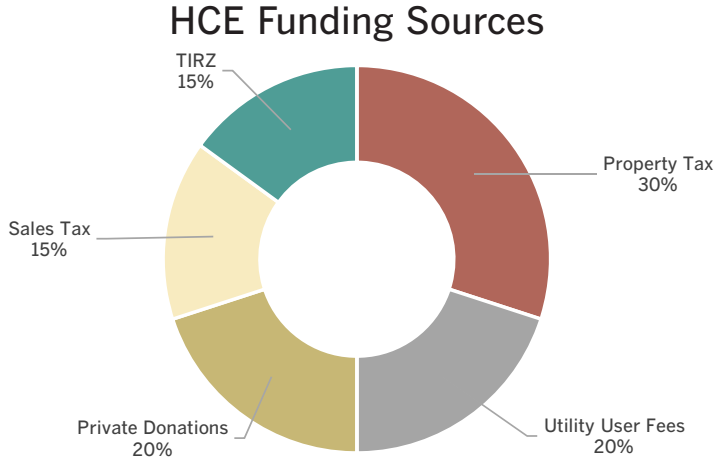


Figure a.2: HCE Funding Sources

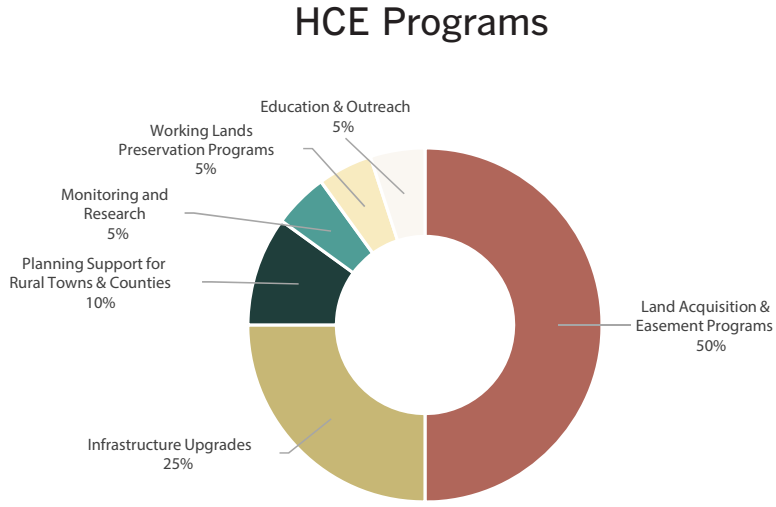


Figure a.3: HCE Programs

In urban areas, the Hill Country Endowment would make investments into urgently needed transit projects, like the Lone Star Rail, which are necessary to allow the Austin-San Antonio corridor to accommodate over three million new residents by 2050. In turn, the urban growth will help finance land and water conservation and stewardship programs throughout the Hill Country. In rural areas, Endowment funds would be used to fund many programs, including purchase of development rights of important conservation lands, creation of municipal land use regulations, economic development strategies, and infrastructure investments in the region's small cities and towns.

Funds could be channeled to counties, municipalities, land trusts, and utility districts to enable them to undertake these activities. This Endowment would support the region's population and economic growth by financing necessary investments in infrastructure and environmental protection required to enable this growth to occur. It would create a vehicle for growth in the region's urban and suburban districts to help finance conservation and other measures in rural areas.

Hill Country Endowment - Mutually Beneficial Results

Each group of stakeholders participating in the Hill Country Endowment will have different needs and will accordingly enjoy different benefits. It is important that the spectrum of programs offered by the Endowment target the needs of each group.

McKinney Falls State Park, Travis County | Photo: Edgar Gallardo

Benefits of the Endowment to Smaller Cities & Towns

- Infrastructure upgrades
- Large landscape preservation
- Economic development
- Planning support and expertise

Benefits of the Endowment to Rural Landowners

- Training and education for the next generation of land stewards
- Subsidies for habitat restoration and other improvements
- Funds for agricultural easements which could re-capitalize ranches and farms
- Awards and recognition for leading land stewards

Benefits of the Endowment to Corridor Cities

- Protection of drinking water quality
- Protection of economic growth
- Opportunity to coordinate strategic planning with surrounding jurisdictions
- Opportunity to increase recreational capacity of the Hill Country

2. Action Strategies

Near-Term Goals

Goal #1 – Generate Scientific Data:
Water management authorities need to have accurate information to make informed decisions that will preserve our water resources. This requires increased scientific research about the behaviour of our aquifers and the relationships between groundwater and surface water.

Goal #2 – Identify Baseline Indicators:
The following indicators and others should be used to track progress in the Greater Hill Country:

(a) Record accurate water table levels
(b) Record transportation trends
(c) Record and track new impervious cover
(d) Record the amount of newly subdivided land
(e) Tally total acres of protected land
(f) Tally total dollars dedicated to protecting land
(g) Design model development standards

Goal #3 – Coordinate Education and Public Outreach:
The public outreach and education goals of the Hill Country Alliance should be expanded with new partnerships and funding sources to bring critical information to elected officials, administrators, and the general public.

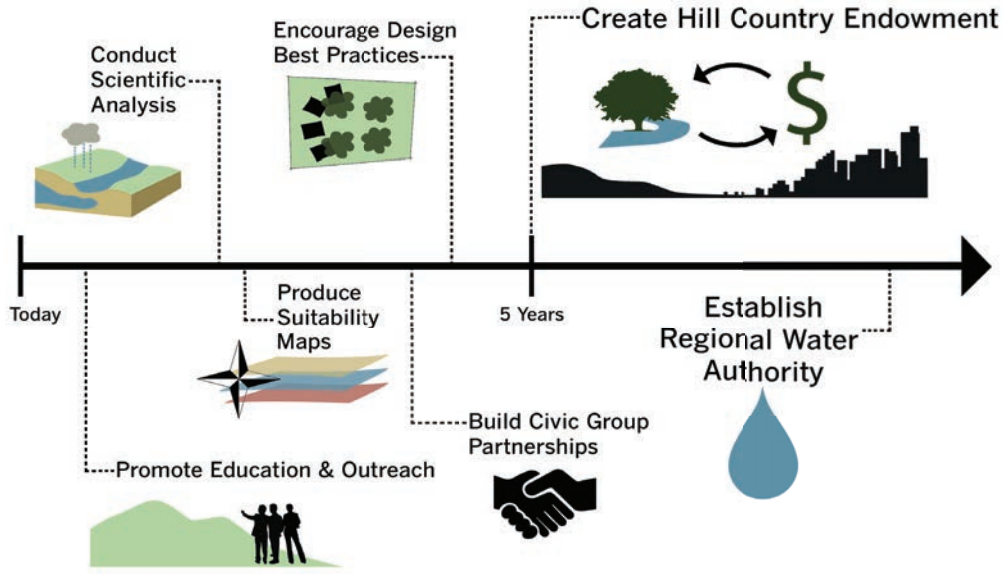


Figure a.4: Timeline of Strategies

Goal #4 – Suitability Mapping:
Suitability maps can lay the groundwork for future efforts to balance development and conservation across the Hill Country region. They provide additional weight and affirmation to the recommendations of the Hill Country Alliance's Vision Map.

Medium-Term Goals

Goal #1 – Create and Sign a Regional Compact:
The Greater Hill Country region needs coordinated management of land use, transportation, water, and economic development. Gaining support for a regional-level regulatory body may be difficult in the current political atmosphere. However, many of the same goals could be achieved through a civic partnership between the Hill Country Alliance and the Greater Austin-San Antonio Corridor Council. Together, with participation from other stakeholders, they could create an advisory regional plan that identifies appropriate locations for development and conservation, proposes locations for transit and other necessary infrastructure, and sets targets for housing production and other facets of development. This advisory plan could provide the basis for subsequent activities, outlined below, including those of the regional compact and Endowment. In other regions – including such disparate places as Salt Lake City and the New York metropolitan area – civic led regional plans have shaped development and conservation activities and infrastructure investments for decades.

Goal #2 – Establish the Hill Country Endowment:
As detailed in the opening of this executive summary, the studio recommends that a Hill Country Endowment be established that could have two functions:

1. An institution that could capture a small share of the region's economic growth to finance needed investments in infrastructure and land and water conservation activities; and
2. A regional commission that could adopt a regional plan and then promote a regional compact in which the region's municipalities and counties would develop plans, regulations, and capital investment strategies consistent with the regional plan.

Creating the Endowment will require a formal working agreement among Hill Country stakeholders, identifying roles and responsibilities for each group engaged in managing the region's future. It is important to build off of cooperative successes in the near term to establish an enduring framework for balancing growth over many decades. There are two critical components of this step:

1. Creating a formal working agreement among stakeholders, and
2. Funding and managing the associated programs.

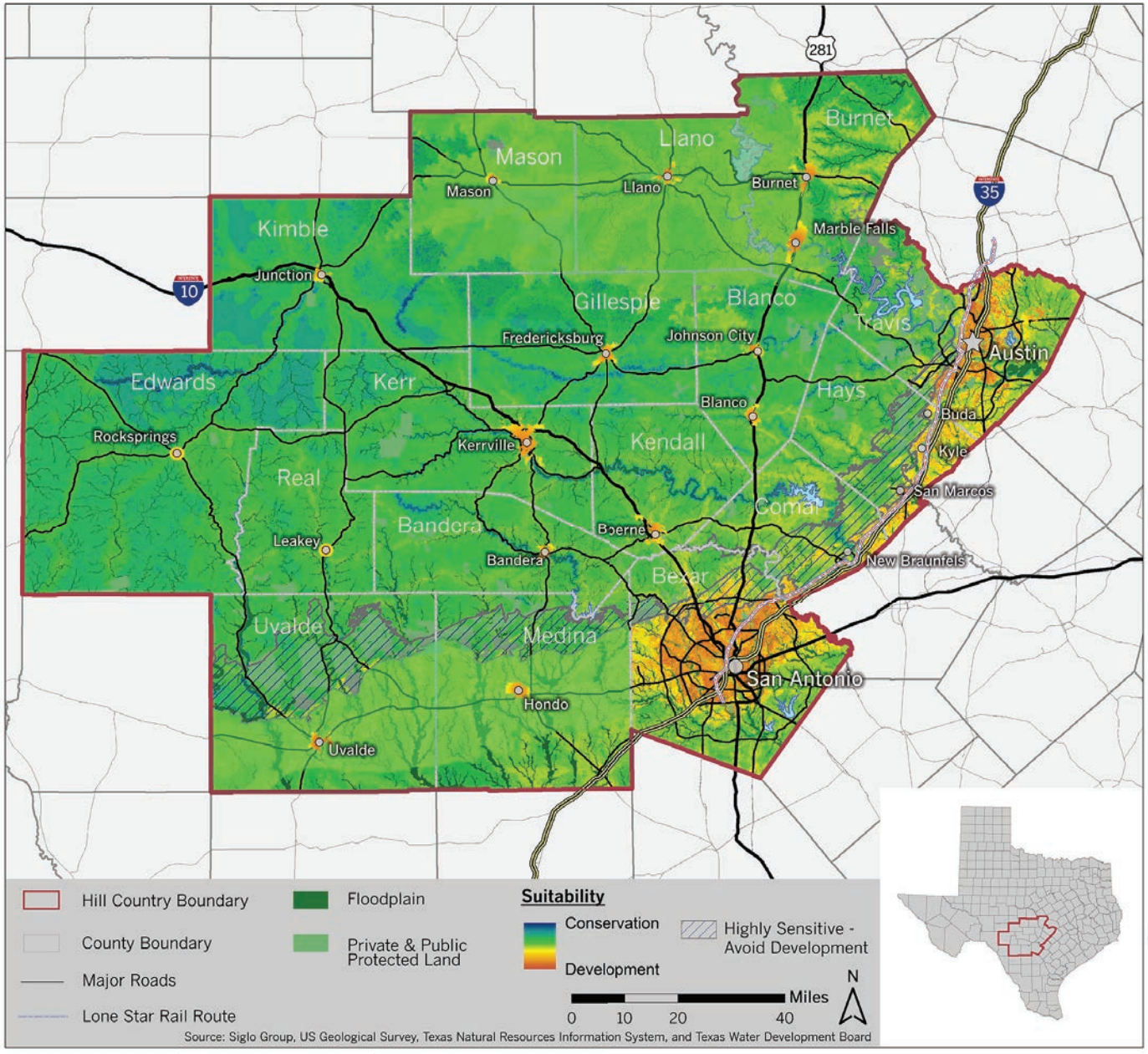


Figure a.5: Preliminary Suitability Map for the Hill Country

Long-Term Goals

All efforts in the region towards coordinated management will fail if required policy reforms are not made at the state level. The State Legislature should recognize that the concerns facing the Hill Country require special consideration in state law. Stakeholders in the Greater Hill Country should advocate for the policy reforms detailed in this section.

Goal #1 – Protect Large Landscapes from Eminent Domain

The goal of protecting land from development is compromised when infrastructure pathways such as roads and electric transmission lines cut through large open landscapes. To make matters worse, properties held under conservation easement agreements are subject to the exercise of eminent domain by governmental entities and utility providers, just like properties that are not permanently dedicated to conservation. In fact, conserved lands often become targets for infrastructure pathways because infrastructure firms and planners perceive conserved lands as large open spaces with few obstructions and few landowners to oppose the project. Changes to state law should improve protections for conservation easements from the exercise of eminent domain.

Goal #2 – Ensure Regulation by Groundwater Conservation Districts

Current groundwater conservation district (GCD) coverage should be reviewed for gaps or unmanaged aquifer areas, and the district boundaries should be extended to cover the gaps. Furthermore, all GCDs should receive sufficient funding to adequately monitor groundwater and administer all of their regulatory duties. Comprehensive GCD coverage and enhanced funding will help prevent unregulated groundwater pumping that compromises groundwater resources.

Goal #3 – Ensure Counties Have Authority over Municipal Utility Districts

Municipal utility districts (MUDs) are currently required to submit applications for approval to the Texas Commission on Environmental Quality (TCEQ). This application requires an evaluation of the effect that the district will have on the groundwater level within the region and of the recharge capability of the groundwater source. It does not, however, require proof of approval from the local GCD or county. TCEQ approval may not reflect local values or priorities for this type of development, and the lack of requirement for a water supply plan or pumping permit

Photo: Karen Bruett

may result in the over-burdening of local groundwater resources once the development is built out. State law should be changed to require MUDs to acquire a permit from GCDs and approval from counties during the MUD permitting process.

Goal #4 – Require Public Disclosure of Real Estate Sales Prices

In Texas, real estate transaction prices are not currently subject to public disclosure. This leaves county appraisal districts without market information that could serve to better inform property tax appraisals and the resulting assessments. One of the risks of not requiring the public disclosure of this information is uneven valuations of commercial and residential properties. In addition to improving the accuracy of evaluations, disclosure of real estate sales prices would also provide important data for planning purposes. State law should be changed to conform with those of most states, which require this disclosure.

Goal #5 – Grant Hill Country Counties Land Use Authority

Proposals to grant land use regulatory authority to counties have been unsuccessful in the Texas Legislature. However, rapid development in some of the most critical aquifer recharge and wildlife conservation zones of the Hill Country presents an urgent need to provide counties with this authority. Establishment of minimum lot sizes and site planning provisions to facilitate preservation of natural areas and working lands, along with regulatory incentives to direct development into small towns, are some of the regulatory tools that counties could use to guide desired development. If counties were able to regulate land use, it would enable them to use their resources more efficiently by planning for the provision of infrastructure such as roads, utilities, and emergency services.

Goal #6 – Create the Hill Country Trinity Water Conservation Area

The actions outlined above respect the Texas tradition of minimal and localized government regulation. Hill Country stewards should carefully monitor the effects of these strategies on the region's economic resilience, water supplies, and biodiversity. If the strategies yield the region's desired outcomes, a new form of regional management could emerge through local initiatives – Texas' very own form of planned regional growth. However, if these strategies do not adequately protect public water supplies, it may be necessary to take additional steps at the regional scale to protect water quality and better coordinate the integrated planning of land use and water management.

To achieve this goal, a new Hill Country Trinity Water Conservation Area should be established to consolidate the current hodgepodge of water management agencies. The Conservation Area would have jurisdiction over the area now under the control of Groundwater Management Area 9. Board members of the existing groundwater conservation districts (GCDs) could serve on an advisory board to the new Conservation Area. This new entity would develop plans and regulatory measures to manage both ground and surface water in the region. Additionally, it could designate "areas of special water resource concern" in which it could regulate developments of regional impact.

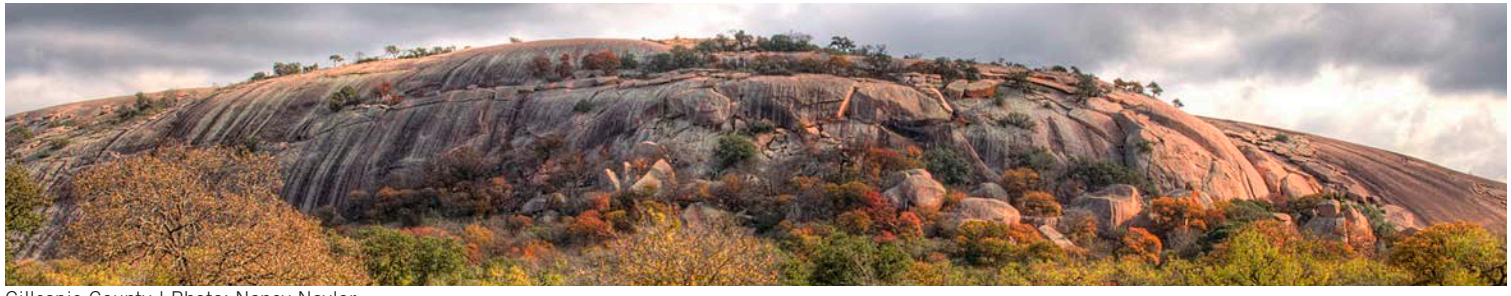
Summary

The goal of this report is to advise the Hill Country Alliance on its future activities and to initiate a public debate about the future of the Hill Country and the steps that are necessary to protect the region's extraordinary economic and natural resources. To initiate this debate we have put forward a number of proposals for new policies, institutions, and investments that could prevent degradation and improve the health of the natural systems that underpin the region's health and quality of life. We have concluded that to protect the Hill Country it will also be necessary to create a new and constructive relationship with the rapidly growing Austin-San Antonio corridor, in effect redefining the whole area as a "Greater Hill Country Region" with a shared destiny. Further, we believe that it will be necessary to transform current sprawling development patterns in the corridor, which are pushing suburban development into the Hill Country's rural areas. These strategies will address the key concerns that will impede the region's future growth: traffic congestion, rising housing prices, and water shortages.

Many of these proposals may be controversial, but we believe that the Texas Hill Country, and these initiatives, are worth fighting for. We are well aware of the challenge of advancing initiatives of this kind given the resistance to new public expenditures and new regulations at the State Capital and across Texas. However, we also have enormous confidence in the ability of Texans to rally around efforts to preserve the Hill Country, this place that is so central to the self-image of our state and region.

We believe that when residents and business and civic leaders comprehend the importance of moving ahead with these measures, and the potential benefits that will follow, they will embrace these and other steps to preserve the region's underlying natural systems.

Let the debate begin!



Gillespie County | Photo: Nancy Naylor

Photo: Rob Greebon

1. Introduction & Beginning

A Brief History of the Hill Country Landscape and its Settlement

The Texas Hill Country, recognized around the world for its stunning beauty, hosts a wealth of natural, cultural, and economic resources within its approximately 17,760 square miles. The Edwards Plateau and the Llano Uplift are the defining geologic features that serve as the foundation for the immense diversity of peaks, valleys, plants, animals, streams, vistas, occupations, pursuits, and people. UT School of Architecture Dean Fritz Steiner has remarked that "If this special region were anywhere else in the country, it would be a national park." Texans have a deep love for this place and for many good reasons. Its history is as rich as the landscape itself. Long inhabited by nomadic Native American tribes, it was a large ecosystem in which rains fed into aquifers that fed into springs that flowed into rivers that flowed on to the sea. Prairie grasses rolled across limestone and granite hills and supported a diverse population of wildlife that drew the tribes that ranged across the beautiful landscape.

Historic Hill Country west of Camp Mabry | Photo: Austin History Center

The Spanish were the first to build more permanent settlements when they established missions and staked their claim to the newly discovered territory. When Mexico gained independence from Spain, and later when Texas gained independence from Mexico, new waves of immigrants arrived from the United States and Europe to settle the wide, untamed lands. The settlers pushed further and further out into the Hill Country from San Antonio and Austin. Battling untamed land, they began grazing livestock on the lush prairie grasses that seemed, at first, to be able to support an endless number of cattle. The invention of the barbwire fence further changed the landscape as large ranches were fenced off and cattle began grazing in pastures rather than on the open range. A select few, such as founder of the Y.O. Ranch, Captain Charles Schreiner, were able to build ranching empires that spanned tens or hundreds of thousands of acres. Most ranchers, however, made more modest livelihoods as the rich prairie grasses began to show signs of overgrazing. Eventually, the land could no longer support such large herds of cattle and sheep. The loss of over 15 inches of top soil is a direct result of these poor agricultural practices.

Even while small towns began to spring up in the Hill Country along rivers and watering holes, the region as a whole remained a sparsely populated place. Some of the

ranches were large enough to become small communities in themselves, but ranchers still bought supplies and raw materials in town. Towns became centers, not just of commerce, but also of culture, providing critical social connections in this sometimes isolated lifestyle. As settlers arrived from Europe through the nineteenth century, they often relied on a network of their countrymen who had come before them to guide their start in this unfamiliar land. Towns such as Fredericksburg, still recognized for its German heritage, developed around a shared cultural background and a desire for connection and familiarity. Before highways were paved across the Hill Country, ranchers making a trip to town would travel in wagons or on horseback. It was not until the middle of the twentieth century that a paved highway system connected these once-isolated ranchers to cultural centers and enabled automobile travel that could take them to town and back in hours instead of days.

The introduction of electricity to the Texas Hill Country was another big step forward for an area that had become impoverished and economically isolated by the early twentieth century. As a U.S. Senator, President Lyndon Baines Johnson, a Johnson City native, was a driving force behind the spread of modern improvements in his home state. Roads, River Authorities, and electric lines made the region more easily accessible, allowing more visitors to experience the state parks and natural areas that had been established in the early twentieth century, built by the Civilian Conservation Corps. Access to the stunning vistas and diverse wildlife helped bring appreciation for this place to an expanding circle of Texans and non-Texans alike. Thousands of school children attended Hill Country campsites in the summers; more and more people grew up with a deep love for the springs, rivers, hillsides, and woods that they enjoyed as children.

Lyndon B. Johnson and Ladybird Johnson in LBJ State Park | Photo: Texas Parks and Wildlife

Making the Same Mistakes Twice: From Overgrazing to Over-developing

The Texas Hill Country encompasses a 17-county area that is bordered on the east by fast-growing Austin and San Antonio and the rapidly urbanizing Interstate Highway-35 corridor that connects these iconic cities. The symbolic and ecological heart of the Hill Country consists of the vast and largely undeveloped area to the north and west Austin and San Antonio, which provides all of the water and much of the quality of life upon which metropolitan residents depend. Rings of low-density subdivisions, strip malls, and office parks are now spreading westward from the corridor cities into the Hill Country, putting the region's surface and groundwater resources, scenery, and wildlife at risk of being permanently lost.

This is the second time since the mid-nineteenth century that the Hill Country's fragile landscape has suffered from abuse of its natural resources. Native prairie grasses grew their deep root systems slowly. Once the cows grazed down to the topsoil, the grasses did not spring back the following year. Without the protection of dense root networks, heavy rains punctuating the dominantly arid climate washed the soil from the hillsides, exposing the bare limestone underneath. Brush plants, once held at bay by a combination of grasses and occasional wildfires, spread out from their rocky abodes, claiming former grasslands for ash juniper and other tenacious water-guzzling plants.[11]

Some of the land in the Hill Country has recovered over the course of the twentieth century, but Texans are making a destructive mistake again. Instead of the cattle economy, the culprit this time is the suburban sprawl based economy, the new cash cow.

Photo: Bruce Rappor

The urban counties of the fast growing corridor contain the indisputable economic and cultural hubs of the region: Austin and San Antonio. These cities attract visitors and residents with their music, history, amenities, and employment opportunities. Serving as anchors for the development corridor, both provide economic and cultural capital to the region as a whole. Populations are growing rapidly: San Antonio can claim the title of seventh-largest city in the country, and at number 11, Austin isn't too far behind. It's not hard to see why. San Antonio is one of the country's top travel destinations and demonstrates a strong identity that includes Spanish and Mexican culture, the Alamo, and

the River Walk. Austin's role as the home of a vibrant live music industry, its entrepreneurial technology industry, and its role as state capital and the home of The University of Texas make it a destination for young people in particular. From an outsider's point of view, it may seem improbable that the corridor is suffering from any ill effects of unrestrained development and population growth. The picture painted in many "Best of" lists may be cheery, but the realities threaten to undermine the very resources and culture that attracted people to these cities in the first place.

