

*The*  
PHILOSOPHICAL  
SOCIETY *of* TEXAS



P R O C E E D I N G S

*2001*

*The*  
PHILOSOPHICAL  
SOCIETY *of* TEXAS

P R O C E E D I N G S

*of the Annual Meeting at Austin  
November 30–December 2, 2001*

*PSV*



AUSTIN

THE PHILOSOPHICAL SOCIETY OF TEXAS

2002

THE PHILOSOPHICAL SOCIETY OF TEXAS FOR THE COLLECTION AND DIFFUSION OF KNOWLEDGE *was founded December 5, 1837, in the Capitol of the Republic of Texas at Houston by MIRABEAU B. LAMAR, ASHBEL SMITH, THOMAS J. RUSK, WILLIAM H. WHARTON, JOSEPH ROWE, ANGUS MCNEILL, AUGUSTUS C. ALLEN, GEORGE W. BONNELL, JOSEPH BAKER, PATRICK C. JACK, W. FAIRFAX GRAY, JOHN A. WHARTON, DAVID S. KAUFMAN, JAMES COLLINSWORTH, ANSON JONES, LITTLETON FOWLER, A. C. HORTON, I. W. BURTON, EDWARD T. BRANCH, HENRY SMITH, HUGH MCLEOD, THOMAS JEFFERSON CHAMBERS, SAM HOUSTON, R. A. IRION, DAVID G. BURNET, and JOHN BIRDSALL.*

*The Society was incorporated as a non-profit, educational institution on January 18, 1936, by George Waverly Briggs, James Quayle Dealey, Herbert Pickens Gambrell, Samuel Wood Geiser, Lucius Mirabeau Lamar III, Umphrey Lee, Charles Shirley Potts, William Alexander Rhea, Ira Kendrick Stephens, and William Embrey Wrather. On December 5, 1936, formal reorganization was completed.*

*The office of the Society is located at 2.306 Sid Richardson Hall, University of Texas, Austin, 78712.*

*Edited by Alison Tartt and Evelyn Stehling*

©2002 by *The Philosophical Society of Texas*

# CONTENTS

---

## *The Land*

The Philosophical Society of Texas	5
<i>Speaker and Topic</i>	
WELCOME AND INTRODUCTION	6
Ellen Temple, President, Philosophical Society of Texas	
AN OVERVIEW	9
Robert Breunig, Moderator	
WHAT DOES IT MEAN TO LOVE THE LAND?	12
Laura L. Jackson	
GLOBAL WARMING AND THE CHANGING LAND	21
Camille Parmesan	
A CENTURY OF LAND USE IN TEXAS: IMPACTS ON WILDLIFE DIVERSITY	35
David J. Schmidley	
SOILS AND THE EDWARDS PLATEAU	47
Libby Stern	
HOW CAN WE HEAL THE LAND?	51
William R. Jordan III	
TEXAS LAND AND PUBLIC POLICY	56
Andrew Sansom	
AMERICA THE BEAUTIFUL	64
Jessica Catto, Moderator	
William E. DeBuys Jr.	67
Melinda E. Taylor	72
Lawrence A. Selzer	78
Patrick F. Noonan	83

THE FUTURE OF THE LAND	
Discussion	87
Conclusion	91
<i>Robert Breunig</i>	
Memorials	95
Officers	105
Past Presidents	106
Meetings	108
Preamble	109
Members of the Society	110
In Memoriam	129

# THE PHILOSOPHICAL SOCIETY OF TEXAS

---

“**T**he Land” was the topic of the 164th anniversary meeting of the Philosophical Society of Texas, held at Austin’s Marriott at the Capitol Hotel on November 30–December 2, 2001. A total of 334 members, spouses, and guests attended. President Ellen C. Temple organized the program, and Robert Breunig of the Lady Bird Johnson Wildflower Center moderated.

The meeting began on Friday with lunch and a tour of the Lady Bird Johnson Wildflower Center, followed by a reception and dinner at the University of Texas Alumni Center. The evening featured readings by Liz Carpenter, Steve Harrigan, Elizabeth Crook, Tim Henderson, and Karen Kuykendall on the topic “The Land We Know.”

President Temple announced the new members of the Society and presented them with their certificates of membership. The new members are Gregg Cantrell, Joyce Pate Capper, Betty Sue Flowers, Donald S. Frazier, Israel J. Galvan, Dee J. Kelly, Adair Wakefield Margo, Kathleen Shive Matthews, Paula Meredith Mosle, Raul Rodriguez, William A. Wise, and Robert E. Witt.

Frank D. Welch, an architect with Frank Welch and Associates in Dallas, received the 2000 Philosophical Society of Texas Book Award for the best book on Texas, either fiction or nonfiction, published in 2000. His *Philip Johnson & Texas* was published by the University of Texas Press.

Members and guests gathered for a reception and dinner at the Bob Bullock Texas State History Museum on Saturday evening. Attendees enjoyed the museum exhibits, which remained open for viewing during the evening, and danced to the music of Corkey Robinson and the Keynotes.

At the annual business meeting, held on Sunday morning, Vice-President George C. Wright read the names of Society members who had died during the previous year: Charles Nelson Prothro, Ralph H. Shuffler, and Dan C. Williams.

Secretary Ron Tyler announced that Society membership stood at 196 active members, 68 associate members, and 36 emeritus members.

Officers elected for the coming year are George C. Wright, president; J. Sam Moore, first vice-president; Alfred F. Hurley, second vice-president; J. Chrys Dougherty III, treasurer; and Ron Tyler, secretary.

An open discussion on “The Future of the Land” concluded the meeting, and President Temple declared the meeting adjourned until December 6, 2002, in Fort Worth.

# THE LAND

## *Welcome and Introduction*

---

ELLEN TEMPLE, PRESIDENT

**W**elcome to Austin and the 164th anniversary meeting of the Philosophical Society of Texas. Although my home is in Lufkin, the heart of the Pineywoods in East Texas, I chose Austin, the heart of Texas, for our annual meeting because the city can more easily accommodate our large group. I also wanted to give you the opportunity to tour the beautiful and peaceful Lady Bird Johnson Wildflower Center, which about 100 of you did yesterday. Mrs. Johnson has inspired me and countless others to love and value our native plant heritage. I would like to dedicate this program in honor of Mrs. Johnson.

I chose "The Land" as our program today because I think that its care is the most critical issue of our new century. We have to get this one right. As Mrs. Johnson has said, the land is the one place where we all come together—it is our home. At the same time, issues relating to the land (which I define as soil, water, plants, and animals) divide us. As a state and a nation, we are searching for common ground, a place where we can agree enough to act and to create public policies that will keep our home beautiful and healthy.

"The Land" seems to be a huge topic, but not nearly as huge as the late Bill Crook's 1995 program "The Oceans" or Steve Weinberg's 1994 program "The Controversial Cosmos," both of which I thoroughly enjoyed. Today my hope is that we will leave this annual meeting with the same sense of wonder about the land that those two earlier programs evoked about the sea and the heavens.

I'm grateful for all of the help that I had for this program. Last night at our reception and dinner at the University of Texas Alumni Center, located on the banks of Waller Creek, which flows past the campus, through town, and on into the Colorado River, we set the stage for today's program with a delightful presentation of readings: "The Land We Know," organized by our own Liz Carpenter, an author and former press secretary of Lady Bird Johnson. For sharing their stories and songs of the Texas land we know and love, I thank Liz as well as authors Steve Harrigan and Elizabeth Crook, who read from their own books; actress Karen Kuykendall; and songwriter and singer Tim Henderson.

I'm also grateful for the special help that the following experts gave me for this program today: Dr. Robert Breunig, executive director of the

Lady Bird Johnson Wildflower Center; Dr. Steve Windhager, director of the Landscape Restoration Program, Lady Bird Johnson Wildflower Center; Dr. Jay Banner, director of the Environmental Science Institute of the University of Texas at Austin; and Terry Hershey and Jessica Catto, two of Texas's leading environmentalists. I also thank Tom Barrow of Houston for giving us the maps that show the ecological regions of Texas. And, of course, I thank Evelyn Stehling, assistant secretary for the Society, for all of her hard work in helping to plan and organize this program and the events for the weekend.

As we focus on "The Land" today and in our panel discussion tomorrow, we will learn more about some of the most pressing issues we face, how we can best deal with them, and what the future holds.

It is my privilege to welcome and to thank our distinguished speakers. After their presentations, you will have the opportunity to ask questions.

Dr. Robert Breunig, known as Bob to those of us who have worked with him over the years, has been the director of the Wildflower Center since 1997. I was president of the board at the time, and I cannot begin to tell you how happy we have been to have him aboard. He came to us as past director of the Desert Botanical Garden in Phoenix, where he developed his passion for native plants. Bob is a leader in the native plant movement and also a member of the Philosophical Society. Bob will present an overview and also serve as the moderator.

Dr. Laura L. Jackson, of the University of Northern Iowa, will give our keynote address with her answer to the question "What Does It Mean to Love the Land?" Her new book is entitled *The Farm as Natural Habitat: Reconnecting Food Systems and Ecosystems*.

Dr. Camille Parmesan, of the University of Texas at Austin, has focused her work of the past several years on the impact of climate change in the twentieth century on wildlife. Her work on butterfly range shifts have been featured in many scientific and popular press reports. She will speak on "Global Warming and the Changing Land."

Dr. David Schmidly, president of Texas Tech University, has spent thirty years studying Texas landscapes and natural history. He has authored five major books about Texas mammals, and his most recent book, *Texas Natural History: A Century of Change*, chronicles the modern history of landscape change in the state and its impact on the fauna. The topic of his presentation is "A Century of Land Use in Texas."

Dr. Libby Stern, of the University of Texas at Austin, will also explore issues close to home with her presentation "Soil and the Edwards Plateau." She applies her specialty of isotope geochemistry to understand earth surface processes both in the modern environment and in the geologic record.

Dr. William R. Jordan III, director of the New Academy for Nature and Culture, is the founder of the journal *Restoration & Management Notes* (now *Ecological Restoration*) and a founding member of the Soci-



ety for Ecological Restoration. His new book is entitled *The Sunflower Forest: Ecological Restoration and the New Communion with Nature*. He will answer the question "How Can We Heal the Land?"

Andrew Sansom, former director of the Texas Parks and Wildlife Department and now director of the International Institute for Sustainable Water Resources at Southwest Texas State University in San Marcos, will speak on "Texas Land and Public Policy."

Our closing panel for the day will focus on national policy and "America the Beautiful." Jessica Catto, who brought this distinguished group of panelists together, will serve as the panel moderator. Melinda Taylor of Environmental Defense; Larry Selzer, vice-president of Sustainable Programs, the Conservation Fund; William E. Debuys Jr., who chairs the Valles Caldera Trust in New Mexico; and Pat Noonan, the founder and chairman of the board of the Conservation Fund, will give us a close look at nongovernmental agencies' work on a national scale.

On Sunday morning, Robert Bruenig will serve as moderator for a summary session, "The Future of the Land." Joining in the discussion will be Laura Jackson, William Jordan, Andy Sansom, Libby Stern, Jessica Catto, and Camille Parmesan.

I will now turn the program over to Dr. Beunig and our distinguished speakers with my warm welcome and thanks for their participation.

# AN OVERVIEW

---

ROBERT BREUNIG\*

**T**hank you. I've really looked forward to moderating this session and to working with this distinguished panel in talking about such a vital subject—the land.

I wanted to set the tone for today's discussion by telling you a personal story about my own understanding and awareness of the land. I began my career as a cultural anthropologist, and I worked in northern Arizona among some of the Indian tribes there. And in 1982 I moved from Flagstaff to Phoenix, which was a huge change for me.

I don't know how much you know about Arizona, but Flagstaff is at 7,000 feet in a beautiful pine forest. It's a great place to live. Those of us who lived in Flagstaff thought of Phoenix as essentially the hellhole to the south. Phoenix was in the Sonoran Desert, and in our language the word "desert" tends to mean an empty and barren place. Having grown up in the Midwest, that's essentially how I looked at the desert.

When I moved to Phoenix, my job was to put together a major exhibition at Phoenix's museum of anthropology called the Heard Museum, and my specific assignment was putting together an exhibit called Native Peoples of the Southwest. So as a part of that process, I began to talk to and interact with a number of people from that region.

One day I was sitting around a table with a group of elders from the Tohono O'odham tribe and talking about the exhibit we wanted to prepare. I kept saying that we wanted to describe "how you all survive in the desert," and I used that phrase several times. Finally, one of the elders looked at me very sternly across the table, raised his hand, and stopped me. "Dr. Breunig," he said, "we don't survive in the desert. The desert is our home. We live here."

Well, at that moment I just wanted to slide under the table. But it was one of those moments when you really come to understand something more profoundly. What I then understood was that the Tohono O'odham are people of the desert, and this is reflected in their very word for themselves—*Tohono*, desert; *O'odham*, people. They had lived for a thousand years in that desert, and they had a deep and intimate understanding of the land of the desert. To them, it was not an empty, barren place where

---

\* Robert Breunig is executive director of the Lady Bird Johnson Wildflower Center and former executive director of the Desert Botanical Garden in Phoenix, Arizona.

they had to “survive,” but a rich and beautiful place. In fact their word for *desert* means “bright and shining place.”

They knew of 300 species of plants that they could use for food alone. And when we think of people who come out of hunting and gathering traditions, we think of them simply wandering around the environment, grabbing something here and grabbing something there.

But that is not the case. Their knowledge was much more intimate, and they had to know how to be at exactly the right place at the right time. Certain foods became available within a very short frame of time. They also had to know exactly how to get the food and how to process it. This was knowledge that was accumulated over a very, very long time.

I thought about the fact that I now was living in the desert too, and I thought about the implications of that concept on my own life. I thought about my upbringing in Indianapolis, Indiana, and what I learned about that land when I was growing up. Now, don't get me wrong. I went to a very fine school. I took biology classes, and I learned some basic things. But I have to admit that I did not have any intimate knowledge of the particular landscape in which I grew up.

I think that's also true for most of today's young people. We are living in a culture that is essentially disconnected from the land, one that does not have a particularly deep and intimate knowledge of the land. I'd like to suggest that this is a problem because it leads us to make bad decisions about the land, and it causes us to look at the land in ways that may ultimately be damaging to it.

This comes across to me in simple little ways. For example, I'm working with some people here in Austin on a development project, and I always recoil somewhat when they start describing the land as, “Well, that's the dirt out there, and we're going to put so many units on the dirt.”

That particular land that they're talking about is essentially critical for the quality of the water for the city of Austin. That land is alive, and does a lot of basic things. It performs what we call ecosystem functions. If the land is disturbed, damaged, or destroyed, it can't do those things for us. Then we have a decline in the water quantity and water quality, and we're subject to more flooding.

So we've got to see the land in a different way and understand that it does things for us that have fundamental value. These things are so basic, have gone on for so long, and are so much a part of everything around us that we don't even see them anymore. And, therefore, we don't value them. We have to recognize that value and bring it into our equations and into our understanding.

I actually have a great deal of hope for the future because, in my work at the Wildflower Center, I see that young people, in particular, have an enormous amount of interest in the land and in interacting with it. Some of our young staff at the Wildflower Center—Steve Windhager, the director of our restoration program, was mentioned earlier—see the land as

something to be interacted with, to be actively involved with in terms of restoration, not something to be simply preserved or set aside.

I want to predict that in the last half of this century a major part of the activity of this culture will be in restoring and rehabilitating land that we have lost and degraded because it will be essential to do so to restore the ecosystem functions and to maintain the health of our land, our economy, and ourselves. So I'm hopeful for the future.

I'd like to close my remarks with a quote from my friend Lady Bird Johnson, who has this to say on the last page of her book *Wildflowers across America*: "Saving our legacy of wildflowers"—and I would add the grasses in which the wildflowers grow—"is something that I am convinced can be accomplished with the right combination of workable ideas and citizens with spirit. How much poorer our world would be without this bounty." And how true that is.

"I think of the words of an old Texas Ranger, written in 1875, 'All of western Texas was a real frontier and for one who loved nature and God's own creation, it was a paradise on earth. In the springtime one could travel for hundreds of miles on a bed of flowers. Sometimes they came up to my stirrups. Oh, how I wish I had the power to describe the wonderful country as I saw it then.'"

Then Mrs. Johnson goes on to say, "For my seven grandchildren and everybody else's, I hope we can keep a part of that vision in our public and private landscapes. In our quest for a better future, I have faith that an appreciation for the values of the past and for the beauty and health of this natural world we all share will be high on our agenda." And I too hope that it is high on our agenda.

One of the things that I hear a lot here in Texas is "We Texans love our land." I've been wondering exactly what that means. So we invited Laura Jackson, who has thought a lot about this question and is also an old friend and colleague from my days at the Desert Botanical Garden, to address us on the subject of what it means to love the land.

# WHAT DOES IT MEAN TO LOVE THE LAND?

---

LAURA JACKSON\*

Thank you very much, Bob, and thank you, Ellen, for inviting me here to visit with such a distinguished group of people. I really am honored to be able to address you and to visit with you. You have given so much to your state, as I'm learning at the various events we've attended together so far. There are so many areas in which you've contributed to the state in terms of higher education, literature, art, music, business, philanthropy, architecture, folklore, history—the list just goes on.

Your accomplishments remind me of a saying that my mother taught me, "Of those to whom much has been given, much will be expected." Clearly, you have expected a lot from yourselves, and the topic of this gathering illustrates your dedication to serious reflection on philosophical issues affecting our times.

My task is to explore the question, What does it mean to love the land? The first thing I should do is to clarify that question by asking, What do we mean when we say "land"? And even scarier perhaps, What do mean when we say "love"?

When I was in college, this business of definitions seemed to me a way for the professor to stall for time. Now that I am a professor, I see that stalling for time is not always a bad idea. After exploring this issue of what land is, I will try to illustrate some of the problems that I see in loving the land, with examples from my home state of Kansas and from my adopted home of Iowa.

Then I'm going to make a case that loving the land is kind of like loving thy neighbor—a tremendous responsibility, a very difficult task that we will never completely accomplish, requiring hard and strategic choices, not only at a personal level, but at the level of society and culture.

What do we really mean when we say "land"? There is, of course, the common vernacular meaning: the landscape, the scenery outside a moving car or on a park trail. Last night we were treated to wonderful descriptions of the diverse land forms of Texas from the Chihuahan Desert to the

---

\* Laura Jackson is associate professor of biology at the University of Northern Iowa in Cedar Falls and coeditor of *The Farm as Natural Habitat: Reconnecting Food Systems and Ecosystems*.

High Plains. From the Hill Country to the Pineywoods to the Gulf Coast, this is an obvious source of pleasure and pride to Texans and a genuine way, a real way, of loving the land. There's also the way we see land when we fly over it, abstractly, as a picture puzzle of different colors and textures, different owners, different land uses, all dissected by rivers, roads, and the various topographic features of the land. There's another way we experience land as gardeners, paying close attention to soil, to light, to rain, as we plan and plant, as we hoe and harvest.

These are the vernacular definitions, but they are not complete. If we combine the aerial view of land with the gardener's view, we begin to approach the sense of land as an *ecosystem*. I'm an ecologist, so that's the way that I have tried to develop my understanding of land. From an ecosystem perspective, land includes animals, plants, the climate, and the marvelously complex living medium that we lump under the word "soil."

Land, in this sense, includes the air flowing above and the water flowing through. It includes processes like photosynthesis and nutrient uptake in plants (carbon fixation from the atmosphere). It includes assimilation of plant energy and nutrients by animals as they eat plants, the pathways of energy and nutrients up the food chain, and later on their decomposition by the action of invertebrates and microbes in the soil.

Fire, flood, and wind are part of ecosystems. For instance, what would South Florida look like without hurricanes? Hurricanes are an intrinsic part of the South Florida ecosystem. And what would a flood plain be without floods? Flooding is not a disaster; flooding is a natural part of the ecosystem.

The ecologist's view of land also extends beyond the common, immediate time scale. What we see on the land today is merely a snapshot; an ecological vision requires us to see land changing over decades, centuries, and even millennia. In decades a tree can grow; in centuries a forest can replace a prairie, a delta can form, a river can change course. In millennia a new soil horizon can form. A climate can go from warmth to ice, and new species can evolve.

Let us adopt the most rigorous and inclusive view of land. Land includes not only wilderness, parks and open scenery, but urban land, suburban shopping malls, and farmland. When we talk about land, we need to talk about all of those lands, not just the stuff we think of as scenery.

Finally, most critical to an ecologist's definition of land is that it includes human beings. We are connected to the oil fields of Iran and Alaska, the coal mines of Appalachia and Wyoming, the hard rock mines of Brazil and the Congo.

We are what we eat; we are physically what we eat. Our bodies are physically part of all the land we eat from—vegetables and fruits from California; bread from Kansas; pork from Oklahoma, Missouri, Iowa; chickens from Alabama and Tennessee; potatoes from Washington and

Idaho; shrimp from Belize and Thailand. Our bodies are physically connected to and part of those ecosystems. And in turn we are very much affected by the way food is produced.

The zone of hypoxia or low oxygen in the Gulf of Mexico (about 7,000 square kilometers, last I checked), is almost dead. Excess nitrogen flowing out of the Mississippi River from the Midwest fertilizes the Gulf, increasing the amount of algae, and as that algae decomposes and falls to the bottom of the ocean, the oxygen is sucked out of the water by microbes. Gulf Coast fishermen sell their boats.

Eat a steak and become part of the Gulf of Mexico ecosystem. I can't emphasize strongly enough that this is a physical reality, just as real and direct as a baby nursing from its mother tastes the broccoli she had for dinner.

So what does it mean to love all the land, the land in its fullest and most complete sense? It means having your heart broken again and again. To paraphrase Aldo Leopold, the father of the modern conservation movement and a Midwesterner, the consequence of an ecological education is that you live in a world of wounds.

Let me show a few images of the land that I love.

This is the Kansas River. I grew up in Salina, but my folks on my dad's side come from the Topeka area, and the Kansas River flows from west to east through wheat, sorghum, and cattle country. It's fed by the Smoky Hill, the Saline, the Solomon, the Blue, the Vermillion, and comes to its confluence with the Missouri River near the Missouri border.

This land is land that my brother Scott has spent most of his adult life on. He frames houses in the Lawrence area. He loves to hunt and fish. He spends almost all of his free time on this river and in the bluff lands above it. Finally, a couple of years ago, he was able to afford to buy a little piece of land along the Kansas River, his little piece of paradise.

Here he is with my daughter Nettie and his daughter Abigail. It's paradise almost. On this hot June day that we took our kids to the sand bar, my brother warned me that the girls weren't going to be able to splash in the cool water on the edge of the sand bar. There was a permanent health advisory; the water is too dirty to swim in. He can't take his daughter fishing there either because the fish have high levels of pesticides in them that limit consumption to eight ounces every six months for an adult male.

There is less and less of this river to show our girls. Long ago when he started college, he used to be able to see large shoals of freshwater mussels on the bottom of the river. The United States is home to the largest diversity of freshwater mussels in the world, and over 70 percent are imperiled or extinct. Now, he rarely even sees a dead mussel, rarely even sees a shell. These were killed off by sediments and excess nutrients in the water.

Growing up, my brother and I used to explore the sand bars and fish and swim in the Smoky Hill River next to our home. This was a major part of our bonding as children—and, I believe, of my beginnings as a

biologist and his beginnings as a sportsman and naturalist. Our children must be held back and taught not to touch the river, as if it were a garbage can in a public restroom. This is a hurt that I can only begin to describe.

Now, let's move to Iowa, another beautiful state, a state of prairies. At the time of the European invasion, 85 percent of the land was prairie and wetland. The prairie developed over the last 10,000 years as plants migrated back in and the glacier melted. Every summer the plant roots grew deep and died, depositing organic matter in the rubble left by the glaciers. Cold winters and wet springs kept the organic matter from oxidizing or decomposing, so it accumulated deep in the soil horizons.

Many parts of the state have eight or more feet of black soil and subsoil. Just to give you an idea what that means in terms of agricultural productivity, I found a map that shows Iowa and other states sized according to the value of their agricultural output. It makes Iowa the biggest state in the Union—even bigger than Texas!

Less than one-tenth of 1 percent of this tallgrass prairie remains. The remnants are small; the largest remnant in eastern Iowa is about 240 acres. Most are in the five- to ten-acre range, and people do back flips when they find a new four- or five-acre prairie.

Let's compare what the landscape looks like now with the prairie ecosystem. Once covered with perennial roots, covered with plants that held the soil in place and soaked up the rainfall and snowmelt, this is now a land of row crops. Because corn and soybeans grow over a very narrow window of time, this land stays essentially bare seven months out of the year.

The remaining prairies are often tiny. I once found a prairie between two farm fields that was about 18 inches wide. Despite being the rarest ecosystem in North America, tallgrass prairie remnants continue to be plowed under every year, especially after land changes hands.

We have also affected the land in other ways. The herbicide atrazine can be detected in all of our surface waters twelve months of the year and has contaminated a major reservoir in the state that is the water supply for several communities.

Des Moines, Iowa, had to build a special reverse osmosis plant, the largest plant in the world, to take nitrates out of the water. This plant was designed to run about two weeks out of the year to mix clean water with other sources of water until they had diluted the nitrates enough to make it legally drinkable. But last year the plant ran for about a hundred days.

Iowa lakes and rivers are distinguished by having the highest levels of nitrogen and phosphorous in the world, according to U.S. Geological Survey data, and we are responsible for a disproportionate share of the dead zone in the Gulf of Mexico, also according to the USGS. About 50 percent of the nitrogen that is applied to our cornfields this fall will reach its intended crop; the rest will head toward you.

Iowa has also lost about half of its original topsoil since the time of



European settlement 140 years ago. We started off on average with 18 inches and we now have on average nine inches. Hans Jenny has calculated that a good inch of topsoil takes 300 to 1,000 years to develop, so we've already burned up several thousand years' worth of topsoil.

Although the U.S. Natural Resource Conservation Service says that most of the erosion is at tolerable rates now, this is hard to believe sometimes. We have unpredictable rainfall, and on July 3 of 1999, when the corn was still small, a large portion of eastern Iowa got nine inches of rainfall in twenty-four hours. The soil was virtually unprotected, and there was more soil loss from this one storm than had occurred on those fields in ten years or more.

When my husband and I moved to Iowa in 1993, I knew that I was moving to a state that was involved in industrial agriculture. However, I wasn't quite prepared for just how industrial it was becoming. The new trend in the late 1980s and early 1990s was the conversion of a very democratic form of livestock production, raising hogs, into a corporate activity that was concentrated in large buildings called hog confinements, or confined animal feeding operations (CAFOs).

These CAFOs can hold 10,000 finishing hogs. That means they are growing from about 30 pounds to about 150 to 200 pounds before they're marketed. Most are corporate owned or raised by contractors.

Longtime rural residents, many of them hog farmers themselves at one time, began to complain. Hearings were held; there was all kinds of strife. They were saying that they couldn't let their children play outside anymore because of the stench, because they became nauseous. They couldn't hang their clothes on the line anymore; they couldn't open their windows on a warm summer night; they couldn't even have friends over for a barbecue and stay outside. And they couldn't sell their houses. People complained of flies, nausea, depression. The official reply was that odor is psychological and extremely subjective.

Just as an aside, I did a study with a colleague at Iowa State and a rural resident to look at manure-management plans in an area with a very high concentration of hogs. Our study contained 60,000 finishing hogs in about four square miles.

We looked at the amount of nitrogen excreted by those hogs and determined that about 1.8 million pounds per year of nitrogen was being released in that area. Almost three-quarters of that nitrogen went straight into the atmosphere as ammonia, and then that comes back down in the rainfall over a larger area.

They were applying nitrogen three times the rate recommended by Iowa State. They were applying nitrogen to soybeans, a legume which fixes its own nitrogen, so they were essentially throwing it away. The levels of phosphorous that they were applying were ten times that recommended by Iowa State.

The troubles of concentrated livestock are already well known. We

have already seen the concentration of cattle into huge feed lots and chickens raised by the millions in small cages. We are now beginning to see 5,000-cow dairies in California and Wisconsin at the expense of small family farms. And I should mention that in Iowa between 1992 and 1997, we went from 34,000 hog farmers to 17,000. By 2001, there were 10,500 farmers selling hogs in Iowa while the total number of hogs sold remained steady.

This is happening all over the country, not just Iowa. I saw, as I was flying over, 200 such hog barns, probably somewhere in Missouri or Oklahoma. We who eat—that's all of us—are physically connected to these ecosystems. Even if we don't live there, we are physically connected.

I think most of us are aware at some level that when we eat we are violating our obligation to be good stewards of creation through our association with these practices. Aldo Leopold says, "Conservation is a state of harmony between men and land. Harmony with land is like harmony with a friend; you cannot cherish his right hand and chop off his left. That is to say, you cannot love game and hate predators; you cannot conserve the waters and waste the ranges; you cannot build the forests and mine the farm. The land is one organism." This is another way of saying that we have to pay attention to all the land, not just the parts that are pretty right now.

Most of us would not have it so if we could help it. If you want to learn more about the food system, I suggest you read *Fast Food Nation* by Eric Schlosser, a very good book that exposes the way that we eat and the system of how we distribute food and connects that with all sorts of other larger social issues, environmental and social.

The good news is that we can help it; we are not stuck, or if we are stuck, we're not stuck that far from the road. In the book that my mother Dana Jackson and I have recently published, *The Farm as Natural Habitat: Reconnecting Food Systems and Ecosystems*, we make the argument that the agricultural landscape we see now is inevitable. Many of the book's contributors know farmers who are already making a solid living and improving the soil, water, and biological diversity on their land. *The Farm as Natural Habitat* stems from the conviction that the agricultural landscape as a whole could be restored to something better. The destruction of every last shred of nature is not a necessary compromise for the survival of the family farm, or because of the need to "feed the world." We maintain that the trend toward sterile, industrialized agriculture is an unacceptable, unaffordable sacrifice; that it is far from necessary; and that we can help farmers reverse it to benefit nature conservation, rural communities, farm families, urban residents, and consumers.

I'd like to briefly introduce you to a few of the farmers we highlight in the book.

Tom Franzen is now an organic farmer, but in 1977 he was a progressive, high-chemical-input farmer. In that year the pope came to Iowa, and

he was listening to the pope's message on the radio as he painted his barn. The pope said that the land is ours to take care of for future generations. Tom said he started to shake so much that he had to get down off the ladder. He spent the rest of the day walking around his farm and reflecting on his role in land stewardship. After that he stopped using insecticides, afraid of what they would do to his family and the soil. When I met him in 1993, he was in the process of drastically reducing his herbicide use.

By 2001 he had eliminated all herbicide and chemical fertilizer on his place, and he was marketing his hogs and soybeans organically. He called me up one day, jubilant. He said, "You know, you think you're committed to organic, but you're not really committed until you get that first bean check." He was paid \$19.50 per bushel when the price for conventional beans was \$5.40. You can afford to get lower yields raising organic crops.

An important element of Franzen's success is his use of holistic resource management techniques. This is a formal process involving the whole family of defining one's values and goals—personal as well as financial and environmental. Once the goals are identified, then the farmer asks how ecosystem processes on the land can be managed to achieve these goals.

Another farmer I would like to talk about is Mike Natvig. He and I worked on a project to convert some of his pastures to prairie—while still grazing them. He raises cattle using rotational grazing methods. They are moved from one pasture to another throughout the summer so they always have fresh grass and the remaining grass is allowed to rest.

Pastures in the upper Midwest are composed almost entirely of European, cool-season grasses and clovers. This is different from Texas and many parts of the Great Plains where cattle still graze on native grasses. Our goal was to restore native biological diversity to his farm without asking him to give up his income from cattle. Mike is also a founding member of Prairie's Edge Sustainable Woods Cooperative, the goal of which is to get better income from woodlands while protecting soil, water, and native biological diversity.

I'd also like to describe a wonderful three-year study led by the Land Stewardship Project in Minnesota. Six farmers and twenty researchers from the University of Minnesota were brought together to study and monitor indicators of economic, social, and environmental health on these farms. The farmers had recently converted from conventional dairying (where the cows are fed grain and hay rations usually raised on the farm) to rotational grazing (where the cows are led to fresh grass each day and feed themselves). Many of these farmers were losing money doing things the way the state agricultural college recommended, so they decided to cut costs and increase their profit margins while accepting lower milk yields using this methods.

One of the most surprising and exciting parts of the study was the bird monitoring. Farmers became expert bird watchers as they learned to rec-

ognize grassland-nesting migratory birds in their pastures. These birds, like Eastern Kingbirds, meadowlarks, bobolinks, and dickcissels, wouldn't go near their corn and alfalfa fields. But once they converted those fields to pasture, the birds began to recognize good nesting habitat.

What do these farmers have in common? They're curious, they're interested in their family's well-being, and they're not locked in to what everybody else thinks they ought to do. They're very independent-minded people. And I would say that they're very empirical; they look very carefully at exactly what the land is telling them, and they respond to that.

Public policy has created a lot of this problem. The current farm bill that's being discussed in Congress has to do with recognizing and rewarding farmers for the multiple benefits that they provide to society—not just feed, food, and fiber, but watershed protection, wildlife habitat, a pleasant rural scenery. Previous farm policy has benefited a few very large grain companies like Archer Daniels Midland and meat processors such as Tyson and IBP.

There are other kinds of public policy that we can learn from out there. In Great Britain they very readily recognize that agriculture and nature are not far apart, that they're really part of the same thing, and that their farmers have a large role to play in conserving the biological diversity of their plants, their butterflies, and their birds. They recognize the value of a beautiful countryside.

It's a nation of amateur naturalists, and they have done a wonderful job of documenting everything that they have. After World War II, a lot of practices were changed. Land uses intensified, more of their diverse, low-productivity pasture land was fertilized, and more of their pastures and hay meadows were plowed up for crops.

Current conservation policies in Great Britain have created an agri-environment scheme in which farmers in certain sensitive areas are rewarded for forgone income if they graze their animals in a more traditional manner that conserves the rich plant diversity of the chalk grasslands.

Hay meadows that even Shakespeare wrote about, with very high levels of wildflower diversity, were also under assault after World War II, and a few of them are now protected. They're harvested for hay in management schemes that maintain that biological diversity, and farmers are rewarded for that. So there are many options out there; there are many ideas that we can learn from.

I'd like to close with a few thoughts about love. Now, I've only been married eight years. Most of you have been probably married longer, so I'm treading on thin ice here. There are people with more insight into this than I have, but there are a few pieces of conventional wisdom that I think we can learn from here as we relate it to the land.

