The Texas Index of Leading Environmental Indicators 2000

Texas Public Policy Foundation

Contents

Introduction

As the largest state in the continental U.S., Texas presents the full range of environmental challenges and natural resource blessings. Texas enjoys over 250,000 square miles of land, with a terrain that varies from Guadalupe Peak (elevation 8,749 feet) in the Guadalupe Mountains to the beaches of the Gulf Coast (at sea level), and from the deep forests and swamplands of East Texas to the rangeland and deserts of West Texas. Texas now boasts the nation's second largest population, having passed New York in 1994, and its most dynamic economy: Texas generated more new jobs than any other state in the 1990s, and has experienced the largest population growth of any state. (See Table 1.)

As long as there are "Dallas" reruns on cable TV, Texas will be synonymous with the oil industry in some of the public mind. To be sure, Texas was once the world's leading oil producer. Yet today oil and gas are just a small part of the Texas economy. Much of the oil and gas industry in Texas today is oriented toward exploration and production around the world. The diversification of the Texas economy throughout the 1990s is why the swoon in oil prices in 1997–98 did not fell the Texas economy as it did in the mid-1980s.

Despite rapid population and job growth during the 1990s, most measures of pollution in Texas are flat or falling. In short, environmental quality is improving in Texas. These favorable environmental trends refute the popular perception that population and economic growth must inevitably degrade the environment.

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Table 1: Population and Employment Growth in Texas

1990 Population	2000 Population (est.)	Change
16,986,000	20,119,000	3,133,000 (18.4%)
1990 Employment	2000 Employment (est.)	
6,980,400	9,271,600	2,291,200 (32.8%)

Source: U.S. Census Bureau & Bureau of Labor Statistics

Air Quality

Because of its hot and humid climate, air quality is one of the most persistently challenging environmental issues confronting Texas. Yet even with rapid population and economic growth, air quality in Texas cities has been improving for most categories of pollution. The sole exception is ozone, which will be discussed in more detail below. Texas compares favorably to the rest of the nation regarding the reduction of “criteria” pollutants monitored by the Environmental Protection Agency (EPA). From 1995–1997, sulfur dioxide (SO_2) emissions in Texas fell by 17.1 percent, while emissions for the nation as a whole increased 11.2 percent. Nitrogen oxide (NO_X) emissions fell 23.6 percent in Texas while rising 8.2 percent nationally. Emissions of volatile organic compounds (VOCs), the main precursor of ozone, fell by 43.2 percent in Texas while falling only 16 percent nationally. Carbon monoxide (CO) emissions fell 12 percent in Texas but only 5.1 percent nationally. The only criteria pollutant where Texas lagged the national trend was particulates (PM10). Particulate emissions fell 11.9 percent in Texas compared to 21.2 percent for the entire nation. However, it should be noted that hotter and drier states in the southwest have the most persistent particulate problems.

More important than emissions is the ambient level of pollution, i.e., the actual concentration of pollution that Texans are exposed to in the air they breathe. It is ambient levels, and not emissions, that determine the health risk to humans. Hence, the EPA monitors ambient levels carefully, while emissions statistics are chiefly estimates derived mostly from computer models. Figures 1–7 show trend data for Texas cities from EPA’s most recent annual air quality report.

Figure 1 shows that although Texas’s population grew 16.3 percent between 1988 and 1997, ambient air pollution levels fell significantly for four of the six “criteria” pollutants the EPA regulates. Figures 2–7 display the trendlines for the last decade for each Texas city that the EPA monitors. Because these tables are difficult to view, Table 2 summarizes