As they have for centuries, water and wildlife still attract visitors to the region from throughout Texas. The historic town of Fredericksburg, LBJ National Historical Park in Johnson City, and Kerrville, famous for its annual folk festival and nearby summer camps along the Guadalupe River, represent some of the Hill Country's well-known attractions. Visitors flock to this area for its popular state parks, resorts, wineries, riverside bed and breakfasts and vacation dude ranches. Indeed, Hill Country tourism generated $7.7 billion in direct tourism travel spending in 2014.[12]

Cultural resources in the Hill Country generate a large stream of revenue for the region. In 2014, tourists spent an estimated 57 million person days in the region, at an an average spending rate of $139 per person per day. More than two-thirds of the visitors to the region come from Texas, though the number of visitors coming from around the world increases each year. Almost a third of come for the region's cultural attractions while 13 percent come for its natural beauty and wildlife.[13] Historic preservation activity, an important contributor to the protection of attractive cultural resources, is another source of economic development and revenue for the Hill Country. As indicated in the table below, tourism spending continues to increase annually, although at a slower rate. Texas has seven tourism regions that are leveraging natural and cultural resources for tourism revenue. Protection and enhancement of the Hill Country region's assets will help increase the region's share of statewide tourism spending.[14]

Hill Country Tourism Travel Spending, 2002-2014*

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2012	2013	2014
$ Millions	3,715	3,858	4,246	4,769	5,290	5,662	5,935	5,340	5,839	6,872	7,343	7,734
% Change from Previous Year		4%	10%	12%	11%	7%	5%	-10%	9%	18%	7%	5%

Table 1: Hill Country Tourism Travel Spending[15]

*Note: 2011 Data was not included in the table due to a lapse in recording that year

Protecting the Hill Country's Critical Assets

Wildlife Conservation

Suburban development in the region's four urban corridor counties poses some of the greatest threats to wildlife, yet these counties also boast some of the state's boldest conservation stories. These counties contain all of the federally designated critical habitat in the Hill Country. Federal intervention spurred by the Endangered Species Act forced the state to create a regional water authority for the Edwards Aquifer. Protection of water and wildlife go hand in hand. As stated by aquatic biologist Thomas Ryan, "The high quality water we enjoy from the Edwards Aquifer has been produced by a healthy biodiversity in a well-functioning ecosystem."[16]

Photo: Jason Crotty

Local environmentalists have fought for protection of several species of spring-dwelling salamanders, celebrated songbirds, and recently discovered karst invertebrates. These hard-won victories have allowed counties to create Habitat Conservation Plans (HCPs), which can be effective tools for conserving land in exchange for expedited permits to develop nearby sensitive habitat from the Environmental Protection Agency (EPA). The Golden-Cheeked Warbler and the Black-Capped Vireo are two of the more high profile species whose presence prompted Travis County to create the 30,444-acre Balcones Canyonland Preserve. This preserve expands the critical habitat protected by the Balcones National Wildlife Refuge, formed in 1992 by the U.S. Fish and Wildlife Service.[17] The Refuge was designated an Important Bird Area by Birdlife International and trails on some portions of the refuge were recognized as National Recreation Trails by the US Department of the Interior in 2005. Although habitat protection is vital and can provide unique recreational opportunities, it alone is insufficient for responsible stewardship of water and wildlife in the Austin-San Antonio corridor.

The Edwards Aquifer recharge zone lies beneath the corridor and extends south and westward, another reason why this area is most in need of conservation. While recreational opportunities abound across the entire region, the corridor counties boast some of the most renowned and cherished gems that attract hikers, hunters, and birders. The City of San Antonio and Bexar County worked together to create an HCP for nine federally protected species in

their jurisdictions. This plan, approved by the U.S. Fish and Wildlife Service in December, 2015, will facilitate development activities while protecting wildlife habitat and outdoor recreational opportunities. Unfortunately, five counties — Bandera, Blanco, Kendall, Kerr, and Medina — opted out of the plan.[18] Recreation, conservation, and a small amount of thoughtful development can work together to protect the area's 88 rare, threatened, and endangered species, but it will require identifying critical habitats and conserving contiguous open space.

The sparse population and larger land parcels in the western Hill Country counties put less pressure on the rare, endangered, and threatened species there. As one moves westward, the mix of species changes: spring dwelling amphibians and karst invertebrates give way to more birds, mammals, and plants. Careful stewardship and wildlife management, even on working agricultural lands, provide existing and effective means of protecting habitat, biodiversity, and water quality. Wildlife management in these areas includes hunting to control destructive deer and feral hogs, filling the gap left when large predators were all but extirpated from the region. Texas Parks and Wildlife (TPWD) offers guidance to landowners on how to best manage their land to support wildlife. TPWD's Conservation Action Plan for the Edwards Plateau outlines sound land and water management practices to maximize healthy habitat on farms, ranches, and public recreation areas. The plan also identifies the Species of Greatest Conservation Need and Rare Plant Communities.[19] These resources, complemented with more aggressive regulation by the U.S. Fish and Wildlife Service and a robust culture of stewardship, will help preserve habitat, species, and the rural character of the western Hill Country.

Growth-based Threats to Hill Country Assets

Rapid Growth is Driving the Region's Economic Success but Threatens its Long-Term Potential

The Austin-San Antonio corridor is one the fastest growing areas in the nation, with San Marcos and New Braunfels leading the way.[20] It contains the four fastest growing counties in the Hill Country–Travis, Hays, Comal and Bexar–and is projected to grow 77 percent by 2050. Hays County alone is projected to grow by an astounding 200 percent during that period.[21] While rapid development and population growth have driven a vigorous economy, the projected addition of another two million people over the next forty years creates a perilous situation.[22] This large population increase will put more pressure on limited drinking water, transportation infrastructure, and other public goods and services, especially if our response is uncoordinated and poorly planned.

We Are Running Out of Water

Those two million additional residents pose a real threat to the region's most essential and valuable resource, water, which sustains all life and environmental characteristics of the Hill Country.[23] The Texas Water Development Board makes it clear, "In serious drought conditions, Texas does not and will not have enough water to meet the needs of its people, its businesses, and its agricultural enterprises."[24] State plans to

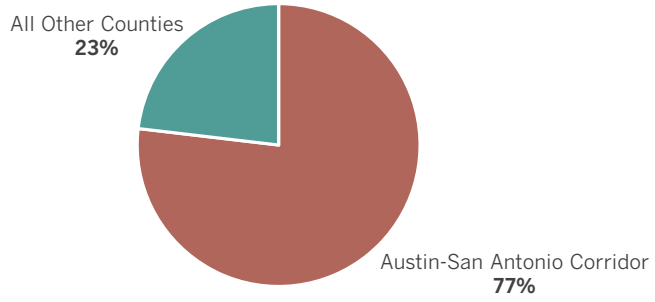


Figure 1: Greater Hill Country Water Consumption[25]

lower aquifer levels to accommodate current demand will exacerbate this shortage and make the region increasingly vulnerable in the future. The Austin-San Antonio corridor consumes the lion's share of the Hill Country water supply and, aside from Austin, relies heavily on groundwater. Much of this economically booming area lies in the Edwards Aquifer recharge zone, which is characterized by karst formations that empty water relatively quickly into the aquifer. That can be good news for water quantity but can spell trouble for water quality. Many of the new residents moving here bring with them a suburban sensibility to landscape maintenance. If current trends continue, they will often replace native grasses with ornamental turf grass, applying fertilizers and herbicides that flow directly into the aquifer. Homeowners near creeks frequently clear out vegetative riparian buffers for creek views, increasing the destructive power of floods.[26] The additional impervious cover from subdivision activity and sprawl increases the risk of flash floods, and threatens the health of the Edwards Aquifer as polluted runoff enters through the recharge zone. Additionally, the corridor and the nearby counties to the west are home to a number of state parks and managed wildlife lands, which depend on the groundwater table for ecosystem health. For all of these reasons, the effects of encroaching development threaten the health of the Edwards Aquifer and the communities and ecoysystems that depend on it.

Vista Ridge Pipeline

Recognizing that water from the Edwards aquifer will be inadequate to meet San Antonio's anticipated water demands, San Antonio Water System has entered into an agreement to pump 50,000 acre-feet/year of water from the Carrizo-Wilcox aquifer. The controversial project would entail construction of a 142-mile, $3.4 billion pipeline. Since San Antonio will not need that water in the near future, opponents fear that the project will open the way to more westward sprawl development as a means to create a market for the "excess" water coming down the pipe.

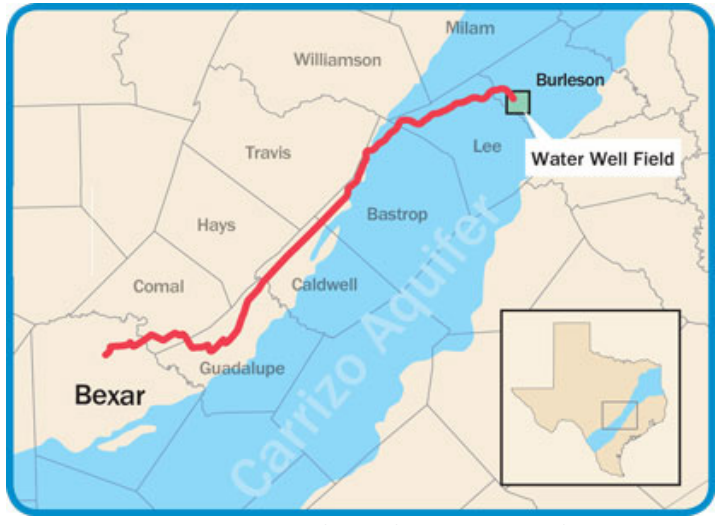


Figure 1.1: Vista Ridge Pipeline | Source: San Antonio Water System

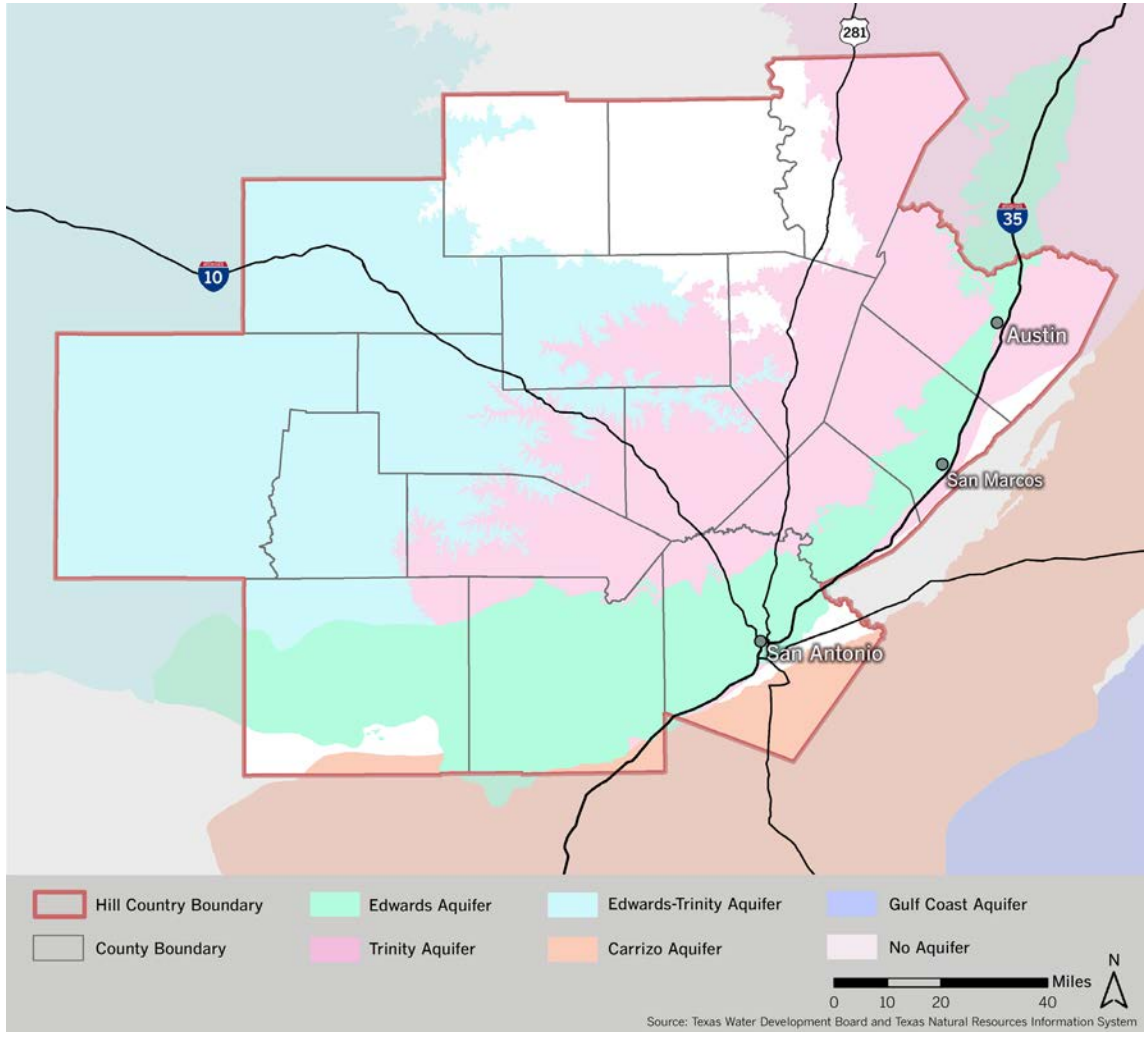


Figure 1.2: Edwards, Trinity, and Edwards-Trinity Aquifers

The Edwards Aquifer contributing zone lies over the western edges of the four corridor counties and stretches over large portions of Bandera, Edwards, Kendall, Kerr, and Real counties. Although the latter counties remain more rural in character and use much less water than their neighbors to the east, their location along the fringes of the steadily suburbanizing corridor places them in a critical position, because they, too, rely primarily on groundwater. As development continues to

move further west into Kendall and Bandera counties, the danger of diminishing Edwards Aquifer water quantity and quality increases, due primarily to the increases in run-off and water consumption that are associated with expanding sprawl. Much of the water used by Hill Country communities is pumped from the Trinity and Edwards-Trinity aquifers. These aquifers have much slower recharge rates than the Edwards Aquifer. Land conservation across the contributing zone will be necessary to ensure future water quantity and quality in the Edwards, Trinity, and Edwards-Trinity Aquifers.

The northern and western reaches of the Edwards Plateau are not facing immediate development pressures, and their water demands are relatively low as the population in these areas is growing at a slow pace. Although land frangmentation and land use change, often associated with rapid population increases and suburban development, are less present in these northern and western counties, proper management of the area's large tracts is very important. Surface water running through Burnet, Kimble, Llano, and Mason counties feed into the Highland Lakes, which provide municipal water supplies to many communities along the Lower Colorado River, the biggest consumer of which is the City of Austin.

In spite of the distance separating these rural counties from their more urban counterparts, water physically unites all of the counties across the Hill Country. Already, surface water sources cannot meet demands in times of drought. As the region grows, ensuring that clean water is available for everyone–residents and businesses alike—will become increasingly difficult. Protecting the quantity and quality of water will be essential to maintaining and improving the economy and quality of life in the Hill Country. Nevertheless, the region is literally, and quite unfortunately, paving its way to a much less prosperous future.

Sprawling Growth and Land Fragmentation Make Protection of Critical Resources More Difficult

The explosive population growth on the eastern edge of the Hill Country can be attributed to a robust and diverse economy, underpinned by the region's higher educational institutions, the state capitol, and a growing number of innovative technology and service industries. As more people, firms, and new institutions move to the corridor, they not only benefit from the many rural amenities located just to the west but also threaten the fragile natural resources and character of the Texas Hill Country. In the absence of county land use regulations, low-density sprawl

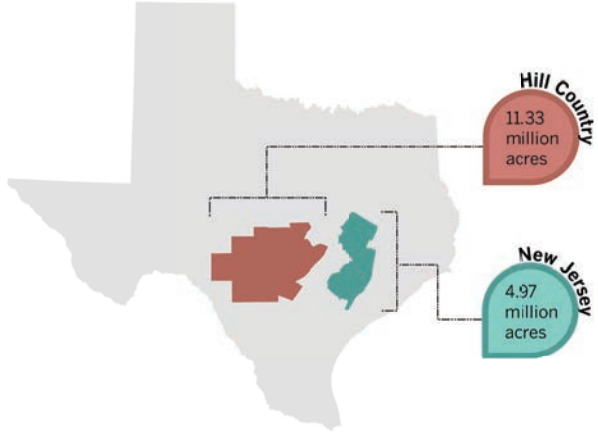


Figure 1.3: Comparison of the Hill Country to the Size of New Jersey

in this portion of the Hill Country is leading to subdivisions and fragmentation of the region's farms and ranches.

As property values continue to climb, development moves ever outward to more affordable unregulated land in Hill Country counties and beyond the reach of municipal land use regulations. Large landscape conservation – at a scale necessary to maintain healthy ecosystems, watersheds, and wildlife – becomes more difficult with increasing land fragmentation. Privately owned farms, ranches, and forest account for 83 percent of land in the state, but these working lands, which can more easily contribute to conservation efforts, are threatened along the edges of the Hill Country's urban corridor.[27]

From 1982 to 2010 in Texas, more than 4.1 million acres of working lands, an area roughly the size of New Jersey, were converted to urban uses.[28] From 1997 to 2007, Hill Country land values increased by 215 percent.[29]

Rising property values and an economy shifting away from agriculture mean that land is being sold in smaller and smaller parcels, often to developers intent on further subdividing the land for small ranchettes and suburban uses.

Texas Cities are Growing Out, Not Up

People are drawn to communities in the Austin-San Antonio corridor because of the economic opportunities and lifestyle amenities available in these growing cities and towns. Since just the beginning of this century the Greater Hill Country has gained over 750,000 people. The urban corridor counties have absorbed 96 percent of the new population during this growth.[30] In economic terms, increases in per capita personal income consistently outpace both the Texas average and the U.S. average. Additionally, annual GDP growth for the Austin and San Antonio Metropolitan Statistical Areas (MSAs) have often surpassed U.S. average GDP growth by one to three percent, even during the years of the Great Recession.[31]

Unfortunately, with this growth come skyrocketing property values and a drastic drop in the availability of affordable homes inside the cities. Growing numbers of workers must commute from suburban towns where they can afford to buy or rent. In Kyle, for example, the monthly cost of housing for both renters and homeowners is lower than in Austin and San Antonio.[32] An astounding 97.4 percent of Kyle's workforce is employed outside its city limits, requiring long commutes to reach desirable jobs and exacerbating the region's traffic problems.[33] In search of housing they can afford and commutes that avoid IH-35, the region's most traveled highway, many of the area's urban residents, new and old, look for housing to the west.

Suburban and Rural Parking Lots

The current suburban paradigm of sprawling, low-density development entails an excessive consumption of acreage and will require huge investments in infrastructure as the region grows. Single-family detached housing dominates the region, even in urban counties, totaling 63 percent of the housing stock and an even larger share of the region's developed land area.[34] This pattern of development demands more roads, utility lines, and impervious cover than do denser mixed-use patterns. Given the limited land use controls in

unincorporated areas, which make up nearly 90 percent of the Hill Country region, suburban and exurban development proliferate unchecked and unplanned.[35] Between 2000 and 2013, the region added 326,000 housing units.[36] A closer look at indicators of sprawl in the Austin MSA shows that 60 percent of single-family detached units are located outside the City of Austin, compared with 41 percent for the San Antonio MSA.[37]

This outward growth of cities not only consumes land suitable for conservation today but will also have crippling effects on city budgets and economic growth in the future. While developers front the costs of building infrastructure, often with the use of Municipal Utility Districts (MUDs), the responsibility of maintaining streets, utility lines, and pipes is usually turned over to the cities. This creates an "illusion of wealth," whereby an immediate increase in the tax base created with little public investment inflates a city's finances on paper, but which backfires when the local government has to pay for the maintenance or replacement of the infrastructure installed by the MUDs.[39]

Fragmented Ranchland is Converting Cows into Condos

Economic and population growth are leading to significant land use change in the eastern third of the Hill Country, adjoining the Austin-San Antonio corridor. Along with the booming population has come a sharp increase in property values. Texas AgriLife Extension and the American Farmland Trust reported 10 years ago that the demand for rural land is now driven by recreational value, aesthetic value, and the proximity to population centers. This "nonagricultural value," or the difference of appraised market land value and agricultural land value, was identified as the most sensitive predictor of changes in land ownership size or future fragmentation. Put another way, in Texas, the rancher's or farmer's property has become more valuable to people as a place to live, rather than as a place to raise livestock or grow crops.[40] Between 1997 and 2012, Texas lost 1.1 million acres of agricultural land to other uses; over half of this land conversion took place in Texas' 25 fastest growing counties.[41] In the Hill Country specifically, 273,500 acres of working lands, or three percent, were lost during this period. This is three times the statewide rate of loss. Eighty percent of the loss in the Greater Hill Country occurred in the four corridor counties, where market values of real estate nearly tripled during the same period.[42]

Compounding the challenges facing ranchers and farmers is the rapid and continuing fragmentation of large tracts of land, which makes it difficult to keep these lands in productive use. The use of eminent domain by municipal utility districts and pipeline and electric generation and transmission companies contributes to fragmentation, with property owners often unfairly compensated for the damage that these takings have on the integrity and economic viability of ranches and farms.

Another challenge is an aging landowner population whose successors will face estate taxes. The aging of land stewards is a trend affecting the entire country; "the largest intergenerational transfer of rural lands in [U.S.] history" will occur during the next two decades.[44] In 2012, full owners operated a majority of farms in the Hill Country. The

average age of operators was 62 years.[45] The federal estate tax exempts land holdings under $5.43 million for the year 2015. Any value above that is taxed at 40 percent. The estate tax is based on the "fair market value," so these taxes are often high in the Hill Country due to the increasing land values and large parcel sizes. Landowners who are land rich but cash poor may be faced with a difficult choice to sell or subdivide their land. As lands continue to change hands, farming and ranching families will need more tools and better information to protect the integrity of their properties.

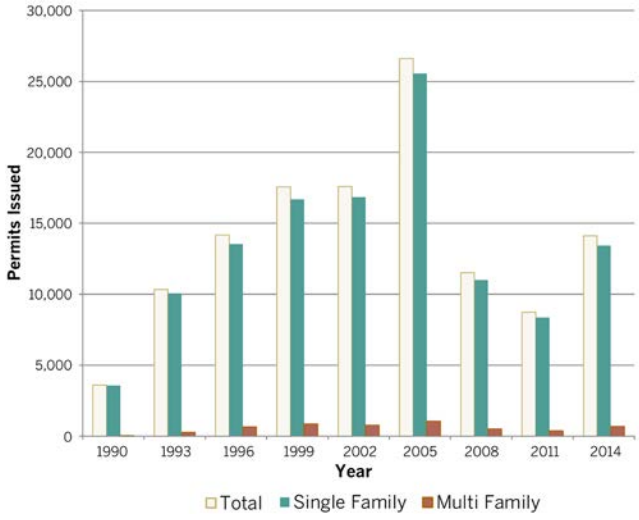


Figure 1.4: Building Permits Issued by Year for New Privately Owned Residential Units[38]

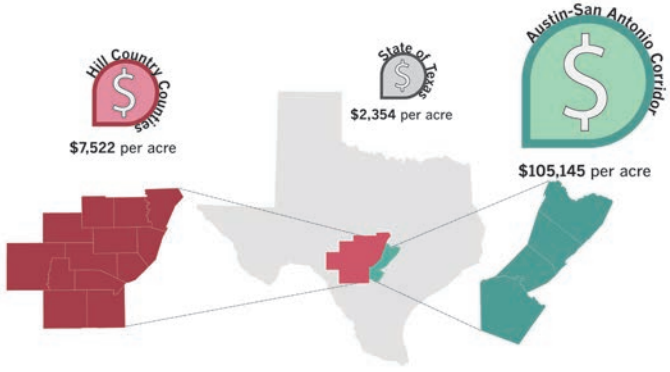


Figure 1.5: Median Land Value Per Acre[43]

Threats from Weak Regulatory Frameworks: Can We Get a Little Help Here?

Outside the large metro areas, few cities and towns in the Hill Country have any form of a Planning and Development Department or planners on staff. The larger communities in the Austin-San Antonio corridor have planning departments, councils of governments, and other planning bodies that enable community and regional planning, which might privilege the metropolitan areas in advocacy and voice for the future of the region. Smaller Hill Country cities and counties should have access to resources for advocacy, planning, cultural resource management, and other activities equivalent to those in the metro areas to be able to protect rural areas and their sense of place. Existing state resources such as the Certified Local Government Program and the Texas Main Street Program have limited reach to assist with these tasks. Assistance in building capacity for these places to plan for the future will be a necessary and important component of a conservation and development strategy for the Hill Country.

A Strong Property Rights Culture that Undermines Landowners' Property Rights

Texans value private property rights. Our aversion to government regulations has kept development controls minimal or nonexistent in unincorporated areas which comprise 90 percent of the Hill Country landscape. Consequently, an upstream riverfront truck stop or sand mining operation, a commercial or industrial project on the other side of the fence, a water export deal taking water out from under the land, or a road or transmission line carving a path across a protected landscape are all common threats and, all to often, realities for Hill Country landowners.

Once one of these threats becomes real, landowners and other community members are frequently surprised that local governments have no authority to deal with many such events that can have devastating financial, emotional, and ecological impacts and long-term consequences for the land, the landowners, and the surrounding communities. This was the case recently in Dripping Springs, where local residents banded together to protest the construction of a concrete plant on the outskirts of town. The movement was named "Stop Dripping Concrete," and it consisted of both private and public action by the City of Dripping Springs. The City Council wrote a letter to the TCEQ against the plant location, while a private lawsuit was filed seeking to stop the project based on concerns over groundwater and air pollution from the plant.[46] In this case, these efforts to stop the proposed plant from becoming a reality prevailed; however, unfortunately these types of reactive efforts are not always successful.

There is a common and strong desire among Hill Country landowners to hold on to the region's unique natural qualities, heritage, character, and beauty. For many landowners, protecting the value and special qualities of this region is what "protecting property rights" really means. Nonetheless, simply protecting private property rights without examining more carefully the implications to our region has made thoughtful, reasonable rules for new development almost impossible.

Property rights advocates with only development interests in mind have been formidable opponents of attempts to establish rules to protect land and water resources. For example, in fast-growing Hays County, planners and elected officials, following the demands of development-driven growth projections, are investing large amounts of public time, money, and expertise trying to convince landowners and other community members that major road and water infrastructure projects are needed. However, landowners are resisting these proposals by telling their elected officials that these plans work against a consensus of broad community desires for quality of life, water supply, land protection, and long-term property values. This story plays out in community after community. In the small community of Driftwood, south of Austin, residents are petitioning county officials not to widen Farm-to-Market roads over concerns that the increased traffic capacity will bring unwanted development and growth.[47]

Texas' Fragmented Water Regulation Framework Does Not Effectively Regulate Water

The State of Texas manages surface water and groundwater under separate regulatory regimes. Surface water is considered state property and managed through permits given by the Texas Commission on Environmental Quality (TCEQ). The state regulates surface water through management plans developed by regional water planning groups which are compiled into the statewide plan by the Texas Water Development Board (TWDB) every five years.

The TCEQ routinely over-commits the use of surface water and, especially during times of drought, this practice can mean economic ruin for industries that depend on permitted surface water. It can also lead to Clean Water Act (CWA) or Endangered Species Act (ESA) lawsuits when river levels drop low enough to affect the function of estuaries feeding into the Gulf of Mexico. The Austin area depends on surface water from the Highland Lakes, which are administered by the Lower Colorado River Authority (LCRA), which holds the TCEQ permits. When lake levels fell during the 2011 drought, rice farmers downstream of Austin were cut off for a period of time due to drought conditions. The LCRA considered the City of Austin's municipal water rights a higher priority than the farmers' rights, even though the farmers had an earlier claim. This system creates the kind of feuds between urban and rural interests that the proposed Hill Country Endowment seeks to overcome. Surface water is simply not effectively managed in Texas, and groundwater management appears even less so.