First of all, we celebrate our loved ones' gifts and we appreciate their strengths, but we also accept their weaknesses. We don't try to change

them, and this is true of the land as well. Rain does not follow the plow, as our pioneer ancestors thought. You cannot change the land by plowing it; you will not increase the rainfall. It is still an arid country, and that is something that we have to accept. It doesn't do us any good to try to blow past that one.

Similarly, we can prevent floods by damming rivers, channeling them and harnessing them, but we pay the cost. There is a species of fish in the Missouri River called the pallid sturgeon. That group of fishes has been alive in North America for 60 million years, and it's currently endangered because of channelization and dams. We pay the cost when we try to change ecosystems beyond their original character.

A second truism about love—little things mean a lot. Small individual gestures add up to big parts of our lives. Small little things? What am I talking about? Nitrate molecules. Carbon dioxide molecules. These are little tiny things that we add every day through driving our cars, through fertilizing our fields inefficiently, and we tend to forget about these little things. But they add up in big ways, and we see the results in global warming and dead zone in the Gulf of Mexico and other estuaries around the world—the loss of beautiful coral reefs as a result of fertilization, the loss of those mussels in the Kansas River, the loss of the ability of our children and grandchildren to swim in those waters.

Antibiotics are a little thing. We currently feed antibiotics to livestock as growth promoters, not to help when they're sick, and bacteria are building resistance to the main classes of antibiotics. Fluoroquinones are the main class of antibiotics fed to hogs for growth promotion, and Cipro is a fluoroquinone. So we are rapidly increasing the risk that we will lose Cipro as a tool to treat anthrax because we want the pigs to grow faster. Other countries have banned subtherapeutic uses of antibiotics and have done so without all of their farmers going out of business. Little things mean a lot.

And finally, let's not confuse momentary attraction to physical beauty with real love. Love involves responsibility and work. I have a six-year-old and a two-year-old—a lot of work. We all know that love involves commitment as well as great joys and satisfaction.

So what does it mean to love the land? Well, first, land is a big, big thing, bigger than we think it is, bigger even than Texas. And love is a strong, strong word. You can't just say it. You have to show it.

# GLOBAL WARMING AND THE CHANGING LAND

---

CAMILLE PARMESAN\*

**M**y subject today is global warming. Although these two words are used almost daily in the media, most people don't really know what it is. So I'd like to spend a few minutes defining what we mean by "global warming."

For the last several years, I've been part of an international organization called the Intergovernmental Panel on Climate Change (IPCC), which was established in 1988 by the United Nations Environmental Programme (UNEP) and the World Meteorological Organization (WMO). The panel was formed at a time when scientists first began to worry that there was some connection between human activities and changes in our climate.

Let me describe the panel a bit more. The IPCC consists of three working groups. Working Group I assesses the scientific aspects of the climate system and climate change, so this group consists of about 200 climate scientists who meet on their own. Working Group II addresses the impact of climate change—that was my group, and there are about 300 of us. Another 200 social scientists make up Working Group III, which assesses options for mitigating climate change. The recent report actually took three years of work, and during that period we were meeting every two or three months, either as small committees or the full working group.

To date, the IPCC has issued three full assessment reports. The most recent of these, the Third Assessment Report, was released in the summer of 2001. The main conclusion of this report—which involved the work of hundreds of experts in meteorology, the cryosphere (ice and snow), glaciology, biology, agriculture, and economics—was twofold: (1) human activities have caused a large increase in what are called greenhouse gases, which I'll explain in a moment, and (2) this increase in greenhouse gases is most likely responsible for the observed rises in global temperature over the past 50 years.

Now we come to global warming. In general, it means that the average temperature of the globe is warming from one year to the next. But it also means much more than this.

---

\* Camille Parmesan is an assistant professor in the Department of Integrative Biology at the University of Texas at Austin.

In concrete terms, global warming means that the weather itself is changing and weather patterns are changing. We're seeing not only a general increase in temperature, but also changes in precipitation patterns over the last 50 to 100 years. For example, rainfall is occurring in fewer but more extreme events. In other words, floods have increased over the past 100 years.

So what is the greenhouse effect that is supposedly causing these changes? Greenhouse gases have actually been around for a long, long time. These gases, such as carbon dioxide, methane, and various nitrogen compounds, occur naturally as by-products of certain geological and biological processes. When they rise into the atmosphere, they build up and form a kind of a blanket.

When solar radiation passes through the atmosphere and strikes the earth's surface, some of this radiation is absorbed, but much of it is converted into heat. As this radiated energy rises and escapes, it is trapped by a "blanket" of greenhouse gases that absorbs and reflects the heat back toward earth. The effect of this trapped energy is to warm the earth. Without greenhouse gases, the earth would be about 60 degrees Fahrenheit colder than it currently is, and life as we know it would not exist.

The greenhouse effect is a perfectly natural phenomenon that has been taking place for millions of years. The problem has to do with what's been happening in the last 140 years or so.

These same molecules that make up naturally occurring greenhouse gases—carbon dioxide, methane, nitrous oxide—are likewise produced by the burning of fossil fuels and other human activities. So human beings have been increasing the levels of greenhouse gases in the atmosphere. More of the sun's heat is retained, warming the surface of the earth and the atmosphere nearest to the earth. So while the greenhouse effect is natural, human beings have strengthened this process in the period between 1860 and the present.

Let's take a look at carbon dioxide in particular, which is thought to be responsible for most of the warming observed over the past century. Atmospheric concentrations of carbon dioxide have steadily increased from about 290 parts per million in 1860, the beginning of the Industrial Revolution, to a little above 360 parts per million at the current time (Figure 1). That's about a 30 percent increase in carbon dioxide concentrations.

What is this increase due to? Essentially the Industrial Revolution. Around that time, we began to burn enormous amounts of fossil fuels that had been locked below the surface since the Cretaceous period, when the dinosaurs roamed the earth. Burning these fuels released carbon dioxide into the atmosphere, and with the spread of industrialization around the globe, concentrations of carbon dioxide have steadily increased.

Carbon dioxide lasts about a hundred years—it's a very stable molecule. Therefore, once it reaches the atmosphere, it hangs around for quite a long time before it breaks down. The burning of fossil fuels—to supply

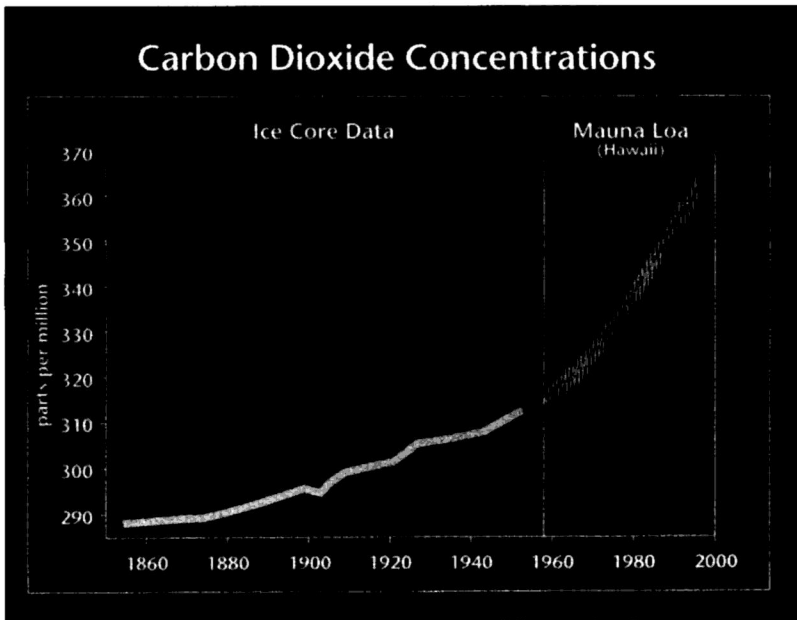


FIGURE 1. INCREASES IN CO<sub>2</sub> CONCENTRATIONS, 1860–2000.  
SOURCE: OFFICE OF SCIENCE AND TECHNOLOGY POLICY.

power for our homes, automobiles, and industrial processes—is responsible for about 75 percent of carbon dioxide emissions caused by human activity. The remaining 25 percent is caused by other sorts of human activities, such as deforestation.

When a forest is cut down, trees are removed from the ecosystem and replaced by bare dirt or agricultural crops, which require much less carbon dioxide for photosynthesis than trees do. Thus, deforestation results in less total biomass for storage, so the extra carbon dioxide that is being produced remains in the atmosphere. Deforestation is often accompanied by clearing, especially in many Third World countries. Once the large logs are taken off, the residue is cleared by burning, which releases yet more carbon dioxide.

And the rate of deforestation is increasing. In Brazil, for example, deforestation was largely confined to the coastal and southern regions in the 1970s; just ten years later, large areas of forest were being cut in the Amazon Basin and this trend has been continuing.

Now, what about temperature? Over the last 140 years, global average temperatures have fluctuated between warmer periods and cooler periods (Figure 2). But if we consider the general trend, it's clear that the temperature has been steadily climbing. Global average surface temperature has risen by about one degree Fahrenheit over the last century. In most regions of the United States, temperatures have risen by between 1.8



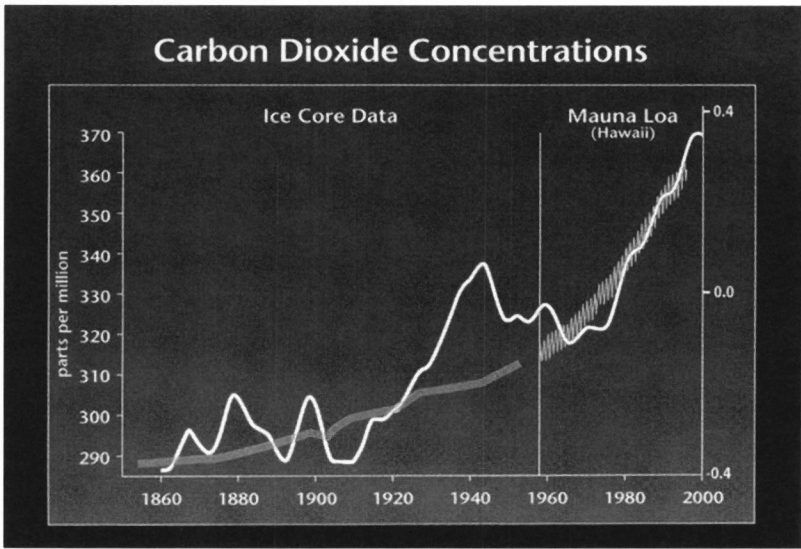


FIGURE 2. INCREASES IN CO<sub>2</sub> CONCENTRATIONS AND GLOBAL AVERAGE TEMPERATURES, 1860–2000. SOURCE: OFFICE OF SCIENCE AND TECHNOLOGY POLICY.

degrees and 5.4 degrees Fahrenheit. In the past 30 or 40 years, this temperature increase matches the increase in carbon dioxide concentration very closely.

To study temperature trends, scientists analyze data from climate stations around the world. Records are rather sporadic for the years before 1910, although various kinds of historical records can shed light on weather and climate. But since 1920 good meteorological data have become increasingly available—at least from Europe, the United States, and Asia. If we look at the details of this temperature increase, what you see is that 1998 was the hottest year on record. The data show that the 13 warmest years on record have all occurred in the period since 1980, with 1998 the warmest. Indeed, temperatures have increased phenomenally over the last century.

But a lot of people are saying, well, temperature goes up and down; this is just normal variation in climate. So let's see what we can learn about natural variability by looking at temperature trends that go back 1,000 years.

Of course, there were no meteorological stations then, but scientists are able to estimate temperatures further back in time by using proxies such as tree rings, coral reef growth, which is much like a tree ring, and ice and ocean sediment cores. The use of ice cores involves drilling deep into glaciers where the ice has trapped little bubbles of gas and oxygen isotopes, which can indicate not only exact atmospheric concentrations of carbon dioxide at that time but temperatures as well.

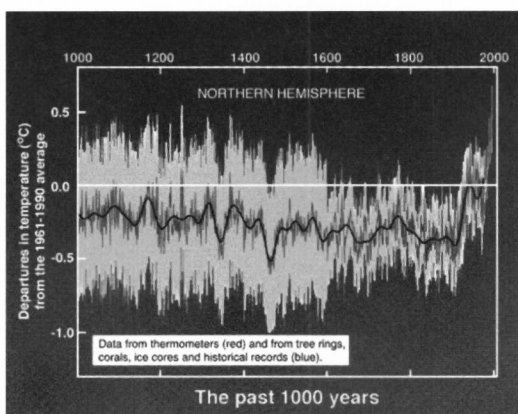
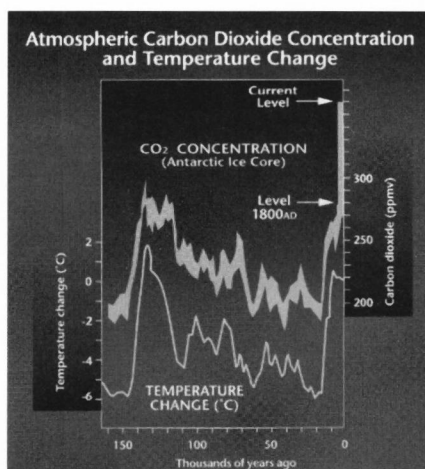


FIGURE 3. TEMPERATURE DATA FOR THE NORTHERN HEMISPHERE, 1000–2000. SOURCE: INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, THIRD ASSESSMENT REPORT (2001).

It's certainly true that the combined data show huge fluctuations in temperature from year to year, warming periods followed by cooling periods, with the pattern repeated again and again until the last 140 years (Figure 3). But these ups and downs are fairly regular and in the same plane until the start of the Industrial Revolution, when temperatures increase sharply and climb to levels much hotter than we've seen before.

If we go back even further, say 160,000 years, the ice core samples again point to major fluctuations in temperature as the earth experienced glacial and interglacial cycles (Figure 4). As the figure shows, large increases in carbon dioxide concentrations have been followed by gradual declines and then subsequent large increases. For thousands of years, this cycle—what we call natural variability—was due to biological and geological processes. However, current carbon dioxide levels are well outside the bounds of natural variability. They are far higher than those of any peak period in the last 160,000 years, and the rate of change in carbon dioxide concentration is also unprecedented. But even more striking is the tight correlation between carbon dioxide concentrations and global tem-

FIGURE 4. CORRELATION BETWEEN CO<sub>2</sub> CONCENTRATIONS AND TEMPERATURE OVER THE PAST 160,000 YEARS. SOURCE: OFFICE OF SCIENCE AND TECHNOLOGY POLICY.



peratures. In the same time period, temperature has risen and fallen but always closely tracking those carbon dioxide levels.

This is what first gave scientists the idea that temperature was indeed very tightly linked to carbon dioxide concentrations. And since then, the numerous experiments of atmosphere scientists have shown that there is indeed a mechanistic link between carbon dioxide and temperature and that carbon dioxide does effectively act as a blanket.

Now, ice core samples can actually go back 420,000 years. While they show the same kind of cycling, with both carbon dioxide and temperature rising and falling in tandem, at no point in that long period are carbon dioxide levels as high as they are now—about 30 percent higher than they have been in the last half million years or so.

If we go back even further on the timeline, we find small peaks of warming that are hotter than modern temperatures, but we must go back millions of years—to the Cretaceous period and the time of the dinosaurs—before we see evidence of temperatures that were quite a bit hotter than what we are experiencing today. The Cretaceous period was associated with what we would now consider very tropical conditions—very high temperatures, extremely high humidity, lots of rain, and a totally different set of plants and animals. In other words, the world's climate was fundamentally different from the climate of today.

The last 10,000 years is the period in which human civilization arose and in which we have flourished as a species. Prior to this, human beings weren't really very numerous.

In the Cretaceous, when the dinosaurs were king, life was very different. The only mammals that existed were rodent-like creatures. They were our closest relatives. Large mammals like horses, elephants, and lions did not evolve until much later. And the land, of course, was very different. The area that is now Texas was mostly under water, and those ancient oceans deposited all the lovely fossils that are used in our beautiful limestone homes today.

Climate change was actually one of the reasons for the disappearance of the dinosaurs. We hear a lot about a meteor striking the earth as a cause, and that very likely did happen. A large meteor would have spewed out a huge cloud of dust, blocking the sunlight, cooling the earth down, and possibly making it drier.

At the same time, the continents were drifting away from the equator and toward the poles, a move into cooler latitudes. This very gradual climate change, a natural process that was possibly helped along by a meteor crash, is what caused quite a few species of dinosaurs to gradually disappear. They simply were not adapted to a cooler, drier climate.

All modern species of plants and animals are equally adapted to their local climates. This is why you don't expect to see a Texas armadillo living with an Arctic penguin. The very idea seems pretty silly to us because species are restricted to fairly small regions of the globe, and biogeogra-

phers and ecologists have shown that these restrictions are largely due to climate. We call it the climate envelope—the climate that will sustain a particular species.

Now, humans are one of the very few species that occur throughout the globe. In fact, we may be the only one except for certain microorganisms. But we are also adapted to the climate in which we evolved. In the far north, the tribal peoples have evolved with thick bodies and short limbs to retain the heat. In much hotter climates, the people have darker skin to protect against solar radiation, and they are also generally taller, with longer limbs, so that they can lose heat. In Europe the people are in between those two extremes.

So let's look at what's been happening to species over the past century with these increases in temperature. Since species are restricted to a fairly small area by their adaptation to climate, then one result that you would expect to find with climate change is the movement of species from one geographical area to another—in other words, dying out in some parts of their range and expanding in other parts. And that is indeed what we are finding.

Let me start with an example from my own work with butterflies—Edith's Checkerspot (*Euphydryas editha*), which occurs in the western United States. This species is a very good candidate for climate-related studies because it has a fairly large range. It extends all the way from Mexico to Canada, encompassing many climate zones, and it is also a species that biologists have been studying for 30 years.

Furthermore, we know from hundreds of small-scale studies that climate really does drive its populations. As part of its natural biology, populations become extinct all the time because of various extreme weather events.

Historically Edith's Checkerspot has lived in many different habitats, from the coastal meadows of California to the highest mountains in California, Oregon, Washington, and Canada, where its host plants grow. Over the last century, a large number of population extinctions have been observed. Since populations become extinct as part of the natural biology of that species, this alone doesn't necessarily mean much until we look at the pattern of those extinctions (Figure 5).

In the southern or lower range, in Mexico and southern California, about 75 percent of the populations have become extinct. In the middle of the range, about 40 percent have become extinct, and in Canada, only 20 percent. It should be emphasized that all the extinctions occurred in natural habitat, so human destruction of habitat was not a factor. This pattern in rate of extinctions has effectively shifted the range of the species northward by about 55 miles on average.

We see the same kind of shift with altitude. In the last hundred years, the populations at the low elevations have become extinct at a fairly high rate—about 40 percent—and in areas where the habitat is intact. In con-

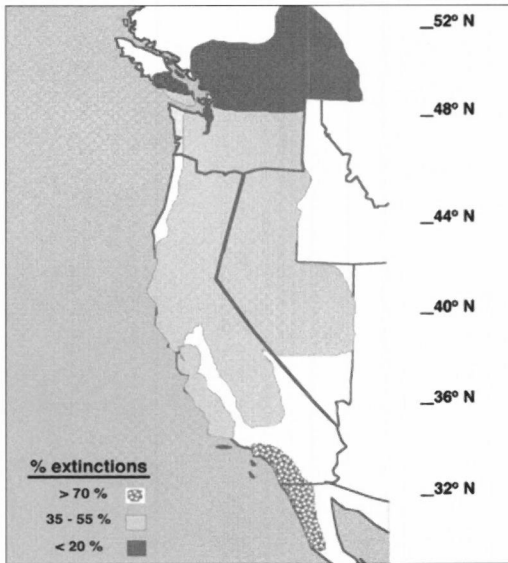


FIGURE 5. PATTERNS OF POPULATION EXTINCTIONS OF EDITH'S CHECKERSPOT BUTTERFLY, 1860-1996.

trast, only 15 percent have become extinct in the high elevations. This means that the butterflies have moved nearly 400 feet up the mountain as well. Interestingly, this shift in range northward and upward matches the shift in temperature that has occurred over the same area. By tracking the temperature isocline—that is, a line on the map connecting areas where mean yearly temperature is the same—scientists have discovered that the mean temperature for, say, June has moved northward by about 63 miles.

Higher temperatures are a problem for the butterflies in the southern area and at lower elevations because the host plants dry up before the caterpillars fully develop. The overall effect of increasing temperatures, then, is to favor the populations at the northern and upper range limits, to the detriment of populations at the southern and lower range limits.

Another species that is undergoing a range shift is the anopheles mosquito, which carries malaria. The anopheles mosquito occurs in Texas, but we're at its very northern limit, so we really don't have a problem with malaria in Texas right now. But scientists predict that this mosquito is not only going to spread farther north but also become more abundant in areas where it currently occurs. Warmer conditions encourage the growth of the malarial parasite and the transmission of the disease, so there is likely to be a much higher incidence of malaria in the wild than it is today in Texas. Now, this isn't necessarily a problem for Texans because we have very good mosquito control programs and very good health care. The IPCC working group concerned with health issues—and many of these people came from the Center for Disease Control in Atlanta—concluded that, although malaria in the wild may become more prevalent, the risk of infection will depend on how we manage health care, sanitation, and education initiatives. And the same is true for most developed industrial countries.

Unfortunately, Third World countries currently lack good health care and effective mosquito control programs. So the spread of the mosquito into parts of northern Africa and the likelihood of an increase in malarial transmission is of great concern.

As I mentioned earlier, long-term changes in physical and biological systems as a result of regional increases in temperature have been widely documented (Figure 6). These studies show changes in cryospheric systems, in water flow, in glacial extent, in sea ice, and in the range shifts of plants and animals all over the world—much like that of Edith's Checkerspot butterfly. These published studies have covered 400 plant and animal species or systems and span the globe reasonably well.

Of those 400 species and systems, 91 percent of the changes that have been documented are what you would expect from climate change.

For example, the red fox has shifted its range northward by about 150 miles, threatening the Arctic fox. Historically the red fox has occupied much of North America, including Canada, the northern extent of its range. It is not as well adapted to cold conditions as the Arctic fox, which is generally confined to Arctic regions. Apparently the two species cannot coexist. The Arctic fox is much smaller and quite passive whereas the red fox is much more aggressive. As the red fox has expanded farther north over the past century, the Arctic fox has been forced to retreat to a narrow region along the Arctic Ocean.

The changes are not confined to the northern latitudes. A study of bird communities in Costa Rica's Monte Verde National Preserve revealed similar range shifts. The preserve extends from lowland valleys up to

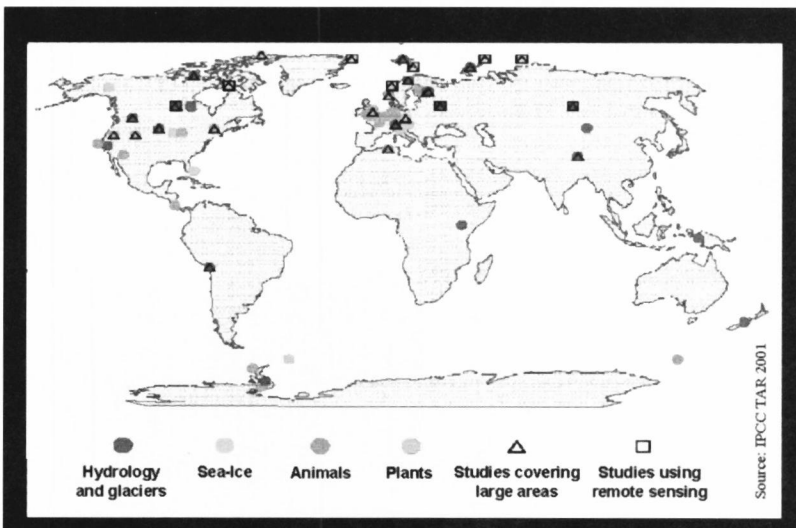


FIGURE 6. LOCATIONS OF OBSERVED CHANGES IN PHYSICAL AND ECOLOGICAL SYSTEMS. SOURCE: INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, THIRD ASSESSMENT REPORT (2001).

cloud forest in the mountains. Over the past 30 years, the keel-billed Toucan and other tropical birds that live down in the valleys have started moving up the mountain slopes and coming into contact with the birds of the cloud forests. One such bird is the tiny, shy, brilliant green quetzal, which is highly revered in Mayan legend. The males have a tail that can be as long as three feet, which prevents the birds from defending themselves very well. As the toucan invades the mountain habitat, it competes with the quetzal for nesting sites. And since it's much bigger and much more aggressive, it's going to win every time. Many of the cloud-forest species have declined or already become extinct with the destruction of habitat, and range shifts increase the pressure on populations even more.

Increases in average temperatures produce changes in physical systems as well. Take glaciers, for example. Glaciers have been photographed and measured for 50 to 100 years, and the historical record demonstrates that snow and ice cover in glacial areas has dramatically decreased around the world. In general, the glaciers of the European Alps have lost 30 to 40 percent of their surface area and about 50 percent of their volume. In Africa, the glaciers on Mount Kenya and Mount Kilimanjaro have lost 60 percent of their area in the last century. In Glacier National Park in Montana, more than 70 percent of the glaciers have already melted, and they will probably disappear by 2030 if warming continues.

The shrinking of glaciers has a significant socioeconomic impact. Many city water systems, for example, are supplied by melting winter snow. In addition, the melting of mountain glaciers contributes to rising sea levels. It is estimated that about 30 percent of the projected change in sea level by 2100 will come from melting glaciers.

Another observed change that is believed to be a response to warming has to do with disruptions in the timing of events. Everyone knows that spring is associated with warmer temperatures, and that's when the flowers come out. The flowers germinate and bloom, the trees start leafing out, and the butterflies appear.

For several hundred years, people have informally documented when these events occur. To take one example, the Marsham family in England has been recording this information in diaries since the 1700s. For the last 50 years, scientists have kept much more rigorous records of these kinds of observations. We've discovered that, over the past century, the events associated with fall and spring are changing by as much as one week to three weeks.

Spring is coming earlier in a very real sense. Migratory birds and butterflies are arriving to their nesting or breeding grounds earlier. Frogs, insects, and birds are breeding up to three weeks earlier. Many plants in Europe and North America are flowering between two and four weeks earlier in the spring. And if you look at the timing of fall events, such as the turning of leaves and the dropping of leaves from the trees, they are occurring later by about one or two weeks. With spring coming earlier and fall later, we're experiencing an absolute increase in the growing season.

This isn't necessarily a bad thing, of course, especially in the northern latitudes. An increase in the growing season may allow agriculture in regions where it has always been limited before.

Changes in plant and animal communities are also taking place. Laura was talking about grasslands and native prairies, and in the last 30 to 40 years these areas have undergone a noticeable increase in trees and shrubs. Woody plants have become more abundant, with woodlands starting to encroach into some of the prairies. Again, humans have not caused the change by planting trees. It's simply been a fairly natural change.

There are some indications that the loss of prairieland is due not only to heavy grazing but also to climate change—that is, changes in precipitation, rainfall, and temperature—and possibly to high levels of carbon dioxide. This last possibility certainly deserves more study. Experiments in environments of artificially increased carbon dioxide indicate that this gas favors woody plants to the detriment of the native remnant prairies.

I've been talking about changes that have occurred in the past century, such as higher temperatures or changes in rainfall patterns that are resulting in drought in some areas and more flooding in others.

But what about the future?

For glimpses into the future, we have to rely on computer models. People have heard a lot about these models and the claim that, depending on the model, you can get whatever result you want. But that isn't quite true, especially for models that work with global averages. The bigger the scale, the better the models work.

Let's look at how several different computer models predict average temperature increases for the United States over the next century (Figure 7). Each line on the chart represents a different model: the UK model, the Canadian model, and so on. We have our own modeling group in Colorado, the National Center for Atmospheric Research. These models are known as the "Hadley model" and "Canadian model."

The chart shows annual average changes in surface air temperature that have been observed for the United States between 1860 and 2000,

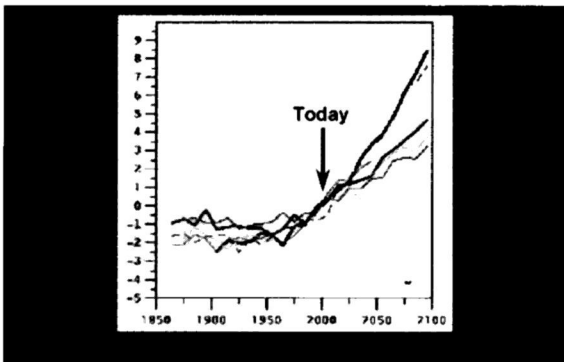


FIGURE 7.  
PROJECTED TEM-  
PERATURE INCREAS-  
ES FOR THE UNITED  
STATES BASED ON  
VARIOUS MODELS,  
2000-2100.  
SOURCE: U.S.  
GLOBAL CHANGE  
RESEARCH  
PROGRAM.



along with projections for the next 100 years. Modeling groups run their analyses by starting with a common point in the historical record—say the year 1910. They then run their model through time, using particular assumptions about the mechanisms underlying the climate system. That is, each model will input a specific effect of each of several known climate-driving factors, such as carbon dioxide, methane, solar orbital changes, or volcanic activity. Each model uses slightly different mixes of these factors as well as slightly different numbers as to how concentrations of these gases will change in the next 100 years. This is one reason they give different results. Then the output of the model from 1910 to the present day is compared with the actual climate record. If the model predictions fit the observed climate, then the model is considered to be a good one. Notice that all of the models are pretty good fits to the actual climate records. The differences are mainly in predicted climate from the present day forward 100 years. These differences are partly due to different assumptions as to how much carbon-dioxide emissions will increase (or not) over the next 100 years.

The negative numbers indicate temperatures that are cooler than the average for the period from 1960 to 1990; the positive numbers indicate warmer temperatures. Today, temperatures are a bit warmer than the average, and the past ten years have been warmer than that.

As you see, there is a lot of agreement among the models, and the predictions are fairly consistent for the next 50 years. Then they start to diverge quite a lot. This means that the models are not as good in predicting temperature increases into the second half of the century as they are in the first half.

Now, you often hear in the media that scientists are uncertain about the models, and I want to explain what that means.

The uncertainty refers to the divergence in these different models. The models all predict warming. The uncertainty is whether this warming is going to be as little as two degrees Fahrenheit or as much as eight degrees Fahrenheit. The bottom line—and there is strong consensus on this—is that the United States will see warmer temperatures over the next 100 years.

Let's talk about Texas and which areas in the state are the most vulnerable to climate change.

People who live in Texas are accustomed to variable weather. Texas experiences fairly extreme temperatures—extreme freezes, extreme heat. Native plants and animals are adapted to this and go dormant during mid-summer and mid-winter, more or less avoiding these extreme temperature conditions.

The effects of droughts and floods are more difficult to adapt to. Changes in precipitation may have a much greater effect on our ecosystems than temperature.

Unfortunately, the models for precipitation change in Texas vary

widely. Some say it's going to be drier, some say wetter. It's very difficult to predict the future climate of Texas.

But we know for certain that the sea level is going to continue to rise, and predictions range from 4 inches to as much as 35 inches. Because Texas has such a long coastline and so much development along the Gulf, many regions are vulnerable.

Galveston is a case in point. The sea level at Galveston has risen about 25 inches over the past century, due to a combination of the rising level of the ocean and the sinking of the land as groundwater is pumped out to provide drinking water. Furthermore, it's a very low island, even relative to other barrier islands. Galveston has actually become a hotspot for research scientists because of all these converging factors, and it's likely to experience some serious problems in the next 20 to 50 years. Similarly, other barrier islands—such as Padre Island, with its wonderful National Seashore recreation area—is going to be highly vulnerable to sea level rises.

Other areas of concern are the tidal flats and salt marshes, like the Aransas Pass National Wildlife Refuge, which is breeding habitat for the whooping crane. The salt marshes also provide a home for oysters and clams as well as the nursery grounds for young shrimp, crab, and fish. So these marshlands not only play an essential role in natural systems but also have economic benefit for commercial fisheries.

Now, you may very well say, if animals and plants change their range and plants change their timing, why won't the salt marshes just recede? This is a perfectly reasonable expectation, but there are two reasons why the marsh ecosystem can't migrate inland.

The first is the rate of change. Things are happening very fast, and a single heavy storm can eliminate a lot of habitat for good. The second reason is the extensive development of the surrounding area. There are towns, there are buildings, there are people, not just vacant land where animals and plants can move around. The landscape is very much dominated by humans, and that restricts many of these movements.

Another thing that we know for certain about the future climate of Texas relates to something called the heat index, which is a combination of temperature and humidity that measures the effects on human comfort. For example, in drier air we can cope with the same temperature that would make us very uncomfortable in high humidity.

There is fairly high agreement among the computer models that Texas will experience an increase in the heat index over the next 100 years. This means we will see not only higher temperatures but also higher levels of humidity.

So what can we do about it? Well, I'd argue that the Hill Country will still be the best place in Texas to live—with our cold spring-fed rivers and creeks.

In closing, I'd very much like to thank the Environmental Sciences

Institute at the University of Texas for helping me put this fancy presentation together. The extremely helpful graphs used in the slides came from the Union of Concerned Scientists, the U.N. Intergovernmental Panel on Climate Change, the U.S. Environmental Protection Agency, the U.S. Global Change Research Program, the Centers for Disease Control, and several special people. We thank you very much.

# A CENTURY OF LAND USE IN TEXAS:

## *Impacts on Wildlife Diversity*

---

DAVID J. SCHMIDLY\*

Texas is a legendary place, not only because of its great size and its unusual history, but also because of its richly varied landscape, which has always inspired in its residents a strong sense of place and a powerful love of the land. From the Pineywoods of East Texas to the mountains and deserts of the west, from the Great Plains in the north to the subtropical Rio Grande Valley, from the springs and rivers of the Hill Country flowing to the bays and estuaries of the Gulf of Mexico, few places can equal Texas's scope and diversity. It has also supported a diversity of people and cultures over the centuries, and this diversity has been increasing as the population of the state has exploded in the past decades.

As we begin the 21st century, it is obvious that great changes have come to the Texas landscape, some so slowly that the differences have been difficult to see, some so quickly that residents can't help but notice. A century ago, Texas was a sparsely settled rural stronghold whose three million people lived and worked mostly on farms and ranches. With an average distribution of 11 people per square mile, there seemed little prospect at the time of running out of natural resources or places to experience the outdoors. Now, however, the state's mostly urban population, which exceeds 20 million, is distributed unevenly across the state, putting increasing pressure on the environment within and around its rapidly expanding urban areas. People have to drive farther and farther to experience the natural world that was once within easy reach.