Table 2: Summary of Ambient Air Quality Compliance and Trends for Texas Cities

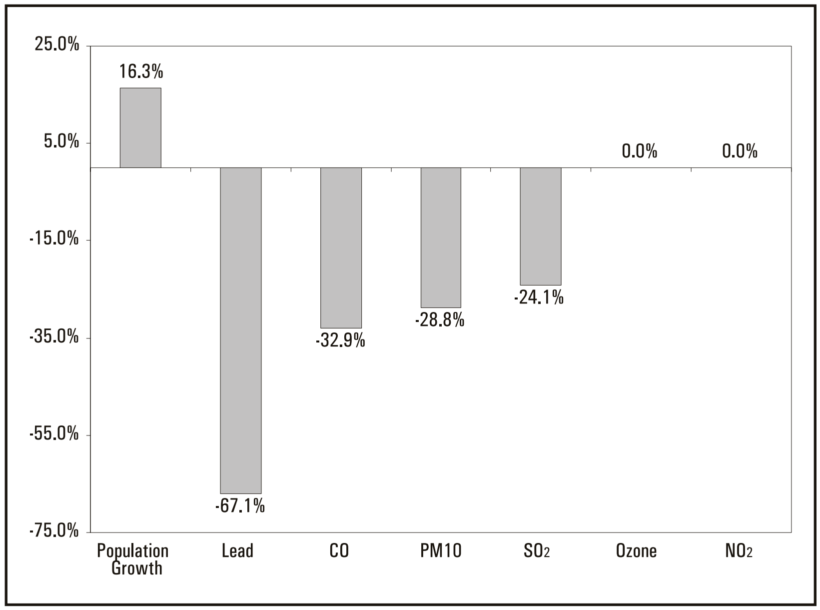
Pollutant	Compliance	Trend	Comments
Lead	All cities meet	All declining	Houston at zero
Carbon Monoxide	All cities meet	All declining	
Sulfur Dioxide	All cities meet	Flat or declining	Galveston the biggest problem area
Particulates	All cities meet	Flat or declining	Clustered near national average
Nitrogen Dioxide	All cities meet	Flat	National trend is also flat
Ozone	Half of Texas cities meet	Flat or slightly declining	Close to national average

Source: EPA.

the trends for the six "criteria" pollutants regulated under the Clean Air Act. Although it is claimed today that Houston has the nation's worst air quality, in fact Houston meets the Clean Air Act standard for five of the six criteria pollutants, and in the case of lead, has achieved a zero ambient level.

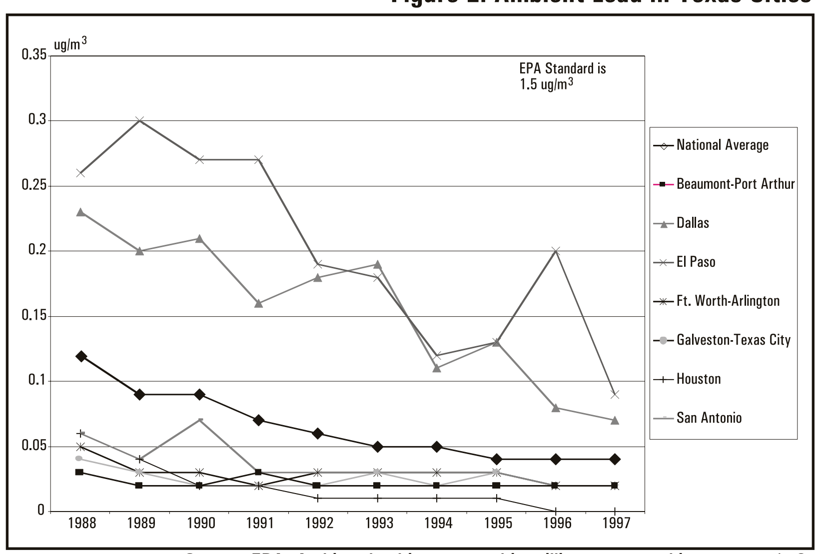
Second, as can be seen from the figures below, El Paso is having the toughest time achieving reduction in several categories of air pollution. El Paso suffers from significant cross-border pollution from Mexico, to the point that the Texas Natural Resources Conservation Commission (TNRCC) has concluded that El Paso cannot currently meet the federal Clean Air Act standards.[1] The EPA has accordingly granted waivers to El Paso. Even with the cross-border difficulties, El Paso is showing progress in several environmental measures areas, and can expect this progress to continue as Mexico upgrades its automobile and industrial technology. Indeed, ozone levels in El Paso show a slight declining trend and are close to the national trendline (see Figure 7D).