Under state law and tradition, property rights in Texas stretch "from the top of your hat to the center of the earth," complicating efforts to regulate the use of land and groundwater. Texas is one of the only states in the American West that continues to follow the "rule of capture" for groundwater regulation.[48] In 1904, The Texas Supreme Court ruled against adopting its counterpart, "the rule of reasonable use," because "the existence, origin, movement and course of such [ground] waters, and the causes which govern and direct their movements, are so secret, occult and concealed that an attempt to administer any set of legal rules in respect to them would be involved in hopeless uncertainty."[49] Over 100 years later, hydrological science has pulled back the veil to a great extent, making the state's continued commitment to this outdated groundwater law appear all the more foolish.

In fact, a recent study published in *Nature Geoscience* reports the results of mapping the Earth's groundwater supplies. Far from occult, this precious resource is being measured and analyzed across the globe yielding alarming data about potential shortages we face. For example, "less than six percent of the groundwater in the uppermost portion of Earth's landmass is modern," meaning that only a small fraction of our groundwater will be replenished in this century.[50] These advances and findings underscore the need to fix our water regulation framework, which does not currently effectively regulate water use.

Rather than address the arcane nature of our water law head on, Texas has made piecemeal attempts to regulate groundwater through the creation of groundwater

conservation districts, resulting in a "crazy quilt" of regulatory entities. First, groundwater conservation districts (GCDs) are approved by the Texas Legislature, often following county jurisdictional boundaries rather than natural boundaries of the aquifers themselves. Some counties, such as Comal, have no GCD, making them more vulnerable to exploitation by water mining companies.

Electro Purification

This patchwork approach leaves some areas unregulated. For example in Hays County, the Houston-based water marketer Electro Purification (EP) planned to pump 5.3 million gallons per day from the Trinity aquifer to sell to nearby communities. The company's wells lie within the Edwards Aquifer Authority's jurisdiction, but the authority only regulated pumping from the Edwards Aquifer, not the Trinity, which also lay below the surface. Residents and activists pressured the Texas Legislature to pass legislation expanding the Barton Springs/Edwards Aquifer Conservation District to cover EP's well field. However, this band aid approach only targeted one of many vulnerable areas and may not stop the project from moving forward in the end.[51]

Source: San Antonio Water System

Photo: Ann-Marie Madden Irwin

GCDs maintain limited staffing and budgets to carry out their responsibilities. While some GCDs receive a percentage of the property taxes collected by the county, others rely only on fees for well permits, which are not a reliable source of revenue.[52] After administrative costs are paid, little remains to fund the studies needed to understand local groundwater conditions. The effectiveness of GCDs is further limited because aquifers stretch across multiple county lines.

In the case of the Vista Ridge Pipeline described earlier in this chapter, the two GCDs governing the well field area disagree about the desirability of the project. The Post Oak Savannah Groundwater Conservation District argues that limiting pumping will make them vulnerable to private property rights lawsuits, while the Lost Pines Groundwater Conservation District has argued that future water shortages could also trigger lawsuits. This strikes at the heart of the private property rights paradox in Texas: "Restricting groundwater pumping may be violating a private property right, but that is also an inevitable consequence of unregulated extraction."[53]

Representatives of each GCD working together within a Groundwater Management Area decide The Desired Future Condition (DFC) for each aquifer, which have spatial boundaries that roughly coincide with those of the Groundwater Management Areas. Often, the agreed upon DFC is well below current water levels. In other words, many aquifers in Texas–including the Trinity Aquifer, so important to life in the Hill Country, are managed towards depletion, not sustainable use, if they are managed at all.

Although GCDs can regulate the amount of water pumped from wells and the TCEQ can regulate the amount of water taken from creeks, rivers, and lakes through permits, these bodies cannot influence the nature of development or land use in their jurisdictions. This is counter to common sense and the scientific understanding that what happens on the land has profound impacts on the quality and quantity of available groundwater and surface water. In fact, there is no regulatory body charged with managing development in the Hill Country outside of municipalities and their extraterritorial jurisdictions (ETJ). This lack of attention to the effects of land use on water quality and quanity in Texas water planning refflects a significant blind spot in the system.

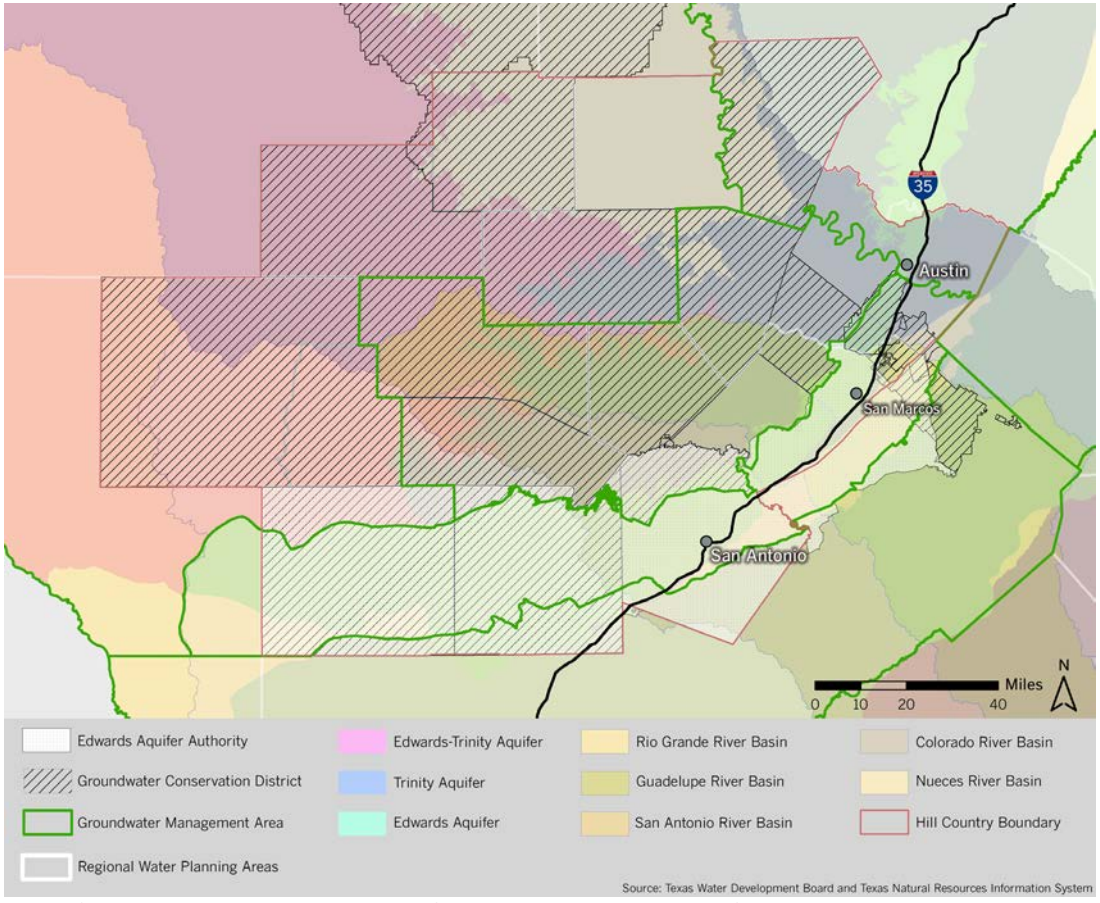


Figure 1.6: Natural and Regulatory Boundaries of Groundwater Resources in the Hill Country

To make matters worse, municipal utility districts (MUDs), usually formed by developers, are typically created to finance water, sewage, and drainage improvements to new real estate development beyond the range of municipal water systems. MUDs can be formed without the consent of neighboring cities or even the counties in which they are located.[54] They are nominally evaluated by the Texas Commission on Environmental Quality but are rarely denied approval. Although there is very little democratic accountability for MUDs, they are frequently granted the power of eminent domain, enabling them to impose themselves on landowners, even those landowners who have committed not to develop their properties by putting them under conservation easements. MUDs can issue bonds to pay for infrastructure costs, immediately have their costs repaid, and then tax new homeowners to repay the bonds. MUDs allow developers to build in areas where there is no existing infrastructure, often for good reason, and are not required to consider the water planning or land use issues that cities must evaluate.[55]

Out of Control: County and Regional Land Use

Not only are there insufficient land use regulation tools in unincorporated areas in Texas, but cities with a population below 5,000 have little say in what development will look like even within their ETJs. These general law cities operate only with the authorities explicitly granted by the Texas Legislature. They do not have the ability to annex land without the permission of the landowner. MUDs are not even required to give them notice of their development plans.[56]

Conversely, larger "Home Rule" cities have the ability to pass their own regulations and laws. These cities have both greater planning power and the ability to annex land without the landowner's permission, which allows for more control over development. Despite these powers, a city's dependence upon property taxes to provide a large portion of their revenue may cause their leaders to feel they have no choice but to annex poorly designed and executed developments near their city's limits. The lack of comprehensive regulatory frameworks in the Texas Hill Country makes the land vulnerable to severe degradation and inefficient, sprawling development.

Pollution and Natural Disaster Threats

Threats to Natural Resources: Air and Wildlife

Unchecked suburban development jeopardizes not only water resources but also the air quality, wildlife, and cultural resources of the Hill Country. Overflowing with international heavy truck traffic and suburban commuters, the IH-35 corridor is one of the most crowded highways in the nation. One-quarter of the 100 most congested stretches of highway in Texas lie between San Antonio and Round Rock.[57]

If the corridor continues to grow according to current development patterns, the traffic situation can only get worse. Anyone who has been in IH-35 traffic understands how unpleasant being stuck in a six-lane parking lot can be, but it's not just a drain on the quality of life and economic

resources. Gridlocked traffic means longer idling times for cars and trucks, which in turn means more emissions that threaten air quality. The Austin area is already close to falling into non-attainment for ozone since the EPA recently lowered its ozone threshold to 70 parts per billion (ppb). San Antonio has had trouble meeting the previous ozone standard of 75 ppb and could face non-attainment status under the new rule. In 2015, Austin had four days above the current standards and San Antonio, nine.[58]

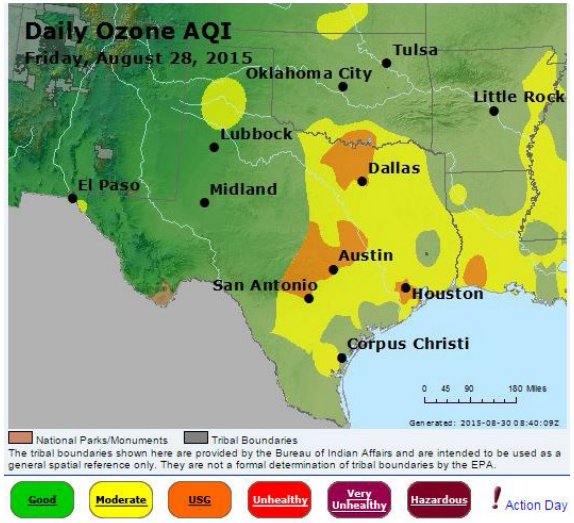


Figure 1.7: Daily Ozone Air Quality Index in Texas for August 28, 2015 | Source: AIRNow

The orange areas on the map above indicate an Air Quality Index unsafe for sensitive groups including children, the elderly, and people with asthma. Note how the orange spreads westward from Austin and San Antonio right into the heart of the Hill Country.

Projected growth along the Austin-San Antonio corridor in combination with oil and gas extraction on the Eagle Ford Shale to the south and east of the corridor could make this already tenuous situation much worse. Non-attainment status would significantly limit industrial development and road construction in the area. As The Capital Area Council of Governments (CAPCOG) reported in September of 2015, non-attainment status for ozone could cost Central Texas between $24 and $42 billion between 2018 and 2046.[59] Even a "marginal" classification could prevent Samsung and Texas Lehigh from expanding manufacturing within the region, lead to delays in infrastructure improvements, and cause temporary losses in federal funding for highway construction projects; this could cost the local economy $21.3 to $37.9 billion through 2046.[60] Clearly, clean air is integral to protecting the Hill Country's robust economy as well as its culture and quality of life. Beyond adverse health effects—such as childhood asthma—and economic impacts, deposition of air pollutants can damage plant and animal life and water quality.

Impacts to federally listed plant and animal species or to their protected habitat could also prove costly to the region. The National Environmental Policy Act (NEPA), Endangered Species Act (ESA), Clean Air Act (CAA), and Clean Water Act (CWA) are the key federal environmental protection statutes that give citizens and activists standing to bring suit against both public and private entities for failing to maintain and protect a healthy environment. As pointed out above, the establishment of the Edwards Aquifer Authority is a result of such a lawsuit. Local governments and agencies in the Hill Country should not wait for the next lawsuit to reactively address problems arising from poorly protected resources.

Litigation, arbitration, and federal monitoring are expensive and time consuming for all involved. Rather than being told what to do by federal judges and agencies, Hill Country leaders should proactively and voluntarily protect natural resources including air, sensitive spring systems, and critical habitats. The vision presented here would be a more "Texan" way to safeguard resources on the Hill Country's own terms.

Extreme Weather Makes Changing Current Development Patterns Even More Urgent

In addition to the rapid changes described above, weather patterns are also changing in the Hill Country. There is growing evidence that this region will experience higher temperatures and more intense rain events in the future. These trends will exacerbate the drought cycles and flash flood events that are already familiar to Hill Country residents.

The region's ongoing five-year drought has made auto-oriented suburban development even less sustainable. Even with the forecast for wetter than normal conditions, return of drought conditions is always lurking around the corner. For example, none of the state was in drought following spring 2015's rains, but 50 percent of the state was in drought just before the Halloween flood of 2015. As State Representative Andy Murr told the audience gathered at the Hill Country Leadership Summit in 2015 "We are always in drought. The next drought starts as the last drop of rain falls."[61] In a region facing surface and groundwater shortfalls, prolonged dry conditions damage critical habitat, agriculture, and wildlife, with potentially serious economic and legal consequences. Drought also sets the stage for greater number, frequency, and strength of wildfires. Water-slowing plants die and water-hogging invasive plants thrive, setting the stage for more destructive floods and wildfires that will be increasingly difficult to fight, all the more so in far-flung suburbs.

Bastrop Fire in 2011 | Photo: Austin American Statesman

The 2011 fires in Bastrop County, situated directly southeast of Austin, claimed two lives, destroyed over 1,600 homes, burned almost 35,000 acres, and resulted in $400 million in losses.[62]In October of 2015, wildfire ripped through an additional 4,000 acres in Bastrop County, a reminder that this threat persists and may occur more frequently in the future. Land fragmentation and population growth in previously rural areas increase both the frequency of wildfires and the potential destruction of property and life.[63]

As suburban development moves out into the juniper-covered hills of these counties, wildfires could become exponentially more deadly, costly, and difficult to fight. Fighting fires puts more strain on water resources and the use of flame retardants containing nitrogen and ammonia poses additional threats to water quality and wildlife.[64] One of the direct impacts of wildfire is increased runoff and erosion due to the absence of vegetation resulting in increased water pollution and flooding.[65]

Flooding is a Big Deal

The Hill Country has long been known by another name, "Flash Flood Alley." Again, suburban sprawl and extreme weather have both exacerbated this powerfully destructive force. Increased impervious cover, hilltop development, and less vegetation and topsoil make the increasingly severe rain events even worse. Record rains in May 2015 resulted in what was described as "one of the most destructive flood pulses in modern history" from the city of Blanco through Wimberley to San Marcos.[66] Some residents described the Blanco River flood as a "100 mile long tornado," that caused tens of millions of dollars in damage to private property as well as to roads and bridges.[67] The Memorial Day floods also killed 27 people across the state.[68] Five months later, in October 2015, flooding claimed another six lives.[69]

The Bastrop fires, recent disastrous floods, and record drought appear to be the new normal for this part of the country. Combined with the projected water shortages, these life threatening weather events point to the urgency with which Texans must act to protect Hill Country assets and lives.

Call to Action: The City Needs the Country, the Country Needs the City

Participants in the Hill Country Workshop strongly recommended that current open space preservation programs be ramped up and financed by a set of permanently dedicated taxes and user fees, private philanthropy and matching state and federal grants. This program will be essential if the region is to protect surface and groundwater supplies, wildlife habitat, ranch and farmland and its tourism economy. For this reason, the studio recommends that the region's most important open spaces be permanently protected. This effort would build on recent successes by the Cities of San Antonio and Austin and U.S. Fish & Wildlife Service in protecting hundreds of thousands of acres of aquifer recharge areas and wildlife habitat. This bold land conservation goal

Blanco River Flood in 2015 | Photo: Houston Chronicle

can be achieved using a broad range of techniques, as described in the call out box on the following page, and financed by the Hill Country Endowment, described later in this report.

We further recommend that a suitability mapping process described later in this report, in conjunction with a robust stakeholder input process, be used to identify priority lands to be protected. It is expected that a detailed analysis will determine that several hundred thousand—or even millions—of acres of Hill Country land will require permanent protection.

Achieving these ambitious land conservation goals will require creative use of a broad range of conservation techniques, hundreds of millions or even billions of dollars in public and private philanthropic funding, and a range of new land use and water management regulations. Conserving this much land will also require the cultivation of political will over an extended period of time. The Hill Country Alliance can help build public support and political will and have the staying power over the years or even decades that may be required to achieve preservation of the region's scenery, wildlife, ranches, water resources and rural way of life. Civic groups in New York, Chicago, Philadelphia, the San Francisco Bay Area and other regions have played a similar role in these places for decades, with considerable success.

Realizing this goal will require that development pressures be taken off of the Hill Country's most significant and threatened open lands and be focussed instead into the region's existing urban and suburban areas, and in the Hill Country's existing towns.

Within the corridor, the Austin-San Antonio Corridor Council could lead advocacy for these new development and mobility patterns, while the Hill Country Alliance maintains its focus on the region's more rural areas. A partnership between the Hill Country Alliance and the Corridor Council could therefore be instrumental for establishing the land conservation, new public revenue streams, regulatory changes, and mass transit required to permanently sustain the region's environmental quality, resources, livability and economic vitality.

Sustaining the success of the booming metropolitan areas along the corridor will require that the entire region maintain a high degree of environmental health. Access to clean, abundant water, recreational opportunities, and

Native Landscapes | Photo: Jonathan Vail

beautiful places to live and work will continue to be important parts of the amenity package offered by these urban centers. Open spaces across the Hill Country help provide clean water and air as well as wildlife habitat
important for healthy ecosystems. The Central Texas economy relies on these natural resources not just to survive, but also to thrive.

The Hill Country's rural areas, on the other hand, rely on the economic benefits that tourism and seasonal and retirement housing provide. Many of these visitors, seasonal residents, and retirees come from the Austin-San Antonio corridor, seeking a beautiful and healthy Hill Country Landscape. But, maintaining the health of these lands requires stewardship, which is expensive. Ultimately, it will require the financial resources and political muscle that only the corridor communities can provide. Rather than letting business as usual pit urban against rural concerns, therefore, both groups must find common cause in regional conservation efforts to ensure the success of the urban corridor while preserving the country in the Hill Country. Both will need to cooperate to create more effective regional planning, land conservation, and water management systems across the region.

The Critical Role of the Lone Star Rail Corridor

As noted earlier in this report, promoting more compact development in existing cities and suburbs will minimize land consumption in rural areas of the region. To that end, the future of the corridor could be transformed by the construction of the proposed Lone Star Rail line. Each station along this route could become a magnet for compact, transit-oriented development. If Austin and San Antonio were to follow the lead of Dallas and Houston in creating extensive light rail networks, similar opportunities would be created in dozens of places throughout these cities and their suburbs.

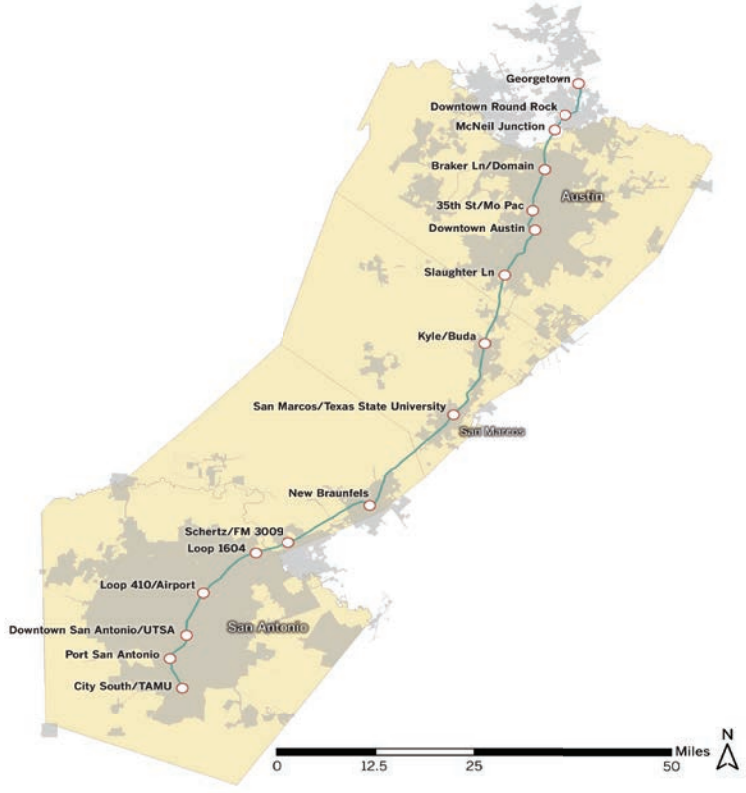


Figure 1.8: Proposed Route for the Lone Star Rail | Source: Lone Star Rail District; TNRIS

If all of these steps are taken, development pressures on open land in rural areas of the Hill Country would be significantly reduced. Where development must proceed in rural areas, it should be focused in the region's numerous small cities and in conservation developments designed to minimize land consumption.

Before the steps leading to the establishment of the Hill Country Endowment are presented, this report will first lay out two alternative futures for the region. The first is about letting current trends and policies continue–a "business as usual" scenario–and it doesn't have a happy ending. The second alternative scenario for the future describes a world class Hill Country that people across the region can create together.

Open Space and Preservation Techniques

Open space and natural lands are an essential part of the region's infrastructure portfolio, providing myriad services to our communities, and worthy of significant investment. They can be protected through a number of different techniques, requiring different levels of funding, technical expertise and political will. The City of Austin, the City of San Antonio, and Travis and Hays Counties have pursued some of these techniques. They should continue to expand their efforts, while other governments in the region join in.

Here are the techniques that are most frequently used to achieve land conservation goals across the country:

- **Fee-simple Acquisition:** Purchase of all of the rights inherent in a piece of land is perhaps the most expensive way to protect open space, requiring that 100 percent of the fair market value of a property be paid to the property owner. But it is also the most reliable and permanent preservation technique, and one that permits public access and intensive management for water quality, wildlife, scenic protection and other purposes. With the land, however, come expensive stewardship costs.

- **Conservation Easement:** Under this tool, development rights are purchased, usually for a fraction of the fair market value of the land itself. In places where land values are high and development potential is strong, easements can cost up to 80 percent of the total fair market value. Where development pressures are week, easements can cost only a small fraction of total value. Easements are frequently donated to land trusts and other conservation groups, and donors can take advantage of state and federal tax advantages for the value of these donations. An important benefit of this technique is that land can continue to be managed by private landowners, to the benefit of all.

- **Transfer of Development Rights (TDR):** Under TDR systems, development rights are transferred from "sending zones" where land conservation is desired, to "receiving zones," where conservation values are low and infrastructure is available. These systems are complicated to design and it is often difficult to calibrate the values in both sending and receiving zones to create an efficiently functioning market for development rights.
- **Conservation Subdivisions:** Also called "limited development," these projects cluster development on the portion of a property most suited for development, and least important for conservation purposes. Areas left undeveloped can be protected through conservation easements. 90 percent or more of the land area of a property can be preserved in this way, often at no loss of value to the developer. A well-designed, well-sited conservation development project can create value that accrues to the developer and landowner.

- **Conservation Zoning:** Zoning can be used to protect open space, through designation of lands in agriculture or conservation zones. Typically a limited amount of development is required, often with very large minimum lot sizes or with requirements or density bonuses for conservation subdivisions.

- **Regional Commissions:** Regional commissions created by federal or state governments can protect sensitive lands containing exceptional scenic, wildlife, recreational or other resources through the creation of conservation districts. Often these commissions span one or more counties and in some cases, such as the Lake Tahoe and Columbia River Gorge Commissions, multiple states.

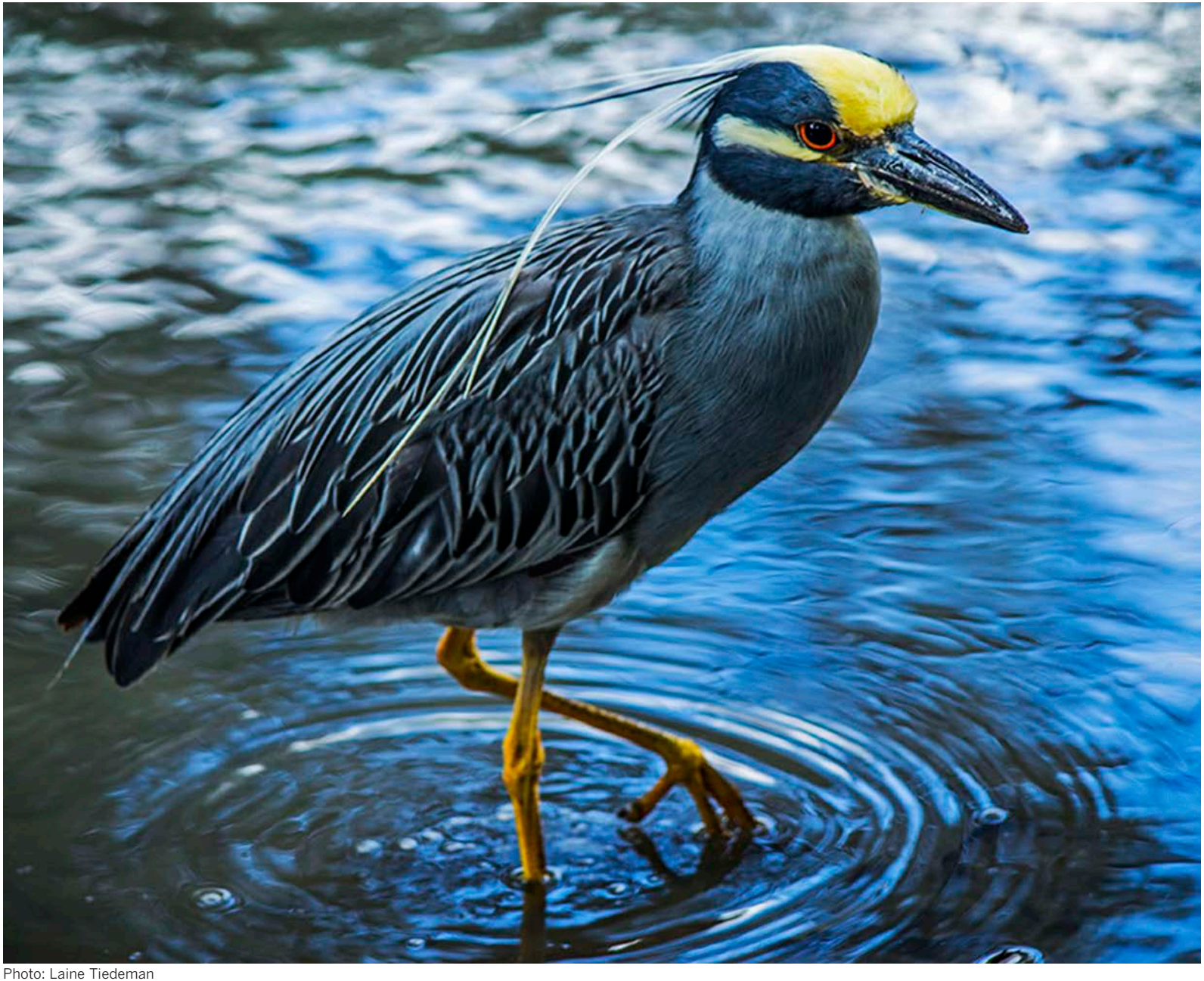


Photo: Laine Tiedeman

2. Comparison of Future Scenarios

Will the Hill Country Keep Growing?