The lay of the land in Texas is distinctive in yet another way. For all of its deeply etched images of wide-open spaces, Texas is unusual in its relative lack of public lands. During its brief time as a republic, Texas sold the bulk of its public lands in order to finance a government. As a result, despite its size, the state owns relatively few public spaces in proportion to its population. More than 94 percent of the state's land remains in private hands. The relative lack of public lands is also a crucial factor in outdoor recreation. For the 99 percent of the population in Texas that does

---

\* David J. Schmidly is the president of Texas Tech University in Lubbock and has served as a trustee of the Nature Conservancy of Texas.

not own a stretch of land, such as a farm or ranch or weekend getaway, the opportunities to enjoy the outdoors have depended, in large part, on access to parks. However, areas of parkland, wildlife refuges, and forests make up less than 3 percent of the state.

These geographic and demographic factors that make Texas such a distinctive place have also made the work of conservation and of providing outdoor recreation opportunities for all Texans an increasingly complex and difficult task.

### THE BIOLOGICAL SURVEY OF TEXAS

Texas is fortunate that the U.S. Congress funded extensive biological surveys of the state at the end of the 19th century and the beginning of the 20th century. These surveys were conducted as part of the program directed by the U.S. Bureau of the Biological Survey, which was established in 1885 as a division of the U.S. Department of Agriculture. The purpose of the surveys, which were directed by the legendary conservationist C. Hart Merriam, was to inventory wildlife and assess its practical value.

Merriam selected a series of states, including Texas, for an intensive biological survey and inventory. Over a period of about 20 years (1889–1906), a team of 12 scientists and field agents led by Vernon Bailey extensively surveyed the state. In Texas the federal field agents compiled an equivalent of more than 5 years of continuous fieldwork. They prepared written reports describing the state's physiography and plants and listing the birds and mammals they observed or captured at 178 different sites in every ecological region of the state. Many of these sites have changed dramatically today.

The culmination of the survey was the 1905 publication *Biological Survey of Texas*, which was authored by Bailey and included information about life zones, reptiles, and mammals. Henry Oberholser, a colleague of Bailey's and one of the federal agents on the survey, made his study of the bird life of Texas a lifelong project, and his report did not appear until 1974.

The recent discovery of the original files from this historical biological survey gives a virtual natural history picture of every region of the state as it existed a century ago. In 1992 I initiated a project to document the archival natural history information from the Texas biological survey. The archival materials assembled included scientific specimens of birds, mammals, and reptiles; museum catalogs of the scientific specimens; field-trip diaries describing the travels of the field agents; detailed biological reports of significant topics; physiographic reports of each place visited in Texas; special correspondence with landowners and field agents; a detailed map of the life zones of Texas; and more than 1,000 black and white photographs of Texas landscapes, habitats, plants, and animals. In addition, several maps of plant and animal distributions prepared by the federal agents were located. These archival materials represent a detailed

depiction of Texas natural history at the turn of the century. This information provides crucial baseline data to compare with the results of current biological surveys and to assess landscape and biotic change information useful to land managers and others seeking to improve land and ecosystem management. My most recent book, entitled *Texas Natural History: A Century of Change*, includes an annotated version of the original *Biological Survey of Texas* as well as several chapters describing what Texas was like more than 100 years ago and what happened to the state during the 20th century.

#### CHANGES IN TEXAS ECOSYSTEMS AND WILDLIFE DIVERSITY

Mammals illustrate some of the patterns of ecosystem and faunal change that took place in Texas during the 20th century. Mammals were the major group of vertebrates featured in the historical biological survey, and the recent publication of *The Mammals of Texas* (Davis and Schmidly, 1994), which summarizes the current status of mammals, provides a context for understanding change in this highly visible component of the fauna. For mammals, the most significant changes include the extinction of populations, subspecies, and species; introductions of nonindigenous species; and major changes in species or subspecies distributions.

Species extinctions have been common. By 1905 the only species of mammals extirpated from Texas were bison, grizzly bear, and elk, although several other species, such as beaver, black bear, spotted cats (ocelot and jaguar), pronghorn, and bighorn sheep, were markedly reduced in distribution or in numbers. Today, the gray wolf and red wolf, black-footed ferret, jaguar, margay, and bighorn sheep are extirpated from the state.

Since the turn of the 20th century, however, a few species have expanded their ranges—the armadillo and the pygmy mouse are notable examples among mammals—whereas others, such as the pronghorn antelope, have undergone drastic range reductions. Entire populations of some subspecies, such as the Big Thicket hog-nosed skunk, have become extinct.

A striking example of the changes occurring in Texas is the plight of the black-tailed prairie dog. This highly social creature was so numerous during the time that Bailey and the field agents worked in the state that a 25,000-square-mile area of plains east of San Angelo was described as a continuous dog town, inhabited by as many as 400 million animals. Following an extended program of extermination, the population was reduced to small, scattered colonies. Today, it is estimated that 98 percent of the population has been lost and that only 300,000 prairie dogs remain in Texas—an estimate that some scientists feel is actually too high because of the small size of the colonies and their scattered nature.

Nonindigenous species, which were rarely encountered by Bailey, now openly range over much of the state. A prime example is the nutria, which

was introduced into the state in the 1930s and now occurs over most of the eastern two-thirds of the state and is still expanding its range. Ungulates introduced from Africa and Asia now occupy rangelands in proliferating numbers. During the 1990s a colony of feral Japanese snow monkeys even became established in South Texas.

Anthropogenic pressures on wild species today are totally different from those earlier in the century. In the early 1900s overexploitation resulting from unregulated market hunting was a serious threat to wildlife. Poisoning, trapping, and unrestricted killing decimated many species. Today the hunting of game species is an important management tool regulated by state law, and the revenue from hunting has become an effective market incentive for landowners to manage for wildlife habitat. Likewise, there are laws to prevent unregulated taking of endangered or threatened species.

Today more problems are related to wildlife habitats that have been destroyed, altered, and fragmented. Loss of critical habitat is the most serious threat to the modern fauna. Early Texas was a magnificent place, with a tremendous diversity of habitats. At one time the state was mostly composed of grassland habitat—the southern reaches of the Great Plains—but human population growth and settlement through the past two centuries have significantly affected Texas. Among the most altered places are the prairies and wetlands, the riparian and riverine ecosystems, and the rangelands of the Edwards Plateau, Rolling Plains, South Texas Plains, and Texas Panhandle. When Texas entered the Union, it was the largest prairie state, but today fewer than 2,025 hectares of the original 5 million hectares of blackland prairies remain. Texas has lost more than 60 percent of its wetlands and about the same percentage of its bottomland hardwood forests.

It becomes evident when assessing the old photographs from the archive that the amount of natural, unpolluted surface water has declined greatly in this century. Almost every photograph the agents took of a stream or river showed abundant natural surface water, which is not true of most of those places today, although the total amount of surface water in the state is probably greater today because of the construction of tens of thousands of tanks and large reservoirs.

A little-appreciated but important factor affecting natural ecosystems in Texas today is the rapid change in land-tenure systems. Unfortunately, an unprecedented breakup of family lands is now occurring in many places, brought about by changing economic conditions, inheritance taxes, and a state financial structure that is extremely dependent on property taxes. For example, throughout much of Central Texas, where only tiny remnants of the native landscape survive today, the average tract size in many counties has dropped in this generation alone from thousands of hectares to fewer than one hundred. These areas, which once provided large blocks of land for wildlife habitat and outdoor recreation, now con-

sist of tiny plots of introduced vegetation that cannot sustain the native wildlife.

#### 20TH-CENTURY CHANGES IN TEXAS LANDSCAPES AND LAND USES

Human disturbance in Texas prior to European colonization was minimal, but the rapid spread of people across the state throughout the 19th and 20th centuries greatly accelerated landscape changes. Population growth presents a formidable challenge to conservation because fish and wildlife resources and people share near identical needs for two critical commodities: water and land. The following discussion summarizes some of the major factors resulting from population growth that have changed the face of Texas landscapes.

*Land conversion and development.* During the 20th century, land cover in Texas was altered principally by human activity, such as farming and agriculture, ranching and stock raising, logging, the suppression of natural fires, and construction associated with expanding urbanization. Urban development, including both urban sprawl and development of vacation homes, has had a huge impact on the landscape of Texas. Most of this growth occurred around major cities where 80 percent of Texans now live. Natural habitats are often reduced by land conversion, leaving less area available for native species. The spatial patterns of habitat may also be altered, resulting in the fragmentation of once-continuous habitat. With urbanization and population expansion came the need for dams, water diversions, and roads to support people's needs and facilitate their movements. Most changes in aquatic systems in Texas can be traced to the construction of dams, either for water storage or flood control, and to other developments on or near waterways. Dam building and water diversions have significantly degraded most major rivers and coastal waterways.

*Misuse of water.* Of all the water resources in Texas, rivers are by far the most seriously threatened. Rivers link our land and water ecosystems. Adequate stream flows and good water quality are essential to their health and the ecosystems they pass through. Every major river basin in Texas has been impounded, and nearly 6,000 small dams create a network of small reservoirs for livestock watering and soil stabilization. These impoundments have substantially altered our hardwood bottomland and riverine/streamside landscapes.

*Suppression of fire.* When Texas entered the Union, it was the largest prairie state, and fire was a major factor in shaping the landscape and land cover. This is no longer true today. Beginning in the 19th century and continuing throughout the next, fire suppression has had a huge impact on the natural conditions throughout the state. The cessation of frequent natural surface fires in the late 1800s was because of reduced vegetation caused by intensive grazing by livestock. The initial suppression of natural surface fires by livestock grazing led to a period of active suppression



of all fires by land management agency personnel shortly after the beginning of the 20th century. Before fire suppression, Texas ecosystems were accustomed to frequent, low-severity wildfires that facilitated landscape and habitat diversity. Under conditions of fire suppression, landscape complexity is made simpler with shade-tolerant tree and shrub populations rapidly expanding. Without question, fire suppression over the past century has pervasively affected many Texas ecosystems.

*Invasion of alien plants.* By the end of the 19th century, alien plants had already successfully invaded Texas landscapes. By the end of the 20th century, alien plants would be common all over the state. In particular, the salt cedar, or tamarix, has inflicted damage to our native landscapes and habitats. It is a vigorous invader of moist pastures, rangelands, and riparian habitats, having spread to almost every river, stream, creek, and wash in the southwestern part of the state. Salt cedar has an extremely high rate of evapotranspiration, and annual water losses often result in a substantial decline in water tables where it is abundant.

A similar situation exists along the upper Texas coast where the Chinese tallow tree from Asia proliferated substantially during the 20th century. The invasion of this plant into coastal Texas has changed much of the region from coastal prairie to monotypic tallow woodlands, displacing native plant and wildlife species.

*Loss of wetlands.* Land conversion and land use throughout Texas has had a strong impact on wetlands, hardwood bottomlands, and riparian areas. Although wetlands comprise less than 5 percent of the state's total area, Texas has lost an estimated 50 percent of its coastal wetlands and 60 percent of its terrestrial wetlands in the past two hundred years. This trend continues today as much of the remaining acreage is being seriously degraded by saltwater intrusion because of the construction of canals, channels, and drainage ditches; by land subsidence and groundwater depletion; by inadequate freshwater inflows because of upstream water projects (dams) and the alteration of natural hydrology; and by pollution from industry, shipping, and urbanization. Large-scale loss and degradation of riparian landscapes throughout the state have resulted from the construction of impoundments; overgrazing by livestock, which has destabilized vegetation and resulted in arroyo cutting and gullyng of the landscape; and the introduction of alien plants such as salt cedar and Russian olive.

*Encroachment of brush.* Since the turn of the 20th century, brush and cacti have continued to cover many areas of the state that were formerly prairie or grassland. The spread of species such as mesquite, cedar, scrub oak, and prickly pear can be attributed primarily to overgrazing and the suppression of wildfires that so often swept over the western plains in the past. The two most obvious culprits contributing to the increase in woody plants have been mesquite and juniper.

*Grazing of livestock.* Widespread grazing of domestic livestock has

had major cumulative effects on the ecology of Texas. The extremely high historical stocking rates and concomitant overgrazing led to significant alterations in the species composition of vegetation across the state. Cool-season grasses and other preferred forage species declined, while unpalatable weedy species, shrubs, and nonindigenous plants increased. The year-round, high-intensity grazing of open ranges that occurred in the past also led to marked reductions in herbaceous plant and litter cover. Overgrazing was also a major contributor to soil erosion, flooding, and arroyo cutting. Livestock grazing, together with fire suppression, both interacting with fluctuations in climate cycles, has had a major impact on land cover in Texas. Range deterioration continued through the drought of the Dust Bowl era in the 1930s but has improved since. Although there are still many areas of the state in need of brush management and removal, the current status of our rangelands does indicate that range can be improved with good management and favorable climatic conditions.

*Fragmentation of land.* Habitat fragmentation is rapidly becoming the most serious threat to landscape integrity in Texas today. Habitat fragmentation is a process by which stands of native vegetation become smaller and discontinuous because of the clearing of land for various purposes, such as agricultural, residential, or commercial use. The effects of habitat fragmentation on animals, plants, and their habitats are numerous, and the biological diversity of native species is almost always reduced. As cities spread and urban dwellers seek land ownership outside the confines of city limits, land holdings exhibit accelerating fragmentation and those species that rely on large continuous tracts begin to decline.

#### CONSERVATION CHALLENGES

Texas is not alone in its struggle to manage its resources while at the same time meeting the needs of its rapidly expanding populations. As we look to the future, there are at least 10 challenges essential to effective conservation of natural resources, open space, and wildlife diversity. These are briefly discussed below.

*Find a common ground for managing wildlife diversity.* Strong positions have been staked out on the extremes of the spectrum of approaches to conservation, and it has become difficult to find a common ground where the majority of people can seek compromise for the common good. Advocacy groups have taken over and polarized the debate because no one has offered society an acceptable alternative to the winner-take-all strategies. Wildlife professionals, who have devoted their careers to the management and conservation of wildlife resources, must take the lead in creating this common ground.

*Set priorities based on current data: the case for monitoring.* If we are to conserve wildlife diversity in Texas, we must have an adequate foundation of knowledge on which to base management decisions. Clearly, what is needed to retard the events that could transpire in this new century is

information on the status of vertebrate species as well as monitoring systems to indicate when a species appears to be in some danger.

*Recognize the changing nature of our clientele.* We must recognize that our clientele is no longer made up of just hunters. Certainly, we must work to increase the understanding of hunting as a viable method of wildlife conservation, but we must broaden our approach to include opportunities for the nonconsumptive enjoyment of wildlife. One area that holds much promise is wildlife-related tourism, or nature tourism, which increased worldwide by 63 percent from 1980 to 1990 and is now the fastest-growing sector in the travel industry.

*Avoid single-species approaches.* Environmental monitoring and single-species approaches can help divert problems before species become extinct, but this is a labor-intensive and extremely expensive solution. The least expensive solution is to manage at the ecosystem level, thereby attempting to conserve through time an entire assemblage of species. In a state like Texas, with its enormous biological diversity, this is really the only long-term approach that is feasible. We do not have the financial or human resources or the time to take a single-species approach toward managing our wildlife resources. We must develop a broader management approach that will consider ecosystems and landscapes and all biological resources instead of a limited subset of species and their habitats.

*Focus on sustainable resource systems and ecosystem management.* To succeed, resource management must be considered in the context of an ecosystem, where resource development, conservation, and protection are considered simultaneously. Competition for resources must give way to cooperative management strategies, where conservation and resource management are linked in sustainable resource systems. Such an approach affords the opportunity to focus on processes through which ecological and human communities are linked, such as the flow of water through a regional watershed, the nutrient cycles that help sustain productive soils, and the seasonal patterns of reproduction and regeneration that characterize the ecological community. We must go beyond resources and yields to include the full range of services, values, uses, diversity, and continuity of ecological services.

*Strengthen scientific research capabilities.* More effort is needed to develop the basic knowledge and tools that are the scientific foundation for managing wildlife. Wildlife research must improve in quality and at the same time broaden its scope if societal issues are to be adequately addressed. Essentially all the major scientific challenges will require changes in the way researchers organize themselves as well as improvements in technology. It will be necessary to enhance and promote interdisciplinary research to promote new technology and different research approaches. As wildlife issues become more complex, the need for interdisciplinary research will become even greater.

*Make conservation education a priority for the public.* People must be

educated to understand what the continuation—or destruction—of wildlife means to their future and that of their descendants, and they must be persuaded to act on their resulting concerns in ways respectful of the diversity of life and their own cultural values. We must also reach beyond traditional commodity-oriented values to address the entire spectrum of values that society places on wildlife resources. Unless we broaden our clientele base, the public confidence to gain the political power and resources to conserve wildlife diversity will not be forthcoming. One of the most critical educational challenges in Texas will involve engaging minorities in conservation issues.

*Increase participation of private landowners.* With 94 percent of Texas lands in private hands, most of the state's native plants and animals reside on private land. What's more, the locations that are most desirable for homes and developments, such as areas around springs and streams and on hills overlooking unspoiled vistas, are often the areas where habitat is most fragile and most critical. As a result, developers and conservation interests often conflict. As a matter of sheer practicality, the concerns of private landowners, the traditional stewards of the land, must be considered when addressing the growing problems of conservation in Texas. Therefore, we must find ways to encourage and not discourage the participation of private landowners in wildlife management. There is a real opportunity to create incentive programs that provide technical or cost-share assistance to private landowners for voluntarily enrolling environmentally sensitive land or wildlife habitat in conservation programs to protect or enhance natural resources.

*Expand acquisition and management of protected areas.* Although they represent only a small part of the Texas landscape, parks and preserves and the federal, state, and private entities that oversee them play increasingly vital roles in the conservation of biodiversity in Texas. For some regions, such as the Rio Grande Valley, they represent what is left of the native habitats. Clearly, there is a need for more parks and preserves and additions to existing areas to protect rare or unique natural resources and to better represent the natural regions of the state. Given their concerns about conservation and scenic beauty, Bailey and the federal agents who produced the biological survey, if they were alive today, would surely endorse such a strategy for the 21st century.

*Promote regional conservation planning.* There is a growing consensus that conservation is best practiced at the regional level where it can be integrated with local customs, values, and land uses and where people can have a vested interest in and become direct participants in the decision-making process. In the future, we must begin to effectively plan for various land uses within the dynamics of landscapes.

There are many excellent examples of how each of these 10 strategies are being implemented in Texas today by various stakeholders, including state and federal agencies, private conservation organizations, public

groups, and private landowner organizations. In the future, we must encourage more interaction among the various stakeholders to continue these collaborative efforts.

### THE SPECIAL CHALLENGES OF LAND FRAGMENTATION AND WATER

Land fragmentation and the misuse of water had become the dominant conservation issues by the end of the 20th century, and they will continue to be the most significant challenges in the 21st century. Texas is no longer a state in which economy and culture are defined primarily by the land. With the continuing influx of new residents and a population increasingly shifting to cities and their suburbs, Texas has become a primarily urban society. Many landowners whose families have lived on the land for generations have come under tremendous pressure to sell their farms and ranches for development. As a result, Texas is in jeopardy of losing its legacy of families who live and work on the land—the traditional stewards of our natural heritage.

The fragmentation of large family-owned farms and ranches poses perhaps the greatest single threat to our wildlife because it places once-plentiful habitat for native plants and animals increasingly at risk. For this reason, it is crucial to find ways to keep large contiguous tracts of land intact and to find ways for all landowners to participate in conservation. This will require us to create incentives such as programs for the purchase of development rights. This program would allow landowners to sell the development rights to their land by granting conservation easements to a government entity or nongovernmental conservation organization, yet retain all other rights of ownership, including the right to continue ranching, farming, hunting, and fishing.

Management of water will be the single most critical conservation issue in Texas in the 21st century. Water is the limiting factor for all aquatic life, plants, and wildlife. Rivers link our land and water ecosystems. With Texas's population expected to double in the first three decades of this century, there is an urgent need to maintain sufficient water for adequate flows to rivers, lakes, and estuaries to maintain the fish and other wildlife species that depend on them. Historically, the allocation of water rights in Texas has not taken into account the needs of the state's ecosystems. Our current water statutes and regulations require that environmental needs be considered in the overall picture, but they do not assure minimal instream flows to sustain the health of rivers and estuaries. As Texas attempts to meet its increased water needs, it must not impair the ecological health of these ecosystems.

### SOME POSSIBLE SOLUTIONS

In response to the need for quick action, two recent studies were commissioned to develop recommendations for strengthening conservation efforts and improving access to open space and the outdoors for Texans.

While serving as governor, George W. Bush appointed a task force on conservation. The report of the task force, entitled *Taking Care of Texas*, was issued in October 2000 and contained recommendations in three broad categories: private lands (incentives, partnerships, and stewardship); public lands (planning, repairing, developing, and meeting future needs); and water (assuring, protecting, and managing for conservation). Regarding private lands, the cornerstone recommendation of the task force was the implementation of programs for the purchase of development rights whereby government agencies or nonprofit groups acquire development rights from farmers, ranchers, and other owners of open space. Although the land remains in private hands and is closed to the public, it can never be converted into shopping centers or housing. Recognizing that Texas possesses a very small amount of public land and the need for access to the outdoors is acute, the Bush task force also concluded that land acquisition must be "an important component of any statewide plan."

In a parallel and complementary effort, the Texas Parks and Wildlife Department contracted with Texas Tech University to conduct a study, which resulted in a report entitled *Texas Parks and Wildlife for the 21st Century*. The report, issued in November 2001, recommends adding 1.4 million acres of state parkland and 559,000 acres of local parkland over the next 30 years. It also calls for preserving a total of 1.1 million acres of native habitat in the state's 11 ecological regions, although it concluded that some of the habitat could serve as parkland and some could remain in private ownership. The study found an acute shortage of outdoor recreation lands near cities. Based on a survey of public opinion, the Texas Tech study revealed Texans' overwhelming support (in excess of 90 percent of the sampled population) for the conservation of water and wildlife as well as the protection and preservation of ecologically important habitats and lands in Texas.

I had the pleasure of serving on the Bush task force and of heading the project research team for the Texas Tech study. Collectively, the two studies offer specific solutions that would position Texas as a leader in conservation and outdoor recreation and provide essential components of the quality of life that our citizens expect in the 21st century. If the recommendations are implemented as proposed, we will have a good chance of retaining our precious heritage of wildlife diversity and wide-open spaces.

## CONCLUSIONS

The next one hundred years will likely decide the future of wildlife and open space in Texas. The decision will be made, either directly or indirectly, as to how much and what kind of nature survives. Conservation pressures will come from a variety of sources. Habitat loss and degradation from overdevelopment, overharvesting, introduction of exotic species, pollution, and other causes will continue to take a significant toll. Global warming or climatic change could exacerbate the loss and degra-

dation of biodiversity by increasing the rate of species extinction, changing population sizes and species distributions, modifying the composition of habitats and ecosystems, and altering their geographic extent. Essentially the problem stems from proliferating human land uses that are powerfully changing the form and shape of the landscape.

Conserving wildlife, which recognizes neither ownership nor boundaries, calls for good science, first-rate technology, excellent management, and a broad constituency willing to make some concessions to save it. To maintain wildlife diversity into the next century will require financing, public support, and, above all, the integrated management skills that even the most sophisticated high-tech farming systems lack. We face a monumental task, far beyond our existing capabilities. But now is the time to look ahead, coordinate, and plan—before our options are further narrowed.

# SOILS AND THE EDWARDS PLATEAU

---

LIBBY STERN\*

This talk focuses on the soils of the Edwards Plateau—how these soils developed and how they control the native vegetation and animals. I am speaking from the perspective of a geologist, so I have the peculiar view that it is the underlying bedrock that controls much of the landscape, from the soils to the plants that grow in these soils. First I would like to discuss what the Edwards Plateau is, both with regard to its geography and geology. Then I will review the different factors that influence the character of various soils and apply these concepts to the soils of central Texas. I will conclude with a discussion of the endangerment of soils and their intrinsic value.

The Edwards Plateau, located in central Texas, is a “physiographic region,” meaning that it has distinct characteristics in terms of landscape, flora, and fauna. The eastern margin of the Edwards Plateau is very abrupt and is manifested as a steep escarpment, a feature visible from space. The Edwards Plateau is indeed a plateau with a relatively flat topography, situated at a higher elevation than regions to the southeast. However, on the southern and eastern margins of the Edwards Plateau, many rivers have eroded downward and cut steep valleys into the plateau, creating valleys and adjacent hills. The erosion by these rivers creates the landscape that we call the Texas Hill Country.

The rocks underlying the Edwards Plateau are limestones that were deposited in a warm, shallow sea during the Cretaceous Period in earth history, or about 100 million years ago. At that time, the land of the Edwards Plateau was located closer to the equator, and the climate of the earth was generally warmer than today’s climate. In this warm, shallow sea limestone formed as a chemical precipitate from the seawater by the reaction  $\text{Ca}^{2+} + 2\text{HCO}_3 \rightarrow \text{CaCO}_3$  (limestone) +  $\text{H}_2\text{O} + \text{CO}_2$ . On a geologic map of Texas that shows the different rocks exposed at the earth’s surface, the Cretaceous limestones are usually portrayed in green, and they have a fairly direct correspondence to the region of the Edwards Plateau. The abrupt eastern margin of the Edwards Plateau goes through Austin and is controlled by a series of northeast-southwest trending faults, along

---

\* Libby Stern is an assistant professor in the Department of Geological Sciences at the University of Texas at Austin.



which the southeast blocks are dropped down relative to the northeast block. The soils of the Edwards Plateau are thin and rocky, where there is any soil present at all, because many areas on the plateau have exposed bedrock rather than soil. The nature of the bedrock of the Edwards Plateau controls the soils and thus the native life and the utility of this land for agriculture.

Hans Jenny, the preeminent soil scientist of the twentieth century, provided a comprehensive framework to describe those characteristics of a place that control the nature of its soils. He defined these factors of soil formation as bedrock, climate, time, biota, slope and aspect, and human perturbation. These six factors combine at a particular site to influence the characteristics of its soils. Let's compare the state soils of Texas—the Houston Black soil series—with the soils of the Edwards Plateau. The Houston Black, found to the east of the Edwards Plateau, is thick, black, and amenable to growing grains and cotton. The distinct character of the Houston Black soil series reflects the formation factor of bedrock; the bedrock beneath the Houston Black consists primarily of shales and sandstones. When shales and sandstones undergo chemical weathering, they produce insoluble minerals like clays; in comparison, when limestones like those on the Edwards Plateau undergo chemical weathering, the rock nearly completely dissolves, leaving behind almost no insoluble residue in the soil. Thus the nature of the bedrock beneath the Houston Black is what makes these soils thick and fertile.

Two other important factors of soil formation are climate and time. The cold, moist climates of northern forests produce spodosols, or soils with rich topsoil overlying a white, leached zone, overlying colorful black, tan, and orange soil beneath. In contrast the hot, moist climates of the tropics produce vibrant red, clay-rich soils. A landscape must be stable for a long period of time to develop these colorful patterns (1,000 to 1,000,000 years), and the length of time over which a soil develops can have a profound influence on its character and thus the life found on the landscape. An interesting example of the importance of time on soil development is the state soil of California, the San Joaquin soil series, which is found on ancient surfaces and is the product of about 3 million years of rain and earthworms, plants, and burrowing animals. The landscape underlain by the San Joaquin soil series is commonly covered by a bumpy pattern called Mima mounds, which are several meters across and about a meter high. The soils have a thick horizon cemented by silica, developed over millions of years, that prevents rainwater from draining through the soil; instead the valleys between the Mima mound are internally drained and accumulate water during the rainy season. These tiny ponds are called vernal pools and support a wide variety of endemic species. These soils create a unique habitat for many threatened species and have been spared much of the disturbance of agriculture in the San Joaquin Valley because the hard silica horizon makes farming difficult. The unusual

hydrology and biology is the direct result of the antiquity of the soils of the San Joaquin soil series, the product of 3 million years of weathering. Yet a large intact area of these unusual soils and vernal pools is directly under the proposed University of California campus at Merced.

The thin, rocky soils of the Edwards Plateau are produced by the weathering of limestone, as I mentioned earlier, but they are also the product of a more complicated history of erosion over the past 15,000 years. I am investigating the erosion of soils from the Edwards Plateau with my colleague Jay Banner and our student M. Jenny Cooke. We are using an extremely well-dated sequence of sediments that have accumulated in a shallow cave in Kerr County over the past 20,000 years as a record of the environment of the Edwards Plateau through time. Rickard Toomey found no prairie dogs in this sedimentary sequence after about 11,000 years ago, whereas they had been abundant prior to this time. Because prairie dogs require a least a meter of unconsolidated soil in which to burrow, their local disappearance is consistent with thinning soils.

To test this idea that the soils of the Edwards Plateau underwent substantial erosion, we are applying a novel technique to quantify the timing of soil erosion from the Edwards Plateau. Specifically we are using the natural abundance of strontium isotopes in fossils of this sedimentary sequence as a record of soil thickness. The limestone bedrock and the clays in the soils have very different strontium isotope compositions: as the soils thinned, more strontium, which is chemically similar to calcium, would be derived from the limestone bedrock rather than the clay minerals in the soils. We have measured the strontium isotope composition of the calcium carbonate in fossil hackberry seed coats as well as fossil mammal tooth enamel from cave deposits. The pattern in strontium isotope composition in these fossils is consistent with thinning soils on the Edwards Plateau from about 15,000 to 9,000 years ago, with little change after this time interval.

Further support for the theory that thick, clay-rich soils once covered the Edwards Plateau region in central Texas comes from small patches of thick, red soils found at the highest elevations on the Edwards Plateau, in contrast to the thin, rocky soils more commonly found in the region. How could thick sediment be deposited at the tops of hills, forming these soils? These soils are not developed on a sedimentary deposit; rather they are relicts of the thick, ancient soils that blanketed the region about 10,000 years ago, and only on flat surfaces at the tops of hills have these soils escaped erosion. There are distinct plants that grow on these thick soils, including the combination of post oak and mesquite, and distinct animals that live in these soils, such as gophers. Thus the bedrock of the Edwards Plateau controls the soils, the geologic history of this region controls where there are thick and thin soils, and the soils control the animals and plants that live in particular habitats.

I was discussing a profound natural erosion event that occurred about

10,000 years ago, but humans are affecting soils in many ways—from promoting erosion to paving over prime agricultural lands. Soils provide an estimated \$17 trillion of services annually, through ecosystem services such as flood prevention and as a forestry and agricultural resource. There are economic as well as ecological reasons to value soils. The character of each soil reflects the complex geologic and climatic history of the landscape, and these soils control the ecosystem. Some of these soils, such as the thick, red, clay-rich soils at the tops of hills in the Edwards Plateau, were formed over perhaps hundreds of thousands of years, and we can irreversibly change that soil in an instant by plowing or paving.

# HOW CAN WE HEAL THE LAND?

---

WILLIAM R. JORDAN III\*

A lot of the presentations so far, beginning with the presentations last night, have been somewhat elegiac—nostalgic looks back. One of the distinctive things about living in the New World—North America, South America, Australia—is that you don't have to go back that far to get to something very different from what we have now. Here in Texas you go back just two or three generations and you've got stories from your grandparents about the prairies that people could ride through for a hundred miles with the bluebonnets brushing their stirrups. And now all that is mostly gone.

That is part of the American experience: this tremendous sense of a diminished landscape—the question, as Robert Frost put it, of what to make of a diminished thing.

But, of course, as a people we don't really like to think of ourselves as just dealing with a diminished thing. That's depressing. It's un-American. As Ellen Temple said in her remarks this morning, we'd rather look ahead to find answers to our questions, solutions to our problems. And to do that we need what critic Leo Marx called "new symbols of possibility." I'd like to talk with you about this morning about environmental restoration, not just as a conservation strategy but as a new symbol of possibility.

People often find the idea of environmental—or ecological—restoration confusing. I think that's because it mixes a warm, fuzzy thing with a sort of mechanical-sounding thing.

But it's really a simple idea. Everyone knows what "restoration" means. It means taking something that's broken or run down or degraded and returning it to some former (usually "better" or more desirable condition). You can do that to a car, a house, an old violin—or an ecosystem.

In any case, this is a pretty demanding idea. There is something categorical about it, something that calls for perfection and completeness. If you set about to restore a thing—not just some quality of the thing, but the thing itself—you want to restore all its qualities. In the case of an ecosystem or landscape, that means you want all the species, in more or

---

\* William R. Jordan III is the director of the New Academy for Nature and Culture and the founder of *Restoration & Management Notes*, now *Ecological Restoration*.

less the correct historic proportions. And you want the processes and the dynamics. We want our restored system not only to look like the historic model but also to behave like it as well.

And we don't care about human interests. We're playing a game here in which we set those aside—in what I call a studied disregard for our own tastes and concerns. This is what distinguishes restoration from other forms of environmental stewardship, such as conservation of natural resources or reclamation of land by planting trees or crops on it, developing it as a source of clean water or fiber or game animals.

I'm not saying anything against this, just that it's different. The restorationist says, you want fuel, you want fiber, you want ruffed grouse? Well, we don't care. We're going to put this place back the way it was, and we don't care what you want—we're just going to do it this way. If there were bluebonnets, fine, we'll put them in. But if there were unpleasant things—rattlesnakes, say, or poison oak or frequent fires, things we don't happen to like—well, they go in, too.

Why, you might ask, would anyone want to do that? I can think of at least two important reasons. First, that's the only way you can hope to preserve the old, natural, "original" landscape. You just can't do that if you simply copy the parts you happen to like. The second reason, which is just as important if not more so, has to do with the meanings that come out of the work itself. Think of it as a game. We play many games with nature. Agriculture is a game. So is medicine and education and art. These games are important in part because of the work they get done. But also because of the meanings they create. And these depend on the rules of the game. Restoration is an important game because it is the game in which we set aside our own interests and preferences in an attempt simply to copy the natural landscape, to defer as fully as we can to nature. That makes it an act of humility. It also makes it an ideal way of defining ourselves in ecological terms by trying to disappear—in an ecological sense—from the landscape, to make it "forget" we are here.

The idea of ecological restoration actually has a long history. It goes back to biblical times in the West. The idea of a Sabbath for the land—the opportunity for the land to rest and recover in an agricultural cycle every seven years, for example—is a kind of restoration. So is the replanting of trees on cutover land, or the rotation of crops as a farming principle.