Figure 1: Population Growth and Ambient Air Quality Trends in Texas, 1988–1997



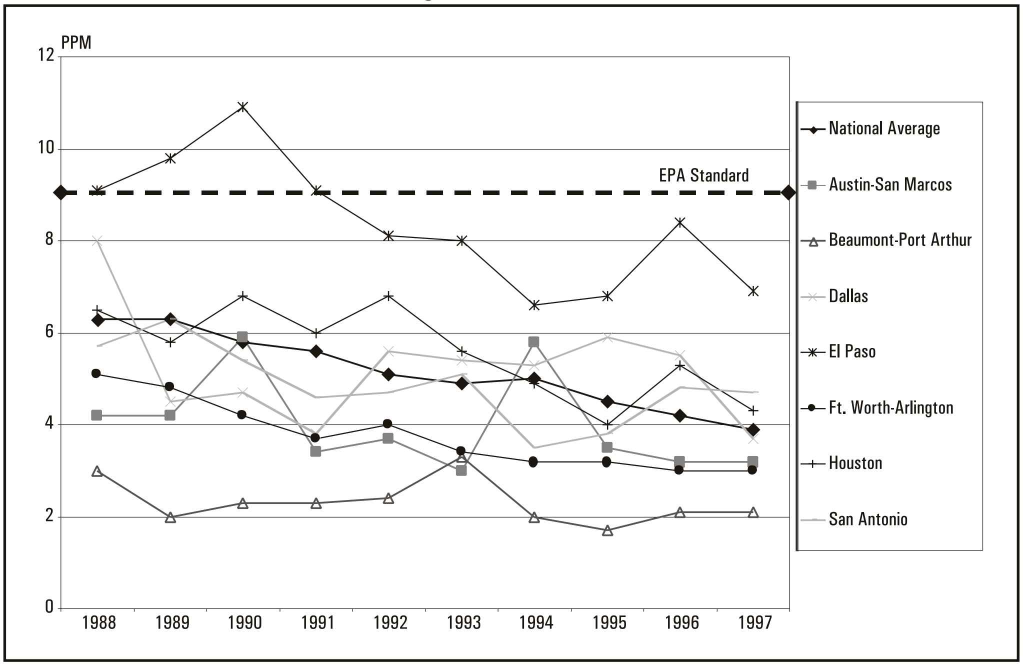
Source: Author's calculations based on EPA data.