The Austin-San Antonio corridor has experienced explosive growth over the past generation. In this portion of the Greater Hill Country region, both population and annual Gross Domestic Product (GDP) have increased at faster rates than much of Texas and the rest of the United States, even surpassing dominant cities like New York, Los Angeles, and San Francisco. Austin, San Antonio, and San Marcos have all absorbed domestic and international migrants, and these newcomers have brought new skills that drive economic growth and improve the quality of life for the inhabitants of Central Texas. Many of the graduates of Central Texas' nearly two dozen colleges and universities stay here to launch their careers and in many cases form new businesses, contributing new ideas and energy to our innovation economy.[70]

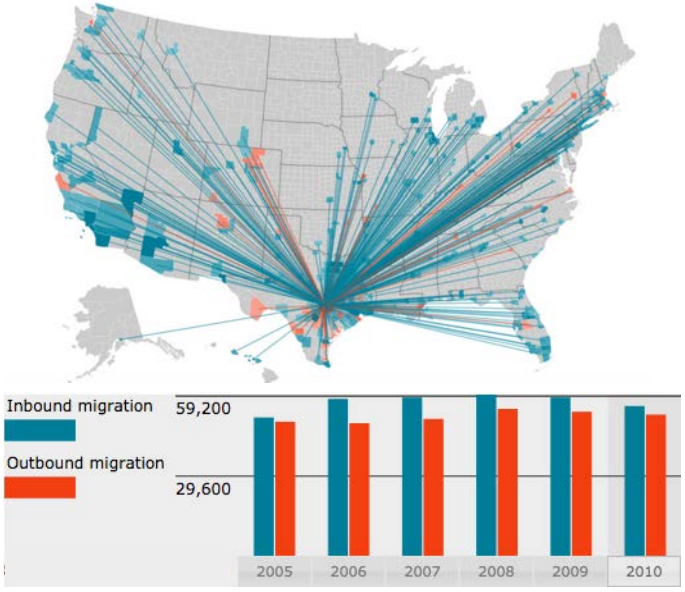


Figure 2: In-Migration Map, 2005-2010 | Source: Forbes

Not every county in the Hill Country has or is projected to experience the pressure of population growth or the good fortune of rising economic output. Indeed, the region's western counties have grown little over the past five years and in the future may even see a slight decrease in population.[71] Nevertheless, they play an important role in the growth trends facing the region. They are also beneficiaries of the economic success of the more urbanized counties

The central logic of our analysis of the Hill Country is that it is, indeed, one region. What is best for the Austin-San Antonio corridor is best for the rural ranch lands of the western counties, and what protects the natural resources of those central and western counties is best for the urban inhabitants and businesses in the corridor. People have been choosing Austin, San Marcos, San Antonio, and other Hill Country cities over the rest of the United States because

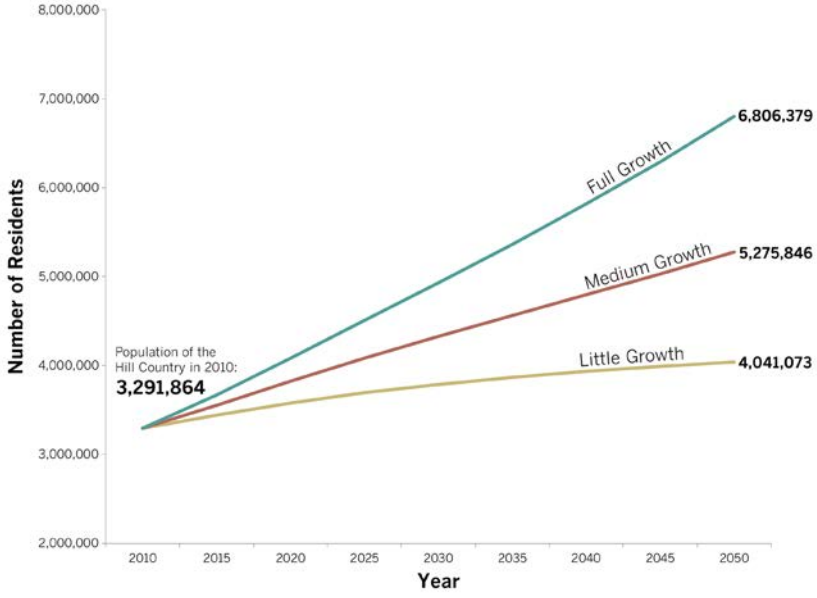


Figure 2.1: Population Projections for the Hill Country

they know that they have employment, education, cultural, and lifestyle opportunities here. That is why people can be expected to continue to come.

Using data from the Office of the State Demographer and the Texas State Data Center, the Hill Country Studio has traced different population growth scenarios every five years until 2050. These scenarios are outlined below.

These forecasts envision a 2050 population in the Hill Country between 4,041,000 and 6,806,000. The lowest estimate of about four million residents assumes that *no one* will immigrate into the Hill Country—an implausible scenario given historical trends and the amenities that continue to attract newcomers. The middle estimate, which projects a total population of 5,276,000, representing a growth of about 1,983,000 additional people during the next 35 years, applies a conservative in-migration rate to the Hill Country. Specifically, it takes the in-migration rate seen in the Hill Country between 2000 and 2010 and divides it in half. It therefore assumes that people will continue to migrate to Central Texas but at a significantly slower rate than we have recently seen. The highest projection, assumes that the in-migration rates of 2000 to 2010 will continue for another 35 years. Thus, it assumes that the 2050 population will total about 6,806,000—a doubling of today's population.

While more people does mean a growing demand for resources like land, water, and food, more people also means that the region will have a larger economy to tackle problems associated with these growing pains. More people means more creative ideas and greater economic assets to finance both urban infrastructure

and investments in conservation of the Hill Country's natural resources. These investments will also underpin the region's continued growth and success.

The Greater Hill Country should embrace robust population growth and see it as an opportunity to build a region that is distinctly Texan—a place that is not only economically vibrant and globally competitive, but also in balance with the natural resources that undergird the economy. A doubling of the population need not be a threat; instead, it can create the opportunity to build right and to fix our past mistakes. The alternative is stagnation, where the 17 counties that make up the Hill Country only welcome another 21,000 people annually, and the other 80,000 people, who would have chosen Central Texas if things were right, will go elsewhere in the country to pursue their careers

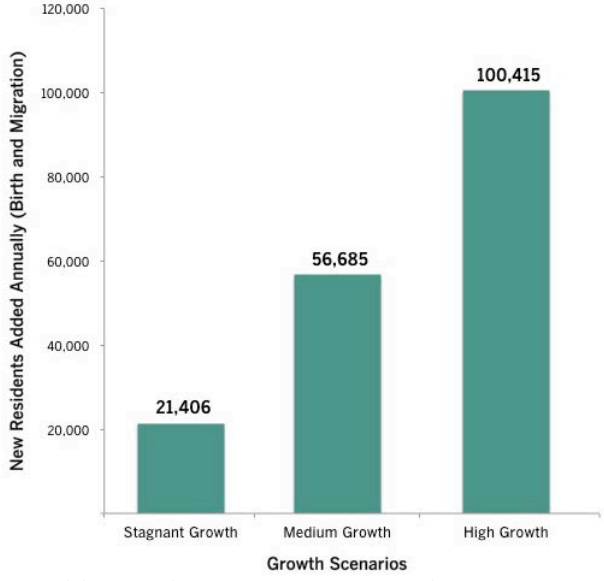


Figure 2.2: Annual Growth Averages for Different Scenarios in the Hill Country

and passions, work with their communities, and raise their families. The Hill Country can absorb 100,000 people a year for the next 35 years, but only if the region plans well.

If we were to grow in the right way, it would lead to unmatched opportunities that would improve the quality of life for all citizens and show the rest of the country—and the world—that there is a way to develop while protecting the natural resources that make a place so beautiful and distinct. The Hill Country can be that place, but only if it grows in the right way. So, the question stands: How will we grow?

How Will the Hill Country Grow?

Where will these additional 3.5 million residents live, work, and play? The counties along the Austin-San Antonio corridor are expected to absorb 93 percent of the new population. How these urban areas grow will determine the fate of the entire region. The region has recently accommodated growth by developing large expanses of low-density land uses, even in urban counties. Compared to high-density development, these patterns result in more impervious cover per person, increased commuting times and costs, and more consumption of land that is valuable for water management and recreation.

However, the Hill Country is currently faced with a unique opportunity and incentive to change how it uses its scarce land and water resources. We propose a new vision for how this region will grow: one that preserves a sense of place, one that protects virtually all of its ranch and farmland and

habitat, focusing rural development in and adjoining existing rural cities and towns and in well-designed conservation subdivisions that preserve open land and scenic vistas. This vision includes fiscally and environmentally sensible development in low-density areas enabled by smart, dense growth in the region's urban areas.

By concentrating growth in the Austin-San Antonio corridor around Lone Star Rail stations, the Greater Hill Country can absorb more people within its existing urban footprint than would otherwise be possible. Density in the right places could decrease highway congestion and air and water pollution, and help temper rapidly escalating housing prices, all while preserving the valuable land to the west of the corridor. This land currently acts as an intricate, irreplaceable asset for providing this region's most precious resource: water.

Not everyone wants to live in a dense, transit-oriented development, and for this reason it will be important to plan for development in the Hill Country's rural areas and small cities. Even in suburban and rural areas, how we grow impacts the health of our region's precious resources. These can be protected by promoting conservation subdivisions which can preserve and in some cases restore the quality of the region's wildlife habitats and natural systems. The table below summarizes the key differences between development as it occurs today, and what could be possible with a new vision for the Hill Country.

Metrics for Comparing Outcomes

The Hill Country is growing quickly due to the high quality of life and economic strength of the region. But how we develop is as important as how fast. To assess different growth patterns for their potential impacts on the region, we estimated metrics representing land consumption, water quality and quantity, storm water management, and commute times. A full discussion of our analytical methods is included in the Appendix of this report.

CATEGORY	BUSINESS AS USUAL	A NEW VISION FOR THE FUTURE
Housing	Low-density, single family housing	Housing density varies throughout region
Land Use	Segregated land use	Mix of land uses in designated areas
Travel Time	Long travel times to urban job center	Shorter travel times to distributed job locations
Travel Mode	Few alternatives to automotive travel	Reliable alternative for regional travel
Land Consumption	Ever expanding urban/suburban footprint	Preservation of valuable land west of corridor
Cost of Services	Vast, expensive infrastructure and higher taxes	Compact, efficient infrastructure and lower taxes
Scenic Views	Degradation of scenic hilltops and views	Preserved Hill Country heritage and beauty
Water	Contamination and reduction of aquifers	Nature stores and filters water resources

Table 2: Comparison of Scenarios for Future Development

Land Consumption Impacts

The ever growing impervious cover in the Austin-San Antonio corridor confirms the claim that development has been sprawling at the edges of the region's urban centers. From 2000 to 2010, approximately 51,380 acres of pervious cover were lost in the Hill Country[71] with 93.4 percent of this change occurring in the counties along the Austin-San Antonio corridor.[72] The number of acres covered by concrete, asphalt, or roof per person varies depending on the compactness of development throughout the corridor, but on average, from 2000 to 2010, 77 acres were converted to impervious cover for every 1,000 new residents.

Each of the following metrics is dependent upon the extent and pattern of development. Because 93 percent of the population growth is expected to be concentrated in the four counties along the Austin-San Antonio corridor (Travis, Hays, Comal, and Bexar) the amount of land consumed depends largely on how these specific counties develop. These counties contain valuable and sensitive natural resources. Even in and around urban areas, developors and planners must proceed carefully. To gain a sense of how much land will be necessary to absorb all of the growth anticipated in the urban corridor, the studio evaluated three density scenarios. The chart on the facing page shows the amount of land that will be consumed between 2015 and future years under these scenarios.

Developing densely in the right places reduces not only the overall land area consumed, but also the amount of impervious cover per person. It preserves more land in its natural state, benefiting surrounding communities. Appropriately planned,

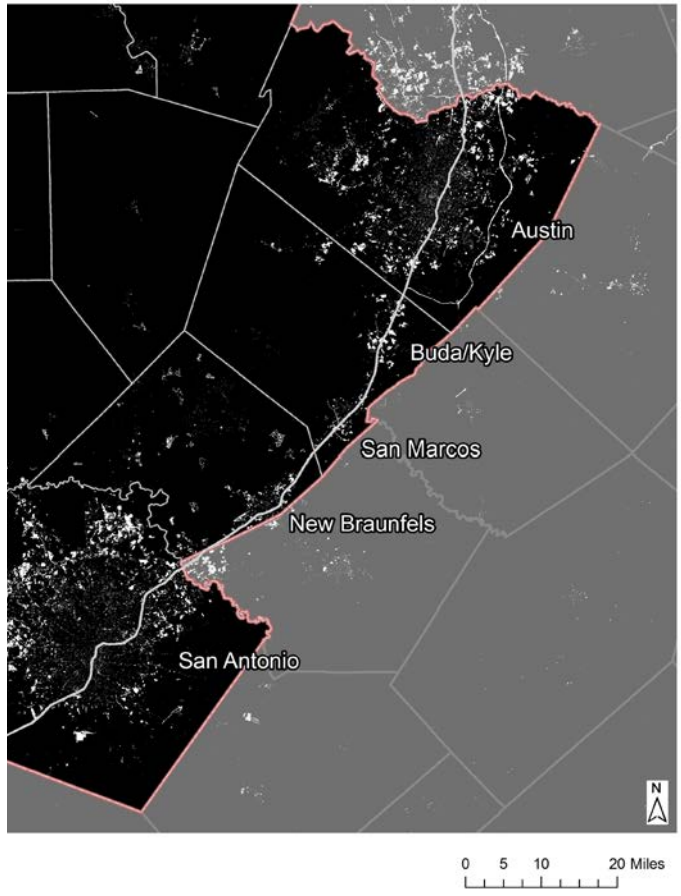


Figure 2.3: New Impervious Cover in the Austin-San Antonio Corridor, 2000-2010[73]

well placed density will be critical to the region's ability to safeguard its water resources and to avoid even more severe flash floods. A comparison of counties throughout the United States demonstrates a relationship between density and impervious cover added per person. The densities listed are

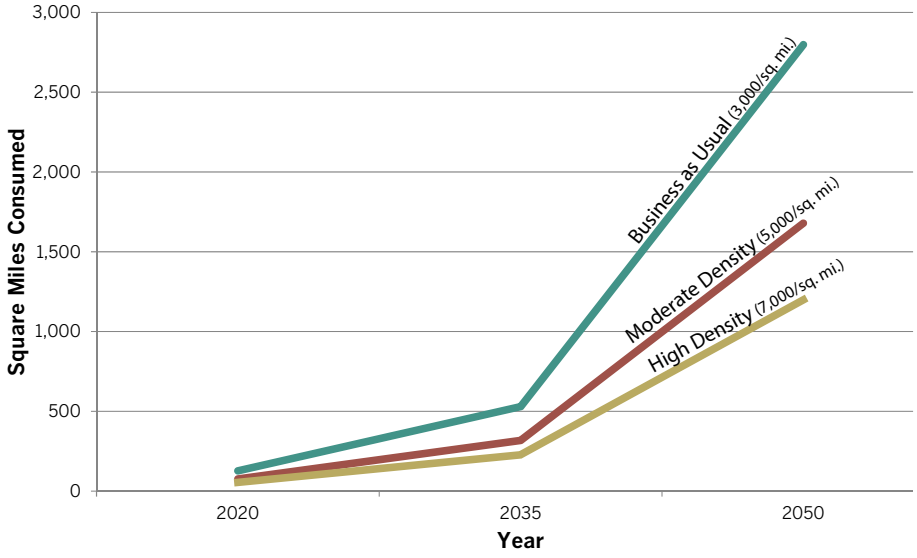


Table 2.1: Scenarios of Land Consumption[74]

COUNTY (MAJOR CITY)	DENSITY (PEOPLE/SQ. MI.)	IMPERVIOUS COVER PER MILLION PEOPLE (SQ. MI.)
New York (New York)	70,168.55	10.27
San Francisco (San Francisco)	17,342.14	35.86
Cook (Chicago)	3,190.87	79.45
Denver (Denver)	4,052.08	90.47
Travis (Austin)	1,017.23	100.29
Fulton (Atlanta)	1,803.13	103.48
Dallas (Dallas)	2,772.95	107.76
Multnomah (Portland)	1,734.36	108.57
Harris (Houston)	2,454.33	126.43
Wayne (Detroit)	2,944.22	135.46
Bexar (San Antonio)	1,360.24	214.10

Table 2.2: Density and Impervious Cover in Urban Counties[75]

not weighted and thus some information is lost in the average across the entire county. Still, the influence of development patterns on the amount of impervious cover needed is illustrated by the comparison of high-density cities, such as New York or San Francisco, to those notorious for sprawl, such as Atlanta or Houston.

Water Quality and Quantity Impacts

As seen from the previous land consumption discussion, the higher the density of development, the lesser the total impervious cover. Impervious cover has a direct impact on the health of both surface water bodies and groundwater bodies. With a runoff coefficient of 0.95, impervious cover sheds almost all of the precipitation it receives.[76] Runoff carries all waste that comes in its path, such as pet waste, oil from cars, and excess fertilizers and pesticides from lawns. These wastes comprise non-point sources of common stormwater pollutants. The nutrients, bacteria, organic compounds, metals, and sediment they contain are pollutants that reduce the water storage capacity of receiving water bodies, impair ecosystems, and pollute drinking water supplies.[77]

A water quality study in North Texas identified urban runoff as the second most frequent cause of pollution to surface waters.[78] Urban runoff is a major threat to water quality in the Colorado River, which is the main source of water to the City of Austin. Fast recharging aquifers like the Edwards are particularly susceptible to runoff pollution. Runoff directly enters the aquifer through fractures, faults, and fissures in the recharge zone without undergoing any filtration.[79] Pollutants enter the aquifer, impairing the drinking water supply of cities that are dependent on it. Cities like Buda and San Antonio heavily rely on the Edwards for their supplies. Figure 2.4 shows the pollutant loads per 1000 people in low, medium, high, and very high density scenarios, based on the population and impervious cover calculations shown in this section. As the figure shows, pollutant loads increase with an increase in land area of impervious cover. Increasing density is one of the ways to reduce the extent of impervious cover, therefore reducing pollutant loads and protecting drinking water supplies. Concentrating growth within higher density development in less sensitive areas protects more sensitive recharge areas, avoiding potential pollution from urban runoff. Cleaner drinking water supplies save municipalities the costs of installing and maintaining more intensive filtration plants that would otherwise be required to bring the polluted water to drinking water standards. It also prevents possible health costs incurred due to widespread water pollution and leads to improved quality of life.

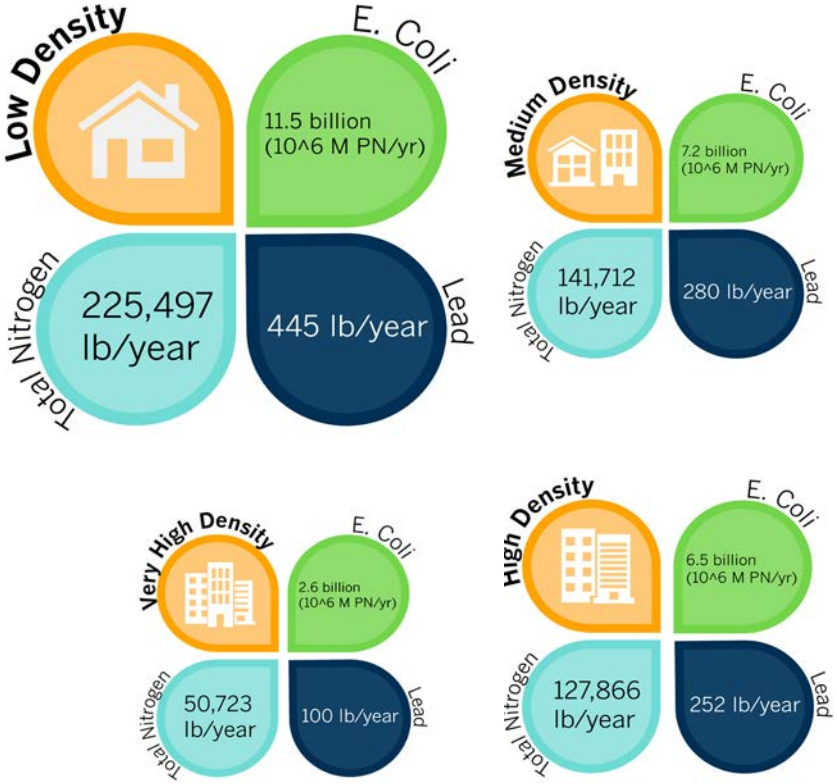


Figure 2.4: Pollutant Loading by Density Scenario

Stormwater Impacts

Since the runoff coefficient of impervious cover is as high as 0.95, most of the rainwater that falls on it flows directly into stormwater drains and creeks. However, in extreme rain events of high precipitation falling within a short time period, creeks become rapidly inundated with peak flows, causing damage to property and potential loss of life. The Hill Country region has seen damage time and again with recurring floods in the Blanco River where riparian buffers are damaged by subdivision activity. The Onion Creek watershed, much of it located within the Austin-San Antonio corridor, saw highly damaging floods in 1998, 2001, 2013, and 2015.[80] The City of

Austin's response has been to buy out property within the Onion Creek floodzone, but this comes at an economic cost as well as a social cost for those who are displaced. However, reducing impervious cover by pursuing denser growth and low-impact development can prevent costs associated with flood management. The graphic below shows the decrease in stormwater generated per capita when communities pursue denser development. Keeping development away from riparian buffers across the watershed is another way of preventing costs associated with flood damage while improving the health and function of our rivers and creeks.

The population of the Hill Country is expected to grow by 3.5 million people by 2050. Although this population influx will bring economic benefits to the Hill Country which are desirable, the patterns and placement of the resultant construction must be handled with care. The nature of the region's new development will be one of the defining factors of the Greater Hill Country's enduring success, health, and high quality of life. Additional growth built out the wrong way will undoubtedly exacerbate current flooding problems. However, the risk posed by increased stormwater runoff can be mitigated through the combined efforts of decreasing impervious cover (through careful planning and increased density), implementing low-impact development, and protecting riparian corridors. These efforts will not only improve the safety of Hill Country residents but also reduce the long-term costs associated with flooding damage and water filtration, while enhancing the integrity of the region's watersheds.

Congestion Impacts

The stretch of IH-35 between US-290 N and SH-71 is already the most congested stretch of roadway in Texas, but congestion will get far worse if current development and transportation trends persist.[81] The current low-density, auto-oriented suburban development style compounds the region's traffic problems. Increased travel demand cannot be met by adding highway capacity alone. The Capital Area Metropolitan Planning Organization (CAMPO) anticipates that vehicle miles traveled (VMT) in the region will nearly double by 2040, while capacity will only increase by 15 percent.[82] Added capacity comes at a high price to taxpayers; between $1.2 billion and $1.9 billion of improvements to IH-35 have been identified within Travis County alone, and almost as much is expected in Hays County.[83]

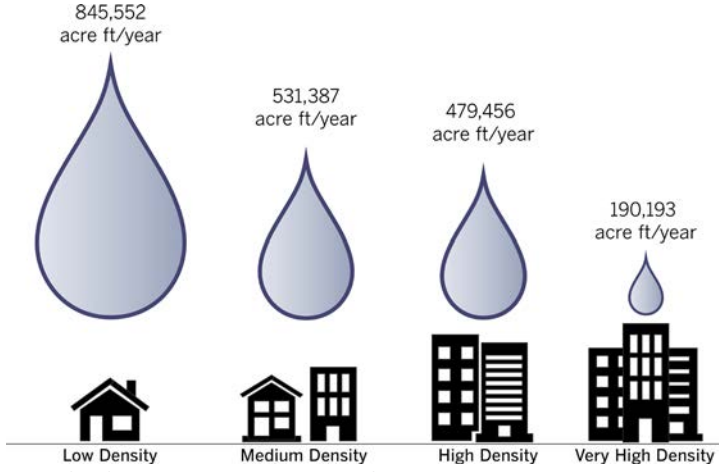


Figure 2.5: Stormwater Runoff by Density Scenario

The transportation problems introduced by sprawling growth patterns are exacerbated by the lack of alternatives for travel along the Austin-San Antonio corridor. In Bexar, Comal, Hays, and Travis counties, around 90 percent of residents travel to work by car, between 70 and 80 percent are driving alone.[84]

The addition of Lone Star Rail to the region will provide another option for residents along the rail corridor. If new growth is concentrated near rail stations, more people will be able to access the system quickly and with ease. Promoting growth near stations will also benefit those who do not use rail by reducing the total demand for highway travel in the region. By 2030, the rail system is expected to remove almost 10,000 cars per day from IH-35, adding up to about 2.7 million trips per year taken off of the highway system.[85] If the region were to focus development around Lone Star Rail and also develop new light rail or commuter rail networks feeding the Lone Star trunk line, an even larger number of trips could be served by rail instead of cars. The table below shows the predicted impacts of this change.