In a purely ecological sense, the idea of restoration goes back about a century. I would locate the beginning of it in this sense around the beginning of the twentieth century, especially in the work of a number of landscape architects, including Frederick Law Olmsted and the kind of work that he did in Central Park. That was not exactly what we would today call ecological restoration, but it came close. It was *almost* restoration because it was an attempt to create a miniature "natural" landscape. But it wasn't *quite* restoration because the representation of the model landscape was somewhat stylized, not quite authentic or ecologically accurate.

Out here on the prairies designers were doing similar things—Jens Jensen in Chicago, for example, or the people responsible for managing roadside vegetation here in Texas, bringing back the bluebonnets.

So this work has its roots in agriculture and in landscape design. It also has roots in game management and forestry, which, in some forms, are strongly restorative.

But one of the interesting things about twentieth-century environmentalism is that, although this idea of restoration existed, and pretty much in its current modern form by the 1920s and 1930s, no one did much with it.

This is an interesting and important thing. It tells us a lot about environmentalism—about our many environmentalisms and their limitations. In fact, I believe that the neglect of restoration by a succession of environmentalisms for almost a hundred years will turn out to be one of the great defining mistakes of twentieth-century environmentalism.

And I can say that now without being terribly negative because we're getting past that. In the last decade or two we have begun to discover restoration, not only as a conservation strategy, but as a way of learning about the natural or historic landscape and as a context for negotiating our relationship with it.

And this has enormous implications for environmentalism. Think about it for a minute. So long as we think that the natural—or what I prefer to call the “classic” landscape—is irreplaceable, which was the way we talked about it in the sixties and seventies and into the eighties, then all we can do is lose them. Then the best we can hope to do is slow the rate of loss.

And if there's no going back, no prospect of restoration and recovery, then eventually—in 50, 100, 500 years—it's all going to be gone. And that's depressing. It's depressing because it's sad to think of the world diminished and impoverished that way, and by us. And it's depressing because it really means we don't belong on this planet.

The discovery that you can restore a classic ecosystem like a prairie—and this idea really grew up on the prairies here in the Midwest—changes that. For one thing, it means that maybe we can recover lost ground.

And it also means that we have a positive, constructive relationship with the classic landscape. And that means maybe we do belong on this planet. And that's good news.

Now, I don't want to overstate this—I don't want to make it sound easy. It's not. Nobody who's involved in this work suggests that it's easy.

But it is, in some cases, possible to get back a reasonably good version of at least some classic ecosystems.

And what we are finding is that doing this has value in itself, as a way of learning about the landscape, about its ecology, about its history, and about our relationship with it.

What is exciting right now is that restorationists are really beginning

to discover the value of this work—or this play, this game we play with nature. And it is turning out to be the key to a healthy relationship with it. It provides something we did not have before: a way of working, and playing, in the classic landscape, on its own terms—a model for the human “use” of these landscapes that, I predict, within a generation will define the way Americans use natural lands such as the national parks and wilderness areas.

And this is good news for nature. Because, as Bob pointed out this morning, what we really need, in order to provide a future for these landscapes, is a way to reinhabit them. This is of a piece with learning to farm sensibly—the sort of thing that Laura was showing us this morning: those farmers who are discovering that they can grow crops without pesticides and artificial fertilizer are actually in a kind of restorative mode, and they are reinhabiting the landscape in somewhat the same way I’m talking about here.

But I’m talking about a specialized version of that, in which our concern is specifically with the classic landscape, which we’ve decided is going to be restored, not to make it productive or useful, but with, as I said, a studied disregard for our immediate interests.

The restorationist does that by very deliberately attempting to copy—not imitate, but *copy*—the classic landscape. And in the process he or she really does reinhabit it.

To get a feel for this, let’s take a look at a few slides that Steve Windhager put together for me from his collection out at the Wildflower Center.

This is what it looks like. It involves little kids out collecting seeds in the prairie.

Very simple. But it is the solution to a big problem. Laura was telling us this morning that they can’t have their kids in the creek up there in Iowa because it’s dirty. So the question is, how can we get ourselves and our kids back in that classic landscape? This is part of the answer. Let them be gatherers—which is really what they are anyway, reliving the most basic, primal kind of human relationship with nature.

Or gardeners, setting out plants—a human activity that dates back to the dawn of agriculture. Weeding—what Thoreau called making invidious distinctions with the hoe.

And fire—of course, this is an exciting way to weed the prairie. And the discovery of the need to burn prairie, in order to restore and maintain it, was one of the major discoveries of restorationists in the 1940s and 1950s.

People love these fires. Some even plan their vacations around the spring burns, the way they might plan a skiing trip. “Oh, we can’t go in March,” they’ll say. “We’ll be burning the prairies.” Why do they feel that way? Fred Turner, who teaches at the University of Texas in Dallas, put his finger right on it. He says people come to feel that way about the burning of the prairies because the burns dramatize our role in the ecology of

the prairie. They dramatize the fact that the prairies need us, just as we need the prairies. So maybe we *do* belong on this planet. That is good news—it makes people happy.

And we do science on these plots, too. So you see there's a sense that the restorationist actually recapitulates the entire history of our species, hunting and gathering through agriculture right down to science.

All this may seem pretty modest, pretty unprepossessing. But we are learning that it has profound implications both for the classic landscape and for our relationship with it.

It is important, first of all, because it changes the *sign* of our relationship from negative to positive. The restorationist goes into the landscape and leaves it "better"—more "natural"—than it was. No one else, not even the birder or the backpacker, does that.

It is important because it makes us aware, not only of the landscapes we try to restore and their ecology and history, but of our relationship with them, and the history of that relationship. It makes use aware of that history because it requires us to study it and then try to repeat it, or to reverse it.

It is important because it is a way of participating in the ecology of the landscape—not just observing or studying it, but actively participating in it, the way other species do.

It is important because it is a way of offering a gift back to nature in recognition of what it has given us.

If that gift is obviously inadequate in many ways—smaller and poorer than the "original"—that is important, too, because it forces us to confront the inequities and imbalances that are inherent in our relationships with nature, as in all relationships: a manifestation of the tension and trouble inherent in nature itself, which is (we must remind ourselves) at odds with itself in the very act of creation.

It is important because anyone can do it. You don't have to leave the city and go up to the Hill Country to "do nature" if you are a restorationist, because the city is a good place to do restoration. And, unlike the Hill Country, where our relationship to the land is essentially consumptive (and therefore in a sense exclusive), there is no end to it. It is ecological junk picking—that is, creative, discerning, constructive work—and so the more people there are, the better.

And it is important because it is social. Not that we can't do restoration alone. We can, and many do. But the work lends itself to collaboration, to socializing, and ultimately to celebration and festival.



# TEXAS LAND AND PUBLIC POLICY

---

ANDREW SANSOM\*

**T**hank you, Robert, and thank you all for including me this afternoon. As I look out across the room, I see in almost every row someone who has helped me along the way, a colleague or a friend or a supporter in our state's conservation efforts over the last 30 years, and I'm particularly glad to see you today and to be with you.

It is a very great honor for me to be once again in the room with Mrs. Lyndon B. Johnson. You know, when I was a college student trying to figure out what I was going to do with my life, she was an inspiration to me. She is a heroine of our movement, and it is a great privilege to be here with her.

She would join me in saying that there are other heroes of that movement here as well, like Ed Harte and Terry Hershey, colleagues Pat Noonan and Bill DeBuys, who are at the dais, so thank you all. These last eleven years have been the greatest privilege of my life, and "privilege" is the only way I can describe it.

I hope today that I can share with you at least a few insights that I have gained about this land that we love. Texas has probably the strongest sense of place of any place or population in the world. I don't know of any other place where there is such a strong sense of heritage and sense of place as in Texas.

I'm sure that each of you knows that heritage is historically unique. As Texas came into America as an independent nation, our forefathers negotiated the retention of all of its public lands and then promptly turned around and sold them to support the government, a process that essentially continues to this day, but a process that has resulted in the statistic that David Schmidly shared with you earlier: about 95 percent of all the land in Texas today is privately owned.

I'm so glad that you got to hear Dr. Schmidly describe his work with Vernon Bailey's *Biological Survey of Texas* because it is clearly one of the most monumental nature resource studies to emerge here at the turn of the century. What is striking is that much of the damage to our landscape

---

\* Andrew Sansom is the executive director for the International Institute for Sustainable Water Resources at Southwest Texas State University and former executive director of the Texas Parks and Wildlife Department.

that we talk about today actually happened prior to 1900. If we recall the photographs of some of the countryside that he showed you, we have to recognize that the landscape of Texas prior to 1900 was horribly overgrazed. Much of the timber in East Texas had already been cut down. As Dr. Schmidly mentioned, many of the species that Vernon Bailey tried to document had already disappeared. This is contrary to what we think about the destruction of our landscape today and what our children hear—that the landscape is endangered as an outcome of modernity. In fact, in many respects, the landscape of Texas is in much better condition today, mostly under private ownership, than it was at the turn of the century. There have been some obvious changes in species distribution and vegetation and other factors. But the fact is that because of the stewardship of private landowners, the landscape of Texas is generally better today than it was 100 years ago.

On the other hand, there have been some tremendous losses. Since European settlement in Texas, we've lost about half of our coastal wetlands and we've lost probably 60 percent of our terrestrial wetlands. Principally because of the construction of reservoirs and other impacts of that kind, we've lost about 63 percent of our bottomland hardwood forests.

The ecosystems, a word that's been used quite a bit here today, of the blackland prairie and the Lower Rio Grande Valley are among the most endangered in the United States. As you heard today, in its natural state Texas was principally a grassland. When the Europeans first began to settle here, there were virtually no trees all the way to the Rocky Mountains, except in the Cross-Timbers region of the eastern part of our state. Texas was a grassland. And today these are our most endangered ecosystems. There were originally 20 million acres of blackland prairie that had not been plowed in Texas. Less than 5,000 acres of unbroken prairie sod exist today, and this is once again because of the stewardship of private landowners who have kept it that way on purpose. I was thrilled earlier today to see Mary Evelyn Blass Huey, formerly the president of Texas Women's University, who with her family has maintained one of the last tiny pieces of unbroken prairie sod in our state.

Even so, Texas is in better shape today, from the standpoint of overall system health, than it was prior to the beginning of the 20th century. About 144 million acres in Texas today are in rural ownership, and that provides the resource base for all of our agriculture, forestry industries, and outdoor recreation. Thus, the greatest single threat to the terrestrial environment in Texas today is the ongoing breakup of family lands. As families continue to leave their property, the tract sizes become smaller and smaller, open space disappears, and natural habitat and biodiversity are lost. Between 1982 and 1997, Texas lost about 2.6 million acres of rural lands. Between 1992 and 1997, that rate doubled the rate of the previous ten years. So today 12 percent of all agricultural land that is transferred from rural ownership every year in the United States is located in Texas.

The rate at which rural property is converted to other uses is greater in Texas than in any other state in the nation. Why is this happening? First, this acceleration is due to demographics, and you've seen the data today. When most of us were young, we were lucky enough to have an aunt or an uncle or a grandparent or a friend who had a farm or ranch that we could visit and where we could spend some time. Texas was still basically a rural state. When the Texas Parks and Wildlife Department was formed, for example, 90 percent of all Texans lived on farms or ranches or in very small towns. Within a few short years, 90 percent of all Texans will live in urban areas. Within a few short years, the ethnicity of that population will completely change: by 2030, Texas will have a non-Anglo majority. Because of these factors and others, there has been a tremendous amount of exurban development in recent years. In 1992, there were 181,000 rural landowners in Texas. By 1997, that number had increased to almost 200,000 rural landowners. So more people own land in rural Texas now than they did even a decade ago, but the average size of a tract of land over that same period dropped by 100 acres. As more people move out of the cities and into the first and second tier of counties around our major metropolitan areas, the size of those tracts of land becomes smaller and smaller.

Another great factor leading to fragmentation is the change in the economics of owning rural land. That is to say, the market value of land has been exceeded by its economic productivity. I'll give you an example. You used to be able to buy a piece of land and make a living on it as a rancher or a farmer. Today that's very difficult. As a result, most people who buy rural land in Texas today are not doing it for the purpose of making a living. The single greatest motivation for purchasing blocks of land in Texas today is recreation. Thus the value of that property has gone way up while its productive value has gone down, making it impossible for a farmer or rancher to borrow money to buy land and repay it through traditional economic activity.

This shift has brought operational changes to the rural landscape. Most land purchases in the decade of the 1990s were by absentee owners, people who aren't even there most of the time. They live in other places and go out to the rural landscape to play because they can afford it. The greatest single impact has been taxation. As you have already heard today, when families face estate taxes, all too often the land is sold to pay off those taxes, and that is the greatest single cause of fragmentation in our state. The trends are clear. Although 81 percent of the land is still owned by 23 percent of the people, that is changing as more and more people buy smaller and smaller tracts of land. The smallest tracts of land today are in East Texas, but the pattern is moving westward, constrained only by the lack of water. We think of Texas as the land of wide-open spaces. But if you look at Texas east of I-35, the average size of a tract of land in most of those counties is less than 20 acres. In many counties in

Texas, the average size of a tract of land is less than ten acres and that increases as you go farther east.

As I mentioned, recreation is the chief motive for the purchase of land today, and settlement of estates is the chief motive for the sale of land today. So what should we do? Well, there are two approaches. One involves private land and one involves public land, in my view. As I mentioned, our greatest single objective should be to try to keep families on ancestral land. People who live on rural lands love it and have generally been good stewards. They must be helped to stay on that land and to continue to take care of it in the future. I have made what passes for a career out of the purchase of land for public ownership and nonprofit ownership. But if the Legislature gave the Texas Parks and Wildlife Department the state's entire annual budget to buy land, it would change that ratio of public and private ownership by only one or two percent.

If we're going to take care of the land in the future in our state, we must enable private landowners to do most of the job. How do we do this? Well, as mentioned earlier, in the middle of the last decade Texas approved a constitutional amendment that allows recreational landowners, or people who manage land simply for its native species and wildlife, to gain the same advantages as agricultural tax valuation. That is, their property taxes are lower than their own land, which is held for other purposes. The execution of Proposition 11 is still being worked out. There are arguments about how large a tract should be in order to qualify. Should it be allowed in a subdivision or is it primarily set up for rural ownership? These issues will be resolved, but in Texas today you may gain a property tax advantage by managing your property for ecological purposes, and that should be continued.

We need to look at subsidies both ways. We subsidize fragmentation in Texas. At the risk of offending some in the room, one of the things that we do in our state is provide veterans almost interest-free loans to buy property with. So we've got counties today like Lampasas County, which has 200 subdivisions, most of which are financed through the Veterans Land Program. I'm not arguing for it or against it. I'm just telling you that some public policies encourage the fragmentation of property. If we've paid over the years subsidies to folks for commodities like sugar and mohair and cotton, why should we not provide financial incentives for landowners to do things like taking noxious brush off the property or reestablishing native habitat, particularly grasses. There is perhaps no greater incentive to help private landowners solve the state's daunting water problems than to give them the tools and even financial incentive to clear invasive brush off private property. Once again, when I look out there and see Mrs. Johnson, I think of the Texas Hill Country and how the Edwards Plateau, which had been a wonderful savannah of grass that grew as high as the stirrups, disappeared after the Civil War and was completely replaced by cedar—in 30 years. If we could restore a good part of

that countryside back to grassland, we would solve a whole lot of the water problems of Central Texas, and that would certainly be worth public subsidy.

We need to increase our technical guidance to landowners. The Texas Parks and Wildlife Department has a program whereby we provide a kind of extension assistance for wildlife and habitat management on private property. But it takes from six months to a year before one of the biologists will come out to see you because the demand is so great and there aren't enough of them to do the job.

Landowners are looking for technical assistance in how to manage their property better. We need to look at cooperatives. When I first met Dr. Huey, I was introduced to a place called Mill Creek Bottom, which is east of here toward Houston. It's a wonderful, fairly large piece of native blackland prairie. It was essentially being managed collectively by a group of German descendants who have been there for 150 years. As a group, they manage property that has separate owners. Across the state more and more cooperatives are forming to manage plants and animals that transcend property lines and political subdivisions. Today in Texas, as our tract sizes get smaller and smaller, one of the most provocative things that is happening to the landscape is for a group of landowners to manage property collectively. Each landowner may own an average of 50 acres, but as a group that collectively owns 250 acres or even 1,000 acres, they can manage that property together so that they can reach common goals and preserve much more land than they would be able to do individually.

We have to keep hammering away at this estate tax issue. I hope the changing economics in our country will not sway the Congress from continuing to look toward a time when estate taxes are gone. If we can't do that, then we should find ways to provide state tax relief for conservation benefits, such as conservation easements or other long-term preservation commitments to open space and habitat protection on private property.

We must begin in this state a program that allows us to purchase development rights from private landowners. You would be intrigued to hear about a project going on in Gunnison Valley of Colorado where private landowners have been pressed to the wall by economics but essentially do not want to leave their property. These are traditional rural ranching and agricultural interests.

Their children are gone, usually living outside the state, and do not want to manage the property. The remaining families have been able to sell the development rights to their property, stay on the land, and continue to do what they've been doing for 150 years—but with the new infusion of income to provide pension funds for themselves or trust funds for their children so they can gain the same economic benefits that people in other business are routinely able to do.

Having said that the future of land conservation is in private hands, do not let me leave the room without emphasizing that we must also con-

tinue the public acquisition of land in our state. Texas is 50th among all the states in the amount of parkland that it provides for its citizens. And make no mistake—this is not just an issue of esthetics or natural history. It is an economic issue. If Texas expects to compete in the world economy in the years to come, it must provide the kind of outdoor opportunities that competitive states are routinely providing. Think of all those young engineers we're trying to attract from Stanford and MIT and other places—they expect to have a place to take their families and spend time outdoors. The last time Texas passed a bond issue for the acquisition of natural and historic properties was when John Connally was governor. The last time Texas passed a bond issue for the acquisition of property for conservation was when John Connally was the governor of our state. We must readdress that issue if we're going to go forward in the 21st century. Much has been said this morning about regional cooperation, and I believe this should be one of the most important concepts that we take away from here.

“Regional” does not only mean government; it means private cooperation like those cooperatives we talked about. It means cooperation like that of the 39 existing land trusts in Texas that Ms. Hershey talked about this morning. But it also means projects like one along Bray's Bayou in Harris County where multiple jurisdictions—county, cities, state agencies—are all working together to preserve a linear corridor through the metropolitan area that is probably 22 miles long. It means finding ways for Dallas County and Tarrant County to get together and figure out a way to preserve the remaining riparian habitat along the Trinity River and through those metropolitan areas. We have to find a way to enable regional entities to work together—those conservation problems in urban areas that we've talked about so much today are not necessarily the business of the state or the federal government, but they are often beyond the capabilities of individual local governments.

We have to find ways to encourage them to work together. Why do we have such difficulty in Texas in purchasing property? Why is it considered such a bad thing to buy land for our people? Well, there are several legitimate obstacles that we have to overcome. The first is the capital costs. And every day the cost of an acre of land in Texas increases, so this is a formidable obstacle. This morning David Schmidly told you that, according to the recommendation of his report, Texas is going to need another 1.4 million acres of parkland in the next 30 years. It doesn't take a rocket scientist to figure out what this is going to cost, and it won't be cheap. So there is a legitimate and serious cost associated with the capital acquisition of that property.

Second, every time the state buys a piece of land in rural Texas, it comes off the property tax rolls in that region, and this causes a burden on those residents, particularly at the county level. Now, it's true, in almost every case, that when a large and attractive public park is estab-

lished in a rural area, the economy of that area is improved. But this comes from the increased sales tax, which doesn't help a county that derives its revenue from property taxes. The Nature Conservancy has done a fabulous job in Texas of understanding that issue and now pays property taxes when it acquires property. The Parks and Wildlife Department, for its last several acquisitions, one of the most important of which Mr. Noonan here at the dais helped us execute, creates endowments that are used to pay the property taxes in those counties. So as long as we are so heavily dependent at the local level on property taxes, we have to be sensitive to the fact that taking property off the tax rolls can have an adverse impact on rural communities.

Finally, when a public entity, whether it's a county or a city or state government, buys a piece of property, it's not only a wonderful gift to the future but a management liability as well. It takes people to operate property, as you know if you own a ranch or a farm. So we have to be sensitive to the fact that when we acquire public property, we take on a liability that we have to foresee at the time that we take this action. What are the consequences if we don't find ways to strengthen private landowners and increase our public acquisitions?

Well, first of all, we're going to threaten several billion-dollar industries. Hunting in Texas today is a \$1 billion industry. And it is entirely dependent on maintaining this wonderful wildlife habitat that we have throughout our state.

Texas is the top bird-watching destination in the world, another \$1 billion industry. It is totally dependent on healthy, diverse wildlife habitat. Recreation and tourism in Texas is a \$25 billion industry, and it is based on the private properties with quality habitat that people can visit and the great parks and historic sites across Texas that people love to go see.

If we can't figure out a way to save the landscape, another consequence is that we're going to jeopardize the water supply. The largest block of public lands in Texas is owned by the General Land Office. You probably wouldn't think of it, but the largest block of public land in Texas is the submerged lands of the bays and estuaries along the coast. They are analogous in our state to the federal lands in Nevada, California, Colorado, and Idaho. Our public lands in the bays and estuaries contribute enormously to our economy and our quality of life. Billions and billions of dollars are generated in those estuaries—from commercial fishing, from sport fishing, from outdoor recreation of all kinds—and they are totally dependent on the continued flow of fresh water down along our rivers to those bays and estuaries.

I know that a number of people here today have read Aldo Leopold many times. I encourage you to go back and read the chapter in which Leopold describes canoeing in the northern reaches of the Gulf of California with his brother back in the 1920s. Each day they saw more ducks and geese and muskrats and shorebirds than you could imagine. They

caught more fish than they could eat. They had a spectacular hunting experience. It's a wonderful description of one of nature's most rich and diverse places, and today it is dead and gone because there is no more fresh water traveling down the Colorado River to the Gulf of California.

We face a similar situation in Texas everywhere below Bay City and we must find a way to provide water for growing industry, for residential use, and for agriculture, but also for our bays and estuaries.

We're going to see some terrible user conflicts. Today there are fights over our riverbeds between people who want to drive vehicles down our rivers and those who want to use them only for passive recreation. There are so few places left to go that those areas open to the public are becoming battlegrounds between different types of users. But the most important thing we'll lose is the opportunity for our children to gain that sense of place. About ten years ago we took a group of children from East Austin canoeing on the Lampasas River. Many of these African-American kids had never seen a canoe. Most of them had never been out of East Austin, and when they got into those boats, they were very uncertain. But by the end of the day, you would have thought they had been in those canoes all of their lives. At the end of the trip, we stopped at a sandbar to take the canoes out of the river, and one of the adult leaders began skipping rocks. The children squealed, and it became apparent that none of them had ever seen anyone skip a rock. So we spent the rest of the afternoon teaching them to skip rocks. That night, after we finished up the dishes, the adult leaders gathered around the campfire telling stories, but the children were back down on the river in the pitch-black dark skipping rocks.

It's good for our economy. It's good for our quality of life. But it's absolutely crucial that we give our children the kind of heritage that we have all enjoyed.



# AMERICA THE BEAUTIFUL

---

JESSICA CATTO\*

**T**hank you very much. This erudite and eloquent panel consists of people who have accomplished and are accomplishing extraordinary and amazing acts of rescue in land and water conservation and restoration of ecosystems all over our America the Beautiful. I'm so glad that we are all here to share in this discussion and to hear what we can do to help with this process.

We have just heard that the Texas landscape in some ways has improved. Well, we can help keep that improvement going, and a big tool in that process is the conservation easement. To my left is Pat Noonan, the supercharged chairman of the Conservation Fund, an organization that has now saved some three and a half million acres and a mastermind of the conservation easement.

Next is William DeBuys, an elusive and evocative writer about water issues in the West and a builder of innovative coalitions to preserve land.

Melinda Taylor, a keen-minded attorney who is the program manager of Ecosystem Restoration for Environmental Defense.

And Larry Selzer, the mastermind who trains the people in the complex business of structuring land conservation transactions and heads Sustainable Programs for the Conservation Fund.

Their feats of creativity and innovation are more often than not worked out at the grassroots level. The power of these coalitions—the rancher with the environmentalist, the local land trust with city and county officials, and advocacy groups such as the Conservation Fund and the American Farmland Trust with the federal government—has resulted in phenomenal progress, as you soon will hear.

These new coalitions have worked over the years out of a critical need to solve—at a local level—water and land problems brought on by increasing populations, increased demand on resources, and climate changes. And you would be surprised at who has joined forces with whom in this problem-solving mode.

Remember the musical *Oklahoma*? Indeed, the cowboy and the farmer

---

\* Jessica Catto is vice chairman of Environmental Defense and serves on the boards of the Conservation Fund and the National Parks Conservation Association.

can be friends. A recent story in the *New York Times* on these confederations quoted a Colorado rancher as saying, "When you have a place like this, you want to honor and celebrate it. Landscapes have memories."

In order to protect open space and wildlife habitat, many communities have gone so far as to dedicate local taxes to support conservation easements. In these days of threat and uncertainty, we have turned to our love of country, of family and friends, and of our freedom as core values, our pride in the value and valor of our fellow Americans.

It's not surprising that our hearts and minds have turned to thinking about what we value most. And high on that list are still our purple mountains, fruited plains, and shining seas. In this time of change, these icons remain unchanged and profoundly comforting.

As a country, we have a traditional reverence for our land, for clean air and clean water. These are part of our value system and key elements for which we are willing to do battle.

If you add up all the people across the country who work on regional and local land trusts—and there are over 1,400 land trusts across this country, environmental advocacy groups such as Environmental Defense, groups that support federal lands such as the National Parks Conservation Association—you are talking about, at the very least, some nine million people. Now, that's a whole lot of grassroots. And a whole lot of political clout.

They are nationwide. These are not little old ladies in tennis shoes. They are from different political parties, religions, colors, genders, and a whole lot of them are young, dedicated, and smart. In other words, this is a serious and forward-thinking grassroots power to be treated with respect, not only for their political power but for their commitment to the health and beauty of their country.

Mrs. Johnson comes to mind here, and I'd like to thank her for her vision and determination, which gave this movement nationwide scope and depth. Her leadership has been and is still key to so many of the alliances we are forging today. She has always been a role model for us, both in and out of the White House.

So with these thoughts in our mind, let's begin our discussion of how to protect our country here at home, truly a part of our own grassroots homeland security.

Robert Breunig spoke of the danger of seeing the land just as a commodity. He's right. When we begin to see us humans as part of a web, a schema, not just as a stand-alone entity, we stop seeing a commodity and start seeing a mutual support system. Our perspective then shifts from quick profit to long-term profit and from instant gratification to gratifying husbandry.

What I'd like to do is outline a few rules of engagement, as it were: each panelist will speak for approximately 15 minutes and then we will have either a brief roundtable or discussions with all of you.

Let's start off with Bill DeBuys. Bill begins his book *Salt Dreams* with the statement that America is the only country with a national dream. That probably explains why we are all here today. Bill has his own dreams—one has become incarnate in the form of the Conservation Fund's Valle Grande Grass Bank, and another in the Valles Caldera Natural Preserve in New Mexico. It is a beautiful place on a high plain with petroglyphs scratched into the rocks, and it represents an experiment in which ranchers and environmentalists are now all partners in preserving the integrity of that land for grazing. Bill is now going to tell us about a cooperative and comprehensive management plan for almost 100,000 acres of ranchland that would otherwise see its stark beauty leached away over the years, bulldozer by bulldozer.

WILLIAM E. DEBUYS JR.\*

I would like to speak from the point of view of public lands and, specifically, public lands in New Mexico, emphasizing two experiments in land management that are applying some of the ideas that have already been presented at this meeting. One experiment is the Valle Grande Grass Bank, and the other is the management of the Valles Caldera National Preserve.

I want to look at these two experiments in terms of three conditions. The first condition is kind of an inversion of Tip O'Neill's advice. He said, "All politics are local." Turning that around, you get "All localities are political." And indeed they are with regard to environmental matters today. In the bad old days, the good old boys did pretty much anything they wanted to do, but today our environmental laws afford the greatest degree of protection that the lands and waters of the United States have ever had. That's the good news.

The bad news is that because the power to veto plans and projects has expanded, the difficulty of launching needed projects is greater than ever. Sometimes good projects get knocked down, just as bad projects do. Often the only way for good projects to advance is through collaboration among multiple parties, which is an essentially political process.

The second condition involves the idea that the land is dynamic, and we've heard a good deal about that today. As an example of how things have changed, let me show you a photograph of the Jornada Experimental Range near Las Cruces, New Mexico, in about 1938. Now, here's the same view in the mid-1980s. These photographs illustrate the succession of a black grama, desert grassland to a shrubland dominated by creosote and mesquite and supporting a negligible amount of its previous grass cover.

You see these kinds of changes in photo pairs from all over New Mexico. In the next photo, taken at Gobernador in the 1940s, near the Jicarilla Apache Reservation in northern New Mexico, you see a large grassland. In this photo from the mid-1980s, the grassland has yielded entirely to sagebrush.

Here is a third pair. The first photograph was taken in 1903 in what is today the Pecos Wilderness of northern New Mexico. Vernon Bailey, about whose work in Texas you have already heard, took this photograph in 1903. The next photograph shows the view in 1999. You can easily note the loss of grassland, the succession of aspen to conifer, and the increasing density of forests generally. These changes have to do with multiple variables such as fire, grazing, and climatic variation, including, as Professor Parmesan pointed out, the rise in atmospheric CO<sub>2</sub>. While it

---

\* William E. DeBuys Jr. chairs the Valles Caldera Trust in New Mexico and directs the Conservation Fund's Valle Grande Grass Bank.

is not possible to tease apart the specific effects of each of these factors, we can discern the main currents of change.

Those changes represent the story of a highly dynamic landscape. We have to learn to work with that dynamism.

The third condition shaping the environment for public land conservation these days concerns the terrific pressures eroding the viability of working landscapes.

You heard Professor Schmidly explain the changing balance of urban versus rural population in Texas. Similar shifts have occurred all over the country. The people who know the land best and who are bound to it have become fewer and fewer. This presents a serious challenge to the conservation movement in its effort to cultivate an ethic of stewardship for land, even in the midst of rapid social change.

All of these conditions come to bear on the Valle Grande Grass Bank and the Valles Caldera National Preserve.

The Valle Grande Grass Bank is a collaboration. The primary partners are the Conservation Fund, an organization I've been privileged to be associated with for 15 years, the Forest Service, the Northern New Mexico Stockmen's Association, and the New Mexico State University Cooperative Extension Service. All of these groups are equal partners in the steering committee that guides the grass bank toward three goals.

The first goal, which responds to the dynamism of the landscape, is the rehabilitation of large landscapes. We consciously use the word "rehabilitate" and not "restore." As you heard earlier, restoration is about getting back to a specific point in the past. We're not trying to pick a certain point. What we're trying to do is recondition the land to a state in which the keystone processes that shape a landscape can again begin to operate. Generally, the chief process we're working with is fire.

At the same time, we're also trying to address the embattlement of working landscapes. We're trying to strengthen what is probably the oldest ranching tradition in North America, or at least in the coterminous United States—that is, the ranching tradition of Hispanic northern New Mexico.

Our third goal for the grass bank is to create a model of cooperation, demonstrating that environmentalists, ranchers, and agency personnel can work constructively together for the benefit of the land and of the people who depend on it.

Our chief tool is a ranch located an hour southeast of Santa Fe on Rowe Mesa. It is a public land ranch, consisting mainly of the 36,000-acre Valle Grande grazing allotment of Santa Fe National Forest. Our ownership of fee land amounts to only 240 acres, but by acquiring the fee land, we became eligible to acquire the grazing permit for all 36,000 acres within the allotment. We benefit from the long western tradition whereby the private land tail wags the public land dog.

We don't own any cattle. Instead, we bring cows from other grazing allotments throughout the Santa Fe and Carson national forests to our

grazing allotment. In this way, the allotments where those cows ordinarily graze can be rested and rehabilitated, usually through the thinning of overgrown pine, piñon, and mixed conifer stands and through the judicious use of prescribed fire.

There are four aspects to the project. The first involves running the ranch. We have to take good care of people's cattle when they bring them to us, and we have an outstanding range rider, who functions as a range-land plumber as much as a cowboy, to handle daily chores on the ranch. We depend on a 1,300-foot water well, four storage tanks, 30 miles of pipeline, and about 36 drinkers to water the cattle. Maintaining the system is a significant undertaking.

Another aspect of operations is working with the Forest Service to get the land treatments accomplished on the rested allotments.

A third aspect of the project is outreach. We try to spread the word about this kind of collaboration.

The fourth involves our science program. We monitor and measure the ecological changes induced by the fires, the thinning, the road replacements, and other treatments intended to rehabilitate the allotments in our program.

The grass bank has operated for four full grazing seasons. We've worked with 26 ranchers from five allotments. So far, they have all been small operators. Some of them have only eight or nine cows, but they stay in ranching in spite of the economics, not because of them.

And that touches a broad set of cultural issues that we unfortunately do not have time to discuss here today. We have completed at least 15 land treatments of 1,000 acres or more, and we've also provided alternative grazing land for ranchers whose ordinary allotments were devastated by recent fires in New Mexico.

Many other partners are involved in this effort, not just the ones I mentioned earlier. These include the Malpai Borderlands Group, a range of foundations, the EPA, and the New Mexico Environment Department, which provide a lot of the money for the land treatments. We also work closely with another group called the Quivira Coalition, which helps us with our outreach.

At first, given all the suspicion between environmentalists and rural people in northern New Mexico, we were worried about getting ranchers to participate in our program. Now we're worried about getting them to leave. It's been very successful. We continue to have more demand for our services than we can meet.

The idea of grass-banking, meanwhile, has taken on a life of its own. Last summer, an intern who came to us from the Duke School of the Environment surveyed the state of grass-banking throughout the West. She turned up 21 initiatives under way in about 10 states that involved efforts to duplicate this kind of process. This is only after a few years of actual grass-bank experimentation.

We're very pleased with such a high level of interest. We also think that

one of the outcomes of this effort is a change in the background noise of environmental politics, at least in New Mexico. The level of animosity seems to have decreased. So has the degree of ethnic tension. A lot more people are now in dialogue, talking constructively about a lot more things.

But we face terrific challenges if we are to move ahead. The Forest Service is much embattled and has great difficulty in executing the land treatments that are needed. We are trying actively to develop capacity among the ranchers we work with for them to take this project over.