CATEGORY	ANNUAL IMPACT OF LONESTAR RAIL
Congestion Delay	Save between 167,400 to 339,600 hours of delay
Cost of Delay	Save between $2.8 and $5.7 million
Cost of Fuel	Save over $255 million in 20 years
Vehicle Mile Traveled	Reduce VMT by 93.5 million miles

Table 2.3: Predicted Impacts of Lone Star Rail[86]

If commuting habits remain static in Central Texas, then by 2050, about 2.44 million workers[87] will drive to work alone each day in the Austin-San Antonio corridor, with many of these commuters traveling 50 minute daily commutes.[88]

We simply cannot build our way out of congestion through roads alone. The only way to decrease congestion is to increase the user-rates in other means of transportation, namely bicycling, walking, and mass transit.

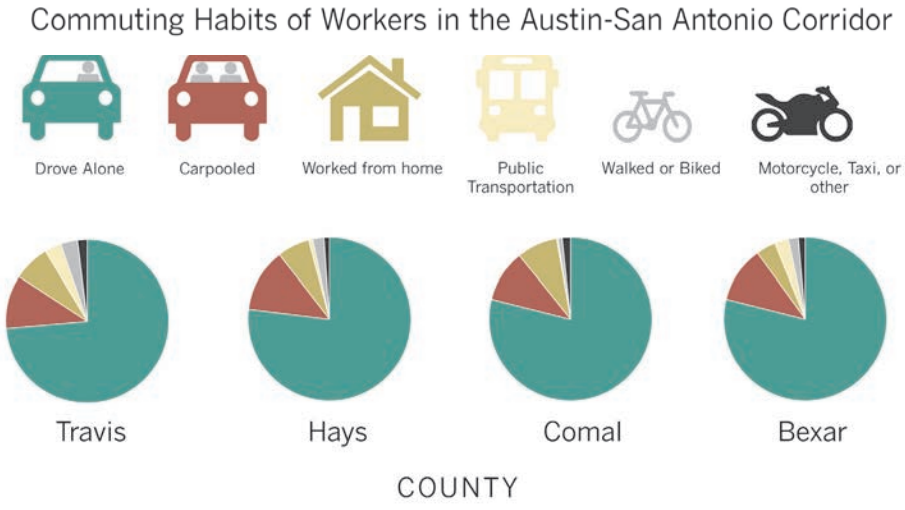


Figure 2.6: Commuting Habits of Workers in the Austin-San Antonio Corridor

Photo: John Bryant Baker

3. Visualizing the Hill Country's Future

Current development trends have led to the decline of precious natural amenities such as hilltops, scenic views, and riverfronts in the Hill Country. If these trends are allowed to continue, we can expect two results:

1. The experience of these unique places will be limited only to the few who can afford it,
2. And as the region's hilltops, ridgelines, and riverfronts develop, new and current residents' vistas will increasingly be not of natural beauty, but of new sprawling developments

The persistence of typical suburban sprawl will eventually strip the Hill Country of its identity and the region will begin to resemble the outskirts of any other major American metropolitan region.

Development in Central Texas doesn't have to follow the same sprawling patterns as the rest of the country. Alternatively, more compact development patterns can absorb population growth while preserving the Hill Country's sense of place. With this approach, existing cities and suburbs in the corridor can accommodate new and old

Figure 3: Aerial View of a New Subidivision in Travis County[92]

Figure: 3.1: Aerial View of Rosslyn-Ballston, Virginia Corridor[95]

residents without urbanizing large tracts of Hill Country land. Furthermore, rural development can be focused in the region's historic towns and in clustered, less intrusive, conservation developments.

Visualizing Density in Urban Areas

Compact and connected land use patterns in the region would offer many benefits to the people who live here. As noted above, the Lone Star Rail line will provide the Austin-San Antonio corridor with a unique opportunity to create new housing choices in both established centers and new communities organized around rail stops. These places can range from densely populated mid- and high-rise apartment buildings in downtown Austin, San Antonio, and San Marcos, to compact townhouses and clustered single-family homes in smaller communities. Existing centers can be in-filled with new mixed-use development, providing a critical mass of residents, workers, and visitors to support retail and other services, including the transit system itself. Good design can incorporate cars, transit, and pedestrians into the same streetscape. A broader range of housing options can appeal to young professionals, families, and retirees, all in the same community.

A number of regions in Texas and across the country have provided models that can be emulated in the corridor. Over 30 years ago for example, communities around Washington, D.C., had to decide how they would receive the new

D.C. Metro lines while respecting the fabric of existing neighborhoods. In Arlington, Virginia, specifically, plans were made to densify around stations along the Rosslyn-Ballston corridor. These efforts have successfully preserved single-family neighborhoods adjacent to the existing transit-oriented development (TOD). Furthermore, the transit corridor has been able to absorb population growth, support transit ridership, and generate revenue for the county through increased land values around stations.[93] With this approach, two square miles of focused transit-oriented development supports as much development as 14 square miles would require under typical suburban development.[94] Here in Texas, on the outskirts of Dallas, the community of Addison similarly challenged the typical paradigm of sprawl by pursuing 80 acres of infill development at a station on the Dallas Area Rapid Transit (DART) light rail system. Known as Addison Circle, this project was a result of a long-term vision for the site that sought to establish zoning in order to incentivize the development of a mix of homes, shops, and offices for local residents. While this is a less mature and smaller development than Virginia's Rosslyn-Ballston corridor, there are many places in the Lone Star Rail corridor that could be developed at this scale.

In Addison Circle and elsewhere, high quality urban design standards have been used to promote an active street life and the creation of vibrant town centers with identity and character.

In the Greater Hill Country, examples of transit-oriented development are beginning to emerge in places like Crestview Station, in Austin. In other places, like San Marcos, examples remain in the proposal stage, awaiting development of the Lone Star Rail system. This rail service will enable development of compact urban and suburban centers along its route, which in turn will foster the ridership upon which the success of the rail line will depend.

Figure 3.2: Transit-Oriented Development in Addison Circle, Texas[96]

Figure 3.3: Sketch of Crestview Station in Austin, Texas[97]

Figure: 3.4: Texas SmartCode TOD, San Marcos, Texas[98]

Visualizing Low-Impact Development

In rural areas of the Hill Country, most new development should be accommodated as infill or through the expansion of already existing cities and hamlets. Doing so will allow these rural towns to mend, support, and upgrade aging infrastructure like water and wastewater systems, and to revive dancehalls, town squares, and other culturally important places.

Additional rural residential demand can be acommodated in "conservation development" projects, wherein new homes and other structures are clustered on small lots on the most suitable portion of larger tracts. Two primary components of these projects are the preservation of open space (including the successful restoration of native prairie and wetlands) and thoughtful design that is mixed use, energy efficient, and pedestrian friendly. Generally, these developments take place on 20 percent or less of the property. The remaining portion of the tract, which should be those that are most suitable for wildlife habitat, agriculture, ranching, and watershed integrity are conserved. Instead of treating open space as an afterthought, simply the byproduct of land that cannot be developed, protected open space is the central organizing principle of a conservation development. Establishing conservation communities is a smart response to the impact that rapid, conventional development has on a community's rural character. This approach shoud be taylored to the Hill Country and pursued wherever ranches are subdivided for residential or commercial development.[99]

Figure 3.5: Planned Agricultural Community, Prairie Crossing, Illinois[104]

Ecological benefits of this development model include providing natural habitat, preserving scenic vistas and rural character, reducing runoff, limiting lawn maintenance, and allowing natural cooling.[100] By clustering development away from water resources and through the reduction of impervious cover, conservation subdivisions can also allow for greater water quality protection than conventional developments.[101] Additionally, conservation developments offer economic benefits to developers. Research has shown that lots will sell for higher prices, are less expensive to construct, and sell more quickly than those in conventional developments.

There are hundreds of examples of successful conservation development projects across the country. One of the best known of these is Prairie Crossing in Lake County, Illinois, northwest of Chicago. There, commuter rail stations provide residents

Figure 3.6: Driftwood Development Plan | Source: Bosse & Associates[107]

easy access to Chicago.[102] An organic farm, community gardens, and 10 miles of trails are just some of the ways that open space is used by the residents.[103]

More locally, Driftwood, in northern Hays County, offers a unique example of a conservation development. Now under construction, this 540-acre mixed-use development plan includes 129 home lots, a town center, 60 acres of vineyards and orchards, and more than 200 acres of open space.[105] It is a legacy project for the owners of the adjacent Salt Lick Barbecue, whose family has lived in the area since the mid-1880s.[106]

Upon completion, the site will have only about one-fifth of the houses that would be built through a conventional, profit-maximizing development. About half of the property will be designated open space.

Building with the Hill Country in Mind

Better planning for the Hill Country, which will include the provision of transit-oriented development in the Austin-San Antonio corridor; denser, walkable towns in the Hill Country's rural counties; and conservation developments tucked into the region's open spaces and working lands, will go a long way towards preserving a healthy environment and quality of life for the whole region. Additionally, it will also be necessary to improve the site planning and visual quality of future development to ensure that it respects the Hill Country's unique traditions and character.

Experience in other parts of Texas and elsewhere in the country has shown that when large land areas such as the Hill Country experience rapid growth, the sense of place and authentic quality begins to dissolve and is replaced by communities with "anywhere USA" development and visually confusing building types.[108] While aesthetic change can be inevitable, it is still important to maintain remnants of the past that retain historic and cultural significance. Examples of incompatible design patterns can already be seen in subdivision "McMansions" and strip malls in many places across the region.[109] If allowed to continue, this will inevitably degrade the rural character that attracts so many visitors to the region. One approach that can be taken to promote high-quality growth is for Hill Country cities and counties to adopt site planning and design guidelines for varying types of development. For example, design guidelines could be adopted for the communities with stations along the Lone Star Rail corridor, for rural clustered development, and for the design of rural highways and commercial development. These guidelines could be either advisory or mandatory, and while mandatory guidelines would be more effective, it would also require more political will for adoption. The following examples are ideas that can be incorporated into design guidelines for the region.

Station Area Development

There is a long tradition on the East Coast and in the Midwest of "railway suburbs": communities that developed around the nineteenth- and early twentieth-century commuter rail lines.

Many of these communities, in places such as New Canaan, Connecticut, Bronxville and Forest Hills Gardens, New York, Lake Forest, Illinois, and Haverford, Pennsylvania, now have some of the nation's most desirable and high-priced housing stock. Considering

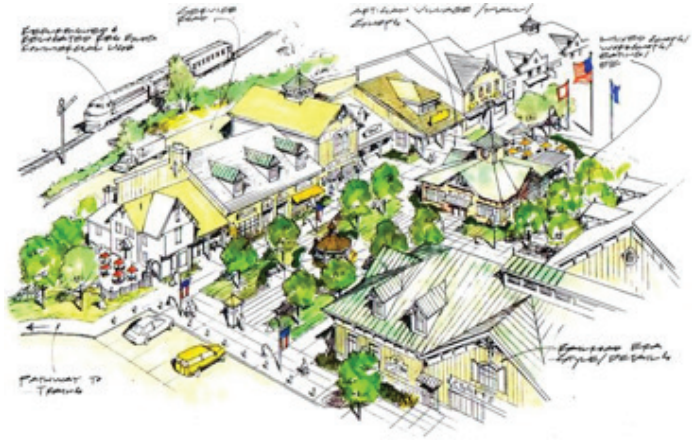


Figure 3.7: Hillsborough County TOD, Roseville, California[110]

this, Yale School of Architecture dean Robert Stern has proposed that a new generation of railway suburbs be developed along new rail lines at both existing centers and at greenfield sites. Nowhere would this tradition be more successful than in the Hill Country.[111] Using this model, Lone Star Rail stations can become hubs for new station area development and be a focus for both established and new communities along this route.

Landscape Materials

Protecting the native landscape and using native plant materials can add distinct quality to the design of the Hill Country's communities. This can be accomplished by creating a rural ambiance with landscape buffers around parking lots and structures. Using a plant palette of native species in town centers, in conservation development projects, and along rural roads will reinforce the region's special character.

Architectural Design

In order to maintain the identity of the Hill Country, historic districts and structures should be preserved. Whenever possible, infill development and expansion of existing communities should use materials and designs that maintain the architectural traditions of the Hill Country. New development should also respect the unique architecture and scale of the region.

Development Patterns

Once a scenic road has been designated, it will be more feasible to improve the quality of development sites and their position along highways. This would require creating or amending zoning and subdivision regulations to prevent undesirable development choices. For instance, clear cutting lots to the road edge is not recommended. Instead, residents should consider a wooded buffer along the road with special consideration to stone walls and large trees to shape lots and clearings. A no-cut-buffer at least 50-feet deep along the road right-of-way would effectively screen houses from a bustling highway.[113] For areas with minimal topographic features, clustering lots with farmhouse and barn-style homes around a limited number of driveways can limit subdivision infrastructure costs, reduce curb cuts (which increase turning movement that leads to accidents and congestion), and protect rural scenery.

Photo: Chris Litherland

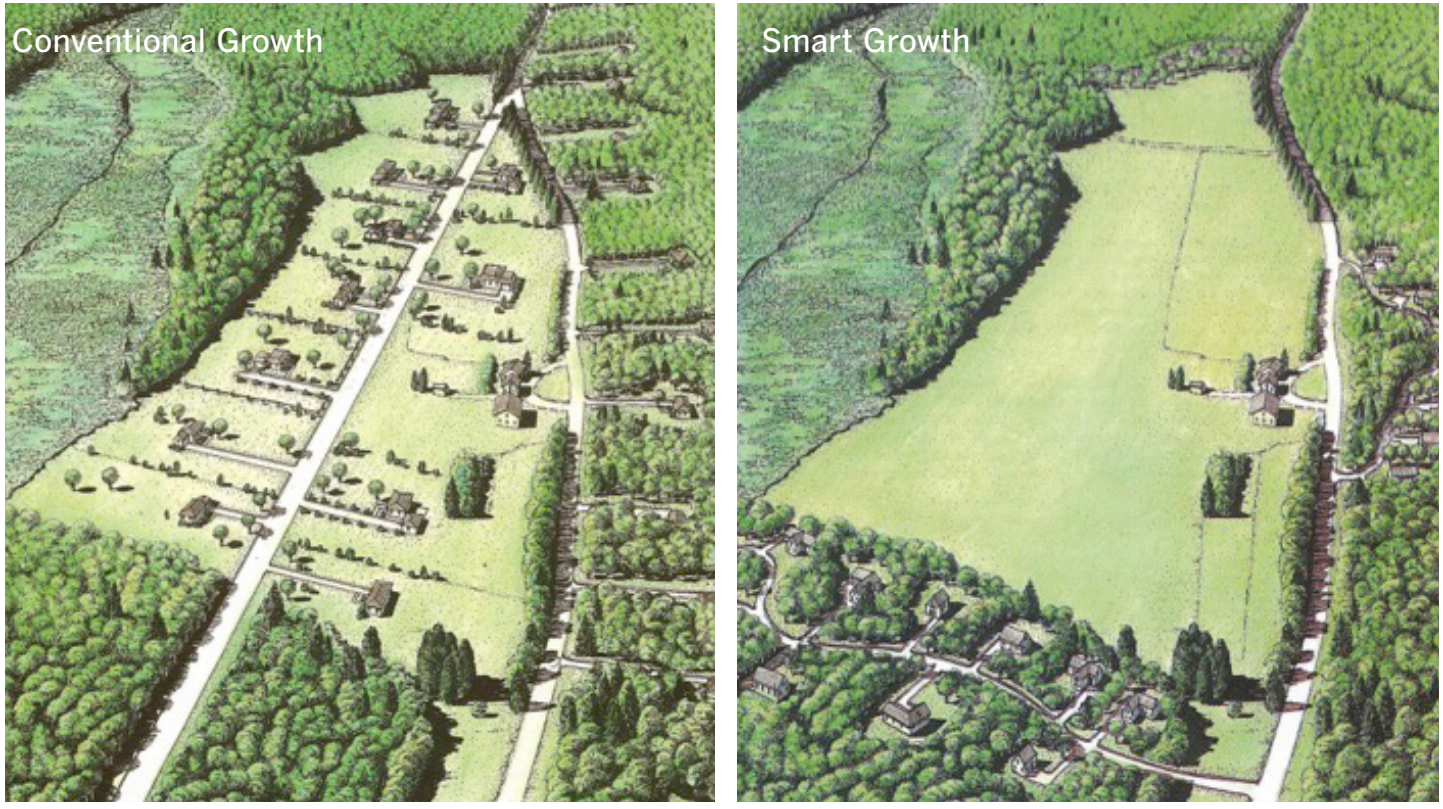
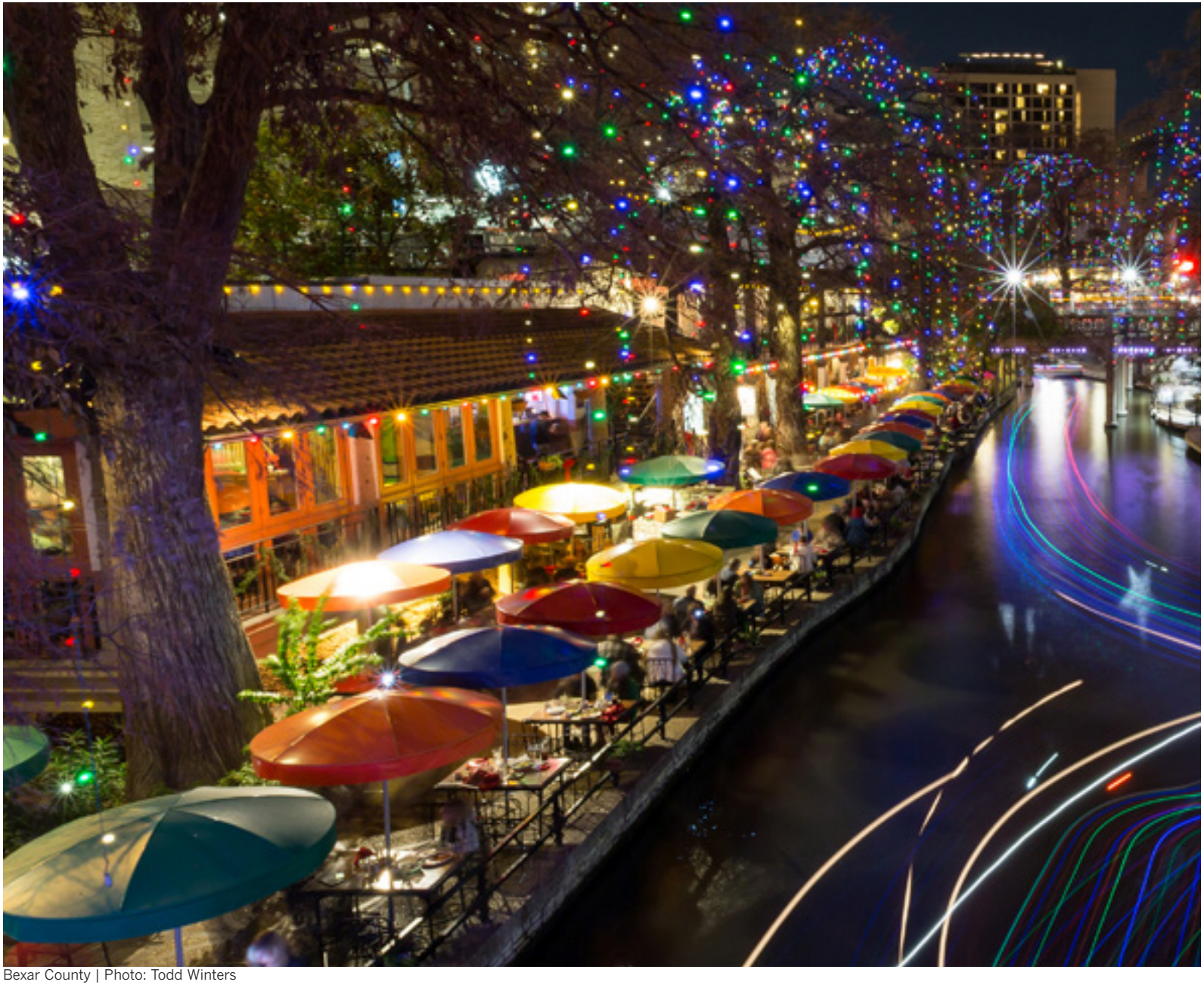


Figure 3.8: Visualizing Conventional Development versus Smart Growth | Source: ***Rural by Design***[112]

These images are intended to illustrate some of the benefits of conservation development patterns in a smart growth context. The landscape shown is more akin to New England than Central Texas, but the principle of preserving rural character and contiguous open space by clustering buildings away from main roads applies equally to both landscapes.



Bexar County | Photo: Todd Winters

4. Where Do We Go From Here?

A new relationship between the major metropolitan areas of the Austin-San Antonio corridor and the smaller cities, towns, and counties to the west can preserve the Hill Country's natural and cultural resources, ensure economic vitality, and create more livable communities. Envisioning better integrated strategies for protecting the Texas Hill Country requires acknowledging the region's cultural and political context. First, as inhabitants of a rural area in a strong property-rights state, many Hill Country residents are opposed to regulations that restrict land and water use. Bold conservation efforts around the country have required strong statutory and regulatory frameworks that are not currently feasible in Texas. To compound the problem, over the last decade state politicians have become increasingly focused on short term economic development.

This focus has created a political situation in which pro-business state leaders are often more interested in loosening existing regulatory protections than in creating new ones. In this context, creating new regulatory programs or new public institutions will be difficult. However, not moving ahead with strong new measures will ensure that much of the Hill Country's landscape and natural and water resources will be lost in coming decades. Texans can seize this opportunity to show the world that they can take bold actions of their own accord to protect what they love.

Create a Hill Country Endowment

Create a Compact to Formalize Regional Cooperation

As noted above, the Hill Country Alliance and the Austin-San Antonio Corridor Council do not need to wait for government to act in order to plan for and protect the Hill Country. They could develop their own "civic-led" regional plan for the 17-county region, which would advise state, county, and municipal officials, as well as the development and conservation communities, as to which areas are most suitable for development and for conservation. This plan could also identify critical infrastructure needs, map urban utility limits, and address other regional priorities. In a number of U.S. regions, including Salt Lake City, Chicago, and New York, civic groups have developed regional plans that have had an enormous impact on regional development and conservation in these places. Civic groups have the advantage of being able to rise above the short-term political considerations and parochial outlooks that often drive the actions of political leaders. They can also, when necessary, disagree with these leaders and oppose ill-considered policies and investments. Also, importantly, they have the advantage of "staying power"—they can stay with issues for years or even decades, while mayors, judges, and others come and go with election cycles.

If HCA and the Corridor Council are to assume this role, they will need to broaden the skills of their staffs and make sure that their leadership is broadly representative of the whole Greater Hill Country region.

What advisory regional plans cannot do, however, is raise public funds for important public investments. To do this will require creation of a new public body, the Hill Country Endowment, with authority to levy taxes and user fees .

Therefore, the studio recommends that a Hill Country Endowment be established with two functional profiles:

- An institution that would capture a small share of the region's economic growth to finance needed investments in infrastructure and land and water conservation activities; and

- A regional commission that would adopt a regional plan and then promote a compact in which the region's municipalities and counties would develop their own plans, regulations, and capital investment strategies that were consistent with the regional plan.

Creating the Endowment will require a formal working agreement between Hill Country stakeholders that identifies roles and responsibilities for each group. It is important to build off of cooperative successes in the near term to establish an enduring framework for balancing growth over many decades. There are two critical components of this step: 1) creating a formal working agreement among stakeholders, and 2) funding and managing the associated programs.

Developing consistency between regional goals and county and municipal plans and regulations will be a critical component of successful regional land management and development strategies. As discussed in the opening section of this report, the "crazy quilt" of existing regulations in the Hill Country is anything but consistent. Inconsistency in this case makes it difficult to implement large-scale

Cypress Creek in Wimberley, Texas | Photo: Dave Hensley

solutions. Establishing a unified framework for protecting the Hill Country will require all of the various actors to agree upon and formalize their individual roles in a working agreement.

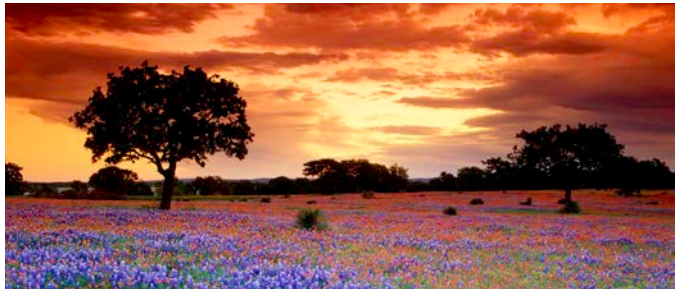


Photo: Joe Lowery

The Hill Country Endowment – Coordinating Regional Growth

In addition to its role in funding infrastructure and land and resource protection, the Endowment could also assume the role of a regional planning body, creating an official vision or plan for the Greater Hill Country region and encouraging or requiring that municipal and county plans and regulations be consistent with the regional plan. This plan could build upon the civic-led regional plan that may be prepared by the Hill Country Alliance and the Greater Austin-San Antonio Corridor Council. In this capacity, the Endowment would

The Hill Country Endowment – A Precedent in Lake Tahoe

Regional planning agreements, even for a geographically small and homogenous area, can be politically difficult to create and maintain. The Tahoe Regional Planning Agency (TRPA) was established after several major development projects in both California and Nevada threatened the Lake's exceptional clarity and quality. This bi-state agency has a range of planning and regulatory powers and has not always been universally popular. The key to Lake Tahoe's success is that all agencies active in the region must conform to the Environmental Threshold Carrying Capacities (ETCCs) benchmark goals. Strict regulations and status-quo preservation did little to meet these ETCC benchmarks, so stakeholders shifted their tactics towards non-regulatory approaches such as habitat restoration, best management practices, and redevelopment with environmental improvements. Economic interests still have a strong voice in the conversation, and the development of Lake Tahoe's cities continues, even if at a slowed, but more sustainable, pace. What has helped keep conservation efforts moving forward is the primary focus on protecting the unique natural resource — the lake. The message to "Keep Tahoe Blue" has been strong and clear, and has informed policies and efforts toward that end.

Trust among organizations has also been critical to successful collaborative efforts. This trust has been built from early successes, repeated interactions, and the development of personal relationships among members of various organizations. Increasing levels of trust then generate networked systems to accomplish conservation, which act both within and outside of regulatory frameworks. That trust grew when the TRPA began to emphasize a culture of dispute resolution via Consensus Building Workshops. The TRPA's success was due to its implementation of the Environmental Improvement Program (EIP), officially launched at the 1997 Presidential Summit. To quote the agency's website, "Recognizing that capital investments, research, and monitoring were essential components of the Regional Plan, the EIP called for an initial investment of $908 million in capital projects and $58 million in research and monitoring over 10 years. The EIP also identified hundreds of specific projects and programs to be undertaken by more than 95 funding and/or action-oriented partners including federal, state, and local agencies, and the private sector."[113] That is, the TRPA democratized responsibility for Lake Tahoe, building a vibrant, but loosely affiliated, network of stakeholders who could each help to restore the health of Lake Tahoe.

have two critical functions—to coordinate the development of transit infrastructure and to support economic growth throughout the region.

Coordinate the Development of Transit Infrastructure around the Lone Star Rail Corridor

The Lone Star Rail will be a much-needed addition to the transportation options for residents of the Austin-San Antonio corridor, but it will not be enough to drastically improve congestion in Central Texas. Under "business as usual" trends, by 2050 households along the corridor will own and operate more than 4.43 million personal automobiles.[114] Meanwhile, continuation of the current increase in housing costs will push residential and commercial development into "greenfield sites" in the Hill Country, as well as to the east of the corridor. Lone Star Rail and other transit investments could reverse or slow these trends, instead bringing new development and residents into compact centers organized around transit stations. However, a commuter line with 13 stops between south San Antonio and north Austin or Georgetown will only be accessible or useful to everyone everyday. In order for it to be truly effective and to reach most of the 2050 projected population of 6.32 million people,[115] it must be complemented by light-rail transit (LRT) systems in Austin and San Antonio, and bus rapid transit (BRT) systems in Austin, San Marcos, New Braunfels, San Antonio, and any other growing cities along the corridor where BRT is feasible.

Propose Land-Use Policies that Support Transit-Oriented, Vertical Mixed Use Development, Decreasing Pressure on Sensitive Hill Country Land

The Hill Country Alliance and the Corridor Council could also collaborate in developing model land use plans and regulations for cities along the Austin-San Antonio corridor and for communities in the more rural areas of the Hill Country. Funding incentives should also be proposed to accompany these policy recommendations. In addition, the partnership should focus on building an interconnected network of green space along the Austin-San Antonio corridor and in the more rural regions of the Hill Country. Green space along the corridor would provide recreational opportunities for the projected 2050 population of 6.32 million.[116]

To that end, the Hill Country Alliance and the Corridor Council should encourage connections among municipal green belts and green spaces. Connecting these separate spaces would increase their usability, allowing residents and visitors to experience nature despite the increasing urbanization of the Austin-San Antonio corridor. Similarly, the groups should encourage green space connections in the rural hinterlands of the Hill Country to support migration corridors and habitat resiliency for important species native to Central Texas.

Support Economic Growth in the Greater Hill Country

Economic development corporations (EDCs) and chambers of commerce are the main economic development groups in the Hill Country. Funded respectively by a portion of city sales tax revenue and by membership dues, they act according to

local priorities and contexts. EDCs were originally created by the Legislature to help cities and towns in Texas recruit industry and manufacturing jobs; their role has to be statutorily expanded to enable community development and quality of life projects that have positive economic impacts and help business recruiting efforts. While chambers of commerce are no strangers to regional collaboration, EDCs tend to have a more competitive business approach. In a region such as the Hill Country, which is dependent on tourism for a large portion of its economic activity,[117] collaborative economic development efforts that focus on enhancing tourism-based revenues could collectively improve the economic situation of small Hill Country towns and could identify collective strategies to make smart investments in a region that has broad appeal to visitors and new residents alike. This pooling of resources may enable larger scale projects that have increased benefits and which help guide economic development for the region in a way that is consistent with community goals and takes advantage of new opportunities that arise due to population growth in the corridor.

The Hill Country Endowment – Promoting Sustainable Practices

Incentivize Low-Impact Development

Incentivizing low-impact development is one way to combat low-density land use patterns, which have resulted in a notable loss of environmentally valuable and very sensitive

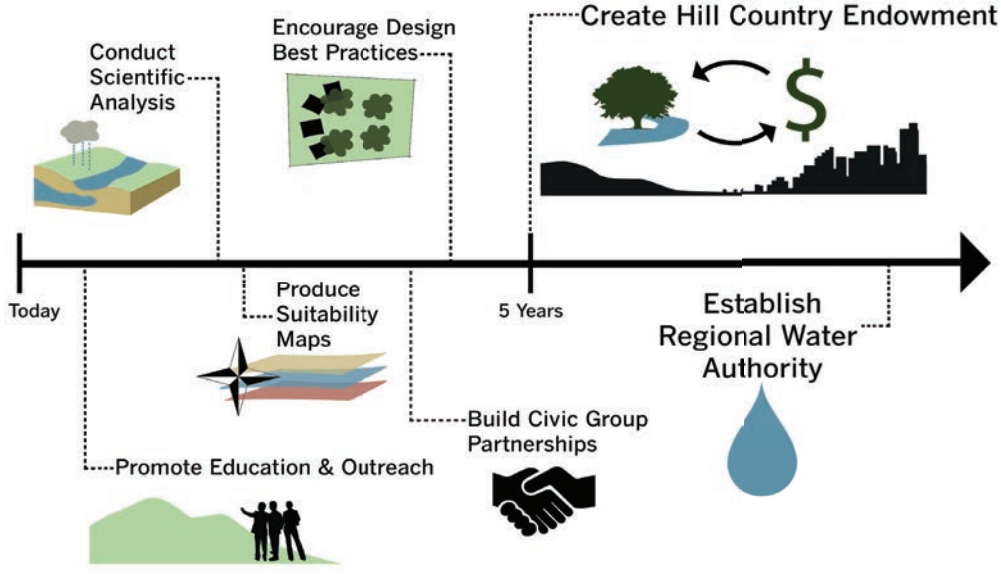


Figure 4: Timeline of Strategies

land in the Hill Country. As mentioned in the previous chapter, conservation subdivisions are one example of an approach that Hill Country communities and developers could take to responsibly develop select rural land outside of the Lone Star Rail corridor. Local conservation subdivision ordinances present an alternative to conventional subdivisions to produce developments that preserve a greater amount of open space. Increasingly, these ordinances are a common way regions can manage sprawl.

Travis County has had a conservation development ordinance for unincorporated areas since 2006, which, unfortunately, has never been taken advantage of by a developer. In this voluntary ordinance, a landowner or developer can elect to enter into a conservation development agreement with the County, which would grant the developer certain incentives, including a quick review process and reimbursements for permit fees, in exchange for the developer maintaining impervious cover on the site below 15 percent and protecting 50 percent of the land on site from development in perpetuity. [118] Because no developer has ever taken advantage of this offer from the County, it is clear that these incentives are not very attractive enough to developers. This may be due to the tendency for innovative subdivision designs to be perceived as financially risky by developers. Despite this commonly held belief, research has shown that conservation subdivisions lead to higher profits for developers, as they sell faster and usually at a higher price point.[119]

Additionally, the challenge of acquiring financing from banks for these novel developments may act as a deterrent for landowners and developers. In 2006, when Travis County was developing its conservation ordinance, prominent conservation subdivision developer Harold Teasdale spoke in Austin on the difficulties of the financing process. In his testimony, he described how he had been denied financing from 20 banks, had to fire his initial home-builder, and encountered controversy with residents on the new siting and road styles in his development, Jackson Meadow, located in Minnesota.[120]

One strategy to help with the unfamiliarity and perceived riskiness of these developments is to improve marketing efforts. As noted in the previous chapter, civic groups and local governments use development awards for successful conservation subdivisions across the country. Hill Country Alliance should make use of such an award system to promote the advantages of these types of communities and recognize innovative developers. Additionally, HCA and its partners must show developers that the benefits of conservation development clearly outweigh the costs. Outreach materials available at local government offices and websites could accomplish this task. One specific tactic that Travis County could take advantage is to hold a workshop with developers so that County planning officials can better understand what the ordinance lacks in educational awareness and financial opportunities.[121]

Overall, the inadequacy of incentives for developers is the top barrier to developing conservation subdivisions, according to a study of four communities in North Carolina.[122] This study found that an expedited permit process, which Travis County does offer, as well as the provision of density bonuses were effective in combating misperceptions about the additional

costs of conservation developments. Density bonuses are one tool that Travis County and other Hill Country counties could take advantage of; this would permit developers to build more homes than they normally would be able to as long as they abide by requirements for open space preservation.

Encouraging public participation at an early stage in the development of the ordinance through community workshops and charrettes could also build support among stakeholders who may otherwise be fearful of the impact that a conservation development incentive or regulation could have on private property rights.

Incentivize Transit-Oriented Development along the Lone Star Rail Corridor

The Lone Star Rail's success will depend on how effectively transit-oriented development (TOD), is executed around the rail stations. Successful transit-oriented development requires coordination at many levels. Municipalities, regional transportation authorities, and private developers are all involved in making decisions regarding land use, infrastructure investment, and funding sources. Station area plans are necessary to coordinate the actions of public agencies and private developers. Currently, the Lone Star Rail District is commissioning station area plan studies—the first step in creating transit-friendly developments.

Implementation can face many barriers. As projects depend on strong partnerships, cooperation between agencies is necessary to reduce bureaucratic barriers.[124] Similarly, transit authorities in this country typically have limited authority regarding land use and depend on localities to establish the necessary land control measures to make density and mixed uses possible near transit stations. Beyond regulatory barriers, TOD ultimately relies on buy-in from private developers. Lone Star Rail can use precedents of public-private partnerships to promote suitable station area development. For example, in Washington, D.C., the Washington Metropolitan Area Transit Authority (WMATA) established a real estate department that played a vital role in joint development projects.[125]

While some developers in Austin or San Antonio might be equipped with the knowledge and tools to build transit-oriented developments near Lone Star Rail stations, the incentives do not yet exist to spur the speedy development of these TODs to correspond with the launch date of the high-speed rail. Municipalities with stations along the Lone Star Rail route will need to develop a suite of incentives to entice Vertical Mixed Use (VMU) development near these stations. Incentives should be aimed at streamlining project delivery or increasing profitability.

For example, California allows waiving some state-level environmental requirements if a TOD meets certain criteria, significantly reducing the time of construction.[126] This specific strategy may not be as effective in Texas due to its less rigorous environmental process; however, this law is an example of a state-led action to enable new types of development. Municipalities can help developers get projects on the ground by creating programs for expedited reviews of plans that meet desired criteria. Localities can also help

TODs become more profitable by lowering impact fees, waiving permit fees, and providing density bonuses.

While the prudent use of design guidelines can help to ensure that the character of these places remains intact, VMU development would help to generate residents' buy-in into the Lone Star Rail, would generate regional "buzz" about rail, and would create economically and culturally vibrant centers of activity right at the rail stops. This economic vitality is absolutely crucial to financing the commuter rail through Tax Increment Reinvestment Zones (TIRZs) and encouraging the development of other transit options, such as urban light rail and bus rapid transit, which would complement the commuter rail line.

Incentivize Model Land Management Practices

The Hill Country needs additional mechanisms to incorporate private lands in regional or landscape scale conservation efforts in order to protect natural resources and the provision of their ecosystem services.[127] This is particularly true in places with high private land ownership rates such as the Hill Country.[128] However, as Susan Charnley, a research social scientist with the U.S. Department of Agriculture Forest Service, noted: "Figuring out how to make working landscapes financially viable may be the biggest challenge of all in this new conservation paradigm."[129] Indeed, families or individuals who own and manage property in the Hill Country today are experiencing unprecedented financial duress and pressure to sell their land, leading to further fragmentation. It is a perfect storm of rising land values, the possibility of estate taxes owed upon the death of an aging population, and the increasing costs and decreasing profits of ranching and farming, all leading to the rapid fragmentation and development of land in this region.

It is imperative that a means of land management that allows for both productivity and conservation be facilitated. So far, strategies to do so have varied and have not received enough support. It is vitally important that the people in the Austin-San Antonio corridor recognize the valuable role

Photo: Thomas Connor

that private land stewardship has in the quality and quantity of urban water supplies.[130] Bridging this divide will entail reinforcing the links between urban residents' enjoyment of water, open space, recreation, and wildlife, with the rural landowners who provide these services.[131] Additionally, it is important to promote and encourage more incentive-based mechanisms to promote good land stewardship. Tax policies that encourage low-intensity land management practices,

such as Texas House Bill 1358 and Texas Senate Bill 449, which supported wildlife management and water stewardship practices, respectively. Policies such as these can help meet the state meeet its conservation goals while aiding private landowners through lower appraised property valuation. Conservation easements are another important strategy that allows for direct payments or tax breaks for the sake of working land preservation. Programs like the Texas Farm and Ranch Lands Conservation Program and the Texas Water Trust, could, if fully operationalized, provide landowners with financial assistance on the condition that certain lands are protected from development and certain waters conserved for environmental use.[132] To be effective, however, these programs will need significantly more funding.[133] In sum, these working lands are both private and public goods and though many Hill Country landowners do not want to sell their land for development——as it is their legacy and is deeply cherished——many families feel they have no choice.

The conversion of cropland, ranch land, and open space is typically a permanent loss,[134] so if were are to safeguard land in Texas, it is imperative that policy solutions are implemented that can compete with the economic "quick fix" that sprawl appears to offer.[135] As the early conservationist Aldo Leopold once said: "Conservation will ultimately boil down to rewarding the private landowner who conserves the public interest. It asserts the new premise that if he fails to do so, his neighbors must ultimately pay the bill."[136] Given the fact that any regional conservation effort cannot feasibly purchase and steward the majority of land currently held in private hands in the Hill Country, support for private land stewardship is critical and cost effective.

Identify Desired Urban Utility Boundaries

Another effective strategy to implement in the Hill Country will be the establishment of urban utility limits. These limits can be generally defined as "artificial boundaries established by a municipality beyond which no public infrastructure services will be extended."[137] Though objectives vary depending on local context, their inherent function is to guide growth by designating how far out from a city center services such as streets, sewer lines, and water lines will be provided.[138] Establishing a utility limit in the Austin-San Antonio corridor would not only aid in the curtailing of sprawl but would also enable more efficient and cost-effective delivery of public services, the preservation of working lands, a reduction in land, water, and air pollution, and serve to invigorate Austin, San Antonio, and San Marcos.[139]

In Texas, there are currently obstacles to creating a fully enforceable urban utility boundary that would promote preferred development. For example, municipal utility districts, which are usually created by developers, have the authority to provide water, sewage, drainage, and other services within their boundaries. Counties can do little to prevent or guide an unwanted development or its infrastructure provision. However, despite these challenges, in the near term, organizations such as the Hill Country Alliance can identify and utilize a desired boundary to make the case against the utility and roadway extensions that currently encourage sprawling development. Voluntary compacts between counties and municipalities could also work towards the same end. Eventually, in order to effectively manage growth in the region, urban utility limits should be adopted in a legally binding

manner by counties, cities, and a regional planning body yet to be established. Suitability mapping and extensive public input should help determine the nature and location of this boundary as well as the infrastructure types to be limited.

Urban utility boundaries are not revolutionary. Indeed, over 100 cities and counties in the U.S. already use a form of utility limit to direct growth.[140] Furthermore, efforts to direct more preferable development in Texas are not novel. In 1998, Austin was already attempting to do so with Desired Development Zones and "Smart Growth" Incentive Programs, initiatives which acted much like utility limits by attempting to influence where development occurs through infrastructure incentives and tax breaks.[141] Incentives and tax breaks will not be sufficient in the long run, howeer. As suburbs continue to creep further west, it is apparent that more concrete action is necessary in order to minimize urban expansion.

The Hill Country Endowment – Organizational Structure

With the experience of Lake Tahoe and other regions in mind, a Hill Country working agreement should provide the basis for ongoing cooperation between government agencies and private interest groups. There are a variety of models for establishing this type of arrangement with different levels of legal enforceability. Regardless of the form of agreement, the most critical components of such documents define in detail the roles and responsibilities of each involved party. Crafting a binding agreement that enables cooperative planning between stakeholders can involve a significant amount of negotiation. In the Texas Hill Country, an easy consensus between all parties is unlikely. However, we believe that the advantages offered by a legally binding agreement far outweigh the costs of protracted negotiations. When complete, this agreement would result in the establishment of the Hill Country Endowment.

The Endowment could be funded by earmarking a portion of the increase over time of sales or property taxes, water utility rates, and TIRZ funds to capitalize general obligation and revenue bonds. While it is impossible to predict what the ultimate funding scheme would be, one possible configuration is illustrated in Figure 4.1.

In urban areas, the Hill Country Endowment would make investments into urgently needed transit projects, like the Lone Star Rail, which are necessary to allow the Austin-

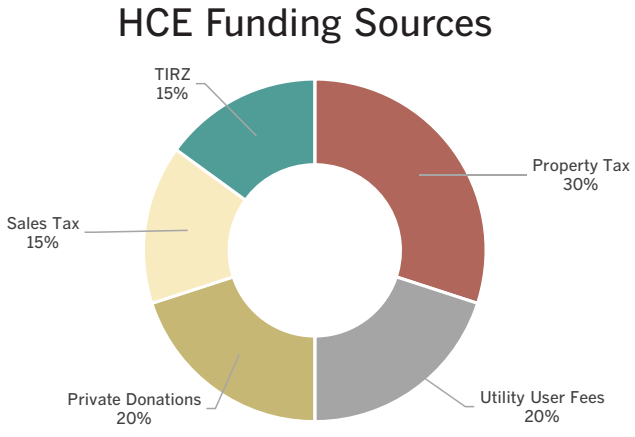


Figure 4.1: HCE Funding Sources

San Antonio corridor to accommodate over three million new residents by 2050. In turn, the urban growth will help finance land and water conservation and stewardship programs throughout the Hill Country. In rural areas, Endowment funds would be used for programs, including purchase of development rights of important conservation lands, creation of municipal land use regulations, economic development strategies, and infrastructure investments in the region's small cities and towns.

Funds could be channeled to counties, municipalities, land trusts, and utility districts to enable them to undertake these activities. This Endowment would support the region's population and economic growth by financing necessary investments in infrastructure and environmental protection needed to enable this growth to occur. It would create a vehicle for growth in the region's urban and suburban districts to help finance conservation and other measures in rural areas.

Since the Hill Country Endowment would have representation from multiple stakeholder groups, it would provide a platform for improved communication between government entities, developers, and private landowners. This would enable the development of consistent messaging and a uniform measuring system to evaluate progress towards goals set for the Greater Hill Country. Coordinated visions and actions would be focused on directing desired growth patterns and achieving the policy reforms necessary for continued prosperity.

The studio proposes that a new Hill Country Endowment be established to promote growth in the right places and to protect the region's natural and scenic resources. The concept would work as follows: As robust population and economic growth proceed in the Austin-San Antonio corridor, a small portion of the increase in economic activity, coupled with other funding streams, such as surcharges on water rates, private donations, and impact fees would be captured to finance the key infrastructure investments required in urban areas as well as the conservation measures required in rural areas of the Hill Country.

The Hill Country Endowment – Mutually Beneficial Results

Each group of stakeholders participating in the Hill Country Endowment will have different needs and will accordingly enjoy different benefits. It is important that the spectrum of programs offered by the Endowment target the needs of each group. Funds from the Endowment would be used to purchase conservation easements, to protect aquifer

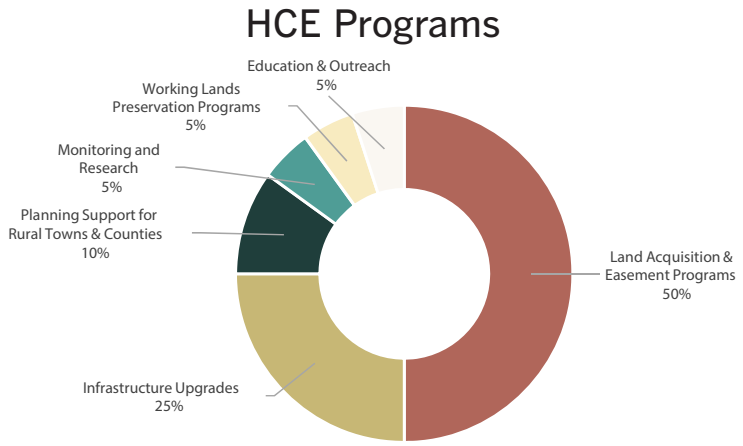


Figure 4.2: HCE Programs

Photo: Rusty Ray

recharge areas, and to finance infrastructure in strategically chosen small town development areas in the western Hill Country counties. Growth and continued prosperity in the corridor will help finance conservation, planning, and stewardship efforts for rural counties and towns. Small rural towns will also receive the expertise, training, and funding they need to protect their rural character so that they do not end up stranded in a sea of exurban subdivisions.

Additionally, the Endowment will protect the scenic, recreational, cultural, and economic resources of the Hill Country. By investing in open green space, the corridor cities and counties help ensure that space remains available for more traditional, land-based economies in the Hill Country.

Benefits of the Endowment to Corridor Cities

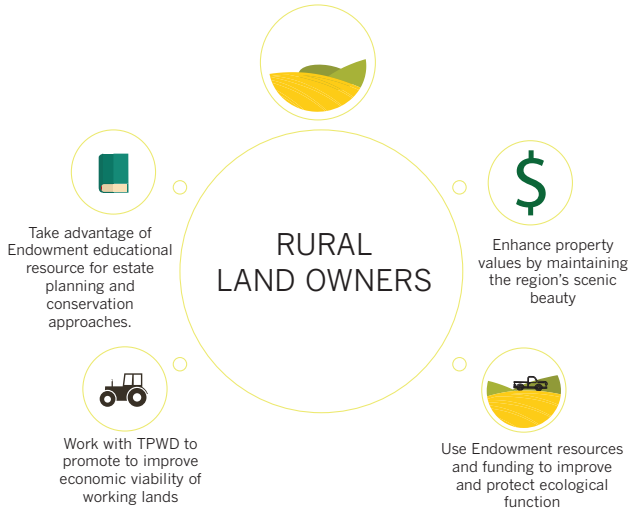
The strong economies of Austin and San Antonio depend on the ecological services and quality of life benefits provided by the Hill Country. Under this proposal, residents of the urban corridor would help to finance land and water conservation in rural areas of the Hill Country. They would do so knowing that the endowment will ensure abundant, clean drinking water for the growing corridor counties by safeguarding the open spaces that protect the region's water supplies. Developing the urban corridor in new transit-friendly development patterns would also improve the quality of life for its residents by freeing them from perpetually congested IH-35. Potential programs include:

- Protection of drinking water quality
- Protection of economic growth
- Opportunity to coordinate strategic planning with surrounding jurisdictions
- Opportunity to increase recreational capacity of the Hill Country

The New York Watershed Agreement

The New York City Watershed Agreement stands as an example of a successful win-win transaction between city dwellers and rural communities, farmers and landowners. Through this transaction, New York City avoided the need to build a $13 billion water filtration plant and continued to have pure drinking water for a relatively reasonable price. To make this possible the city invested $1 billion in land conservation, improved land use regulations and wastewater treatment in watershed communities, and provided financial and capacity assistance to farmers to improve agricultural runoff. Funding of the program is administered by the Watershed Partnership and Protection Council, made up of watershed stakeholder groups. Using this same model, cities in the Austin-San Antonio corridor could avoid spending billions for new highways, aqueducts, flash flood prevention, and other measures by instead investing in multimodal transit, in Hill Country land conservation, in land stewardship, and in effective planning for Hill Country towns.

Figure 4.3: Roles and Responsibilities of Each Stakeholder


RURAL
LAND OWNERS
Take advantage of Endowment educational resource for estate planning and conservation approaches.
Work with TPWD to promote to improve economic viability of working lands
Enhance property values by maintaining the region's scenic beauty
Use Endowment resources and funding to improve and protect ecological function


DEVELOPERS
Use Endowment incentives to densely develope within the urban corridor
Improve and protect property values by maintaining the region's scenic beauty
Enhance the Hill Country's iconic image through conservation developments
Reinvigorate Hill Country towns through mixed use development


NON
GOVERNMENTAL
ORGANIZATIONS
Develop education and outreach programs aimed at various stakeholder groups
Connect smaller communities to planning and financial resources
Develop a monitoring system to measure and evaluate collective impact at regular intervals
Launch media campaigns to raise awareness and support for regional coop-eration and the Hill Country Endowment

Action Strategies

The studio has been fortunate to meet representatives from many organizations actively involved in the protection of the Hill Country and all its natural resources—water, scenic vistas, night skies, working lands, preservation areas, as well as its cultural heritage. Many of these organizations, such as the Hill Country Alliance and the Hill Country Conservancy, have already developed action strategies. Furthermore, they have begun to collect some of the data necessary for understanding where the Hill Country stands today and for charting a way forward.

It is important that these organizations continue with their work. The studio recommends that these stakeholders work together to standardize the data they collect and the indicators they use to track progress. While many organizations are collecting data and tracking the progress of their own conservation efforts, some of these organizations across the 17 counties of the Hill Country seem to work in silos. The studio believes that if these organizations were to work with the same data sets and collectively establish the primary indicators to track progress in the Hill Country, their effect would dramatically increase.

These collectively developed data and indicator sets could then be shared with all the inhabitants of the Greater Hill Country. Annual reports that educate the public about how much, or how little, has been done to protect the land, to create a robust regional transit system, to prevent sprawling development that drastically increases impervious cover, or to ensure that the natural resources are there to sustain our prosperity well into the future would be shared in the media outlets all throughout the region. Conservation groups, perhaps working with universities, could develop and maintain a website where these indicators would be readily accessible through visually engaging infographics. Concerned citizens, civic leaders, government officials, and investigative reporters could access this shared data to help them establish where we are, and where we need to go. Most importantly, this aggregated data, generated by a community of stakeholders, would help to establish consensus on a very basic fact: We've got work to do.

Near-Term Goals

Goal #1 - Generate Scientific Data

Water management authorities need to have accurate information to make informed decisions that will preserve our water resources. This will require increased scientific research about the relationship of groundwater and surface

Kerr County | Photo: Marvin Gohlke, Jr.

water and the behavior of our aquifers. To carry out these studies, academic researchers and groups with aligned interests must be identified. For example, environmental groups concerned about the state of the Gulf Coast's estuaries could assist in finding funding sources that would pay for studies about appropriate surface water allocation. Funding sources such as foundations and government grants must also be identified to ensure that research will be continued.