But what we find over and over is that these working people are strapped for time, and they are cut off from the network of foundations and other donors whose support they need. In some cases, they lack the managerial and financial capability to take on this kind of thing.

All this adds up to a need for leadership development and the development of a strong nonprofit sector within rural America. If I could ask for just one thing in the West, it would be for attention to that issue, because that's the stepping-stone that will get us to the kind of land stewardship we need.

In my remaining time, let me turn to the other project that I wanted to mention, the Valles Caldera National Preserve. It consists of 89,000 acres at the center of the Jemez Mountain Range, just west of Los Alamos, New Mexico. The federal government acquired this land on July 25, 2000.

The preserve encompasses a collapsed volcanic field—a caldera—that formed following eruptions about 1.2 million years ago. These eruptions cast out about 360 cubic kilometers of material in a very short time, probably within just a year or two. By comparison, the relatively recent eruption of Mount St. Helens ejected only 2 cubic kilometers of material. The eruption of the Valles Caldera volcanic field was a great geologic event. After casting out so great a volume of material, the field fell in upon itself, creating a great high-altitude basin about 12 miles in diameter, which has since seen the resurgence of smaller volcanic domes within it.

The caldera is a place of astonishing beauty, dominated by high mountain grasslands. It is a singular environment. The tops of certain peaks and other sites within the preserve are sacred to many nearby pueblos. The cultural and religious issues that impinge on the caldera are extraordinary.

It is also a land of great productivity. The previous owners ran about 5,600 head of steers annually on only 89,000 acres. For New Mexico, that's a very high stocking rate.

The preserve has about 30 miles of trout streams and one of the largest elk herds in the United States. In fact, when I visited two weeks ago, during the last hour before sunset our group saw six herds of elk, each herd ranging in size from 300 to 600 animals. As you might imagine, the caldera provides habitat for many trophy bulls. Hunting will be a major activity within the preserve. Winter sports opportunities will also be extraordinary, as will the management challenges.

Let me return briefly to the three conditions I mentioned at the begin-

ning of my remarks. The first was collaboration: the management of the Valles Caldera National Preserve has not been assigned to the Forest Service, or the National Park Service, the BLM, the Fish and Wildlife Service, or any other established agency.

Its management has been assigned to a board of trustees operating a wholly owned federal corporation, the Valles Caldera Trust. One of your leading Texan citizens, Bob Armstrong, is a member of that board, on which I also serve. The legislation establishing the trust specifies that Bob and I and our colleagues be drawn from different backgrounds and areas of expertise. It is fair to say that the Valles Caldera Trust is an explicit experiment in collaboration.

In terms of adapting to the dynamism of the land, we are explicitly experimental. The one federal law from which we are exempted involves national forest planning: we don't have to write a cumbersome ten-year plan.

Instead, we are free to practice adaptive management. Toward that end, our largest investment so far is in biological inventory and monitoring work to provide us the scientific baselines against which we can measure the impact of our activities. This will enable us make adjustments season by season and year by year instead of big overhauls decade by decade.

Third, with regard to the embattlement of rural America, we are charged with continuing to operate the Valles Caldera National Preserve not as a park or national forest or wildlife refuge, but as a working ranch.

Our management program will feature aspects of all those other functions. It will include a lot of recreation, an emphasis on ecological protection, and eventually the production of timber, but throughout everything, it will continue to be a working ranch.

The Valles Caldera Trust is on its way, embarked on its work. We are learning a great deal about the fascinating land we have been charged with tending.

This being a philosophical society, I will end on a philosophical question—a question that has long intrigued me. It is one that Socrates asked of Alcibiades: “Do you assent to what you know?”

We have all learned a great deal today from the outstanding presentations we have heard. We know more now than we did when we came in. But do we assent to it? Can we express then that knowledge in action? That's the challenge we face at the Valles Caldera National Preserve, learning about the place and making the difficult decisions to go forward based on what we know, not just what people, looking on, urge us to do.

And that's the problem that we all face in our various walks of life.



MELINDA E. TAYLOR\*

It's a real pleasure to be here with you all today, and I appreciate being invited.

As a lawyer by training, I've spent much of my career trying to use the law to protect endangered species—those rare plants and animals that have suffered the most as a result of man's rather ingenious ability to manipulate and destroy their habitats.

I've learned an incredible amount over the years about all the various creatures that I've worked to protect and about the various threats that they face. I've found that being a lawyer with only a modest amount of science background can be very fascinating.

I've developed a very profound appreciation of the land and the myriad intricate functions it provides to thousands and thousands of different organisms. I am awed, both by the resilience of the land in responding to and recovering from the huge array of abuses that we heap upon it and, paradoxically, by its fragility and the extent to which humans have been able to alter the landscape—permanently, in some cases—and destroy the ecosystems that occur there.

I work for an environmental organization that spends considerable time, energy, and resources advocating for change. We're dedicated to protecting the rights to clean air and clean water, protecting the land from pesticides, and working for stronger government programs to protect rare species.

I believe that the work we do is very important, and I'm proud of the progress that we have made. A number of once-rare species, like the brown pelican, the osprey, and the bald eagle, have recovered from near-extinction.

Many rivers and streams are cleaner and clearer than they were 25 years ago, and there are actually more forests in the eastern United States today than there were a century ago. But despite these gains, it's become increasingly clear to me and to my colleagues that at least with respect to the protection of biodiversity, we are not going to get there through traditional advocacy alone.

The reason is that in order to protect biodiversity, we're going to have to do more than just influence the government to pass stronger laws. Strong laws are important, but they're just not going to get us there.

We have to fundamentally change, I believe, the way in which people think about land, nature, and all the animals and plants within it. We have to promote what Aldo Leopold referred to as the land ethic. In Leopold's words, a land ethic changes the role of *Homo sapiens* from a conqueror of the land community to a plain member and citizen of it.

---

\* Melinda E. Taylor is senior attorney and program manager for the Ecosystem Restoration Program, Environmental Defense.

I'm going to talk about three things during this presentation. First, I want to give you some information about endangered species in the United States and here in Texas that will give you the context of my work at Environmental Defense.

Second, I want to describe my organization's approach to protecting endangered species. I think we've developed some rather innovative ideas that I enjoy talking about.

Finally, I'll propose some steps that I believe are necessary if we're going to make progress across the state and across the nation in conserving endangered species on a large scale.

So let me start with some background information that will underscore some of the points Professor Schmidly made in his excellent overview of land patterns and land use in Texas.

There is, of course, little doubt that humans have already dramatically reconfigured the American landscape. Today more than 85 percent of the virgin forests in the United States have been logged at one time or another. Of the tallgrass prairies that once existed in the United States, 90 percent have been either plowed under or paved over. And 98 percent of the nation's rivers and streams have been dammed, diverted, or otherwise developed in some form or fashion.

In the process of all this modification, hundreds and hundreds of species have already vanished. Many others have so severely declined that they are considered endangered, and many are just much less plentiful today than they were historically.

The Nature Conservancy estimates that about 1 percent of the original species in the United States have gone extinct, 16 percent are in what they consider to be immediate danger of extinction or elimination, and another 15 percent are considered vulnerable.

Based on the Nature Conservancy's terminology, about one-third of the original historic species occurring in the United States are now a conservation concern. The overwhelming cause of the decline of these species is habitat destruction.

Despite these losses, however, the United States still has a very impressive amount of biodiversity left. There are more than 100,000 native species—freshwater and terrestrial—that have been identified in the United States. That includes about 16,000 ferns, conifers, and flowering plants, 2,500 vertebrates, and 75,000 insects. Those are only the species groups that have actually been counted. The actual number of species in this country is probably several times greater than that.

So there is a huge amount of biodiversity here. There's clearly still a lot left to protect. Of the 100,000 species that have been identified, the Fish and Wildlife Service has listed as threatened or endangered a little over 1,200 species.

Once a species is listed as threatened or endangered by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, it deserves some special protections. Federal agencies are required to take extra pre-

cautions not to harm the species or damage its habitat in undertaking federal actions. Private individuals are also prohibited from doing anything to harm the species or its habitat.

Now, several years ago two of my colleagues at Environmental Defense, Michael Bean and David Wilcove, reviewed the Fish and Wildlife Service's information and the various scientific literature to find out how the agency was doing with protecting endangered species through the federal act.

They arrived at several key conclusions. First, they found that more than one-third of the endangered species in the United States occur exclusively on non-federal land—that is, they occur only on private lands or state-owned lands, not in national parks, national refuges, or other federal properties.

That statistic alone tells you that it's simply impossible to work to protect endangered species in the United States by focusing only on federal lands. Here in Texas that's a moot question anyway. Because so much of our land is privately owned, we of course have to work with private landowners if we are to come anywhere close to protecting the 91 listed species in Texas

Their second finding was that those endangered species occurring only on private lands are declining more than species occurring only on federal lands. Indeed, the contrast is pretty dramatic.

According to Fish and Wildlife Service estimates, 64 percent of the endangered species that occur only on federal lands are considered to be either stable or improving in status. That's not a bad statistic. In contrast, only 19 percent of the species that occur only on private lands are considered to be stable or improving in status.

So a much larger number of species on private lands are declining. There are also a number of species on private lands whose status is unknown for obvious reasons: surveys haven't been done on private lands.

Now, what this information tells us about the federal Endangered Species Act and the other statutes that Congress has passed to protect rare species is that they're simply not working very well on private lands. There are several reasons for this.

First, the Fish and Wildlife Service doesn't have the necessary resources—neither the manpower nor the investigators nor the money—to aggressively enforce the act against private individuals. Second, it's very difficult to make a case.

As a lawyer, I have not been involved in Endangered Species Act prosecutions, but I am knowledgeable about all the case law, and I know it is very difficult to make a case against an individual that harm to an endangered species has occurred.

However, in my view, the main reason that the Endangered Species Act is not working effectively on private lands is that it simply contains no

incentives for private landowners to manage their land in a proactive way.

It's full of prohibitions, full of sticks, full of hammers, full of thousand-nots, but it contains nothing in the way of positive incentives to encourage good habitat management. Now, because many endangered species rely on active management—whether it's prescribed fire or control of alien species like fire ants or zebra mussels—it's not enough to simply refrain from doing harm anyway.

There's a real need for landowners to actively manage their land in a way that will restore, protect, and keep habitats healthy for endangered species. We simply must have the commitment of private landowners to ensure the survival of endangered species in this country.

Now, it's not easy to work on endangered species issues on private lands. Some of the most publicized clashes that we've seen over the last couple of decades have occurred on private property over property rights and potential restrictions on private land use because of endangered species.

Here in Texas in 1990, when the golden-cheeked warbler was listed as an endangered species in the Hill Country, there were literally hundreds of ranchers who were very upset with the Fish and Wildlife Service for that listing. They were worried about being told they couldn't manage for cedar on their property anymore or they couldn't graze in the way they were accustomed to doing.

On the East Coast, the endangered red-cockaded woodpecker has caused problems for years, although some of the conflicts have dissipated recently. But it was for many years considered to be the spotted owl of the East, and timber lot owners with beautiful old-growth stands of longleaf pine were cutting down those stands in order to avoid what they called infestation of red-cockaded woodpeckers.

Then of course the clash between farmers and the government over water rights and irrigated water up in the Klamath River Basin has been in the news recently and is of great note. So clearly an innovative approach is needed.

Over the last five to six years, Environmental Defense and other organizations have been actively involved in looking for new ways of working with private landowners, seeking new approaches to break through some of the ill will that exists between private landowners and the government on the issue of endangered species.

Three years ago Environmental Defense established what we call a landowner conservation assistance program in the Hill Country. It was set up with a rather modest investment of funds from the Meadows Foundation in Dallas, which was the key to helping us get started.

Three years later we have a waiting list of landowners who are anxious to work with us in the Hill Country. What we do is similar to the activities that Bill DeBuys described in New Mexico. We are providing

small grants and technical assistance to landowners who are interested in managing, in this case, for two endangered songbirds—the golden-cheeked warbler and the black-capped vireo.

We pay for things like prescribed fire, oak shinnery management, cedar removal, replanting of oak trees, construction of fences on people's properties so they can use rotational grazing for moving cows out of an area during the nesting season. The degree of interest that we've witnessed has just been overwhelming.

At this point about 35 landowners are participating in the program, and this amounts to about 75,000 acres of land. The only limiting factor is our staff's ability to go out and do site assessments and write management plans for people.

We've learned a lot from this experience, and I want to share some of the things that we think are the most important take-home lessons from this. First, there is a definite demand for information from landowners, especially among these newer landowners.

Andy Sansom talked about this new generation of landowners in Texas who are buying up pieces of family ranches and willing to pay more money for them because they don't depend on the land for revenue and support.

In our case, that's been a blessing because these folks don't need to graze a property heavily in order to make a living. They have the resources and the capacity to step back a bit and enjoy it—either its hunting value, for white-tailed deer or game birds, or just its esthetic value.

So they're interested in working with us and eager for information. They want to learn how to manage the land in a way that will restore endangered species habitat and protect it. And they're very interested in what the landscape would have looked like historically.

Second, we've found that a comparatively small investment of funds can have a dramatic impact. It so happens that the black-capped vireo is fairly easy to manage for. It's not terribly expensive to do a prescribed burn or even to top off cedar or oak shinneries to recreate the sort of brushy habitat that the vireo likes.

By a nice coincidence, white-tailed deer like the same type of habitat that black-capped vireos like. So for these species in particular, the possibility for success stories is there.

Furthermore, you get an enormous bang for the buck in terms of generating good will among landowners. The Texas Parks and Wildlife Department has seen the same thing with technical assistance program.

By being on the land and being available to landowners, you touch first one person and then his neighbors and then that person's neighbors. It becomes a sort of ever-widening circle, if you will, of landowners interested in this sort of species management.

The next step for us is to expand this effort further. We have already formed some very exciting partnerships with groups like the Central

Texas Cattlemen's Association, the Texas Parks and Wildlife Department, the U.S. Fish and Wildlife Service, and the Nature Conservancy. We're interested in partnering with more organizations and trying to establish this program in other parts of the state and, ultimately, other parts of the country. I think there is enormous potential for this kind of work.

Environmental Defense has just received a grant from the Houston Endowment, and I'm excited to say that we're going to have the capacity to expand this program to South Texas for work on the ocelot and the jaguarundi along the Texas-Mexico border. I think that's an incredibly exciting opportunity for us. We're also working with some landowners east of Austin in Bastrop County on habitat restorations for the Houston road.

So on a large scale I believe that the only way to promote Leopold's land ethic is to educate and inform people and to look for the confluence of interests between private landowners and conservationists.

But ultimately we must get across to people the overall ethic and the necessity of respecting all the components of nature. Our experience suggests that there is reason to be optimistic about the possibility of managing for endangered species, especially on rural lands.

The problems associated with urban development are much tougher, however. You can't expect a landowner who has been offered a great sum of money by a real estate developer to turn down such a sale in favor of the rather small incentive that we're able to offer.

But that's where we get back to ethics and the role that advocates have to play, all of us who care about these species and are interested in protecting them on a large scale.

Let me close with this thought: it's imperative that we use all our creative powers to encourage growth and development in ways that are consistent with endangered species management and that will protect the rarest among them.

LAWRENCE A. SELZER\*

**W**ill Rogers, a great cowboy, once said that even if you're on the right track, you'll get run over if you're standing still. For the next few minutes I'd like to spend a little time talking about water and perhaps suggesting some ways that we can keep from getting run over.

But first, a few brief comments about water. The earth is covered in water—97 percent of all water on earth is in the oceans. It's a blue planet when seen from space. But if 97 percent of the water on the planet is salty, that leaves only 3 percent that's fresh. Of that 3 percent, 2 percent is locked up in the polar ice caps, which means that of all the water on earth, only 1 percent is available to us. Now, even with that 1 percent, there's plenty of water on the planet for all the people and all their needs.

The problem is that, in many cases, the water and the people are not in the same place. A second problem is that we do things to the water through our day-to-day activities that pollute it; by polluting it, we lessen the amount available to us.

Let's pick up on some of the themes that we heard earlier today and look at water perhaps in a slightly different way—and perhaps more constructively. Growing populations and changing values continue to place increasing demands on our water resources.

This results in water use management conflicts nationwide, but particularly here in the West, where the population is expected to increase by up to 30 percent over the next 25 years. Agricultural needs are often in direct conflict with urban needs as well as with water demand for endangered species and for recreation and scenic enjoyment.

These are quantity issues. As for quality, we know that most water quality standards are set at the federal level. But most land use decisions that affect water quality are made at the local level.

So what's the result? I would suggest that the result is a mixed bag of successes and failures across the nation with regard to water quality and water quantity. On the plus side, the greatest change clearly came with the passage of the Clean Water Act in 1972, which had the goal of making all waters fishable and swimmable.

Before the passage of the Clean Water Act, the majority of water pollution was from factories and emissions. We call this point source pollution because it came out of a point—a pipe. Pollution got so bad that in 1969 the Cuyahoga River, which flows right through downtown Cleveland, actually caught on fire from all the toxic waste and burned for several days.

---

\* Lawrence A. Selzer is senior vice president of Sustainable Programs for the Conservation Fund.

Since that time we've imposed thousands of regulations affecting emissions from point source discharge, and we've made great strides cleaning up point sources of pollution, virtually eliminating it. In fact, the successes of these regulations led a former administrator of the Environmental Protection Agency to say that, well, all of our waters may not be fishable and swimmable, but at least they are no longer flammable!

So why is it that more than a third of our waters don't yet meet the goals of the Clean Water Act? The answer is directly related to land use. Our day-to-day activities have a direct impact on water quality. The decisions that we make each day with the property we own, the activities that we undertake, affect our water for years to come.

Here are a few examples. Last year Americans improperly dumped 365 million gallons of used motor oil. That's more than 27 times the Exxon-Valdez oil spill. One gallon of motor oil pollutes up to 750,000 gallons of water.

More than 70 million pounds of pesticides are put on lawns and golf courses each year. There are more than 22 million septic systems operating in the United States, discharging about 1 trillion gallons of wastewater annually to soils and groundwater—which is a particularly sobering fact when you realize that 50 percent of all drinking water in the United States is groundwater.

While each of our actions may not seem like much, clearly the cumulative impact is significant. These kinds of dispersed, diffuse sources of pollution, because they don't originate from a single point, are called non-point source pollution.

As Jessica mentioned earlier, nonpoint sources of pollution have received some attention in the last decade. It's a very thorny issue because we're talking about individual behaviors. We're talking about people's backyards, parking lots, and streets, and you simply cannot regulate those areas.

I suggest that the solutions for nonpoint pollution lie in several areas: education, voluntary initiatives, and economic incentives. But we have water quantity challenges as well. Consider these examples. Overpumping of groundwater for agriculture, the single largest user of water in the United States, has caused the land in California's San Joaquin Valley to subside by more than 30 feet in some places, leaving telephone poles suspended in midair, held up only by the high-tension wires. Furthermore, Houston has the dubious distinction of being named the fastest-sinking city in America due to overpumping of groundwater.

Coastal Louisiana, because of climate change, as we heard earlier, and because of channelization of rivers and wetlands, is losing 30 square miles of land each year. The Colorado River, as Andy mentioned, which was once one of the mightiest rivers of the West, has been so diminished by overwithdrawals that it no longer reaches the Gulf of California.

These examples are emblematic of our management—or rather mis-



management—of water. I think essentially you can categorize our management challenges into three broad areas: geopolitics, economics, and education.

From a geopolitical or governance perspective, there's no question about it—we're a mess. There are more than 16 different congressional committees at the federal level and at least four departments in the executive branch that have some jurisdiction over water. States have primacy regarding intrastate issues, and on top of that, land use decisions that have a direct and substantial impact on water are primarily made at the local level.

Topping it all off, however, is the fact that we continue to manage water according to political boundaries rather than natural boundaries. Rivers, lakes, and groundwaters don't care what state they're in. They don't respect political boundaries.

We need to shift from managing water by political boundaries to natural boundaries—what we call watersheds. We need to move to a watershed-based framework if we're going to break through some of the complexity and inefficiency that is currently hard-wired into our system.

Austin offers a great example of how the community, by moving to a watershed approach, has been able to make progress in protecting the Edwards Aquifer. The key step was identifying about 15,000 acres, part of the green infrastructure of this community that is critical to the water recharge in the aquifer.

Another example is the Chesapeake Bay watershed, which includes six states and is home to more than 65 million people. These states, in an unprecedented fashion, have now signed the Chesapeake Bay Compact, which sets numeric targets for land conservation, limits certain types of land use behavior, and allows for regulatory alignment across state boundaries.

From an economic perspective, much of our mismanagement of water can be traced to the fact that it takes 8 gallons to produce a tomato, 15,000 gallons to make a barrel of beer, 39,000 gallons to make a new car, and 300 million gallons of water to produce a single day's supply of newsprint.

We need to rethink the economics of water. Should we pay for water itself, not just the delivery system? Should we be growing rice in the desert? Should 16 million people live in Los Angeles when the Los Angeles Basin receives only enough annual rainfall each year to support 100,000?

With shortages and drought, we are beginning to see changes. We are paying more for water in some areas. As a result, water allocations are changing and water markets are emerging. But these changes can be controversial.

For example, right here in Texas, a project would allow a landowner to pump over 200,000 acre-feet of groundwater a year—that's enough water for one million people—even if it makes surrounding wells go dry.

The local water district, because of Texas water law, cannot stop the project; yet it calculates that this project will reduce the water in a four-county area by 50 percent over the next 100 years. Hearing that reminds me of something Yogi Berra, the great American philosopher, once said, "We were lost but making great time."

Changes in water allocation and the development of water markets present some conservation opportunities, and this is important, for as water is transferred from one place to another or one use to another, there are opportunities to capture water for conservation purposes.

When the L.A. Basin was first being developed early in the 20th century, the power brokers in the water wars had a saying: Water flows uphill toward money. Our challenge is to figure out how to put conservation at the top of that hill.

Education is the third area that we need to focus on. If you ask average Americans where their water comes from, they'll tell you, from the tap. In fact, most people don't know where their water comes from, and they have no idea that their daily actions have a direct impact on the quality and quantity of their water resources.

In a recent survey of the Chesapeake Bay area, 61 percent of the people believed strongly that more needed to be done to protect the bay; yet only 10 percent believed they were part of the problem. We must remedy this problem.

First, people need to learn their watershed address. They need to find out what is going on in their watershed. Second, they need to participate in local decision making regarding water and land use. For example, efforts are under way to develop watershed-sensitive design standards for new developments. There are many examples of local governments that have refused to issue development permits until the developer could prove that the necessary water resources were available before the development started.

Third, people must recognize that they need to protect the land that provides their water, as they are doing here in Austin. But this requires a new level of sophistication regarding the integration of land use and water quality.

It requires new tools and language, new behaviors, new relationships. These are things we do not yet have. We need training, education, and leadership development programs for environmental professionals in public, private, and nonprofit organizations to come together to learn these new skills.

This is beginning to happen. There are now more than 800 watershed organizations around the country, and like land trusts, they are one of the fastest-growing segments of our movement. They're locally based and locally driven and can be enormously effective. Watershed organizations, by definition, are regional and interdisciplinary in nature, so they're ideal vehicles for balancing economic and environmental concerns.

To close, I'd like to quote an old friend who is now the dean of the School of Public Administration at Syracuse University. He said that the role of the public administrator is to make a "mesh" of things.

I suggest that in the future we'll need to look to watershed management to make a mesh of things. We need to link upstream with downstream, surface water with groundwater, and land use with water quality. How can we start?

As I said earlier, we need to learn about water through training and education. We need to shift to a watershed framework for management. We need to price water appropriately. We need to establish water markets to move water to more efficient uses.

Finally, we need to identify and protect the green infrastructure essential for our water resources. Only by refocusing in this way, I believe, will we be able to manage our water resources for future generations, successfully integrating the issues we've heard about today concerning land, land use, and water conservation.

PATRICK F. NOONAN\*

Let me say first that it's a privilege to be here with my colleague, Larry Selzer. It's a special honor to be with some of my Texas conservation heroes—Jessica Catto, Ed Harte, Terry Hershey, young Chris Harte, and, most important, Andy Sansom.

You don't know what a rare individual you all have in Andy Sansom, and I want to thank him for being a very special conservation leader here in Texas and across the nation.

Oliver Wendell Holmes once said that to live fully is to be engaged in the passion of one's time. I submit to you that the passion of our time is land conservation.

For many reasons land has meant a great deal to this country. And after September 11th, I suggest to you that it will mean even more in terms of solitude and recovery. In a recent survey the two most important institutions after those events were our churches and our parks.

In America the challenges before us are substantial for conservation. In my grandchildren's lifetime, the U.S. population may very well double.

I think it's important to understand the history of the environmental movement to understand where we are today and where we're going. I suggest there are three eras in the environmental movement. When we became a nation in 1776, the first 200 years were years of resource exploitation—resources were treated as a commodity. The next era began with Earth Day in 1970, which led to an era of unprecedented environmentalism.

Today the environmental movement has grown to some 10,000 non-profit 501c(3) organizations. There's one coming every day, and they're growing extremely rapidly and, most important, at the grassroots level.

When I began in conservation 30 years ago, we in the environmental field received less than 1 percent of the charitable dollar. Today we receive over 3 percent of the charitable dollar, or, to put it another way, \$6 billion is flowing into those 10,000 organizations. A recent Roper poll of Americans concluded that the top issue in the 21st century will be the environment.

Today I suggest to you we're now moving into a third era for conser-

---

\* Patrick F. Noonan is founder and chairman of the board of the Conservation Fund, a national, nonprofit land and water conservation organization. Through land acquisition, community initiatives, and leadership training, the Conservation Fund and its partners demonstrate sustainable conservation solutions emphasizing the integration of economic and environmental goals. They have conserved over 3.5 million acres across America and are rated A+ by the American Institute of Philanthropy for their low fund-raising costs and effectiveness.

vation—an era of sustainability—and it is this era that I want to talk to you about this afternoon.

We in the Conservation Fund believe that the real opportunities for land conservation in this great land we call America lie with the free enterprise system. They link with private stewardship, as Andy Sansom has suggested.

We need to partner with the greatest motivator the free world has ever known—the free enterprise system. And so what we are about today at the Conservation Fund is working with businesses and entrepreneurs in ways we had never dreamed of before. We are supported by over 250 corporations, along with foundations and individuals. Every day we preserve over 1,000 acres of land. The great majority of that land is not fee ownership; it's easements and working landscapes, and it's done with private capital.

The opportunities to work with the free enterprise system are indeed significant because we have found that haphazard conservation is worse than haphazard development. That's what we've had in this great land we call America—haphazard conservation.

You cannot stop growth, and you cannot stop development. But you can channel growth on those lands that have the carrying capacity and away from lands that we've identified as conservation priorities. In the Chesapeake Bay area where I come from, states have just come together and agreed on a historic compact.

The governors signed a compact, the 2010 compact, to inventory and prioritize all the river watersheds flowing into the Chesapeake Bay—64,000 square miles will be inventoried and prioritized for conservation over the next decade.

We will identify those lands and those watersheds that are critical for conservation, and then we will work with developers to encourage development in targeted areas that have the carrying capacity, those which we have identified for growth.

That is what I call not “smart growth” but “smart conservation.” And in the 21st century this is the kind of thinking we are going to see more of as we attempt to collaborate with the free enterprise system.

One of my overriding concerns in the conservation field is leadership capacity. Do we have the capacity to lead in our field? Because today we are not dealing simply with ecological issues and ecosystem management information systems; rather, we're dealing with business issues.

We're dealing with new drivers for conservation, including Wall Street, tax credits, and joint ventures as we integrate our thinking with the business community.

Recently, the chairman of Du Pont advised that as the CEO of Du Pont, he is the chief *environmental* officer, not the chief executive officer. And more and more corporate executives, from small, medium-size, and large corporations, are embracing conservation as an opportunity for a competitive market advantage in the 21st century.

As you think about the future of conservation in Texas, I would suggest three areas to focus upon.

The first is education—for our youth and for yourself—and becoming engaged as a volunteer in this great land effort of conservation.

The second is good public policy. The farm bill now pending in Congress has tremendous opportunities for cross-compliance, a concept that environmental groups embrace. We are going to support major price supports for farmers and ranchers. In return, we seek cross-compliance for conservation and streamside conservation by easements.

And we will see the largest farm bill in the history of America, in part because the environmental community has embraced the farm bill as a partner with the farmer to get it passed.

The third and perhaps most important area is embracing the idea of new conservation capital with the private sector, including joint ventures with the private sector.

We recently acquired some 300,000 acres for \$80 million in New York, Vermont, and New Hampshire. As the land came on the market, we wanted to protect only a portion. The bid required the buyer to buy all the property, thus we went into the market and we bid against Wall Street firms. We were the successful bidders, paying over \$76 million in cash.

We then created a master plan with conservation groups in the three states, and you know what we found? There was only 100,000 acres that really needed to go into public ownership for parks and wildlife. The great majority—200,000 acres—was better managed by the private market, and that's just what we did. We put the 100,000 acres into parks and wildlife refuges, and we remarketed the 200,000 acres in the private market, subject to conservation easements.

We found willing buyers for the 200,000 acres, and today those lands are back in private ownership and on the tax rolls, providing jobs and tax revenues in those rural communities.

Recently John Hancock came to us representing pension funds and said, "We want to invest in the Chesapeake Bay, and we are concerned about environmental issues in the bay. Would you help us do an environmental scan of a large tract that's just come on the market?" Hancock did not want to own endangered species habitat. So we conducted environmental scans, and we determined that within those 400,000 acres, only about 15 percent really had environmental sensitivity and belonged in conservation.

So we said to John Hancock, "Let's bid together. Let's acquire this property together. You take down the majority of it, the 80 percent that should be in timber production. We'll take down the remaining 20 percent for conservation." We submitted a joint bid and together we were the successful bidders—a remarkable partnership between the Conservation Fund, a national, nonprofit land conservation group, and a private capital investor.

We've taken those lands, the 20 percent, and made them into parks

and wildlife refuges. We could never have made that project possible without private capital, without collaboration and a joint venture.

Today the issue of climate control is very real, and we see a new opportunity for another type of conservation capital for carbon sequestration. We're working with Texaco and American Electric Power, using their cash and their capital to buy lands in Mississippi and Louisiana and then reconvertng those lands into timberlands as carbon banks.

We have formed a partnership to acquire degraded farmlands and replant the lands as tree farms to capture carbon credits.

Again, private capital is employed to achieve conservation objectives through a joint venture. So I would suggest to you, as we move forward in the 21st century and examine how we leverage our time and our capital, that we look to the private sector as an unparalleled opportunity for conservation in the future.

I do believe that landscapes and special places in Texas are very worth preserving. They are fragile and unique, and they are also emblematic of Texas. You have an enormous challenge before you to think collaboratively and encourage private stewardship.

You all know the adage that 1 percent makes things happen, 9 percent watches things happen, and the great majority, 90 percent, says, "What happened?" You are the 1 percent that can make things happen.

A conference like this has never been held, to my knowledge, and I congratulate the organizers, for I believe there is real leadership here to sponsor these forums across America. I can assure you that in every state there are people like you who care about their state and the future of private lands.

I urge you to consider not only the future of land conservation in Texas but also how you can challenge other states for similar conferences across this great land we call America.

# THE FUTURE OF THE LAND

---

## *Discussion*

DR. BREUNIG: What, if any, changes do we need to make culturally in order to address some of the land questions that we raised yesterday?

DR. JACKSON: I think we need to talk about food, and about mobility and connectedness. In both cases, we need to make a very clear, accurate accounting of the real costs of how we eat, and the real costs of mobility and connectivity that we prize so greatly.

Yesterday I talked about some of the real costs of food. Many of them are invisible. You don't see them because they're in another region. We just found out that some chocolate is produced by child slave labor in the Congo. We certainly don't see the pollution in Iowa, and I don't see the pollution that's caused by growing cotton in Texas.

But we need to begin to assume these costs, to take a clear-eyed look at these things and refuse to shove them under the table. I have two recommendations, and I put them in sort of a rude way. The first is, find yourself a farmer; and the second, learn to cook.

Most of you in your generation know how to cook, but my encounters with students and also even a lot of people in my generation tell me that people don't cook anymore. It's very common to eat out at least once a day and have prepared food the rest of the time. And when you do that, you are really cut off from the source of sustenance in a very profound way.

But there are movements to revitalize farmers' markets, as Karen Enyedy is involved in, and that's happening all over the country. There are efforts all over the country to create stronger connections between local food production and people's eating, whether it's in a fancy restaurant like L'Etoile in Madison, Wisconsin, or Chez Panisse in San Francisco, California.

Those fancy restaurants have led the way to more affordable efforts. There is a wonderful, inexpensive restaurant in Waterloo that we go to regularly called Rudy's Taco. And it is not a chichi place. The prices are quite reasonable. He serves organic chicken, locally produced beef, organic pork. All of the beans, rice, and tortillas are locally produced, either right in Iowa or in Wisconsin. The tomatoes are local and pesticide-free all year round. He buys them from a greenhouse nearby. The lettuce in season is also local.



People are recognizing the values of connecting with local farmers and becoming more fully part of the local ecosystem. And that, of course, means that the consumer begins to have leverage. One can say, "Well, did you have to spray your sweet corn this year?" And when they say no, you say, "Well, that's great. I can always cut out a few worms."

The corollary to eating locally is that there is less processing. The food processors that used to be all over—creameries, canneries, and the like—are gone. In order to really begin to eat more locally, we're also going to have to invest in local food processing.

Maybe we can do things differently than we did before. Maybe we don't need to have Mom at home full-time, cooking meat, potatoes, and gravy. Maybe there are other ways to do this that are a little bit more attuned to our current structure of living.

When my husband tells audiences that they should find themselves a farmer, I like to add, you should also find yourself a wife, because eating locally means preparing vegetables and cutting things up and spending time with your food. But this is a very valuable and rewarding activity, and it can keep us out of trouble if we spend time doing basic things.

I think we also need to calculate the real cost of mobility and connectivity. When we talk about the economy growing and all the wonderful things we can do on the Internet, we rarely acknowledge that all of this is on the back of physical infrastructure.

Infrastructure is a real cost of doing business, and in my home state that has meant several highway projects that were planned through prairies and wetlands. Conservationists and nature lovers had to battle the "Department of Single Occupancy Vehicles" to save these places and the rare plants and animals that live there.

I prefer this name because if a state Department of Transportation were really serious, it would be planning for buses and trains and bikes, not just cars and trucks. A big cultural change in our future is to change the way we think about the actual costs of mobility.

And that also goes for connectivity—cell phones and Internet access. These have infrastructure costs that are real. There are right of ways that have to be dug, there are cables that have to be buried, and it's getting crowded out there. There are places where people are having to make some sacrifices in the area of cell phone towers. Communities are finding themselves staring up at a big ugly cell phone tower in their neighborhood.

And so I think that, increasingly, communities are going to have to assess these costs of technology and mobility, along with their benefits, and ask whether this is what they really, really want for now and also for their children. Because that infrastructure lasts a long time.

DR. BREUNIG: Bill, what are the key cultural changes that you think are required in order to forge a new relationship, or perhaps a better relationship, or a different relationship? Or do we need to make any changes at all with respect to our relationship to the land?

DR. JORDAN: Well, that's obviously a big question. But I think it's

interesting to consider it from the perspective provided by the work of ecological restoration.

I pointed out that environmentalism has been very slow to adopt restoration even as a strategy for conservation. But we are doing that now, and I think that bodes extremely well for the future. I think, however, that to really get over the watershed here into a world where we can really think of ourselves as citizens of the land community, we are going to have to come to terms with some things that half a century ago our environmental thinkers consistently overlooked. Leopold wrote that we must learn to think of ourselves as “plain members” of the land community, and I think that’s a good idea insofar as Leopold was trying to emphasize that we are, in fact, *members* of a land community.

But I think there’s a danger in placing too much emphasis on the plainness of our citizenship. For one thing, we aren’t really all that plain. For better or worse, we are peculiar—or at least strikingly distinctive—in certain ways. And for another, *all* species are like that. They are all peculiar and distinctive—different from all other species.

Those differences matter. And they can be troubling—think, for example, of the “difference” between a predator and its prey, and the “political” implications of that.

We talk about diversity and about celebrating differences. But we usually celebrate differences only when they don’t really make a difference—when they don’t hurt, as we do when we paper over the difference between ourselves and other species, telling ourselves that we are just “plain citizens” like all the rest.

I think that in celebrating difference and change, and the prospect of communion, as a writer like Thomas Berry does, we overlook the difficulty and the pain involved in this. And I would say that this is the great challenge for us today—to face up to the fact that communion and beauty and meaning are not easy and natural, but actually require hard cultural and emotional work.

From what little I know of the arts, theology, and anthropology—the disciplines of relationship—there’s no reason to think that these things are easy or that they ever have been. And I think a fundamental assumption of our culture way back, hundreds of years, at least to the Enlightenment, is that it is easy.

There’s an amazing account of this in Aldous Huxley’s *Brave New World*, in which the savage comes to the world controller and says he has been reading an old copy of Shakespeare, and that it’s amazing, wonderful stuff. This is beautiful—tragic and beautiful. Why don’t you do this stuff? he asks. And the world controller says, pityingly, You don’t understand. That’s beauty. We don’t have beauty. We have happiness.

Of course, what Huxley meant by “happiness” in the context of *Brave New World* was a horrible life of emotional convenience, of sexual promiscuity, of shooting up on drugs, of getting everything you wanted.

This idea—that beauty and happiness are antithetical, and that beauty

is a higher value than happiness, and is gained at the expense of happiness—I think is something that we’re going to want to explore. If we don’t, then I think we may not get—or deserve—beauty, or community, but something more like the world controller’s “happiness.” The kind of community and beauty we’re going to have is going to be as different from what those words used to mean—to Shakespeare, to the Australian Aborigines, and the pre-modern people generally—as “cool” in the suburbs is different from “cool” where it begins, in the ghetto, where it was invented, out of a kind of grim necessity, to make your way in the world.

# CONCLUSION

---

ROBERT BREUNIG

The topic of the 2001 proceedings of the Texas Philosophical Society was “The Land.” Speakers were selected to address various issues related to the land. Inspired by the familiar saying that “Texans love their land,” I asked keynote speaker Laura Jackson to address the question “*What does it mean to love the land?*”

During the Sunday summary session I asked our panel of speakers and audience members to address an additional question: *What key cultural changes—if any—are needed if we are to love our land in a way that restores rather than diminishes its health and beauty as well as its ecological well-being?* What follows is a synthesis of comments from that session and my own closing comments on these two questions.

At the start of the summary discussions, speaker Bill Jordan spoke to the issue of cultural changes that could benefit the land. In considering what it means to be, in Aldo Leopold’s words, “a plain citizen of the land community,” Jordan explored the idea that being a “citizen of the land community” is not necessarily “plain” or easy. Jordan observed that it takes hard cultural and emotional work to become a citizen in “communion” with nature, a citizen who values beauty above happiness. “Beauty is a value higher than happiness,” Jordan noted, and one that includes pain as well as pleasure.

I would contend that within such a concept of beauty lies an understanding that the many features and forces of the natural landscape—rock, soils, water, plants, animals, precipitation, fires, floods, and predation—relate to each other as a functional whole. These forces of nature can be harsh, even deadly, but at the same time beautiful in that each plays a part in the whole of creation. This leads to the deeper understanding that what affects one aspect of nature also affects the whole.

In turn this deeper understanding suggests that our culture must learn to value the rest of nature as much as we value ourselves. A cultural change in how we define “community” is needed. We must extend the notion of community to include all life forms that live in the place we inhabit. For if we persist in defining community as only our human community, we will continue to destroy the rest of creation around us—and ultimately threaten our own existence.

Keynote speaker Laura Jackson, in her remarks during the summary discussions, stressed that we must assess the environmental costs of our

technologies, including those of food production, mobility, and connectivity. Jackson suggested that we change our economic culture by adding these costs to the price of goods and services sold. For example, in food production the post-World War II “green revolution”—with its extensive use of synthetic nitrogen fertilizer and pesticides and the widespread clearing and conversion of land, crop cultivation, and drainage of wetlands—costs us heavily in soil erosion, water pollution, and human health. To cite just one result, pollution from croplands and livestock operations carried by the Mississippi River is the primary cause behind an oceanic “dead zone” in the Gulf of Mexico, which now covers 8,000 square miles—an area larger than the state of New Jersey. In mobility and connectivity our technologies bring additional pollution and land fragmentation, also costing much in terms of esthetics. Roads mar and fragment the American landscape and contribute to sprawl. Jackson pressed the issue: At what point do we say the damage is enough? Can we begin to think in terms of consolidating the infrastructure and impacts of technology and connectivity rather than proliferating them? Can we convert the “green revolution” in agriculture into a new revolution based on sustainable growing practices?

During the discussion session member Jerry Supple suggested that ethical investing is yet another required cultural change needed for the preservation of land. We as stockholders are demanding profits at the expense of the environment, Supple pointed out, and until we recognize and correct this, we are contributing to the degradation of our land and environment.

Speaker Parmesan and member Lloyd Lochridge each suggested that our culture should replace an era of conflict between environmentalists and developers with one of communication and compromise. In this shift, those who seek to protect and conserve the land would form relationships and alliances with those who seek to develop it. In this new era, both sides would seek a better understanding of the other’s perspectives and concerns: developers would realize that good environmental policies can be good business, and environmentalists would realize that land preservation becomes more feasible in a strong economy.

The summary discussion session entailed lively comment about the need for public access to natural land and about stewardship of land in public versus private hands. Jackson encouraged us to include rural communities in the picture and to remember that land preservation is not only about preserves and parks for urban dwellers. Public policies that enable people to make a living by owning land and farming it sustainably, or by starting rural businesses rather than sprawling into new suburbs, can also contribute to preservation of open space and environmental quality.

Speakers Parmesan and Sansom agreed with Katherine Smith, Jerry Supple, and others in the audience that land is not necessarily better cared for when it is in the public domain. Some private landholders have proven

to be excellent stewards of the land. However, there was a general consensus that public access to natural areas for coming generations will be key to the preservation of a land ethic. Terry Hershey expressed a concern that Texas is 50th in the nation in parkland per capita.

To ensure a future in which every Texan will have the opportunity to form a meaningful relationship with the land may require some deep changes in our thinking about settlement patterns, perhaps even a new "American Dream." Would it be possible for our culture to move from the American Dream of home ownership on a sizeable plot of land to a new concept that is sometimes referred to as "clustering"? This concept embraces more compact living patterns in exchange for the preservation of a healthy natural landscape with public access to natural areas.

Perhaps the biggest cultural change needed is the simple recognition that we are not in control of nature. While we have exerted great influences upon the forces and cycles of nature, we can now see that we are not in control of the consequences of this influence. For example, widespread use of DDT in the 1950s and 1960s led to one of the first realizations of this fact and nearly cost the extinction of many bird species, including the American bald eagle. More recently, air and thermal pollution are understood to be responsible for a global warming pattern that is predicted to erode biodiversity, diminish crop yields, flood shorelines, and bring about other undesirable outcomes long into the future.

We need to recognize our dependence on a healthy landscape that is ecologically whole. And we need to learn to work with nature rather than in opposition to nature to maintain a healthy landscape. Such a landscape will be diverse, containing the full spectrum of plant and animal species representative of its region. Such a landscape will function to provide clean water, clean air, and the continued accumulation of fertile soil needed for both wildlife and human populations.

The proceedings were marked by a general consensus that the education of children will be key to any cultural changes we desire to effect in support of a genuine love of the land. Children need to learn about place in a very deep way—through a kind of learning that isn't happening today. Just as children learn all the other essential survival skills, such as reading, math, science, and social skills, so too is knowledge of one's own place on earth an essential skill—to know the landscape, its watershed, soils, plants, animals, and the relationships among all these things. For example, because plants form the foundation of life for animals and people, our culture needs to educate our children and all of our citizens about the unique plant heritage of each and every place. It is best to learn these things firsthand, through direct experience. Future generations of Texans, if the current trend of estrangement from the land persists, will have no concept of what a natural landscape is about.

In summary, loving the land is not solely about valuing the land as an economic resource, though that is of course part of why we value it.

Those of us who make our living by farming and ranching or in forestry, mining, and other activities may especially value land for its economic benefits. Beyond this, there is an emotional attachment to the land that leads to a deep concern for its future, for its character, its soil, its water, and all the things that live upon it. This kind of love is rooted in a deep connection to the land, in an intimate knowledge of the land.

How will Texans of the future be able to love the land if it is a land they don't see and have access to, a land they don't walk upon? If we want future generations to love the land as our ancestors did, we will have to take an approach to education and cultural experience that is different from the one our culture is taking today. We will have to find a way to re-instill in ourselves and our children a deep understanding similar to that known to people who lived directly off the land, but also informed by our increased understanding of the biological sciences and ecology.

At the end of the day we must ask ourselves: Can a Texan be a Texan if he or she does not know the land *and* love the land? It is a proposition for all Texans to ponder.

# MEMORIALS

---

## GEORGE L. MACGREGOR 1901-1994

George Lescher MacGregor, born in Little Rock, Arkansas, and raised in Waco, where his father was a lawyer, died at the age of 93 in 1994. He arrived in Dallas in May 1929 to take a sales job at Dallas Power & Light Company, quickly rising through the corporate ranks to become head of industrial sales in only two years. Eighteen years later, he became president of the company. He helped organize Texas Utilities Company in 1947, which ultimately joined DP&L, Texas Electric Service Company, and Texas Power & Light. He became president of Texas Utilities in 1953 and its chairman in 1967. He retired in 1972.

As his business career progressed, MacGregor was active in Dallas civic affairs. He and the late businessman and philanthropist Karl Hoblitzelle guided much of the fund raising that made the University of Texas Southwestern Medical School in Dallas such an important center in the medical world. He became chairman of the Southwestern Medical Foundation (1973-1981). He also served as president and chairman of the Hoblitzelle Foundation (1948-1981). In 1969 the Dallas Hospital Council recognized MacGregor's work with the Dallas Hospital Council Service Award. The medical center established a professorship and distinguished chair in his honor.

He and his late wife, Jean Edge MacGregor, were two of the fourteen founders of St. Michael and All Angels Episcopal Church.

## JACK RUSSELL MAGUIRE 1920-2000

Jack Russell Maguire died at his home in Fredericksburg in 2000. Born in 1920, Maguire became a reporter at the early age of sixteen, graduated from the University of Texas, and went on to a career as an Associated Press reporter, public relations executive, director of the University of Texas Ex-Students Association, director of the Institute of Texan Cultures in San Antonio, and author.

Maguire loved to tell the story of how he got his first job. At age sixteen, he applied for a summer job with the Denison *Herald*. The editor turned him down, but Maguire challenged the editor, saying that he



deserved a reporting job if he could land a front-page story. The editor agreed. Soon after delivering the challenge, Maguire learned through his father, who worked for the Katy Railroad, that President Franklin D. Roosevelt would go through Denison on his way to the Texas Centennial celebration in Dallas. Maguire wrote the president, telling him of the bet and how much he wanted the job and suggesting that if he would stop in Denison and deliver a short speech, the cub reporter would have his story. Roosevelt apparently liked the idea, for he complied. Maguire got his front-page story and launched his career as a journalist.

Maguire also worked as a newscaster for a Sherman radio station and as a reporter for the Denton *Record-Chronicle* before entering North Texas State University (now the University of North Texas) to study journalism. Transferring to the University of Texas, he worked for the old International News Service, then for the Austin bureau of the Associated Press. He was elected editor of the *Daily Texan* and graduated in 1944. He worked at newspapers in Denison and St. Louis, Missouri, before returning to Texas to become editor of the *Katy Magazine*. He later worked as a public relations executive with the Texas & Pacific Railroad before being named public relations director of the Texas Insurance Advisory Association. He resigned that position in 1965 to become director of the University of Texas Ex-Students Association.

Maguire wrote a "Talk of Texas" column for years that appeared in *Texas Highways* as well as several newspapers. He also wrote or co-authored nine books and hundreds of magazine articles, mainly about Texas or railroads. He interviewed every president from Roosevelt to Lyndon B. Johnson.

Maguire married the former Patsy Jean Horton of San Antonio in 1945. Following her death in 1985, he married Ann Roddy, whom he had known during his college years.

R.T.

### H. STANLEY MARCUS

1905-2002

For years Stanley Marcus kept a quote from Goethe under the glass on top of his desk: "Was du ererbt von deinen Vätern hast, Erwirb es, um es zu besitzen" ("What you have inherited from your fathers you must earn in order to possess"). Stanley Marcus did that and much, much more. The fact that he kept that quote near him was a mark of the man he was. In keeping with Goethe's dictum, Stanley Marcus took the retail business he had inherited and made it a name known internationally. He learned of style and grace and elegance from his family, but his impact on Dallas and Texas went far beyond the training he received at the feet of his parents and his aunt and uncle.

Born into the Dallas merchandizing family of Herman Marcus and his sister and her husband, Carrie and Al Neiman, on April 20, 1905, Stanley

literally learned the business on the floor of the store, starting at the age of two playing with empty thread spools. He was schooled in the public schools of Dallas and at the feet of his mother, Minnie Lichtenstein, a Dallas native. He graduated from Harvard in 1925 and continued in graduate studies in business there. He had wanted a career in printing and publishing, but his father convinced him that he needed to make money in the store before he could indulge this interest, so at the age of twenty-one he went home to work as the company's secretary, treasurer, and director.

Stanley Marcus married St. Louis native Mary Cantrell, and they had three children, a daughter Jerrie and twins Wendy and Richard. He took the reins of Neiman Marcus in December of 1950 upon the death of his father. He ran the business according to the credo he had learned from his father, "It's never a good sale for Neiman Marcus unless it's a good buy for the customer," and further transformed Neiman Marcus into an icon of customer service and high-quality merchandise.

In 1938 he created the Neiman Marcus Award for Distinguished Service in the Field of Fashion, which was presented over a period of several decades to designers as diverse as Coco Chanel and Miuccia Prada as well as to individuals such as Grace Kelly and Grace Mirabella, whose personal style and point of view influenced fashion directions. Neiman Marcus was the first retail apparel store outside of New York to advertise in national fashion magazines.

His other innovations for Neiman Marcus were to devise the Fortnight celebrations that for twenty-nine years transformed the downtown store into a fantasy replica of a particular country and offered products unique to that part of the world. In doing so, he made Dallasites and Texans think more globally, and he made the world aware of Neiman Marcus and Dallas and Texas. Fortnight galas brought stars and celebrities and even royalty to Dallas and in the process raised funds for local arts organizations and charities.

In 1960 Mr. Stanley, as he was affectionately known by the store employees, pumped new life into the store's forty-five-year-old catalog by creating the Christmas Book with his brother Edward. The book introduced His and Hers exotic gifts and became world famous for its unusual gift-marketing ideas: His and Hers airplanes, camels, and submarines; white mink cowboy chaps; a black Angus steer delivered anywhere in the world along with a silver roast beef cart.

Among his many awards in fashion and advertising, Marcus received the New York Fashion Designers Annual Award in 1958; the gold medal from the National Retail Merchants Association in 1961; and induction into the Texas Business Hall of Fame in 1984. The American Advertising Federation chose him as only the second retailer to receive its greatest honor, a lifetime achievement award in advertising. He received an honorary doctorate of arts and letters from the University of North Texas in 1983.

In 1975 Stanley Marcus retired as chairman and chief executive offi-

cer of Neiman Marcus and became chairman emeritus. He had not only made the retailing enterprise renowned throughout the world as the epitome of quality, raising the level of taste of all who desire "the better things in life," but also played a key role in developing Dallas into the place it holds today on the world scene. It is impossible to measure the impact he had on Dallas and Texas. He was involved in almost every aspect of cultural life of Dallas, which in turned spilled over into the rest of Texas.

He remained a busy and vibrant public voice, building on a legacy that included challenging censorship in the 1930s and defending long-haired students in the 1960s. A mentor to many, Stanley Marcus stood up against racism and human-rights abuses. In interviews and in a long-running newspaper column, he held forth with customary candor on civic affairs, fashion and retailing, and education, among other issues. He helped found the Dallas Opera and helped save the Dallas Symphony when it was foundering. He was an art collector and connoisseur who defended the right of the Dallas Museum of Art to display controversial works. He served on the board of the Georgia O'Keeffe Museum and Santa Fe's cultural organizations as a great advocate and supporter. He was a supporter of architect Philip Johnson, who changed the skylines of Texas cities. His civic devotion never flagged. He was one of the key figures to take a public stand in an attempt to restore the feeling of community and self-esteem after the assassination of President John F. Kennedy, taking out a full-page ad in the *Dallas Morning News* to do so.

He retained a lifelong love of books and the production of them. In 1928 he was the major force in forming the Book Club of Texas. He was actively supportive of the lively book scene in Dallas and found ways to promote books in Neiman Marcus without having a book department. When Helen Corbitt made the Zodiac Room at Neiman Marcus a renowned restaurant and wrote her cookbooks, Neiman Marcus placed them and other cookbooks in the Epicure Shop and sold thousands of them. Tom Lea's *The Brave Bulls* was featured in the store, as was author Ludwig Bemelmans, creator of the *Madeline* series of children's books. His promotion did not stop at selling books. At the urging of his friend J. Frank Dobie, Marcus collected money from like-minded patrons in Dallas to support Roy Bedichek for a year while he wrote *Adventures with a Texas Naturalist*. For years Marcus sponsored the cocktail party preceding the annual Texas Institute of Letters banquet. He was involved with several projects with the premier Texas typographer, bookmaker, and artist Carl Hertzog, to name just a few of his advocacies of books and authors.

Stanley Marcus started his writing career with articles published in *Fortune*, *Atlantic Monthly*, *Pageant*, and *Reader's Digest*. He wrote his first book, *Minding the Store*, in 1974, followed by *Quest for the Best* in 1979. In later years, the University of North Texas Press reissued both of

those books after publishing collections of his columns from the *Dallas Morning News* in *The Viewpoints of Stanley Marcus: A Ten-Year Perspective* and *Stanley Marcus from A to Z*, the latter edited by Michael Hazel. Marcus co-edited a book, *American Greats*, with Dallas advertising executive Robert Wilson.

He was also an inveterate book collector, a habit begun while he was at Harvard. He told the story of being told by his wife that he had to stop collecting books as they had run out of space. Books were spilling from the bookcases into stacks on the floor, making it difficult to move around the house. Mr. Stanley then cagily thought he could collect miniature books because he could slip four or five of them into his pocket and into the house without being noticed. After the collection reached 1,500, however, she became aware of them, too. He eventually amassed a collection of some 2,500 miniature books. He was also a publisher of miniature books. His *Somesuch Press* is known for the superb typography and high-grade paper in these three-inch-tall books, generally printed in editions of 200–300 copies, often signed by the designer or the publisher or both. They are little jewels of the bookmaker's art. Marcus donated many of his collections to the Dallas Public Library and to Birdwell Library at Southern Methodist University.

After his retirement he began marketing himself as a consulting company that advised on marketing, customer service, and taste. He was highly successful at this enterprise, as he was in everything he did. He went to his office at Crescent Court every day, impeccably dressed in an Oxxford tailored suit, silk tie and handkerchief to match, along with coordinated suspenders, ready for a full day of work. He continued to travel in his consulting business and shopped frequently. When he traveled to cities where there were Neiman Marcus stores, he would always visit them. He loved to go to the stores and just walk the floors. At his book signings in the Neiman Marcus stores, he took a special interest in the employees who lined up, asking them about their department and chatting with them about the store. He delighted in finding second-generation employees whose parents he often remembered.

In his consulting business the genius of Stanley Marcus is perhaps best revealed by the story of his being hired by Jeff Bezos, founder and chief executive officer of Amazon.com, to talk to the organization. Mr. Stanley, ninety-four at the time, arrived to talk to the young people dressed in his usual impeccable Oxxford suit and found himself standing before 300 T-shirt-clad employees. Realizing that he would have a tough time establishing rapport with this audience, he said: "I took off my coat, my necktie and my shirt, down to my T-shirt. And then I said, 'Okay. Let's talk.' I couldn't have planned it better. It broke the ice. I was on stage for two hours."

J. Frank Dobie said of Roy Bedichek when he died, "He left life in the way he had hoped to, without ever having been out of it." Certainly that

and more could be said of H. Stanley Marcus—a marvelous role model for the rest of us. Dallas and the state of Texas would not have been the same without him.

F.B.V.

MARSHALL TERRELL STEVES

1923-2000

Marshall Terrell Steves, a member of a pioneering San Antonio industrial family, died while vacationing in Rome on October 30, 2000.

Marshall was born on February 25, 1923, in San Antonio, the son of Albert and Annie Tobin Bell Steves and one of five brothers. He traced his history back to Juan Curbelo, a member of a small group of Canary Islanders who arrived in San Antonio in 1731. Services were held at St. Mark's Episcopal Church, San Antonio. He was buried at dusk, as he requested, in the cemetery at his family ranch in Comfort, about 40 miles northwest of San Antonio.

His great-great-grandfather, Edward Steves, who immigrated from Germany in 1849, opened a lumber business in San Antonio in 1866 and was important in the city's early development. The business he founded continues to thrive today under the name of Steves and Sons, where Marshall was chairman of the board when he died.

Marshall attended the San Antonio Academy as well as Texas Military Institute and was a fourth-generation attendee of Washington and Lee University. He graduated from the United States Naval Academy, class of 1946. After graduation from the United States Submarine School in New London, Connecticut, he served in submarines for two years prior to his discharge from the U.S. Navy to return to his family business.

In 1948 he married Allierose Patricia Galt in San Antonio. They have three sons, Marshall Terrell Steves Jr., Edward Galt Steves, and Sam Bell Steves II; three daughters-in-law, Jane Williams Steves, Nancy Marchbank Steves, and Sarah Hause Steves; and a goddaughter, Nan Cunningham Watson. Additionally he is survived by six grandchildren, Marshall Terrell Steves III, Lisa Galt Steves, Gloria Galt Steves, Sarah Elizabeth Steves, Sam Bell Steves III, and Lyda Wilomena Emelia Steves.

Along with his commitment to Steves and Sons, Marshall was involved in many aspects of the life of San Antonio. He was president of Hemisfair in 1968, the San Antonio World's Fair, and was an active participant in numerous businesses and social and civic organizations. He was a trustee of Bat Conservation International as well as a trustee and past president of the Admiral Nimitz Foundation. In 1966 he received the Distinguished Service Award from the Sons of the Republic of Texas for meritorious service in preserving the heritage of Texas. He was an active member of the Order of the Alamo, the Texas Cavaliers, the German Club, and a most enthusiastic member of the Philosophical Society of Texas.

Marshall's contributions to the life of the city of San Antonio are legend. He had a fabulous sense of humor, a great desire to give, and a willingness to share with his employees, with his friends, and with frequent visitors to the city. He will be greatly missed by us all.

A. B. D.

MARGARET CLOVER SYMONDS  
1905-1995

Margaret Clover Symonds, one of Houston's most beloved and respected citizens, died October 26, 1995. She was born in Chicago in 1905 and graduated from Northwestern University.

In 1928 Margaret married Gardiner Symonds of Hinsdale, Illinois, which became her home until 1942 when she moved to Corpus Christi with her husband. In 1943 Margaret and her family moved to Houston when her husband became the first president of Tennessee Gas and Transmission Company, later named Tenneco, Inc. Gardiner Symonds was among the country's most admired and respected chief executives in the energy industry.

Margaret was president of the River Oaks Garden Club from 1961 to 1962 and also served as an officer of the Garden Club of America from 1962 to 1978. She was a trustee of Northwestern University, where the conservation laboratory at Deering Library bears her name. She also served on the boards of the Child Welfare League of America, De Pelchin Faith Home, the Houston Symphony Society, the Houston Arboretum and Nature Center, the Bayou Bend Gardens Endowment, and the National Tropical Botanical Garden.

Margaret is survived by three sons, Henry Gardner Symonds Jr., Williston Brandreth Symonds, and Jonathan Taft Symonds, all of Houston, and also one daughter, Mrs. Philippe Bodin of Portland, Oregon. Margaret was buried at the family gravesite at Bronswood Cemetery in Oak Brook, Illinois.

Margaret Symonds was a very beloved member of the Houston community with many friends. She made a great impact upon her adopted city, especially in the area of city beautification and in its cultural life.

J.S.B.

C. G. WHITTEN  
1925-2002

C. G. Whitten, a native of Abilene, died on August 5, 2002. Born April 1, 1925, to C. G. and Eugenia St. Clair Whitten, C. G. graduated from the Abilene public schools, served in the United States Air Corps, and was awarded the Air Medal and six Oak Leaf Clusters. He graduated from Hardin-Simmons University and received a J.D. degree

from the University of Texas. At the time of his death, he was Of Counsel to the law firm of Whitten & Young, P.C., in Abilene.

C. G. was a tireless civic worker, participating in most of the drives and nonprofit organizations in Abilene during his business career. He most recently was chairman of the board of the Grace Museum of Abilene and the Abilene Cultural Affairs Committee. He was a former president of the Abilene Rotary Club, the Abilene Country Club, and Fairway Oaks Country Club. He served on the board of the Abilene Chamber of Commerce, was a former director of the West Central Texas Oil and Gas Association, and was a member and former president of the Abilene Independent School District Board of Education.

Professionally C. G. was active in the legal community of Texas and the nation, serving with the Abilene Bar Association, American Judicature Society, American Bar Association, American Bar Foundation, and Texas Bar Foundation. He served as chairman of the Fellows of the Texas Bar Foundation during the period 1983-1984. He had been a director and member of the Executive Committee of the Board of Directors of Independent Bankshares, Inc., since its inception. He also served as senior vice-president and general counsel of Pittencrieff Communication, Inc. (1992-1997). He was president of the Downtown Improvement Corporation. He also served on the University of Texas Press board of advisors and was chairman of that organization shortly before his death.

Not only was C. G. a civic worker in the various organizations of the state and local community, but he was also widely known as a philanthropist. No one who came to his door in need was turned away. He was a positive force for good, not only in the Abilene community but also to all who knew him. A lifelong Democrat, C.G. was an unrelenting champion of the underdog. He will be missed, but his influence and leadership will be felt for years to come.

W.P.W.

#### DANIEL CALL WILLIAMS

1913-2001

**D**aniel Call Williams of Dallas died on January 16, 2001. He was born in Brenham on February 22, 1913, to Daniel Call Williams Sr. and Harriet Ann Wilkins. Williams graduated from the University of Texas with a B.S. degree in petroleum engineering and worked with Magnolia Petroleum Company from 1935 until 1947. He became the director of Southland Life Insurance Company in 1944, its president and chairman from 1953 to 1984, and chairman of the board of Southland Financial Corporation from 1971 until 1986. Since 1953, Williams had served as a director and officer of every major life insurance industry organization in the country, including the presidencies of the Life Insurers Conference in 1964 and 1965 and of the American Life Convention in 1968 and

1969. He also served as president of the following organizations: Texas Life Convention, Dallas Central Business District Association, Community Arts Fund, Dallas County United Fund, Dallas Zoological Society, and the Greater Dallas Planning Council. He was a principal in the development of Las Colinas.

Williams was National Fund Chairman for the National Board of Governors of the American National Red Cross. He served on the organizing committee for the Cotton Bowl Council, later serving as president and chairman of the board. He served on the boards of the Coordination Board, Texas College and University System; Schreiner Institute, Kerrville; Southwest Center of Advanced Studies, Dallas; Stillman College, Tuscaloosa, Alabama; Texas Commission of Higher Education; and the Board of Regents of the University of Texas System (1969-1981), including the offices of vice-chairman and chairman. He served as chairman of the University of Texas Development Board; chairman of the University of Texas System Chancellor's Council, of which he was a Founder Member; and chairman of the Board of Visitors of the University of Texas M. D. Anderson Cancer Center. He was honored in 1993 as a Distinguished Alumnus of the University of Texas at Austin.

Williams was active in the formation of the Presbyterian Hospital System, serving as chairman of the Presbyterian Hospital of Dallas; Presbyterian Medical Center, Dallas; Presbyterian Healthcare System; and Presbyterian Village North, Inc. He served as an elder of Highland Park Presbyterian Church from 1940 until 1991 as well as elder and elder emeritus of the Park Cities Presbyterian Church from 1991 until his death.



# OFFICERS OF THE SOCIETY

---

*For the Year 2002*

*President*

GEORGE C. WRIGHT

*First Vice-President*

J. SAM MOORE JR.

*Second Vice-President*

ALFRED F. HURLEY

*Secretary*

RON TYLER

*Treasurer*

J. CHRYS DOUGHERTY III

*Directors*

GEORGE C. WRIGHT  
J. SAM MOORE JR.  
ALFRED F. HURLEY  
ELLEN C. TEMPLE  
A. BAKER DUNCAN  
PATRICIA HAYES

WILLIAM P. WRIGHT  
JACK S. BLANTON  
CHARLES C. SPRAGUE  
STEVEN WEINBERG  
WILLIAM D. SEYBOLD  
J. CHRYS DOUGHERTY III

# PAST PRESIDENTS

---

*Mirabeau Buonaparte Lamar	1837-59
*Ira Kendrick Stephens	1936
*Charles Shirley Potts	1937
*Edgar Odell Lovett	1938
*George Bannerman Dealey	1939
*George Waverley Briggs	1940
*William James	1941
*George Alfred Hill Jr.	1942
*Edward Henry Cary	1943
*Edward Randall	1944
*Umphrey Lee	1944
*Eugene Perry Locke	1945
*Louis Herman Hubbard	1946
*Pat Ireland Nixon	1947
*Ima Hogg	1948
*Albert Perley Brogan	1949
*William Lockhart Clayton	1950
*A. Frank Smith	1951
*Ernest Lynn Kurth	1952
*Dudley Kezer Woodward Jr.	1953
*Burke Baker	1954
*Jesse Andrews	1955
*James Pinckney Hart	1956
*Robert Gerald Storey	1957
*Lewis Randolph Bryan Jr.	1958
*W. St. John Garwood	1959
George Crews McGhee	1960
*Harry Hunt Ransom	1961
*Eugene Benjamin Germany	1962
*Rupert Norval Richardson	1963
*Mrs. George Alfred Hill Jr.	1964
*Edward Randall Jr.	1965
*McGruder Ellis Sadler	1966
*William Alexander Kirkland	1967
*Richard Tudor Fleming	1968
*Herbert Pickens Gambrell	1969
*Harris Leon Kempner	1970

---

*Carey Croneis	1971
*Willis McDonald Tate	1972
*Dillon Anderson	1973
*Logan Wilson	1974
*Edward Clark	1975
Thomas Hart Law	1976
*Truman G. Blocker Jr.	1977
Frank E. Vandiver	1978
*Price Daniel	1979
Durwood Fleming	1980
Charles A. LeMaistre	1981
*Abner V. McCall	1982
*Leon Jaworski	1983
Wayne H. Holtzman	1983
Jenkins Garrett	1984
Joe R. Greenhill	1985
William Pettus Hobby	1986
Elsbeth Rostow	1987
John Clifton Caldwell	1988
J. Chrys Dougherty	1989
*Frank McReynolds Wozencraft	1990
William C. Levin	1991
William D. Seybold	1992
Robert Krueger	1993
Steven Weinberg	1994
*William H. Crook	1995
Charles C. Sprague	1996
Jack S. Blanton	1997
William P. Wright Jr.	1998
Patricia Hayes	1999
A. Baker Duncan	2000
Ellen C. Temple	2001

---

\*Deceased

# MEETINGS

---

## *of the Philosophical Society of Texas*

- |   |                             |
|---|-----------------------------|
| 1837 - Founded at Houston,<br>December 5                    | 1965 - Salado               |
| 1840 - Austin, January 29                                   | 1966 - Salado               |
| 1936 - Chartered, January 18                                | 1967 - Arlington            |
| 1936 - Reorganizational meeting,<br>Dallas, December 5      | 1968 - San Antonio          |
| 1937 - Meeting and inaugural<br>banquet, Dallas, January 29 | 1969 - Salado               |
| 1937 - Liendo and Houston,<br>December 4                    | 1970 - Salado               |
| 1938 - Dallas   | 1971 - Nacogdoches          |
| 1939 - Dallas   | 1972 - Dallas               |
| 1940 - San Antonio  | 1973 - Austin (Lakeway Inn) |
| 1941 - Austin   | 1974 - Austin               |
| 1942 - Dallas   | 1975 - Fort Worth           |
| 1943 - Dallas   | 1976 - San Antonio          |
| 1944 - Dallas   | 1977 - Galveston            |
| 1945 - Dallas   | 1978 - Houston              |
| 1946 - Dallas   | 1979 - Austin               |
| 1947 - San Antonio  | 1980 - San Antonio          |
| 1948 - Houston  | 1981 - Dallas               |
| 1949 - Austin   | 1982 - Galveston            |
| 1950 - Houston  | 1983 - Fort Worth           |
| 1951 - Lufkin   | 1984 - Houston              |
| 1952 - College Station                                      | 1985 - College Station      |
| 1953 - Dallas   | 1986 - Austin               |
| 1954 - Austin   | 1987 - Kerrville            |
| 1955 - Nacogdoches  | 1988 - Dallas               |
| 1956 - Austin   | 1989 - San Antonio          |
| 1957 - Dallas   | 1990 - Houston              |
| 1958 - Austin   | 1991 - Galveston            |
| 1959 - San Antonio  | 1992 - Dallas               |
| 1960 - Fort Clark   | 1993 - Laredo               |
| 1961 - Salado   | 1994 - Austin               |
| 1962 - Salado   | 1995 - Corpus Christi       |
| 1963 - Nacogdoches  | 1996 - Dallas               |
| 1964 - Austin   | 1997 - Houston              |
|   | 1998 - Abilene              |
|   | 1999 - Austin               |
|   | 2000 - San Antonio          |
|   | 2001 - Austin               |

# PREAMBLE

---

**W**e the undersigned form ourselves into a society for the collection and diffusion of knowledge—subscribing fully to the opinion of Lord Chancellor Bacon, that “knowledge is power”; we need not here dilate on its importance. The field of our researches is as boundless in its extent and as various in its character as the subjects of knowledge are numberless and diversified. But our object more especially at the present time is to concentrate the efforts of the enlightened and patriotic citizens of Texas, of our distinguished military commanders and travelers,—of our scholars and men of science, of our learned members of the different professions, in the collection and diffusion of correct information regarding the moral and social condition of our country; its finances, statistics and political and military history; its climate, soil and productions; the animals which roam over our broad prairies or swim in our noble streams; the customs, language and history of the aboriginal tribes who hunt or plunder on our borders; the natural curiosities of the country; our mines of untold wealth, and the thousand other topics of interest which our new and rising republic unfolds to the philosopher, the scholar and the man of the world. Texas having fought the battles of liberty, and triumphantly achieved a separate political existence, now thrown upon her internal resources for the permanence of her institutions, moral and political, calls upon all persons to use all their efforts for the increase and diffusion of useful knowledge and sound information; to take measures that she be rightly appreciated abroad, and acquire promptly and fully sustain the high standing to which she is destined among the civilized nations of the world. She calls on her intelligent and patriotic citizens to furnish to the rising generation the means of instruction within our own borders, where our children—to whose charge after all the vestal flame of Texian liberty must be committed—may be indoctrinated in sound principles and imbibe with their education respect for their country’s laws, love of her soil and veneration for her institutions. We have endeavored to respond to this call by the formation of this society, with the hope that if not to us, to our sons and successors it may be given to make the star, the single star of the West, as resplendent for all the acts that adorn civilized life as it is now glorious in military renown. Texas has her captains, let her have her wise men.