Goal #2 - Identify Baseline Indicators

The Hill Country Alliance and other stakeholders should work together to establish baseline benchmarks for identifying and monitoring critical issues facing the region and the effects of coordinated responses to those problems. A set of quantitative metrics should be established to monitor these systems. Once stakeholders establish these metrics, they can then collectively measure progress against those metrics.

The studio has proposed five possible metrics that these stakeholders could, first, quantify and, second, use to monitor progress during review years. These review years would occur annually, bi-annually, or every five years, depending on the metric and the availability of data.

2.1 Record Accurate Water Table Levels

In order to galvanize democratic support—and eventually public concern—about diminishing water supplies, stakeholders must work together to set up water table tracking mechanisms. Currently, groundwater conservation districts monitor the aquifer water levels within their jurisdiction. Some of the districts use sophisticated real time data collection methods while others need users to self-report well-water levels. Realizing that insufficient funding is currently a limiting factor for many groundwater conservation districts, we believe it is important that stakeholders standardize the quality of available groundwater data across the region. Coordinated representation of the data in an accessible manner, for example online infographics, will help stakeholders streamline their messaging for greater impact. Groundwater management areas define desired future conditions of aquifers, establishing baseline water table levels that must not be surpassed. However, because there is no legally binding cap on pumping water, water usage, especially among industrial users, is probably outstripping the restorative capacity of aquifers. The monitoring of aquifer levels would help to galvanize support for a proposed cap on water drawdown, which must be enforced for the entire aquifer through careful management and incentives.

2.2 Record Transportation Trends

Transportation policy drives urban form. A transportation system primarily focused on roads and automobiles will gradually push development into the westward portion of the four counties of the Austin-San Antonio corridor—where the most sensitive parts of the Edwards Aquifer Recharge Zone are located and the most critical conservation lands needed to protect native habitat. Increasing the use of alternative forms of transportation along the corridor will promote shifts in household and individual lifestyles that have a less harmful impact upon the environment. Generally speaking, commuters who get to work by mass transit (commuter rail, bus, or light rail), bicycle, foot, or even car-sharing and carpooling will

tend to live in closer proximity with each other, creating market demand for denser housing options such as condos, townhomes, apartments, row homes, and New Urbanist developments similar to the Mueller community in Austin.

Transportation statistics—in particular traffic congestion levels on major highways and transit ridership across the region—should be monitored every three years using Census data, and should help galvanize and inform civic groups that can advocate for alternative transportation options in communities and cities along the Austin-San Antonio corridor and near the proposed Lone Star Rail. Like the Water Table metric, statistics for the Greater Hill Country, the corridor, individual counties, and individual cities should be easily accessible online through educational infographics.

2.3 Record & Track New Impervious Cover

New impervious cover is one of the clearest measures of what is happening to the Greater Hill Country—development pressure from the major cities along the Corridor, where 96 percent of the population lives, is creeping into the sensitive lands west of these cities. While impervious cover is an unavoidable reality of growing cities, it is preferable to see this new impervious cover within the existing boundaries of cities (urban infill) as opposed to at the edges of city boundaries (sprawl).

The studio's analysis of changes in impervious cover between 2000 and 2010 is the first iteration of this monitoring. Studio GIS analysts accessed data from the National Land Cover Database, managed and publicly shared by the Multi-Resolution Land Characteristics Consortium. This organization releases updated impervious cover data every five years. This information should be used to update new impervious cover maps of the Greater Hill Country at similar five year intervals. Again, the purpose of this analysis is to provide a clear, accessible map set to the public, governments, civic groups, and businesses, alerting them to the dangerous trends that have been threatening the sensitive lands of the Hill Country. These maps should be available on the same website as the above metrics and indicators, allowing users to cross-reference data and map trends themselves.

2.4 Record & Track Newly Subdivided Land

Using satellite images and geographic information systems, it would be possible to calculate the amount of the region's land that is urbanized and subdivided each year. These statistics should be reported on an annual basis or as frequently as the data will allow.

2.5 Tally Total Acres of Protected Land

The Greater Hill Country comprises 17,760.6 square miles of total area.[142] There are 3,533.9 square miles of total area in the four counties comprising the Austin-San Antonio corridor.[143] Stakeholders involved in environmental protection, conservation, and land stewardship efforts in the Greater Hill Country should continue to actively monitor and update the portion of land dedicated to green space—be it public parks, conservation easements, National Wildlife Refuges, land banks, or urban green belts. The Hill Country Alliance collects this data annually and they should publish

their findings widely. This statistic can help galvanize public support for conservation efforts, especially when those efforts come with steep price tags. Currently the proportion of land dedicated to green space in perpetuity is less than five percent[144]—a figure that raises concerns given how important green space is both to ecological health for plant, animal, and human communities and the psychological health of humans who need access to the outdoors. The total acres of protected land metric should be reviewed on an annual basis to check the progress of conservation efforts, especially relative to the new impervious cover metric.

2.6 Tally Total Dollars Dedicated to Protecting Land

The Gross Domestic Product (GDP) of the two largest metropolitan statistical areas (MSAs) in the Greater Hill Country (Austin-Round Rock and San Antonio-New Braunfels) together totaled $220 billion in 2014.[145] What percentage of that annual figure is devoted to green infrastructure, conservation, agriculture programs, and monitoring and research of these activities? Much like the indicator that tracks total land dedicated to green space relative to the total land area of the Greater Hill Country, the Studio hypothesizes that this percentage is low, well under one percent. Many residents of the Greater Hill Country would probably vocally support green space, and based on that public support, they would expect government representatives and civic leaders to increase the supply of green space relative to the size of the growing population. Actually measuring the amount of green space protected each year would, again, raise eyebrows and alarm constituents. Annual media advertising on the percentage of corridor and Greater Hill Country GDP devoted to green space protection, conservation, and stewardship would serve as a wake-up call that Central Texas is not doing enough to protect the land and water resources that have fueled so much of the region's success.

The website mentioned above should house all of these metrics so that the public, journalists, research organizations, governments, and businesses can access them easily and quickly. The most powerful force behind bold action is reliable data that tells the story of the Hill Country's growth and change. If, despite public support, governments and stakeholders fail to make measurable progress on each of these metrics over, for example, a 15-year period, then one would have quantitative reason and evidence to call for bolder, regulatory interventions, which we describe in more detail below (see "Long-Term Goals").

2.7 Design Model Development Standards

In order to spread awareness about the benefits of responsible development in the Hill Country, this studio suggests that the Hill Country Alliance provide model development standards and best practices that reflect conservation-minded development. Using these standards, HCA could recognize successful low-impact development in the region through annual "Best of" awards. This could further strengthen ties between the conservation and development communities. One example of this type of award system is the 1000 Friends of Iowa's Best Development Awards, a statewide program that recognizes sustainable commercial, residential, and civic developments, as well as nature preservation projects. Similar to HCA, this nonprofit's mission is responsible land

use. Through these awards, 1000 Friends brings attention to cities, landowners, and developers who demonstrate how responsible development is beneficial to their communities.[146] Additionally, the Environmental Protection Agency (EPA) has developed a "smart growth self-assessment tool" for rural communities, a guide that helps local jurisdictions monitor how well their policies and codes support the kind of development they wish to see in their towns.[147] HCA could provide a similar type of assessment, personalized for the Hill Country region, which could help build capacity for smaller communities that lack access to planning resources.

Goal #3 - Coordinate Education and Public Outreach

The Hill Country Alliance has already had enormous success in raising public awareness and building support for its efforts to preserve the region's natural resources and other assets. HCA could collaborate with the Corridor Council and other groups to sustain and increase the effectiveness of these efforts across the Greater Hill Country region.

Goal #4 - Suitability Mapping

Suitability mapping will provide Hill Country stakeholders and local jurisdictions the means to distinguish areas that are more attractive for development from those that hold tremendous conservation value. By integrating development and conservation goals, development will be directed to areas capable of absorbing it with existing infrastructure, while areas most vulnerable to the impacts of land transformation, such as increased runoff and habitat fragmentation, will be protected and conserved. The results of these analyses can be readily visualized and used to underpin plans and regulations needed to promote a responsible pattern of growth for the region.

These suitability maps can lay the groundwork for future efforts to balance development and conservation across the Hill Country region. They provide additional weight and affirmation to the recommendations of the Hill Country Alliance's own Vision Map. The composite maps generated by this analysis can inform a number of decisions regarding not only where development is most desirable or conservation is most necessary, but also what type of urban form can best accommodate projected population growth. However, to ensure future applications of suitability mapping represent a comprehensive and unbiased perspective, the values guiding this data-based process must be derived directly from the stakeholders and local jurisdictions themselves. Through extensive community input, suitability mapping can powerfully inform a tangible, illustrative vision for the future of the Hill Country.

Medium-Term Goals

The near term goals outlined above would build confidence and public support to move towards establishing the Hill Country Endowment. To move ahead with this step will require that stakeholders—— including participating cities and counties, civic groups and others—— create a formal working agreement among themselves, followed by identification of the taxes and user fees that will be used to fund and manage the associated programs.

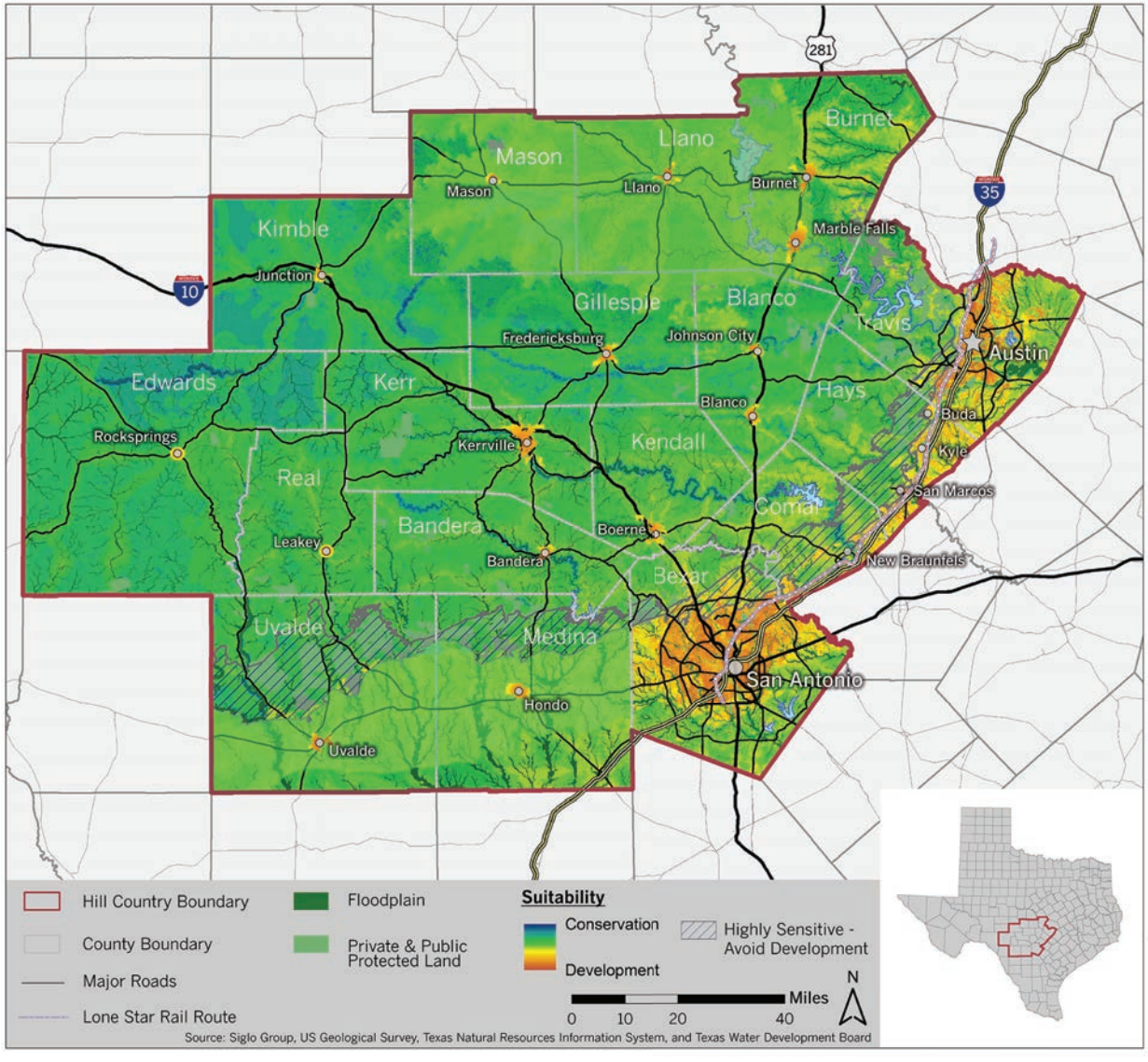


Figure 4.4: Suitabilty Map for the Hill Country

Goal #1 - Create and Sign a Regional Compact

The Greater Hill Country region needs coordinated management of land use, transportation, water, and economic development. Gaining support for a regional level regulatory body may be difficult to achieve in the current political atmosphere. However, many of the same goals could be achieved through a civic partnership between the Hill Country Alliance and the Greater Austin-San Antonio Corridor Council, for instance. These groups could prepare an advisory regional plan that would identify priority development and conservation areas, key infrastructure investments, the location of an urban utility limit and other regionally-significant matters.

Using their regional plan as a guide, the civic groups should advise the Hill Country Endowment in its various activities. The groups should also advocate for key investments and policy changes required to achieve the goals outlined in this report. The Hill Country Alliance would focus on issues facing rural areas of the region and its small cities, open spaces and water resources. The Corridor Council would focus on urban and economic development, housing and transportation issues in the corridor, in particular construction of Lone Star Rail and other transit systems and urban development around these systems.

Both groups would collaborate to advocate on region-wide development and conservation issues, and on institutional and legal reforms.

Goal #2 – Establish the Hill Country Endowment

As detailed in the opening of this chapter, the studio recommends that a Hill Country Endowment be established that could have two functional profiles:

- An institution that would capture a small share of the region's economic growth to finance needed investments in infrastructure and land and water conservation activities; and
- A regional commission that would adopt a regional plan and then promote a compact in which the region's municipalities and counties would develop their own plans, regulations, and capital investment strategies that were consistent with the regional plan.

Creating the Endowment will require a formal working agreement among Hill Country stakeholders, identifying roles and responsibilities for each group engaged in managing the region's future. It is important to build off

The Greater Austin-San Antonio Corridor Council

Civic and business leaders from Austin and San Antonio founded The Greater Austin-San Antonio Corridor Council in 1984 as a forum in which they could discuss issues of importance to the region's continued prosperity. The Council engages scores of committee members in its work, all civic and business leaders from large and small communities in the corridor. To date, the Council has focused primarily on transportation issues including Lone Star Rail and the development of State Highway 130. It would be natural for the Council to expand its scope to include planning of and advocacy for dense development in the corridor, supported by a robust public transit system.

of cooperative successes in the near term to establish an enduring framework for balancing growth over many decades. There are two critical components of this step: 1) creating a formal working agreement among stakeholders, and 2) funding and managing the associated programs.

Developing consistency between regional goals and county and municipal plans and regulations will be a critical component of successful regional land management and development strategies. As discussed in the opening section of this report, the "crazy quilt" of existing regulations in the Hill Country is anything but consistent. This makes it difficult to implement large-scale solutions. Establishing a unified framework for protecting the Hill Country will require all of the various actors to agree upon and formalize their individual roles in a working agreement.

Long-Term Goals

Efforts made towards coordinated regional management will fail if required policy reforms are not made at the state level. The Texas Legislature should recognize that the concerns facing the Hill Country require special consideration in state law. Stakeholders in the Greater Hill Country should advocate for the policy reforms detailed in this section.

Goal #1 - Protect Large Landscapes from Eminent Domain

The goal of protecting land from development is compromised when infrastructure pathways such as roads and electric transmission lines cut through large open landscapes. Landowners suffer when large parcels are fractured and full compensation is not provided. To make matters worse, properties held under conservation easement agreements are subject to the exercise of eminent domain by utility providers and governmental entities, including municipal utility districts, just like properties that are not permanently dedicated to conservation. In fact, conserved lands often become targets for infrastructure pathways because infrastructure firms and planners perceive conserved lands as large open spaces with few obstructions and few landowners to oppose the project. This fact discourages landowners who would otherwise place their land under conservation easements from doing so. Current law does not give enough priority to protecting conservation easements when charting roadways and other infrastructure pathways. Changes to state law should improve protections for conservation easements from the exercise of eminent domain.

Green Belt Alliance

The Greenbelt Alliance has been advocating public policy and regional plans that protect open space in California's Bay Area since 1958. Beginning in the 1980s, it has recognized the importance of smart growth in the region's cities to its mission of preserving open spaces throughout the Bay Area, expanding its focus to include the promotion of dense, dynamic, and livable cities that complement open space and working lands. In addition to direct advocacy and grassroots organizing, the Greenbelt Alliance engages in policy research to promote the type of growth that it believes will make the Bay Area a desirable place to live for generations to come. Its report ***At Risk: The Bay Area Greenbelt,*** which it publishes every five years, is widely regarded as the region's most accurate and comprehensive assessment of at-risk open space and is a useful model for the Hill Country Alliance and its partners to draw from.

Goal #2 - Ensure Regulation by Groundwater Conservation Districts

Current groundwater conservation district (GCD) coverage should be reviewed for gaps or unmanaged aquifer areas, and the district boundaries should be extended accordingly. The current patchwork of groundwater regulation has vulnerabilities that may be exploited in a manner similar to the Electro Purification well fields proposed earlier this year.[148] Furthermore, all GCDs should receive sufficient funding to adequately monitor groundwater and administer all of their regulatory duties. Comprehensive GCD coverage and enhanced fudning will help prevent unregulated groundwater pumping that compromises groundwater resources.

Goal #3 - Ensure Counties Have Authority over MUDs

Municipal utility districts (MUDs) are currently required to submit applications for approval to the Texas Commission on Environmental Quality (TCEQ). This application includes a requirement for an engineering report, including evaluation of the effect the district will have on the groundwater level within the region and the recharge capability of a groundwater source.[149] It does not, however, require proof of a groundwater pumping permit from a GCD or any approval from the county other than the filing with the county clerk of a landowner petition for the creation of the MUD. TCEQ approval may not reflect local values or priorities for this type of development, and the lack of requirement for a water supply plan or pumping permit may result in the over-burdening of local groundwater resources once the development is built out and drawing water from the aquifer. State law should be changed to require MUDs to acquire a permit from GCDs during the MUD permitting process.

Examples from Around the Country

Several U.S. regions have adopted similar strategies and institutions that can provide templates for how the Endowment might operate. Portland's elected metropolitan government administers a regional vision plan, consistency process, and regional growth boundary. It also finances and operates metropolitan infrastructure systems. The Twin Cities' Metropolitan Council, for example, administers an urban utility limit, sewer and other regional infrastructure systems. It also administers a regional tax base sharing scheme. San Diego and Denver both have regional councils of governments that administer regional plans and consistency programs. Denver's "Mile High Compact" is a voluntary agreement among the region's chief elected officials to administer regional transit-oriented development and land conservation programs. New York City's regional watershed agreement provides funding from New York City water rate payers for programs of land conservation, wastewater treatment, technical assistance, and agricultural land management in upstate watershed communities. Nonprofit civic groups have played an important role in developing and administering all of these programs.

Goal #4 - Require Public Disclosure of Real Estate Sales Prices

In Texas, real estate transaction prices are not currently subject to public disclosure. This leaves county appraisal districts without market information that could serve to better inform property tax appraisals and the resulting assessments. One of the risks of not requiring the public disclosure of this information is uneven valuations of commercial and residential properties, as was the case in a recent study of Travis County real property appraisals, which resulted in a City of Austin lawsuit against the Travis County Appraisal

District. This lack of disclosure was linked to unfairly distributed tax burdens on residential landowners due to undervalued commercial property in the City of Austin.[153] In addition to resolving this type of conflict, disclosure of real estate sales prices would also provide important data for planning purposes. State law should be changed to conform with those of most states, which require this disclosure.

Cape Cod, Massachusetts

In Cape Cod, Massachusetts, the Cape Cod Commission was formed in 1990 to help manage growth in the region and to preserve its groundwater and other natural resources. The Commission has developed regional plans and provided technical assistance to the towns on the Cape that may not have planning staff and expertise. The Commission also has the regulatory power to designate district of critical planning concern (DCPCs) and review large projects called developments of regional impact (DRIs).

Goal #5 - Grant Hill Country Counties Land Use Authority

Proposals to grant land use regulatory authority to counties have been unsuccessful in the Texas Legislature. However, rapid development in some of the most critical aquifer recharge and wildlife conservation zones of the Hill Country presents an urgent need to provide counties with this authority. Establishment of minimum lot sizes and site planning provisions to facilitate preservation of natural areas and working lands, regulatory incentives to direct development into small towns for tax revenue capture, and designation of protected areas are some of the options for land use regulation that could help guide desired development patterns. If counties were able to regulate land use, it would enable them to use their resources more efficiently by enhancing planning for the provision of infrastructure such as roads, utilities, and emergency services.

Goal #6 - Create the Hill Country Trinity Water Conservation Area

The action items discussed so far respect the Texas tradition of minimal government involvement and regulation. Hill Country stewards should carefully monitor the impacts of these strategies on the region's economic resilience, water supply, and biodiversity. If the strategies yield the region's desired outcomes, we will see a new form of regional management through local initiatives—Texas' very own form of planned regional growth. However, if the strategies do not yield necessary positive outcomes, it may be necessary to create a new Hill Country Trinity Water Conservation Area (HCTWCA) to coordinate the integrated planning for surface and groundwater resources, and related land use concerns across the whole region.

The HCTWA would assume the current jurisdiction and responsibilities of Groundwater Management Area 9 (GMA 9), and members of other individual groundwater conservation districts (GCDs) would serve the new body in an advisory role. Other advisory members may include representatives from counties. HCTWCA would identify priority conservation areas and other management steps required to protect the region's water resources. The local control on the development of GCDs and cities should continue. However, for large development or water projects that would have an impact on the water resources of the entire region, HCTWCA would hold an

additoinal review apart from the review of the local bodies. Such a review would maintain local control that is highly valued in Texas and ensure regional collaboration.

HCTWA would be responsible to fill the knowledge gap of groundwater movement and its connection to surface water in the Hill Country. HCTWA could collaborate with the University of Texas or U.S. Geological Survey for generating the missing science. There are multiple avenues to follow for funding the HCTWA; options could include making the new district eligible for funding through the proposed Hill Country Endowment, or by creating a surcharge on water rates.

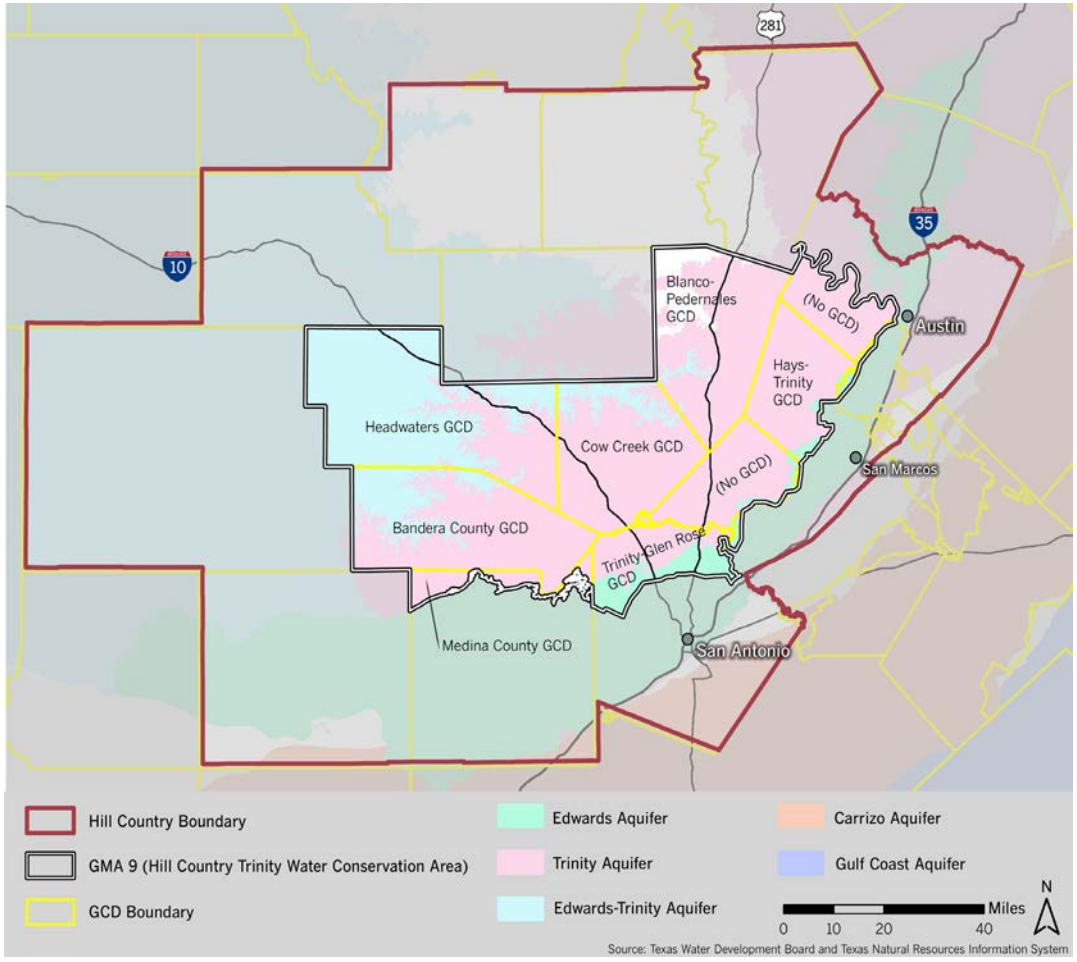


Figure 4.5: Proposed Hill Country Trinity Water Conservation Area

Pedernales Falls State Park | Photo: Lois Schubert

Conclusion

This studio was initiated at the request of the Hill Country Alliance to identify threats to the well-being of the Texas Hill Country's exceptional natural, cultural and scenic resources and to recommend solutions to these challenges. The studio believes that these resources, and in particular the region's scenic landscape, biodiversity, and water resources are very much at risk, due to unmanaged suburban sprawl in the Austin-San Antonio corridor, and due to overuse and abuse of the region's limited water supplies. We further believe that if the quality and quantity of these resources is threatened, it will also threaten the economy and quality of life in the Austin-San Antonio corridor.