# MEMBERS OF THE SOCIETY

---

(AS OF AUGUST 2002)

(NAME OF SPOUSE APPEARS IN PARENTHESES)

- ABOUSSIE, MARILYN (JOHN HAY), chief justice of the Texas Third Court of Appeals, *Austin and San Angelo*
- ALLBRITTON, JOE LEWIS (BARBARA), lawyer; board vice-chairman, Riggs Bank, N.A., *Houston*
- ANDERSON, THOMAS D. (HELEN), lawyer, *Houston*
- ARMSTRONG, ANNE LEGENDRE (TOBIN), former U.S. ambassador to Great Britain; regent, Texas A&M University System, 1997, *Armstrong*
- ARNOLD, DANIEL C. (BEVERLY), private investor, *Houston*
- ASHBY, LYNN COX (DOROTHY), former editor, editorial page, *Houston Post*; member, Houston Philosophical Society; author, columnist, *Houston*
- ATLAS, MORRIS (RITA), lawyer; senior managing partner, Atlas and Hall, *McAllen*
- BAKER, REX G., JR., lawyer, *Houston*
- BARNES, SUSAN J., THE REVEREND, assistant rector, St. Matthew's Episcopal Church, *Austin*
- BARNETT, LYNN (RANDY), director, Abilene Cultural Affairs Council, *Abilene*
- BARROW, THOMAS D. (JANICE), president, T-Bar-X, Ltd., *Houston*
- BASH, FRANK (SUSAN), director, McDonald Observatory, University of Texas at Austin, *Austin*
- BATISTE, JOHN PAUL, executive director, Texas Commission on the Arts, *Austin*
- BELL, PAUL GERVAIS (SUE), retired general contractor, *Houston*
- BENTSEN, LLOYD (BERYL ANN "B.A."), former U.S. senator and U.S. secretary of the treasury, *Houston*

- BLANTON, JACK S., Sr., former chairman, current board member, Houston Endowment, Inc., *Houston*
- BOBBITT, PHILIP C., professor of law, University of Texas at Austin; author, *Austin*
- BOLES, JOHN B. (NANCY), William Pettus Hobby Professor of History, Rice University; managing editor, *Journal of Southern History*, *Houston*
- BOLTON, FRANK C., JR. (JO ANN ETHRIDGE), lawyer; former head of legal department, Mobil Oil Company, *Houston*
- BONJEAN, CHARLES M., Hogg Professor of Sociology and executive director of the Hogg Foundation for Mental Health, University of Texas at Austin, *Austin*
- BRANDT, EDWARD N., JR. (PATRICIA), physician-medical educator; Regents Professor, University of Oklahoma-Health Sciences Center, *Oklahoma City, Oklahoma*
- BREUNIG, ROBERT G. (KAREN ENYEDY), executive director, Lady Bird Johnson Wildflower Center, *Austin*
- BRINKERHOFF, ANN BARBER, chair, UTMB Centennial Commission; Hogg Foundation national advisory board; vice-president, Houston Community College Foundation; chairman emeritus, Liberal Arts Foundation, University of Texas at Austin; chair, Women's Institute, Houston, *Houston*
- BROWN, MICHAEL S. (ALICE), professor of molecular genetics and director, Jonsson Center for Molecular Genetics, University of Texas Southwestern Medical Center; 1985 Nobel laureate in physiology or medicine, *Dallas*
- BROWNELL, BLAINE A. (MARDI), president, Ball State University, *Muncie, Indiana*
- BROYLES, WILLIAM, JR. (ANDREA), author; founding editor, *Texas Monthly*; former editor-in-chief, *Newsweek*; co-creator, *China Beach*; author, *Brothers in Arms*; co-screenwriter, *Apollo 13*; screenwriter, *Cast Away*, *Austin*
- BRYAN, J. P., JR. (MARY JON), CEO, Torch Energy Advisors, Inc.; former president, Texas State Historical Association, *Houston*
- BURNS, CHESTER R. (ANN), James Wade Rockwell Professor of the History of Medicine, University of Texas Medical Branch, *Galveston*
- BUSH, GEORGE W. (LAURA), president of the United States of America, *Washington, D.C.*
- BUSH, LAURA WELCH (GEORGE), first lady of the United States of America; founder of the Texas Book Festival, *Washington, D.C.*
- BUTT, CHARLES C., chairman, HEB, *San Antonio*

- CALDWELL, JOHN CLIFTON (SHIRLEY), rancher; former chairman, Texas Historical Commission; former president, Texas State Historical Association, *Albany*
- CALGAARD, RONALD KEITH (GENIE), chief operating officer, Austin, Calvert and Flavin, Inc.; former president, Trinity University, *San Antonio*
- CAMPBELL, RANDOLPH "MIKE" B. (DIANA SNOW), Regents Professor of History, University of North Texas, *Denton*
- CANTRELL, GREGG (BRENDA), professor of history, University of North Texas, *Denton*
- CAPPER, JOYCE PATE (ROBERT), founder, Abraham Lincoln Appreciation Society; honorary consular, Grand Duchy of Luxembourg; organized first Edna Gladney Auxiliary in 1965; opened Pate Museum of Transportation in Cresson, Texas, *Fort Worth*
- CARLETON, DON E. (SUZANNE), director, Center for American History, University of Texas at Austin, *Austin*
- CARPENTER, ELIZABETH "LIZ," former assistant secretary of education, Washington correspondent, White House press secretary; consultant, Lyndon Baines Johnson Library; author and speaker, *Austin*
- CARSON, RONALD (UTE), Harris L. Kempner Distinguished Professor in the Humanities in Medicine and director of the Institute for the Medical Humanities, University of Texas Medical Branch at Galveston, *Galveston*
- CATTO, HENRY E. (JESSICA), former U.S. ambassador to Great Britain and El Salvador; vice-chairman, Aspen Institute; former vice-chairman, National Public Radio; former director, U.S. Information Agency, *San Antonio*
- CAVAZOS, LAURO F. (PEGGY ANN), former U.S. secretary of education; former president, Texas Tech University and Texas Tech University Health Sciences Center, *Port Aransas*
- CHRISTIAN, GEORGE (JO ANNE), writer and public affairs consultant; former press secretary to President Lyndon B. Johnson, *Austin*
- CIGARROA, JOAQUIN G., JR. (BARBARA), physician, internal medicine and cardiology, *Laredo*
- CLEMENTS, WILLIAM P., JR. (RITA), former governor of Texas; former chairman, SEDCO, Inc.; former U.S. deputy secretary of defense, *Dallas*
- COOK, C. W. W. (FRANCES), company director, former CEO, General Foods Corporation, *Austin*
- CORMIER, RUFUS (YVONNE), attorney and partner in the Houston office of Baker Botts, LLP, *Houston*



- CRAVEN, JUDITH LYNN BERWICK (MORITZ), past president, United Way of the Texas Gulf Coast; regent, University of Texas System, *Houston*
- CRIM, WILLIAM ROBERT (MARGARET), investments, *Kilgore*
- CROOK, MARY ELIZABETH (MARC LEWIS), author; member, Texas Institute of Letters, *Austin*
- CRUTCHER, RONALD A. (BETTY), provost and executive vice-president for academic affairs, Miami University; cellist, *Oxford, Ohio*
- CUNNINGHAM, WILLIAM H. (ISABELLA), former president, University of Texas at Austin; former chancellor, University of Texas System, *Austin*
- CURTIS, GREGORY (TRACY), editor, *Texas Monthly*, 1981-2000; author, *Austin*
- DANIEL, JEAN BALDWIN, former first lady of Texas; author, *Liberty*
- DAVIDSON, CHANDLER (SHARON L. PLUMMER), professor of sociology and political science, Rice University, *Houston*
- DAVIS, D. JACK (GAIL), dean of the School of Visual Arts, University of North Texas, *Denton*
- DEAN, DAVID A. (JEAN), lawyer; former secretary of state, Texas, *Dallas*
- DEBAKEY, MICHAEL E., cardiovascular surgeon; chancellor emeritus, Baylor College of Medicine, *Houston*
- DECHERD, ROBERT W. (MAUREEN), chairman, president, and CEO, Belo Corp., *Dallas*
- DELCO, WILHELMINA (EXALTON), former member, Texas House of Representatives; civic leader; adjunct professor, Community College Leadership Program, University of Texas at Austin; chair, Board of Trustees, Huston-Tillotson College, *Austin*
- DENIUS, FRANKLIN W. (CHARMAINE), lawyer; former president, University of Texas Ex-Students' Association; member, Constitutional Revision Committee; Distinguished Alumnus, University of Texas at Austin; decorated veteran of World War II, *Austin*
- DENMAN, GILBERT M., JR., lawyer, partner, Denman, Franklin & Denman; chairman of the board, Southwest Texas Corporation and Ewing Halsell Foundation, *San Antonio*
- DE WETTER, MARGARET BELDING, artist and poet, *El Paso*
- DICK, JAMES, founder-director, International Festival-Institute at Round Top; concert pianist and teacher, *Round Top*
- DOBIE, DUDLEY R., JR. (SAZA), successor trustee, Clayton Foundation for Research; shareholder, Brorby & Crozier, P.C., *Austin*
- DORN, EDWIN (FRAN), dean of the Lyndon B. Johnson School of Public Affairs, University of Texas at Austin, *Austin*

- DOUGHERTY, J. CHRYS, III, retired attorney; former Honorary French Consul in Austin; former president, State Bar of Texas; former trustee, St. Stephen's Episcopal School, Austin; former trustee, University of Texas Law School Foundation; trustee, Texas Supreme Court Historical Society, The Austin Project; administrative vice-chair, Texas Appleseed, *Austin*
- DOUGHERTY, J. CHRYS, IV (MARY ANN), director of research, Just for the Kids, *Austin*
- DUGGER, RONNIE E. (PATRICIA BLAKE), author, social structure activist, *New York, New York*
- DUNCAN, A. BAKER (SALLY), chairman, Duncan-Smith Investments, Inc., *San Antonio*
- DUNCAN, CHARLES WILLIAM, JR. (ANNE), chairman, Duncan Interests; former secretary, U.S. Energy Department; deputy secretary, U.S. Defense Department; president, Coca-Cola Company; chairman, Rotan Mosle Financial Corp., *Houston*
- DUNCAN, JOHN HOUSE (BRENDA), businessman; chairman, board of trustees, Southwestern University, *Houston*
- EKLAND-OLSON, SHELDON (CAROLYN), executive vice-president and provost, University of Texas at Austin, *Austin*
- ELKINS, JAMES A., JR., trustee, Baylor College of Medicine; trustee, Menil Foundation, *Houston*
- EMANUEL, VICTOR LLOYD, naturalist, founder of Victor Emanuel Nature Tours, *Austin*
- FARABEE, KENNETH RAY (MARY MARGARET), former vice-chancellor and general counsel, University of Texas System; former member, Texas Senate, *Austin*
- FAULKNER, LARRY R. (MARY ANN), president, University of Texas at Austin, *Austin*
- FEHRENBACH, T. R. (LILLIAN), author; historian; former chairman, commissioner emeritus, Texas Historical Commission; former chairman, Texas Antiquities Committee; fellow, Texas State Historical Association, *San Antonio*
- FEIGIN, RALPH D. (JUDITH), president and CEO, Baylor College of Medicine, *Houston*
- FINCH, WILLIAM CARRINGTON (LUCY), retired dean, Vanderbilt Divinity School; former president, Southwestern University, *Nashville, Tennessee*
- FISHER, RICHARD (NANCY), ambassador and deputy U.S. trade represen-

- tative; vice-chair, Overseas Private Investment Corp. (OPIC); former managing partner, Fisher Capital Management; former executive assistant to U.S. secretary of the treasury; adjunct professor, Lyndon B. Johnson School of Public Affairs, University of Texas at Austin; democratic nominee for U.S. Senate, 1994; founder, Dallas Committee on Foreign Relations, *Dallas*
- FLATO, TED (KATY), architect, Lake/Flato, *San Antonio*
- FLAWN, PETER T. (PRISCILLA), president emeritus, University of Texas at Austin, *Austin*
- FLEMING, DURWOOD (LURLYN), former president and chancellor, Southwestern University, *Dallas*
- FLEMING, JON HUGH (CHERYL), educator; consultant; businessman; former president, Texas Wesleyan College; former member, Governor's Select Committee on Public Education, *North Zulch*
- FLOWERS, BETTY SUE (JOHN), director, Lyndon Baines Johnson Presidential Library, *Austin*
- FLY, EVERETT L. (LINDA), landscape architect; architect, *San Antonio*
- FRAZIER, DONALD (SUSAN), professor of history, McMurry University; fellow and executive director, Grady McWhiney Research Foundation, *Abilene*
- FROST, TOM C. (PAT), senior chairman of the board, Frost National Bank, *San Antonio*
- FURGESON, W. ROYAL, JR. (JULI), U.S. district judge, Western District of Texas, Midland Division, *Midland*
- GALBRAITH, JAMES K. (YING TANG), professor, Lyndon B. Johnson School of Public Affairs, University of Texas at Austin, *Austin*
- GALVAN, ISRAEL J. (MARSHA ANN PERLMAN), founder and president of GHG Corp., *League City*
- GALVIN, CHARLES O'NEILL (MARGARET), centennial professor of law, emeritus, Vanderbilt University, Nashville; of counsel, Haynes and Boone, LLP; distinguished professor of law, emeritus, Southern Methodist University, *Dallas*
- GARCIA, JULIET VILLARREAL (OSCAR E.), president, University of Texas at Brownsville and Texas Southmost College, *Brownsville*
- GARNER, BRYAN A. (PAN), author; lecturer; lawyer; president, LawProse, Inc., *Dallas*
- GARRETT, JENKINS (VIRGINIA), lawyer; former member, board of regents, University of Texas System; former chairman, board of trustees, Tarrant County Junior College; distinguished alumnus award, University of Texas at Austin, *Fort Worth*

- GARWOOD, WILLIAM L. (MERLE), judge, U.S. Court of Appeals, Fifth Circuit, *Austin*
- GEORGE, ROGER JAMES, JR. (CHERYL), trial lawyer; founding partner, George & Donaldson, LLP, *Austin*
- GILLIS, MALCOLM (ELIZABETH), president, Rice University, *Houston*
- GOETZMANN, WILLIAM H. (MEWES), Jack S. Blanton Sr. Endowed Chair in History and American Studies, University of Texas at Austin, Pulitzer Prize-winning author, *Austin*
- GOLDSTEIN, JOSEPH L., professor of medicine and molecular genetics, University of Texas Southwest Medical Center; Nobel laureate in medicine or physiology, *Dallas*
- GORDON, WILLIAM EDWIN, distinguished professor emeritus, Rice University; foreign secretary (1986-1990), National Academy of Sciences, *Houston*
- GRANT, JOSEPH M., chairman and CEO, Texas Capital Bancshares, Inc., *Dallas*
- GRAVES, HOWARD DWAYNE (GRACIE), chancellor, Texas A&M University System, *College Station*
- GREENHILL, JOE R. (MARTHA), lawyer; former chief justice, Supreme Court of Texas, *Austin*
- GUEST, WILLIAM F. (AMY), attorney; chairman, American Capitol Insurance Company, *Houston*
- HACKERMAN, NORMAN, former president, Rice University; former president and vice-chancellor, University of Texas at Austin, *Austin*
- HAMILTON, ANN THOMAS, grant officer, Houston Endowment, Inc.; vice-president, Jacob and Terese Hershey Foundation, *Houston*
- HAMM, GEORGE FRANCIS (JANE), president, University of Texas at Tyler Foundation, *Tyler*
- HANNAH, JOHN, JR. (JUDITH GUTHRIE), chief judge, Eastern District of Texas, *Tyler*
- HARDESTY, ROBERT L. (MARY), former president, Southwest Texas State University; former assistant to the president of the United States; former chairman, board of governors, U.S. Postal Service; former vice-chancellor, University of Texas System, *Austin*
- HARGROVE, James W. (MARION), investment counselor; former U.S. ambassador to Australia, *Houston*
- HARRIGAN, STEPHEN MICHAEL (SUE ELLEN), author; contributing editor, *Texas Monthly*, *Austin*
- HARRISON, FRANK, physician; president emeritus, University of Texas

- Health Science Center at San Antonio; former president, University of Texas at Arlington, *Dallas*
- HARTE, CHRISTOPHER M. (KATHERINE STODDARD POPE), investments, *Portland, Maine*
- HARTE, EDWARD HOLMEAD, former publisher, *Corpus Christi Caller-Times, Corpus Christi*
- HARVIN, WILLIAM C. (HELEN), lawyer, *Houston*
- HAY, JESS (BETTY JO), chairman, HCB Enterprises, Inc.; chairman, Texas Foundation for Higher Education; former member, board of regents, University of Texas System, *Dallas*
- HAYES, PATRICIA A., interim president, CEO, Seton Healthcare Network, *Austin*
- HECHT, NATHAN LINCOLN, justice, Supreme Court of Texas, *Austin*
- HERSHEY, TERESE TARLTON "TERRY," civic leader; Houston Parks Board; National Association of Flood Plain Managers Foundation; National Recreation and Park Association; Texas Women's Hall of Fame; former board member, National Audubon Society; Trust for Public Lands; Texas Parks and Wildlife Commission; founder, fellow, advisory board member, Lady Bird Johnson Wildflower Center; Frances K. Hutchison Medal for distinguished service to conservation, Garden Club of America, *Houston*
- HEYER, GEORGE STUART, JR., professor emeritus of the history of doctrine, Austin Presbyterian Theological Seminary, *Austin*
- HIGGINBOTHAM, PATRICK E. (ELIZABETH), judge, U.S. Court of Appeals, Fifth Circuit, *Dallas*
- HILGERS, WILLIAM B., attorney; former chairman, Supreme Court of Texas Grievance Oversight Committee, *Del Valle*
- HILL, JOHN L., JR. (Elizabeth), attorney; former chief justice, Supreme Court of Texas; former attorney general, Texas; former secretary of state, Texas, *Houston*
- HILL, LYDA, president, Hill Development Company and Seven Falls Company, *Dallas*
- HINES, GERALD DOUGLAS (BARBARA), chairman, Hines Interests, *Houston*
- HOBBY, DIANA (WILLIAM), *Houston*
- HOBBY, WILLIAM PETTUS (DIANA), lieutenant governor, Texas, 1973-1991; Radoslav A. Tsanoff Professor, Rice University; Sid Richardson Professor, Lyndon B. Johnson School of Public Affairs, University of Texas at Austin, 1991-1997; chancellor, University of Houston System, 1995-1997, *Houston*

- HOFFMAN, PHILIP GUTHRIE (MARY), president emeritus, University of Houston; former president, Texas Medical Center, Inc., *Houston*
- HOLAND, DOMINGO ALTER (MARA LESSA), investor; president, Liverpool of McAllen and Holand Properties, Inc., *McAllen*
- HOLLAMAN, ELIZABETH E., former head, Trinity Episcopal School; educational consultant; president, Cavalry Consulting, Inc., *Galveston*
- HOLTZMAN, WAYNE H. (JOAN), professor emeritus of psychology and education; special counsel, Hogg Foundation for Mental Health, University of Texas at Austin, *Austin*
- HOOK, HAROLD SWANSON (JOANNE), retired chairman and chief executive, American General Corp.; trustee, Baylor College of Medicine; former national president, Boy Scouts of America; Texas Business Hall of Fame, *Houston*
- HORCHOW, S. ROGER (CAROLYN), founder and former CEO, Horchow Collection; author; theatrical producer, *Dallas*
- HOWE, JOHN P., III, physician; president and CEO, Project Hope, *Washington, D.C.*
- HUBERT, FRANK W. R., chancellor emeritus, Texas A&M University System, *Bryan*
- HUEY, MARY EVELYN (GRIFFIN), president emerita, Texas Woman's University, *Denton*
- HUGHES, VESTER T., JR.; lawyer; partner, Hughes & Luce, *Dallas*
- HURLEY, ALFRED FRANCIS (JOANNA), professor of history, University of North Texas, chancellor emeritus, University of North Texas System, *Denton*
- HUTCHISON, KAY BAILEY (RAY), U.S. senator; former state treasurer, Texas, *Dallas*
- INMAN, BOBBY R. (NANCY), admiral, U.S. Navy (retired); investor, *Austin*
- JACK, JANIS GRAHAM (WILLIAM DAVID), U.S. district judge, *Corpus Christi*
- JAMAIL, JOSEPH D., JR. (LEE), attorney; philanthropist, *Houston*
- JAMES, THOMAS N. (GLEAVES), cardiologist; Professor of Medicine, Professor of Pathology, Inaugural Holder of the Thomas N. and Gleaves T. James Distinguished Chair in Cardiological Sciences, former president, University of Texas Medical Branch at Galveston, *Galveston*
- \*JOHNSON, CLAUDIA TAYLOR "LADY BIRD," *Stonewall*
- JOHNSON, LUCI BAINES (IAN TURPIN), chair, LBJ Holding Company, *Austin*

- JOHNSON, RICHARD J. V. (BELLE), chairman emeritus, *Houston Chronicle, Houston*
- JOHNSTON, MARGUERITE (CHARLES W. BARNES), journalist; author; former columnist and editor, *Houston Post, Houston*
- JORDAN, BRYCE (BARBARA), president emeritus, Pennsylvania State University, *Austin*
- JOSEY, JACK S. (DONNA PEARSON), president, Josey Oil Company; member, board of governors, Rice University; former regent, University of Texas System; president emeritus, Welch Foundation, *Houston*
- JUSTICE, WILLIAM WAYNE (SUE), senior judge, U.S. District Court, Eastern District of Texas; sitting by designation in the Western District of Texas, *Austin*
- \*KAIN, COLLEEN T., retired executive assistant, University of Texas at Austin, *Austin*
- KELLY, DEE J. (JANICE), attorney, *Fort Worth*
- KELSEY, MAVIS PARROTT, SR., retired physician; founder and former chief, Kelsey-Seybold Clinic, *Houston*
- KELTON, ELMER (ANNA), fiction writer, livestock journalist, *San Angelo*
- KEMPNER, HARRIS L., JR. (HETTA), trustee, H. Kempner; president, Kempner Capital Management, Inc., *Galveston*
- KEMPNER, RUTH L., *Galveston*
- KESSLER, JAMES LEE (SHELLEY), rabbi, Temple B'nai Israel; founder and first president, Texas Jewish Historical Society, *Galveston*
- KING, CAROLYN DINEEN, chief judge, U.S. Court of Appeals, Fifth Circuit, *Houston*
- KING, JOHN Q. TAYLOR, SR., chancellor and president emeritus, Huston-Tillotson College; major general, AUS (retired), lieutenant general, Texas State Guard, *Austin*
- KLEBERG, SALLY SEARCY, financial educator, family office manager, *New York and San Antonio*
- KLEIN, MELVYN N. (ANNETTE), managing partner of GKH Partners, L.P.; attorney; adjunct professor, Texas A&M University-Corpus Christi, *Corpus Christi*
- KOZMETSKY, GEORGE (RONYA), professor and administrator, University of Texas at Austin, *Austin*
- KRIER, CYNDI TAYLOR (JOSEPH), former member, Texas Senate; vice-president of Texas government relations, USAA; partner, Vallejo Ranch, *San Antonio*

- KRUEGER, ROBERT "BOB" CHARLES (KATHLEEN), former U.S. ambassador to Botswana; former U.S. senator, congressman, ambassador to Burundi, ambassador-at-large to Mexico; former Texas Railroad commissioner; former vice-provost and dean of Arts and Sciences, Duke University; author; president, Krueger Associates, *New Braunfels*
- LABOON, ROBERT BRUCE (RAMONA), partner, Locke Liddell & Sapp LLP, *Houston*
- LARIVIERE, RICHARD W. (JANIS), dean, College of Liberal Arts, University of Texas at Austin, *Austin*
- LAW, THOMAS HART (JO ANN), lawyer; former member, board of regents, University of Texas System, *Fort Worth*
- LEBERMANN, LOWELL H., JR., chairman, Centex Beverage, Inc., *Austin*
- LEE, AMY FREEMAN, chairman, board of trustees, Wilhelm Schole, Houston; artist; critic; author; lecturer, *San Antonio*
- LEMAISTRE, CHARLES A. (JOYCE), president emeritus, University of Texas System Cancer Center, M. D. Anderson Hospital and Tumor Institute, *San Antonio*
- LEVIN, WILLIAM C., physician; president emeritus and Ashbel Smith Professor, University of Texas Medical Branch at Galveston, *Galveston*
- LIEDTKE, J. HUGH, chairman emeritus, Pennzoil-Quaker State Company; trustee, Rice University, *Houston*
- LINDSEY, JOHN H. (SARA), businessman; art collector; civic leader; former member, board of directors, Museum of Fine Arts; director, Alley Theatre; member, board of regents, Texas A&M University System; former member of the board, U.S. Military Academy at West Point, *Houston*
- LIVINGSTON, WILLIAM S. (LANA), senior vice-president, University of Texas at Austin, *Austin*
- LOCHRIDGE, LLOYD (FRANCES), lawyer; former president, State Bar of Texas; former member, board of governors, American Bar Association, *Austin*
- LOCKE, JOHN PATRICK (RAMONA), president, Locke Holdings, Inc., *Dallas*
- LORD, GROGAN (BETTY), senior chairman, First Texas Bancorp; member, Texas Securities Board; trustee, Southwestern University, *Georgetown*
- LOVE, BEN F. (MARGARET), retired chairman and CEO (1972-1989), Texas Commerce Bank, Houston, and Chase Banks of Texas, *Houston*
- LOW, GILBERT, lawyer, *Beaumont*
- LOWMAN, ALBERT T. (DARLYNE), past president, Texas Folklore Society, Book Club of Texas, Texas State Historical Association; managing partner, Lowman Ranch, Ltd., *San Marcos*



- LUCE, TOM (PAM), lawyer; of counsel, Hughes & Luce, *Dallas*
- McCOMBS, B. J. "RED" (CHARLINE), owner, Minnesota Vikings, *San Antonio*
- McCORQUODALE, ROBIN HUNT; novelist, *Houston*
- McDERMOTT, MARGARET, *Dallas*
- McFADDEN, JOSEPH M., president emeritus, professor of history, University of St. Thomas, *Houston*
- McGHEE, GEORGE CREWS, former U.S. ambassador to West Germany and Turkey, *Middleburg, Vermont*
- McHUGH, M. COLLEEN, partner, Bracewell & Patterson, LLP, *Corpus Christi*
- MACKINTOSH, PRUDENCE M. (JOHN), author; member, Texas Institute of Letters, *Dallas*
- McKNIGHT, JOSEPH WEBB (MIMI), professor, Southern Methodist School of Law; legal historian; law reformer, *Dallas*
- McLAUGHLIN, JOHN MARK (AMY), rancher; lawyer; chairman, Texas State Bank, *San Angelo*
- MACON, JANE (LARRY), attorney, city and trial attorney, City of San Antonio, *San Antonio*
- MADDEN, WALES H., JR. (ABBIE), attorney; former member, board of regents, University of Texas System, *Amarillo*
- MARGO, ADAIR WAKEFIELD (DEE), owner, Adair Margo Gallery; member, Texas Higher Education Coordinating Board; State Advisory Council, Texas Book Festival; chairman, President's Committee on the Arts and Humanities, *El Paso*
- MARGRAVE, JOHN L. (MARY LOU), E. D. Butcher Professor of Chemistry, Rice University; chief scientific officer, HARC; National Academy of Sciences, *Houston*
- MARK, HANS (MARION), professor of aerospace engineering, University of Texas at Austin, *Austin*
- MARSH, GWENDOLYN "WENDY" O. (STANLEY), civic volunteer active in arts and education, *Amarillo*
- MARTIN, JAMES C., associate director for development, Center for American History, University of Texas at Austin; former executive director, San Jacinto Museum of History, Houston, *Austin*
- MARZIO, PETER CORT (FRANCES), director, the Museum of Fine Arts, Houston, *Houston*

- MATTHEWS, KATHLEEN SHIVE, dean, Wiess School of Natural Sciences, Rice University; elected to American Association for the Advancement of Science, *Houston*
- MATTHEWS, JUDY JONES, president, Dodge Jones Foundation, *Abilene*
- MIDDLETON, HARRY J. (MIRIAM), director emeritus, Lyndon Baines Johnson Presidential Library and Museum; executive director, Lyndon Baines Johnson Foundation, *Austin*
- MILLER, CHARLES (BETH), chairman, Meridian National, Inc., *Houston*
- MOORE, J. SAM, JR. (GRETA), retired lawyer; former chairman, Texas Committee for the Humanities; former member, Texas Law Review Association, *El Paso*
- MOSELEY, JOHN DEAN (SARA BERNICE), president emeritus, Austin College; former director, Texas Legislative Council; consultant, *Sherman*
- MOSLE, PAULA MEREDITH (JON), trustee and chairman, Hockaday School; former dean of women, Rice University; former governor, current trustee advisor, Rice University, *Dallas*
- MOUDY, JAMES MATTOX (LUCILLE), chancellor emeritus, Texas Christian University, *Fort Worth*
- MULLINS, CHARLES B. (STELLA), professor of internal medicine, J. Fred Schoellkopf Jr. Chair in Cardiology, University of Texas Southwestern Medical Center, *Dallas*
- MURPHY, EWELL E., JR., lawyer, retired partner, Baker Botts, LLP; distinguished lecturer, University of Houston Law Center, *Houston*
- NATALICIO, DIANA S., president, University of Texas at El Paso; member, Texas Women's Hall of Fame; author, *El Paso*
- NEWTON, JON P. (BETTY SUE), lawyer, *Austin*
- OLSON, LYNDON L., JR. (KAY), former U.S. ambassador to Sweden, *Waco*
- OSBORNE, BURL, publisher emeritus, *Dallas Morning News*, *Dallas*
- PALAIMA, THOMAS G. (CAROLYN), professor of classics, University of Texas at Austin, *Austin*
- PHILLIPS, THOMAS R. (LYN), chief justice, Supreme Court of Texas, *Austin*
- POPE, JACK (ALLENE), former chief justice, Supreme Court of Texas, *Austin*
- POWELL, BOONE (DIANNE), chairman, Ford, Powell & Carson, Architects; fellow, College of Fellows, American Institute of Architects; former

- president, Texas Society of Architects; peer professional, U.S. General Services Administration, *San Antonio*
- PRESSLER, H. PAUL, III (NANCY), justice (retired), Court of Appeals of Texas, Fourteenth Supreme Judicial District, *Houston*
- RAMEY, TOM B., JR. (JILL), lawyer; chief justice, Twelfth Court of Appeals, *Tyler*
- RAMIREZ, MARIO E. (SARAH), physician; past member, board of regents, University of Texas System, vice-president for South Texas/Border Initiatives, University of Texas Health Science Center at San Antonio, *Rio Grande City*
- RANDALL, EDWARD, III (ELLEN), private investor; board of directors, EOG Resources, Inc., Kinder Morgan, Inc., and EcOutlook.com, Inc., *Houston*
- RANDALL, RISHER (FAIRFAX), former senior vice-president and director, American General Investment Corp.; manager, family trusts, investments, and real estate, *Houston*
- REASONER, HARRY MAX (MACEY), lawyer; senior partner, Vinson & Elkins, *Houston*
- REAVLEY, THOMAS M. (FLORENCE), judge, U.S. Court of Appeals, Fifth Circuit, *Austin*
- REYNOLDS, HERBERT H. (JOY), president emeritus, Baylor University, former Air Force/NASA psychologist and neuroscientist, *Waco*
- RHODES, CHARLOTTE W. (ALEC), patron, Shakespeare at Winedale; Chancellor's Council, University of Texas at Austin; Harry Ransom Humanities Research Center Advisory Council, University of Texas at Austin, *Dripping Springs*
- RITER, A. W. "DUB," JR. (BETTY JO), former president, NCNB Texas-Tyler, vice-chairman, board of regents, University of Texas System, *Tyler*
- ROBINSON, MARY LOU, U.S. district judge; former state appellate and trial judge, *Amarillo*
- RODRIGUEZ, EDUARDO ROBERTO, attorney, Rodriguez, Colvin & Chaney, LLP, *Brownsville*
- RODRIGUEZ, RAUL (LORENA), managing director and CEO, North American Development Bank, *San Antonio*
- ROMO, RICARDO (HARRIETT), president, University of Texas at San Antonio, *San Antonio*
- ROSTOW, ELSPETH (WALT), Stiles Professor Emerita, former dean, Lyndon B. Johnson School of Public Affairs, University of Texas at Austin, *Austin*