This special region draws so many people because of its extraordinary quality of life, access to clean air, water, and open land, relatively low housing costs, and short commutes. Current development trends now threaten all of these positive attributes. Rapid population and economic growth combined with current development patterns continue to escalate housing prices and proliferate gridlocked highways. The once easily accessed countryside is now being pushed away by rings of low-density suburban sprawl emanating out from Austin and San Antonio. Consequently, the things that have made this a great place to live and work are slipping through our fingers.

However, we do not need to accept these trends as inevitable. The region can once again take hold of its future. To do so, the studio has concluded that preserving the Hill Country's natural resources and its quality of life requires transforming the development and mobility patterns commonly found in the Austin-San Antonio Corridor. This will also require greater commitments to land and resource preservation in the region's rural counties. Low-density, auto-based development is consuming prodigious amounts of open land, escalating housing prices, and aggravating highway congestion. All of these factors are pushing people and activities out into the Hill Country's rural lands, and into its most environmentally sensitive areas, threatening wildlife habitat and water quality and quantity in the Edwards and Trinity aquifers, as well as the surface waters of the region's rivers and streams. Further degradation of these resources will, in turn, place the water supplies of the region's cities at risk. For all these reasons it will be necessary to rethink and to transform development patterns and conservation initiatives across both urban and rural areas of the Hill Country.

The goal of this report is to initiate a public debate about the future of the Hill Country region, and the steps that will be required to protect the region's extraordinary economic and natural resources for decades to come. To do this, we have put forward a number of proposals for new

policies, institutions, and investments that could prevent degradation of, and actually improve the health of the natural systems that underpin the region's success and quality of life.

Some of these proposals might be controversial, but we believe that the Texas Hill Country, and these initiatives, are worth fighting for. We are well aware of the challenge of advancing initiatives like these given the resistance to new public expenditures and new regulations at the State Capital and across Texas. However, we also have enormous confidence in the ability of Texans to rally around efforts to preserve the Hill Country, this place that is so central to the self-image of our state and region.

We believe that when residents and business and civic leaders comprehend the importance of moving ahead with these measures, and the potential benefits that will follow, they will embrace these and other steps to preserve the region's underlying natural systems.

Let the debate begin!

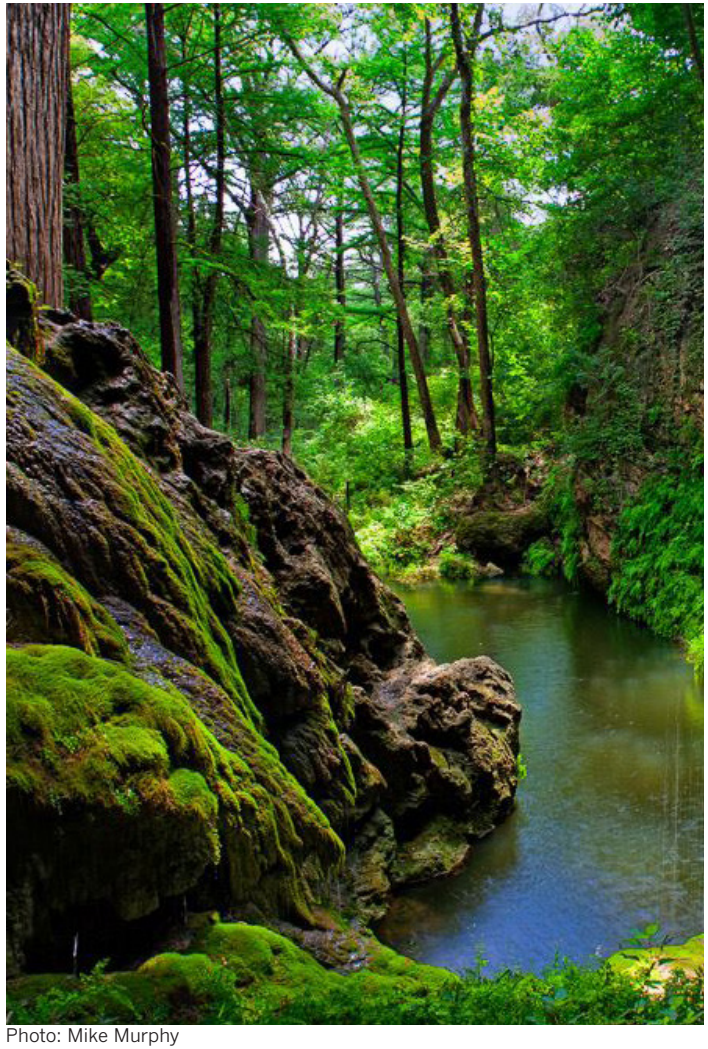


Photo: Mike Murphy

Appendices

Appendix A – Preliminary Suitability Mapping Exercise

Suitability Mapping Methodology

These suitability maps are based on a systematic, multi-factor analysis of physical, cultural, and economic variables relevant to the Hill Country. To begin, each variable is weighted as a percent, with larger percentages ascribed to variables deemed of greater importance. Each variable was then scored on a scale of 1 to 10 based on its unique qualities, with 10 signifying the greatest value and 1, the least. Land use, for example, was weighted at 10, then broken down into wetlands, agriculture, scrub and barren, with scores of 10, 7, 5, and 1, respectively. In terms of conservation suitability, the variables used were: the Edwards Aquifer recharge zone, riparian buffers, the Colorado and Brazos River basins, slope, land cover, scenic interest, wildfire risk, and springs. Both the recharge zone and riparian buffers were given the most weight, as the studio deemed their conservation value to be very high. All other variables were weighted equally. In terms of development suitability, the variables included were Lone Star Rail stops, highways, scenic interest, and developed land. All were weighted equally and scored based on distance in miles to each specific layer. These variables were included based in part on the analysis done for the Ohio Lake Erie Balanced Growth Program, wherein it was discussed what inputs could be utilized to represent development interest in suitability analysis. For example, the Lone Star Rail Stops, highways, and developed land inputs, were included to represent proximity to existing infrastructure, which was a quality listed as desirable for developers in the Ohio study.

Suitability Mapping

A suitability analysis is a tool used to determine the most desirable locations for specific land uses based on a number of intrinsic characteristics.[152] Depending on the land use objective, suitability maps are generated in Geographic Information Systems (GIS) in accordance with the factors or constraints deemed most relevant to that particular land use. The result of the analysis is a composite map that indicates the most suitable location for selected land use types. Suitability analyses allow an array of information to be portrayed in simplified maps that can then be utilized in developing future land use plans. Although the analysis is both objective and data-driven, the values used to identify the input factors are subjective in nature and reflect the preferences and goals of the community.

Thus, it is critical that the values conveyed in the suitability analysis align with community-wide priorities, as articulated by stakeholders themselves. Once these values and priorities have been outlined, they can be used to shape the suitability analysis.

For the Hill Country, suitability mapping provides stakeholders and local jurisdictions the means to distinguish areas that are more attractive for development from areas that hold tremendous conservation value. By integrating development and conservation goals, it is intended that development will be directed to areas capable of capturing it (in terms of both environmental thresholds and existing/future infrastructure) while areas most vulnerable to the impacts of land transformation (in terms of increased runoff, diminished water quality/quantity, and habitat fragmentation) will be protected and conserved. Using the results of these analyses, priority conservation and priority development areas can be readily visualized and used to underpin plans and regulations needed to promote a responsible pattern of growth for the region.

Mapping Development and Conservation Suitability for the Hill Country

Continued low-density sprawl across the Hill Country will adversely affect the region's public health, quality of life, and the economy.

The effects from this type of low-density sprawl have already been experienced and studied across the U.S., which allows us to anticipate what type of consequences we can expect in Texas if current trends continue. To begin, low-density patterns result in greater losses of sensitive environmental lands, such as wetlands, flood plains, critical habitat, aquifer recharge areas, stream corridors, and steep slopes. Furthermore, sprawl also disrupts the natural habitats of various native species, to the extent that fragmentation is often noted as the foremost threat to biodiversity.[153] Also of critical importance, especially in the Hill Country, is the effect that low-density sprawl development will have on water resources. This type of land use is accompanied by a high degree of impervious cover and erosion that will result in greater stormwater runoff. Not only does this result in more severe and frequent flood events, but it also increases the risk of pollutants entering drinking water supplies. Sprawl has been shown to generate the most sediment, biological and chemical oxygen demand, nitrogen and phosphorus runoff, and suspended solids and fecal coliform bacteria of any development pattern.[154]

The accompanying suitability maps can help decision makers and landowners prevent these negative effects of sprawl by demonstrating a better way to develop and conserve. This is not only a means of setting aside those areas in the Hill Country for preservation that are most environmentally sensitive but also of distinguishing those factors that enable smart, cost-efficient development as well. This analysis outlines the variables that can provide a template for successful development and the preservation of working lands and open space. The environmental factors considered here, such as riparian areas, recharge zones, and endangered species habitats, will illuminate areas in the Hill Country that are most critical to be conserved and spared from development. While scant literature covers factors for development suitability, this analysis also identifies the areas that are adjacent to highways, existing infrastructure, social amenities, transit stops, and scenic interest as most suitable for development.[155] Taking into account all of these variables, the suitability maps that follow are to function as GIS decision-support models, with each analysis done independently before the maps are combined to indicate where smart, balanced growth can and should occur.

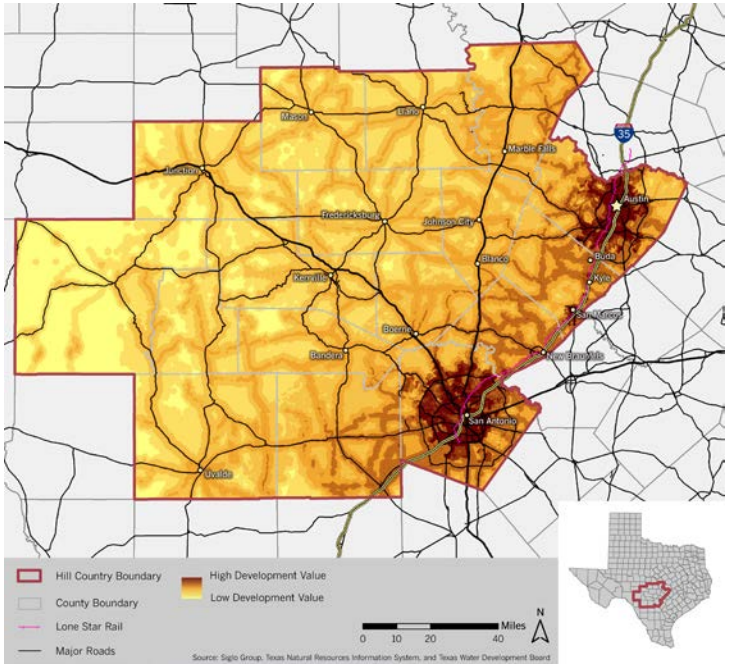
Suitability Analysis Results

Development Suitability Map

The results of these suitability maps exhibit some apparent and interesting patterns. Areas are identified that are most attractive to growth and most likely to experience significant development pressures. This pattern tracks the major highways that crisscross the Hill Country and increases in intensity near population centers and points of scenic interest. In this model, all variables were weighted equally, but stakeholders involved in future applications of suitability analysis might assign values differently. For example, greater emphasis might be given to particular towns, cities, or even specific highways, which would produce different suitability outcomes and thereby alter the areas deemed most desirable for capturing future growth. These and other potentially relevant factors, such as proximity to water bodies, property values, the location of current water infrastructure, or the degree of water resource vulnerability, could be identified through a stakeholder process in order to best represent development interest.

Conservation Suitability Map

As the conservation suitability map reveals, the majority of priority conservation areas are located immediately west of the IH-35 Corridor. Riparian areas around streams and rivers and the recharge zone for the Edwards and Trinity aquifers are clearly demarcated as priority areas to protect and conserve. Special emphasis was placed on the recharge zone and riparian corridors in order to underscore the vulnerability of aquifers and water resources in the Hill Country.

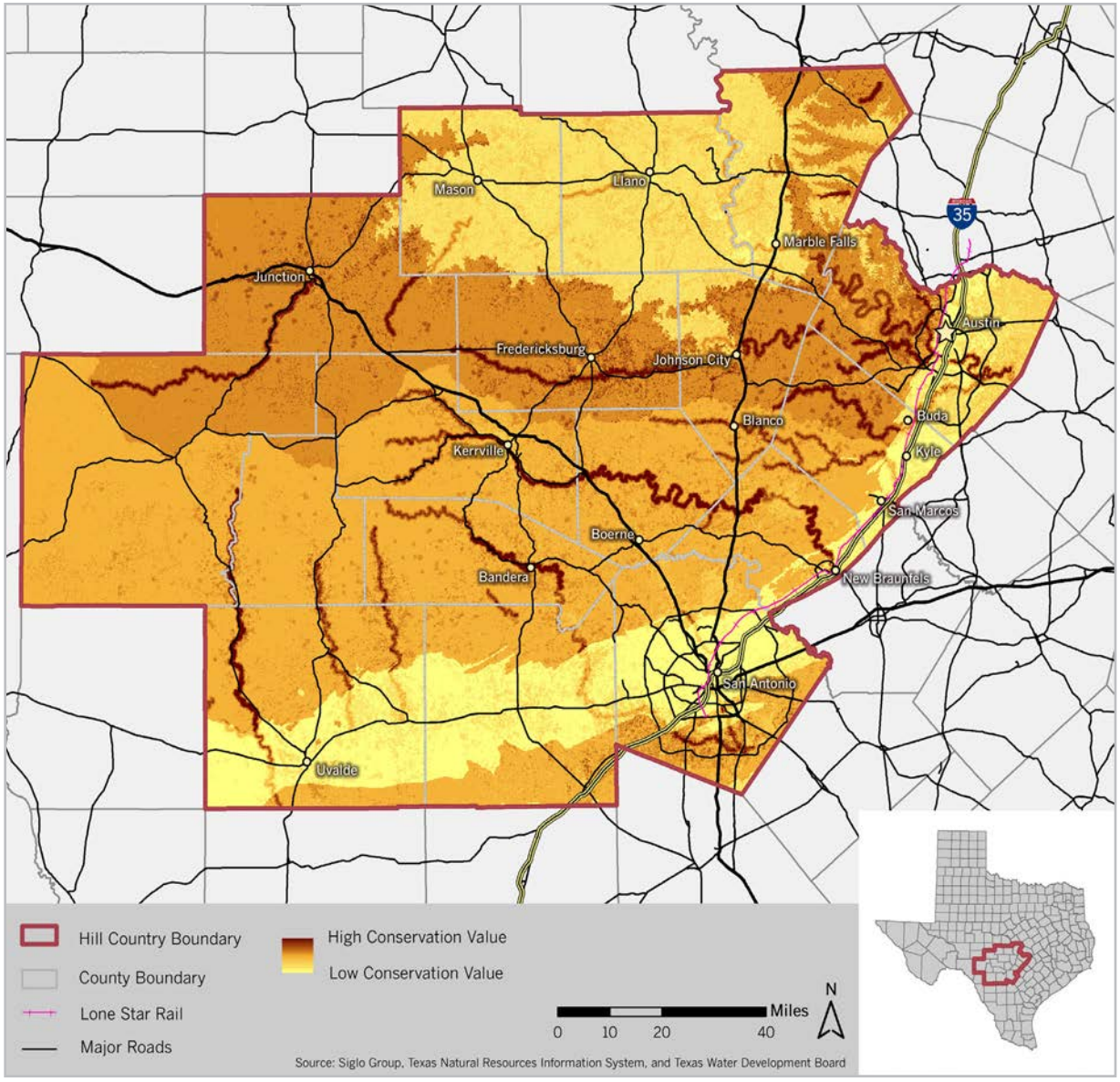


Appendix Figure A.1: Development Suitability Map for the Hill Country

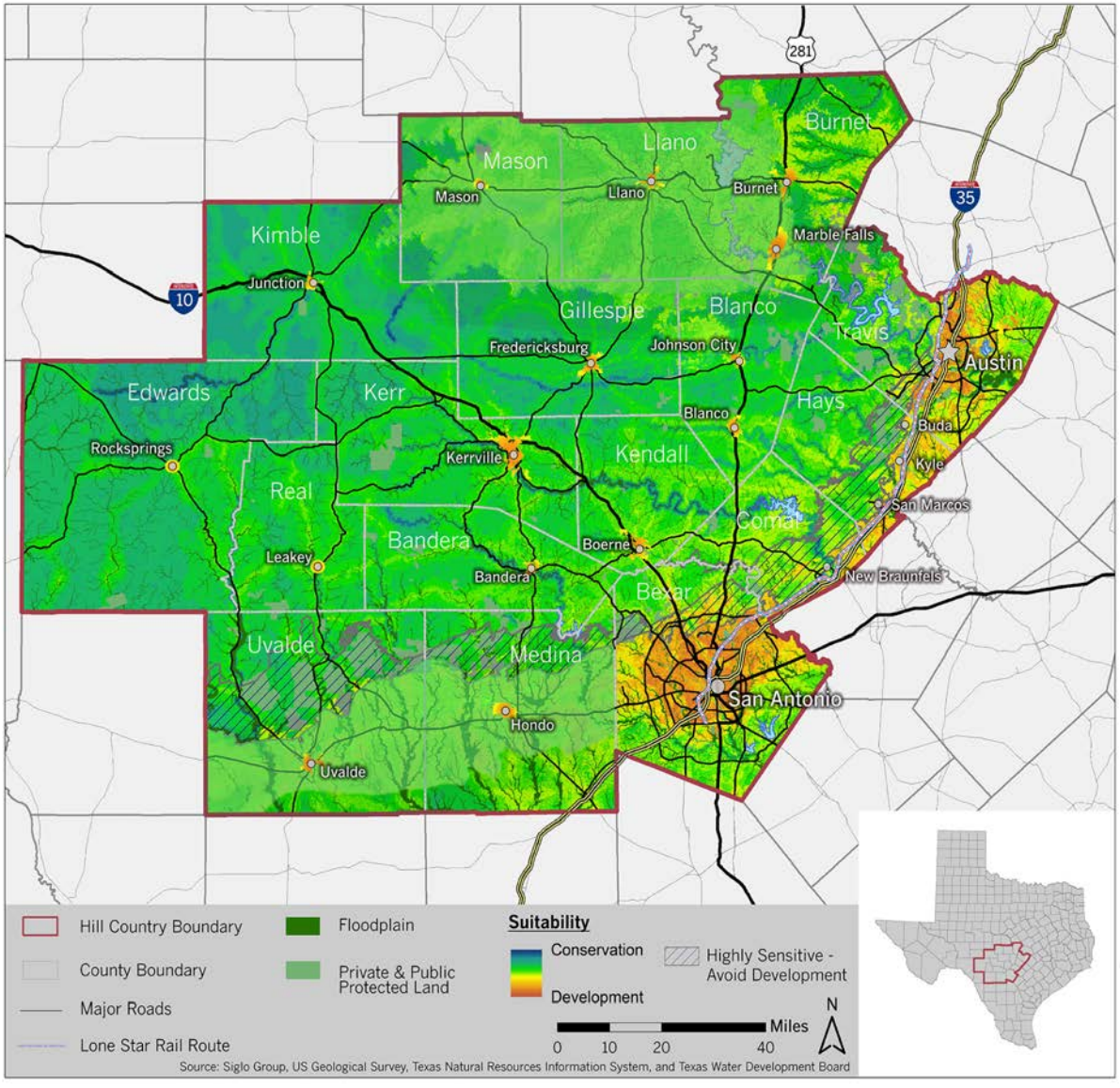
Given the inherent connection between ground and surface water and the challenges this poses to future water supplies (for both human consumption and environmental flows), protection of the regional watershed was given the highest weight in the conservation suitability analysis. Other components incorporated into the assessment include topography, land cover, wildfire risk, scenic interest, and privately and publicly protected lands. Together these elements were deemed most important in determining areas of the Hill Country with the greatest conservation value. Though this analysis is not exhaustive, the preliminary results of the assessment mirror current growth patterns along with IH-35 Corridor and serve to emphasize the need to promote balanced growth in Travis, Hays, Comal, and Bexar counties in order to avoid encroachment into areas that are not already highly urbanized.

Overlay of Conservation and Suitability Map

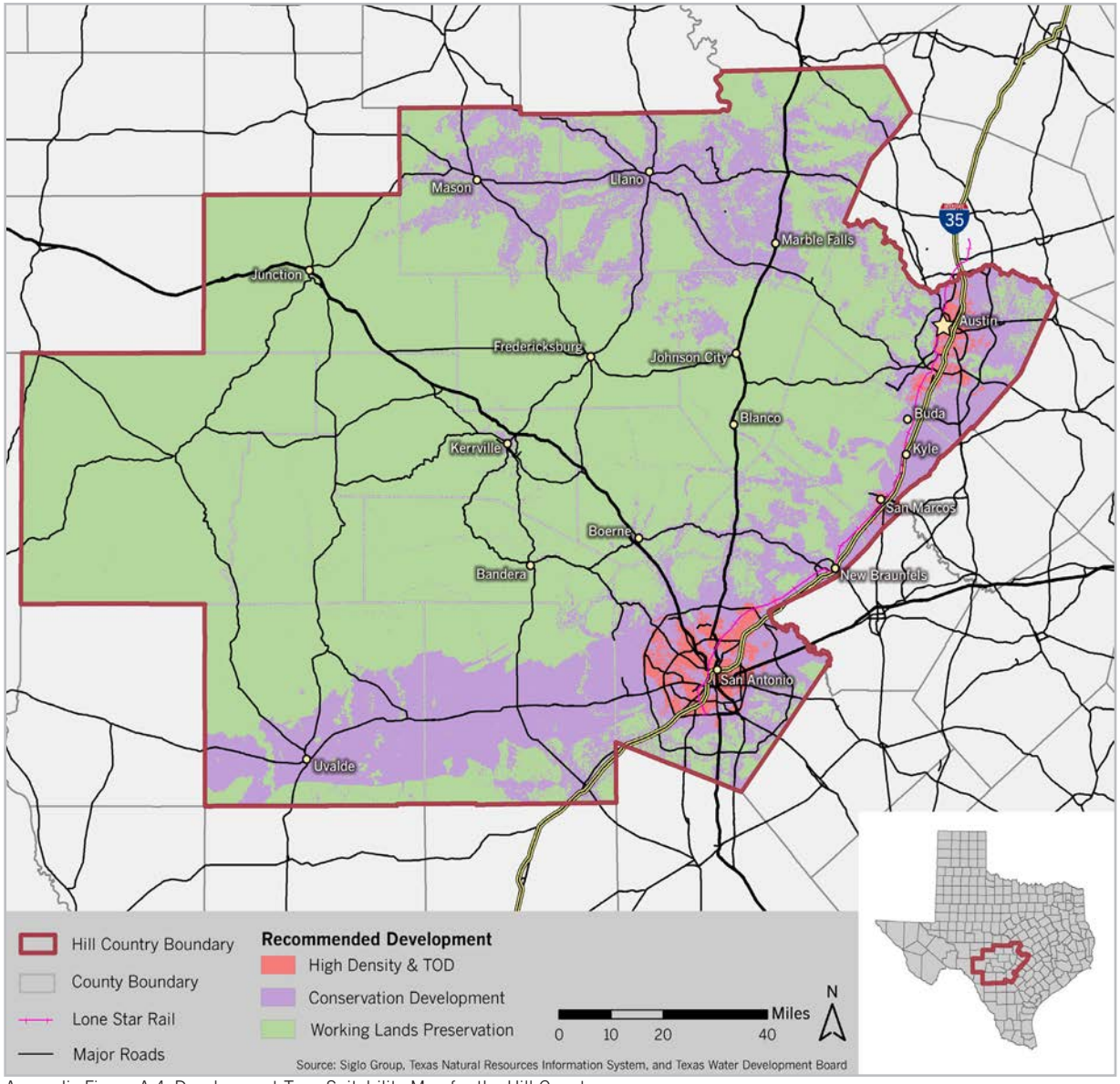
By joining both the development and suitability maps, it is possible to identify lands most suitable for development and conservation. Development should be focused along IH-35 and the Lone Star Rail corridor while avoiding those areas of high conservation value within the corridor. There are pockets throughout the Hill Country that have both high development potential and lower conservation value, which could absorb development as well. This development should be targeted within the region's extensive network of historic city and town centers. Many of these places have the potential for extensive infill development and expansion. To do so, however, will require that they update and expand aging water and sewer systems, schools and other municipal services. It would be appropriate for Hill Country Endowment funds to be used for this purpose. For those areas that lie in the middle of the conservation and development spectrum, stakeholder input will be critical to deciding whether conservation or development is most appropriate. This map is not a definitive proscription for future development, but rather a guide for how and where smart, balanced growth that best serves the people of the Hill Country could occur.



Appendix Figure A.2: Conservation Suitability Map for the Hill Country



Appendix Figure A.3: Suitability Map for the Hill Country



Appendix Figure A.4: Development Type Suitability Map for the Hill Country

Takeaways

These suitability maps serve the groundwork for future efforts to balance development and conservation across the Hill Country. They provide additional weight and affirmation to the recommendations of the Hill Country Alliance's own Vision Map. The composite maps generated by this analysis can be used to make a number of decisions regarding where development is most desirable, conservation is most necessary, and what type of urban form can best accommodate projected population growth. To ensure that future applications of suitability mapping represent a comprehensive and unbiased perspective, the values guiding this data-based process must be derived directly from the stakeholders and local jurisdictions themselves. Through extensive community input, suitability mapping can provide the means to create a tangible, illustrative vision for the future of the Hill Country.

Appendix B - Metrics and Population Methodology

The American Community Survey was used to calculate the most recent estimated population for the 17 counties that comprise the Hill Country. Specifically, database DP05, 2013, was used. When projecting population scenarios for the Hill Country, data was taken from the Office of the State Demographer in Texas. The Demographer has population projections for five-year periods between 2015 and 2050. It employs three different scenarios based on different migration possibilities: no migration; half of standard, residual migration rates during 2000-2010; and full migration rates. More information about the State Demographer's methodology can be found at http://osd.texas.gov/Data/TPEPP/Projections/Methodology.pdf

Metrics were largely determined by reducing known realities and patterns of today to per capita or per household values and then multiplying those per capita or per household values by the projected population of a given, future year. For example, the current car ownership rate was calculated for each household and then that value was multiplied by the projected number of households for 2050. This yields a projected number of cars for households.

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