- ROSTOW, WALT WHITMAN (ELSPETH), Rex G. Baker Professor of Political Economy, emeritus, University of Texas at Austin; former special assistant to Presidents John F. Kennedy and Lyndon B. Johnson, *Austin*
- ROVE, KARL C. (DARBY), senior advisor and assistant to the president of the United States, *Washington, D.C.*
- RUTFORD, ROBERT HOXIE (MARJORIE ANN), Excellence in Education Foundation Chair in Geoscience, University of Texas at Dallas; former president, University of Texas at Dallas; former director, Division of Polar Programs, National Science Foundation; president, Scientific Committee on Antarctic Research, *Richardson*
- SCHRUM, JAKE B. (JANE), president, Southwestern University, *Georgetown*
- SCHWITTERS, ROY F. (KAREN), S. W. Richardson Regents Chair in Physics, University of Texas at Austin; former director, Super Conducting Super Collider, *Austin*
- SCOTT, JENNY LIND PORTER (LAWRENCE E.), poet and educator; former poet laureate of Texas, *Austin* and *Los Angeles, California*
- SELDIN, DONALD W., William Buchanan and University of Texas System Professor of Internal Medicine, University of Texas Southwestern Medical Center, *Dallas*
- SEYBOLD, WILLIAM D. (ADELE), retired surgeon; former director, University of St. Thomas; former chief of surgery and chairman of the executive board, Kelsey-Seybold Clinic, *Dallas*
- SHERMAN, MAX RAY (GENE ALICE), professor and dean emeritus, Lyndon B. Johnson School of Public Affairs, University of Texas at Austin; former president, West Texas State University, *Austin*
- SHILLING, ROY B., JR. (MARGARET), president emeritus, Southwestern University, *Austin*
- SHIVERS, ALLAN "BUD," JR. (ROBIN), chairman, Shivers Group, Inc.; chairman, Seton Fund, *Austin*
- SIBLEY, D. J. (JANE), physician (retired), *Austin*
- SMITH, FRANK C., JR. (KATHERINE), electrical engineer; specialist in data processing and geosciences, *Houston*
- SPIVEY, BROADUS A. (RUTH ANN), past president, State Bar of Texas; shareholder, Spivey & Ainsworth, P.C., *Austin*
- SPRAGUE, CHARLES CAMERON (ALAYNE), president emeritus, University of Texas Health Science Center at Dallas; chairman emeritus, Southwestern Medical Foundation; former dean and professor, Tulane University School of Medicine; chairman, Association of Academic Health Cen-

- ter; president, American Society of Hematology; chairman, Association of American Medical Colleges, *Dallas*
- STALEY, THOMAS (CAROLYN), director, Harry Ransom Humanities Research Center; Harry Ransom Chair of Liberal Arts; professor of English, University of Texas at Austin, *Austin*
- STANLEY, DIANE (PETER VENNEMA), author and illustrator, *Houston*
- STEPHENS, F. L. "STEVE" (POLLYANNA), former chairman, CEO, and co-founder, Town & Country Food Stores, Inc., *San Angelo*
- STOBO, JOHN D. (MARY ANN), president, University of Texas Medical Branch, *Galveston*
- STOREY, CHARLES PORTER (HELEN), lawyer; trustee; former chairman, Southwestern Legal Foundation, *Dallas*
- STOREY, CHARLES PORTER, JR. (GAIL), physician; author; medical director, St. Luke's Episcopal Hospital Palliative Care Service; associate professor of medicine, Baylor College of Medicine, *Houston*
- STRONG, LOUISE CONNALLY (BEEMAN), professor of medical genetics; Sue and Radcliffe Killiam Chair, University of Texas System Cancer Center; Phi Beta Kappa, *Houston*
- SULLIVAN, STEPHEN W. (JANIS), vice-president, newspaper operations, E. W. Scripps Company, *Cincinnati, Ohio*
- SULLIVAN, TERESA A. (DOUG LAYCOCK), vice-president and graduate dean, professor of sociology and law, Cox & Smith Faculty Fellow in Law, University of Texas at Austin, *Austin*
- SUPPLE, JEROME H. (CATHY), president emeritus, Southwest Texas State University, *Seguin*
- SUTTON, JOHN F., JR. (NANCY), A. W. Walker Centennial Chair in Law Emeritus, University of Texas at Austin; former dean, University of Texas Law School; former practicing attorney, San Antonio and San Angelo, *Austin and San Angelo*
- TEMPLE, ELLEN C. (ARTHUR "BUDDY" III), former member and vice-chair, board of regents, University of Texas System; publisher, Ellen C. Temple Publishing, Inc., *Lufkin*
- TEMPLE, LARRY (LOUANN), lawyer; former chairman, Texas Higher Education Coordinating Board, *Austin*
- THOMASSON, CHARLES W. (WILLA), lawyer, *Corpus Christi*
- THOMPSON, JERRY D. (SARA), professor of history, Texas A&M International University, *Laredo*
- TROTTER, BILLY BOB (PEGGY), pathologist; director emeritus, Laboratories of Hendrick Medical Center, *Abilene*

- TROTTI, ROBERT S. (EDNA GRACE), attorney, *Dallas*
- TYLER, RON(NIE) C. (PAULA), director, Texas State Historical Association; professor of history, University of Texas at Austin, *Austin*
- VANDIVER, FRANK EVERSON (RENÉE), director, Mosher Institute for Defense Studies; former president, Texas A&M University; former professor of history, Rice University; former Harmsworth Professor of American History, Oxford, *College Station*
- VENINGA, JAMES F. (CATHERINE WILLIAMS), CEO and campus dean, University of Wisconsin-Marathon County, *Wausau, Wisconsin*
- VICK, FRANCES BRANNEN (ROSS), former director and co-founder, University of North Texas Press; councilor, Texas Institute of Letters and Texas Folklore Society; board, Texas Council for the Humanities, *Dallas*
- WAINERDI, RICHARD E. (ANGELA), president and CEO, Texas Medical Center, *Houston*
- WARNER, DAVID C. (PHYLLIS), professor, Lyndon B. Johnson School of Public Affairs, University of Texas at Austin, *Austin*
- WEDDINGTON, SARAH RAGLE, lawyer; adjunct professor, University of Texas at Austin; former member, Texas House of Representatives; former assistant to the president of the United States; former general counsel, U.S. Department of Agriculture; author, *Austin*
- WEINBERG, LOUISE (STEVEN), professor of law, William B. Bates Chair for the Administration of Justice, University of Texas at Austin, *Austin*
- WEINBERG, STEVEN (LOUISE), Josey-Welch Foundation Chair in Science and Regental Professor, University of Texas at Austin; Nobel Prize in physics; research and publications in physics and astronomy, *Austin*
- WHEELER, JOHN ARCHIBALD (JANETTE), Ashbel Smith Professor Emeritus of Physics; former director, Center of Theoretical Physics, University of Texas at Austin, *Hightstown, New Jersey*
- WHITE, FRED NEWTON, JR. (ROSANNE), professor emeritus of medicine, Scripps Institution of Oceanography, University of California at San Diego, *San Antonio*
- WHITMORE, JON S. (JENNIFER), provost, University of Iowa, *Iowa City, Iowa*
- WHITTENBURG, GEORGE (ANN), lawyer; member, Council of the American Law Institute; Life Fellow, American Bar Foundation, *Amarillo*
- WILDENTHAL, C. KERN (MARGARET), president, University of Texas Southwestern Medical Center, *Dallas*

- WILHELM, MARILYN, founder-director, Wilhelm Schole International; author, *Houston*
- WILSON, ISABEL BROWN (WALLACE S.), board of trustees: Brown Foundation, Houston; Smith College, Northampton, Massachusetts; chairman, Museum of Fine Arts, Houston; board of visitors, University of Texas M.D. Anderson Cancer Center, *Houston*
- WILSON, ROSINE MCFADDIN, historian and author; former president, Texas Historical Foundation; vice-chairman, Texas Historical Commission; president of the board, McFaddin-Ward House Museum; trustee, McFaddin-Ward Foundation; trustee, San Jacinto Museum of History, *Beaumont*
- \*WINFREY, DORMAN HAYWARD (RUTH CAROLYN), former secretary, Philosophical Society of Texas; former director, Texas State Library, *Austin*
- WINTERS, J. SAM (DOROTHY), lawyer, *Austin*
- WISE, WILLIAM A. (MARIE), chairman of the board, president, and chief executive officer of El Paso Corporation, *Houston*
- WITT, ROBERT E. (ANNE), president, University of Texas at Arlington, *Arlington*
- WITTLIFF, WILLIAM DALE (SALLY), typographer and publisher; president, Encino Press; scriptwriter and film producer; councilor, Texas Institute of Letters, *Austin*
- WOLF, STEWART, professor of medicine, Temple University, *Bangor, Pennsylvania*
- WOODRUFF, PAUL (LUCIA), professor of philosophy, University of Texas at Austin; author, *Austin*
- WORSHAM, JOS. IRION (HARRIET), lawyer, Hunton & Williams, *Dallas*
- WRIGHT GEORGE CARLTON (VALERIE), provost and executive vice-president for academic affairs, University of Texas at Arlington, *Arlington*
- WRIGHT, JAMES S. (MARY), architect; senior partner, Page Southerland Page, *Dallas*
- WRIGHT, LAWRENCE GEORGE (ROBERTA), author; staff writer, *The New Yorker*; screenwriter, *Austin*
- WRIGHT, WILLIAM P. "BILL," JR. (ALICE), investments; author, photographer; former chairman, Western Marketing, Inc.; former member, National Council on the Humanities; former chairman, Texas Council for the Humanities; board of managers, School of American Research, Santa Fe; director, National Trust for the Humanities; University of Texas Press Advisory Council; commissioner, Texas Commission on the Arts, *Abilene*

YOUNG, BARNEY T. (SALLY), founding partner, Rain, Harrell, Emery, Young, and Doke; of counsel, Locke, Liddell & Sapp, *Dallas*

ZAFFIRINI, JUDITH (CARLOS), senator for the twenty-first district of Texas; owner, Zaffirini Communications, *Laredo*

\*Life Member

\*\*Honorary Member



# IN MEMORIAM

---

(Date indicates year of *Proceedings* in which memorial is published.)

- SAMUEL HANNA ACHESON (1971)  
NATHAN ADAMS (1966)  
CLAUDE CARROLL ALBRITTON JR.  
(1997)  
JAMES PATTERSON ALEXANDER  
(1948)  
AUGUSTUS C. ALLEN  
WINNIE ALLEN (1985)  
DILLON ANDERSON (1973)  
ROBERT BERNERD ANDERSON  
(1990)  
JESSE ANDREWS (1961)  
MARK EDWIN ANDREWS (1992)  
THOMAS REEVES ARMSTRONG  
JAMES WILLIAM ASTON  
WILLIAM HAWLEY ATWELL (1961)  
KENNETH HAZEN AYNESWORTH  
(1944)  
BURKE BAKER (1964)  
HINES HOLT BAKER  
JAMES ADDISON BAKER (1941)  
JOSEPH BAKER  
KARLE WILSON BAKER (1960)  
WALTER BROWNE BAKER (1968)  
CLINTON STANLEY BANKS (1991)  
EDWARD CHRISTIAN HENRY  
BANTEL (1964)  
EUGENE CAMPBELL BARKER (1956)  
MAGGIE WILKINS HILL BARRY  
(1945)  
WILLIAM BARTHOLOMEW BATES  
(1974)  
DEREK H. R. BARTON (1998)  
WILLIAM JAMES BATTLE (1955)  
WILLIAM BENNETT BEAN (1989)  
HENRY M. BELL JR.  
WARREN SYLVANUS BELLOWS  
(1966)  
HARRY YANDELL BENEDICT (1937)  
JOHN MIRZA BENNETT JR. (1993)
- GEORGE JOHN BETO (1991)  
JOHN HAMILTON BICKETT JR.  
(1947)  
WILLIAM CAMPBELL BINKLEY  
(1970)  
JOHN BIRDSALL  
CHARLES McTYEIRE BISHOP (1949)  
WILLIAM BENNETT BIZZELL (1944)  
JAMES HARVEY BLACK (1958)  
ROBERT LEE BLAFFER (1942)  
TRUMAN G. BLOCKER JR. (1984)  
ROBERT LEE BOBBITT  
MEYER BODANSKY (1941)  
HERBERT EUGENE BOLTON (1953)  
CHARLES PAUL BONER (1979)  
GEORGE W. BONNELL  
JOHN GUTZON de la MOTHE BOR-  
GLUM (1941)  
HOWARD TANEY BOYD (1991)  
PAUL LEWIS BOYNTON (1958)  
EDWARD T. BRANCH  
LEO BREWSTER (1980)  
GEORGE WAVERLEY BRIGGS (1957)  
ALBERT PERLEY BROGAN (1983)  
GEORGE RUFUS BROWN (1983)  
JOHN R. BROWN (1994)  
ANDREW DAVIS BRUCE (1968)  
JAMES PERRY BRYAN (1975)  
LEWIS RANDOLPH BRYAN JR. (1959)  
BOB BULLOCK  
JOHN W. BUNTON  
RICHARD FENNER BURGESS (1945)  
WILLIAM HENRY BURGESS (1946)  
EMMA KYLE BURLESON (1941)  
JOHN HILL BURLESON (1959)  
DAVID G. BURNET  
I. W. BURTON  
GEORGE A. BUTLER (1992)  
JACK L. BUTLER (1990)  
CHARLES PEARRE CABELL (1970)

---

\*As of August 2002

- CLIFTON M. CALDWELL  
 GEORGE CARMACK  
 JOHN WILLIAM CARPENTER  
 EVELYN M. CARRINGTON (1985)  
 PAUL CARRINGTON (1989)  
 H. BAILEY CARROLL (1966)  
 MARY JO CARROLL (1994)  
 EDWARD HENRY CARY (1954)  
 CARLOS EDUARDO CASTAÑEDA  
 (1958)  
 THOMAS JEFFERSON CHAMBERS  
 ASA CRAWFORD CHANDLER (1958)  
 MARION NELSON CHRESTMAN  
 (1948)  
 EDWARD A. CLARK (1992)  
 JOSEPH LYNN CLARK (1969)  
 RANDOLPH LEE CLARK (1993)  
 TOM C. CLARK  
 WILLIAM LOCKHART CLAYTON  
 (1965)  
 THOMAS STONE CLYCE (1946)  
 CLAUDE CARR CODY JR. (1960)  
 HENRY COHEN (1952)  
 HENRY CORNICK COKE JR. (1982)  
 MARVIN KEY COLLIE (1990)  
 JAMES COLLINSWORTH  
 ROGER N. CONGER (1996)  
 JOHN BOWDEN CONNALLY JR.  
 (1994)  
 TOM CONNALLY (1963)  
 ARTHUR BENJAMIN CONNOR  
 JOHN H. COOPER (1993)  
 MILLARD COPE (1963)  
 CLARENCE COTTAM (1974)  
 MARGARET COUSINS (1996)  
 MARTIN McNULTY CRANE (1943)  
 CAREY CRONEIS (1971)  
 WILLIAM H. CROOK (1997)  
 JOSEPH STEPHEN CULLINAN (1937)  
 NINA CULLINAN  
 ROBERT B. CULLOM  
 MINNIE FISHER CUNNINGHAM  
 THOMAS WHITE CURRIE (1943)  
 PRICE DANIEL (1992)  
 WILLIAM E. DARDEN (1998)  
 HARBERT DAVENPORT  
 MORGAN JONES DAVIS (1980)  
 GEORGE BANNERMAN DEALEY  
 (1946)  
 JAMES QUAYLE DEALEY  
 EVERETT LEE DeGOLYER (1957)  
 EDGAR A. DeWITT (1975)
- ROSCOE PLIMPTON DeWITT  
 ADINA DeZAVALA (1955)  
 FAGAN DICKSON  
 CHARLES SANFORD DIEHL (1946)  
 FRANK CLIFFORD DILLARD (1939)  
 J. FRANK DOBIE (1964)  
 EZRA WILLIAM DOTY (1994)  
 GERRY DOYLE  
 HENRY PATRICK DROUGHT (1958)  
 FREDERICA GROSS DUDLEY  
 KATHARYN DUFF (1995)  
 J. CONRAD DUNAGAN (1994)  
 CLYDE EAGLETON (1958)  
 DWIGHT DAVID EISENHOWER  
 EDWIN A. ELLIOTT  
 ALEXANDER CASWELL ELLIS (1948)  
 JOE EWING ESTES (1991)  
 HYMAN JOSEPH ETTLINGER (1986)  
 LUTHER HARRIS EVANS  
 WILLIAM MAURICE EWING (1973)  
 WILLIAM STAMPS FARISH (1942)  
 SARAH ROACH FARNSWORTH  
 CHARLES W. FERGUSON  
 JOE J. FISHER  
 STERLING WESLEY FISHER  
 LAMAR FLEMING JR. (1964)  
 RICHARD TUDOR FLEMING (1973)  
 FRED FARRELL FLORENCE (1960)  
 JAMES LAWRENCE FLY  
 PAUL JOSEPH FOIK (1941)  
 LITTLETON FOWLER  
 CHARLES INGE FRANCIS (1969)  
 JOE B. FRANTZ (1993)  
 LLERENA BEAUFORT FRIEND (1998)  
 JESSE NEWMAN GALLAGHER (1943)  
 HERBERT PICKENS GAMBRELL  
 (1983)  
 VIRGINIA LEDDY GAMBRELL (1978)  
 WILMER ST. JOHN GARWOOD  
 (1989)  
 MARY EDNA GEARING (1946)  
 SAMUEL WOOD GEISER (1983)  
 EUGENE BENJAMIN GERMANY  
 (1970)  
 ROBERT RANDLE GILBERT (1971)  
 GIBB GILCHRIST (1972)  
 JOHN WILLIAM GORMLEY (1949)  
 MALCOLM KINTNER GRAHAM  
 (1941)  
 IRELAND GRAVES (1969)  
 MARVIN LEE GRAVES (1953)  
 WILLIAM FAIRFAX GRAY

- LEON A. GREEN (1979)  
 NEWTON GRESHAM (1996)  
 DAVID WENDELL GUION (1981)  
 CHARLES WILSON HACKETT (1951)  
 WALTER GARDNER HALL (2000)  
 RALPH HANNA  
 HARRY CLAY HANSZEN (1950)  
 FRANKLIN ISRAEL HARBACH (1998)  
 THORNTON HARDIE (1969)  
 HELEN HARGRAVE (1984)  
 HENRY WINSTON HARPER (1943)  
 MARION THOMAS HARRINGTON  
 GUY BRYAN HARRISON JR. (1988)  
 TINSLEY RANDOLPH HARRISON  
 JAMES PINCKNEY HART (1987)  
 HOUSTON HARTE (1971)  
 RUTH HARTGRAVES (1995)  
 FRANK LEE HAWKINS (1954)  
 WILLIAM WOMACK HEATH (1973)  
 ERWIN HEINEN (1997)  
 JACOB W. HERSHEY (2000)  
 J. CARL HERTZOG (1988)  
 JOHN EDWARD HICKMAN (1962)  
 GEORGE ALFRED HILL JR. (1949)  
 GEORGE ALFRED HILL III (1974)  
 GEORGE W. HILL (1985)  
 JOSEPH M. HILL  
 MARY VAN den BERGE HILL (1965)  
 ROBERT THOMAS HILL (1941)  
 JOHN E. HINES (1998)  
 OVETA CULP HOBBY (1995)  
 WILLIAM PETTUS HOBBY (1964)  
 ELA HOCKADAY (1956)  
 WILLIAM RANSOM HOGAN (1971)  
 IMA HOGG (1975)  
 THOMAS STEELE HOLDEN (1958)  
 EUGENE HOLMAN (1962)  
 JAMES LEMUEL HOLLOWAY JR.  
 PAUL HORGAN (1997)  
 A. C. HORTON  
 EDWARD MANDELL HOUSE (1939)  
 ANDREW JACKSON HOUSTON  
 (1941)  
 SAM HOUSTON  
 WILLIAM VERMILLION HOUSTON  
 (1969)  
 WILLIAM EAGER HOWARD (1948)  
 LOUIS HERMAN HUBBARD (1972)  
 JOHN AUGUSTUS HULEN (1957)  
 WILMER BRADY HUNT (1982)  
 FRANK GRANGER HUNTRESS (1955)  
 PETER HURD  
 HOBART HUSON  
 JOSEPH CHAPPELL HUTCHESON JR.  
 JUNE HYER (1980)  
 JULIA BEDFORD IDESON (1945)  
 FRANK N. IKARD SR. (1990)  
 R. A. IRION  
 WATROUS HENRY IRONS (1969)  
 PATRICK C. JACK  
 HERMAN GERLACH JAMES (1966)  
 LEON JAWORSKI (1982)  
 JOHN LEROY JEFFERS (1979)  
 JOHN HOLMES JENKINS III (1991)  
 HERBERT SPENCER JENNINGS  
 (1966)  
 LYNDON BAINES JOHNSON (1973)  
 WILLIAM PARKS JOHNSON (1970)  
 ANSON JONES  
 CLIFFORD BARTLETT JONES (1973)  
 ERIN BAIN JONES (1974)  
 EVERETT HOLLAND JONES (1996)  
 HOWARD MUMFORD JONES  
 JESSE HOLMAN JONES (1956)  
 JOHN TILFORD JONES JR. (1993)  
 MARVIN JONES (1977)  
 MRS. PERCY JONES (1978)  
 JOHN ERIK JONSSON (1996)  
 DAVID S. KAUFMAN  
 PAGE KEETON  
 HERBERT ANTHONY KELLAR (1955)  
 ROBERT MARVIN KELLY (1958)  
 LOUIS WILTZ KEMP (1956)  
 HARRIS LEON KEMPNER SR. (1987)  
 THOMAS MARTIN KENNERLY  
 (1966)  
 DANIEL E. KILGORE (1995)  
 WILLIAM JACKSON KILGORE (1993)  
 EDWARD KILMAN (1969)  
 FRANK HAVILAND KING  
 WILLIAM ALEXANDER KIRKLAND  
 (1988)  
 ROBERT JUSTUS KLEBERG JR. (1974)  
 DOROTHY W. KNEPPER (1998)  
 JOHN FRANCIS KNOTT  
 LAURA LETTIE SMITH KREY (1985)  
 ERNEST LYNN KURTH (1960)  
 POLYKARP KUSCH (1993)  
 LUCIUS MIRABEAU LAMAR III (1978)  
 MIRABEAU B. LAMAR  
 FRANCIS MARION LAW (1970)  
 F. LEE LAWRENCE (1996)  
 CHAUNCEY DEPEW LEAKE (1978)  
 UMPHREY LEE (1958)

- DAVID LEFKOWITZ (1956)  
 MARK LEMMON (1975)  
 JEWEL PRESTON LIGHTFOOT (1950)  
 DENTON RAY LINDLEY (1986)  
 EUGENE PERRY LOCKE (1946)  
 JOHN AVERY LOMAX (1948)  
 WALTER EWING LONG (1973)  
 JOHN TIPTON LONSDALE (1960)  
 EDGAR ODELL LOVETT (1957)  
 H. MALCOLM LOVETT  
 ROBERT EMMET LUCEY (1977)  
 WILLIAM WRIGHT LYNCH  
 ABNER VERNON McCALL (1995)  
 JOHN LAWTON McCARTY  
 JAMES WOOTEN McCLENDON  
 (1972)  
 L. F. McCOLLUM (1996)  
 CHARLES TILFORD McCORMICK  
 (1964)  
 IRELINE DEWITT McCORMICK  
 MALCOLM McCORQUODALE JR.  
 (1990)  
 JOHN W. McCULLOUGH (1987)  
 TOM LEE McCULLOUGH (1966)  
 EUGENE McDERMOTT  
 JOHN HATHAWAY McGINNIS (1960)  
 ROBERT C. McGINNIS (1994)  
 GEORGE LESCHER MacGREGOR  
 (2001)  
 STUART MALCOLM McGREGOR  
 ALAN DUGALD McKILLOP (1974)  
 BUKNER ABERNATHY McKINNEY  
 (1966)  
 HUGH McLEOD  
 LEWIS WINSLOW MacNAUGHTON  
 (1969)  
 AYLMER GREEN McNEESE JR. (1992)  
 ANGUS McNEILL  
 JOHN OLIVER McREYNOLDS (1942)  
 JACK R. MAGUIRE (2001)  
 HENRY NEIL MALLON  
 GERALD C. MANN (1989)  
 STANLEY MARCUS (2001)  
 FRANK BURR MARSH (1940)  
 HARRIS MASTERSON III (1997)  
 WATT R. MATTHEWS (1997)  
 MAURY MAVERICK (1954)  
 BALLINGER MILLS JR. (1992)  
 BALLINGER MILLS SR. (1947)  
 MERTON MELROSE MINTER (1978)  
 PETER MOLYNEAUX  
 JAMES TALIAFERRO MONT-  
 GOMERY (1939)
- DAN MOODY (1966)  
 DAN MOODY JR.  
 BERNICE MILBURN MOORE (1993)  
 FRED HOLMSLEY MOORE (1985)  
 MAURICE THOMPSON MOORE  
 TEMPLE HOUSTON MORROW  
 WILLIAM OWEN MURRAY (1973)  
 FRED MERRIAM NELSON  
 CHESTER WILLIAM NIMITZ (1965)  
 PAT IRELAND NIXON (1965)  
 MARY MOODY NORTHEN (1991)  
 JAMES RANKIN NORVELL (1969)  
 CHILTON O'BRIEN (1983)  
 DENNIS O'CONNOR (1997)  
 CHARLES FRANCIS O'DONNELL  
 (1948)  
 JOSEPH GRUNDY O'DONOHUE  
 (1956)  
 LEVI ARTHUR OLAN (1984)  
 TRUEMAN EDGAR O'QUINN (1989)  
 JOHN ELZY OWENS (1951)  
 WILLIAM A. OWENS (1991)  
 LOUIS C. PAGE (1982)  
 GLORIA HILL PAPE  
 JUBAL RICHARD PARTEN (1993)  
 ADLAI McMILLAN PATE JR. (1988)  
 ANNA J. HARDWICK PENNY-  
 BACKER (1939)  
 HALLY BRYAN PERRY (1966)  
 NELSON PHILLIPS (1966)  
 GEORGE WASHINGTON PIERCE  
 (1966)  
 EDMUND LLOYD PINCOFFS (1991)  
 BENJAMIN FLOYD PITTINGER  
 KENNETH S. PITZER (2000)  
 GEORGE FRED POOL (1984)  
 CHARLES SHIRLEY POTTS (1963)  
 HERMAN PAUL PRESSLER JR. (1996)  
 CHARLES NELSON PROTHRO (2000)  
 HARRY MAYO PROVENCE (1996)  
 MAURICE EUGENE PURNELL  
 CHARLES PURYEAR (1940)  
 CLINTON SIMON QUIN (1956)  
 COOPER KIRBY RAGAN  
 HOMER PRICE RAINEY (1985)  
 CHARLES WILLIAM RAMSDELL  
 (1942)  
 EDWARD RANDALL (1944)  
 EDWARD RANDALL JR. (1970)  
 KATHARINE RISHER RANDALL  
 (1991)  
 LAURA BALLINGER RANDALL  
 (1955)

- JO STEWART RANDEL  
 HARRY HUNTT RANSOM (1976)  
 EMIL C. RASSMAN  
 FANNIE ELIZABETH RATCHFORD  
 SAM RAYBURN (1961)  
 JOHN SAYRES REDDITT (1972)  
 LAWRENCE JOSEPH RHEA (1946)  
 WILLIAM ALEXANDER RHEA (1941)  
 JAMES OTTO RICHARDSON  
 RUPERT NORVAL RICHARDSON  
 (1987)  
 JAMES FRED RIPPY  
 SUMMERFIELD G. ROBERTS (1969)  
 FRENCH MARTEL ROBERTSON  
 (1976)  
 CURTICE ROSSER  
 JOHN ELIJAH ROSSER (1960)  
 JOSEPH ROWE  
 JAMES EARL RUDDER (1969)  
 THOMAS J. RUSK  
 McGRUDER ELLIS SADLER (1966)  
 JEFFERSON DAVIS SANDEFER (1940)  
 MARLIN ELIJAH SANDLIN  
 HYMAN JUDAH SCHACHTEL (1991)  
 EDWARD MUEGGE "BUCK" SCHI-  
 WETZ (1985)  
 VICTOR HUMBERT SCHOFFEL-  
 MAYER (1966)  
 ARTHUR CARROLL SCOTT (1940)  
 ELMER SCOTT (1954)  
 JOHN THADDEUS SCOTT (1955)  
 WOODROW BRADLEY SEALS (1991)  
 TOM SEALY (1992)  
 GEORGE DUBOSE SEARS (1974)  
 WILLIAM G. SEARS (1997)  
 ELIAS HOWARD SELLARDS (1960)  
 DUDLEY CRAWFORD SHARP  
 ESTELLE BOUGHTON SHARP (1965)  
 JAMES LEFTWICH SHEPHERD JR.  
 (1964)  
 MORRIS SHEPPARD (1941)  
 JOHN BEN SHEPPERD (1989)  
 STUART SHERAR (1969)  
 PRESTON SHIRLEY (1991)  
 ALLAN SHIVERS (1985)  
 RALPH HENDERSON SHUFFLER  
 (1975)  
 RALPH HENDERSON SHUFFLER II  
 JOHN DAVID SIMPSON JR.  
 ALBERT OLIN SINGLETON (1947)  
 JOSEPH ROYALL SMILEY (1991)  
 A. FRANK SMITH JR. (1993)  
 A. FRANK SMITH SR. (1962)
- ASHBEL SMITH  
 FRANK CHESLEY SMITH SR. (1970)  
 HARLAN J. SMITH (1991)  
 HENRY SMITH  
 HENRY NASH SMITH  
 THOMAS VERNON SMITH (1964)  
 HARRIET WINGFIELD SMITHER  
 (1955)  
 ROBERT S. SPARKMAN (1997)  
 RALPH SPENCE (1994)  
 JOHN WILLIAM SPIES  
 TOM DOUGLAS SPIES (1960)  
 STEPHEN H. SPURR (1990)  
 ROBERT WELDON STAYTON (1963)  
 ZOLLIE C. STEAKLEY (1991)  
 RALPH WRIGHT STEEN (1980)  
 IRA KENDRICK STEPHENS (1956)  
 MARSHALL T. STEVES (2001)  
 ROBERT GERALD STOREY (1981)  
 GEORGE WILFORD STUMBERG  
 HATTON WILLIAM SUMNERS (1962)  
 ROBERT LEE SUTHERLAND (1976)  
 HENRY GARDINER SYMONDS  
 (1971)  
 MARGARET CLOVER SYMONDS  
 (2001)  
 WILLIS M. TATE (1989)  
 JAMES U. TEAGUE (1996)  
 ROBERT EWING THOMASON (1974)  
 J. CLEO THOMPSON (1974)  
 BASCOM N. TIMMONS (1987)  
 LON TINKLE (1980)  
 CHARLES RUDOLPH TIPS (1976)  
 MARGARET LYNN BATTS TOBIN  
 (1994)  
 VIRGIL W. TOPAZIO  
 JOHN G. TOWER (1991)  
 HENRY TRANTHAM (1961)  
 FRANK EDWARD TRITICO SR. (1993)  
 GEORGE WASHINGTON TRUETT  
 (1944)  
 RADOSLAV ANDREA TSANOFF  
 (1976)  
 EDWARD BLOUNT TUCKER (1972)  
 WILLIAM BUCKHOUT TUTTLE  
 (1954)  
 THOMAS WAYLAND VAUGHAN  
 (1952)  
 ROBERT ERNEST VINSON (1945)  
 LESLIE WAGGENER (1951)  
 AGESILAU WILSON WALKER JR.  
 (1988)  
 EVERETT DONALD WALKER (1991)

- RUEL C. WALKER  
THOMAS OTTO WALTON  
FRANK H. WARDLAW (1989)  
ALONZO WASSON (1952)  
WILLIAM WARD WATKIN (1952)  
ROYALL RICHARD WATKINS (1954)  
WALTER PRESCOTT WEBB (1963)  
HARRY BOYER WEISER (1950)  
PETER BOYD WELLS JR. (1991)  
ELIZABETH HOWARD WEST (1948)  
CLARENCE RAY WHARTON (1941)  
JOHN A. WHARTON  
WILLIAM H. WHARTON  
WILLIAM MORTON WHEELER  
(1937)  
GAIL WHITCOMB (1994)  
JAMES LEE WHITCOMB  
WILLIAM RICHARDSON WHITE  
(1977)  
C. G. WHITTEN (2001)  
WILLIAM MARVIN WHYBURN  
(1972)  
HARRY CAROTHERS WIESS (1948)  
DOSSIE MARION WIGGINS (1978)  
PLATT K. WIGGINS  
DAN C. WILLIAMS (2001)  
JACK KENNY WILLIAMS (1982)
- ROGER JOHN WILLIAMS (1987)  
LOGAN WILSON (1992)  
JAMES BUCHANAN WINN JR. (1980)  
JAMES RALPH WOOD (1973)  
DUDLEY KEZER WOODWARD JR.  
(1967)  
WILLIS RAYMOND WOOLRICH  
(1977)  
BENJAMIN HARRISON WOOTEN  
(1971)  
SAM PAUL WORDEN (1988)  
GUS SESSIONS WORTHAM (1976)  
LYNDALL FINLEY WORTHAM  
FRANK McREYNOLDS WOZEN-  
CRAFT (1993)  
FRANK WILSON WOZENCRAFT  
(1967)  
WILLIAM EMBRY WRATHER (1963)  
ANDREW JACKSON WRAY (1981)  
CHARLES ALAN WRIGHT (2000)  
RALPH WEBSTER YARBOROUGH  
RAMSEY YELVINGTON (1972)  
HUGH HAMPTON YOUNG (1945)  
SAMUEL DOAK YOUNG  
STARK YOUNG  
HENRY B. ZACHRY (1984)  
PAULINE BUTTE ZACHRY (1998)