Figure 2: Ambient Lead in Texas Cities



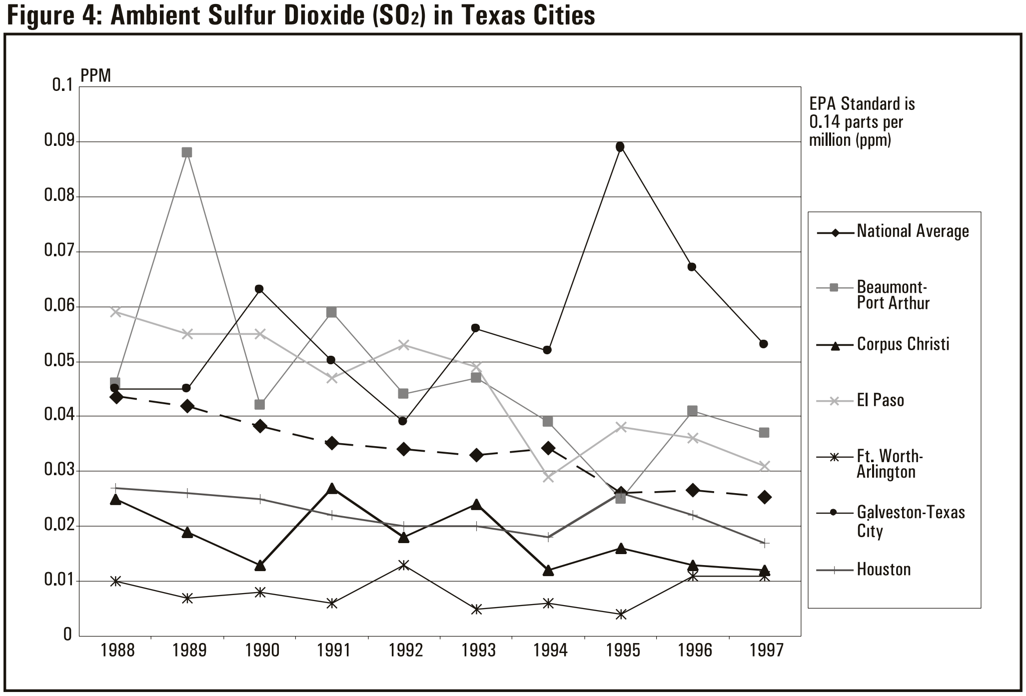
Source: EPA. Ambient lead is measured in milligrams per cubic meter, ug/m3. The Clean Air Act standard for lead is 1.5 ug/m3.

Figure 3: Ambient Carbon Monoxide (CO) in Texas Cities



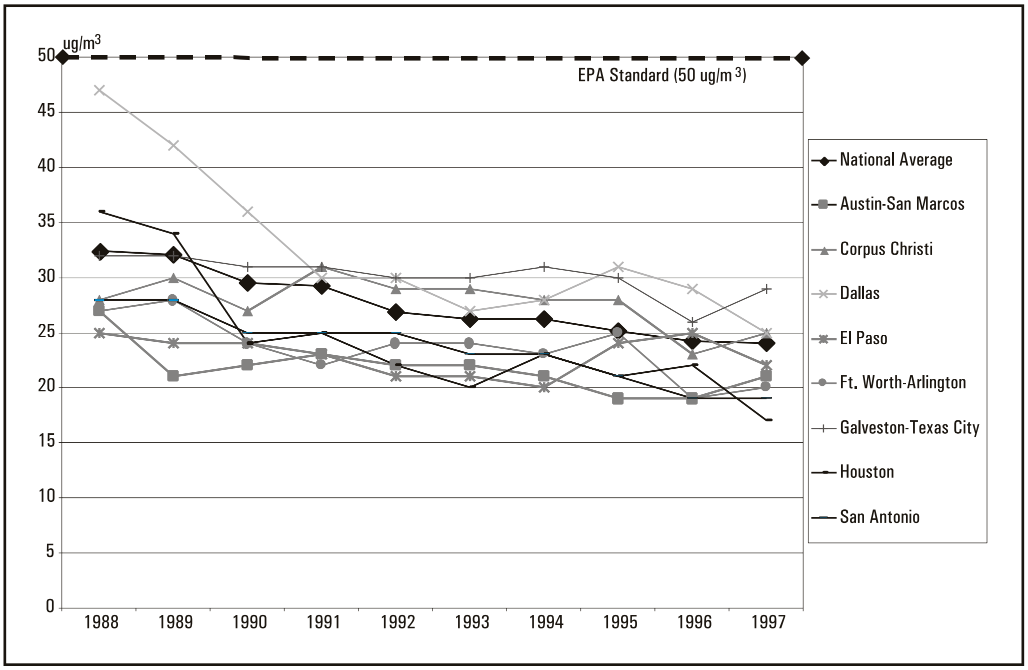
Source: EPA. Clean Air Act standard is 9 ppm.

Figure 4: Ambient Sulfur Dioxide (SO_2) in Texas Cities



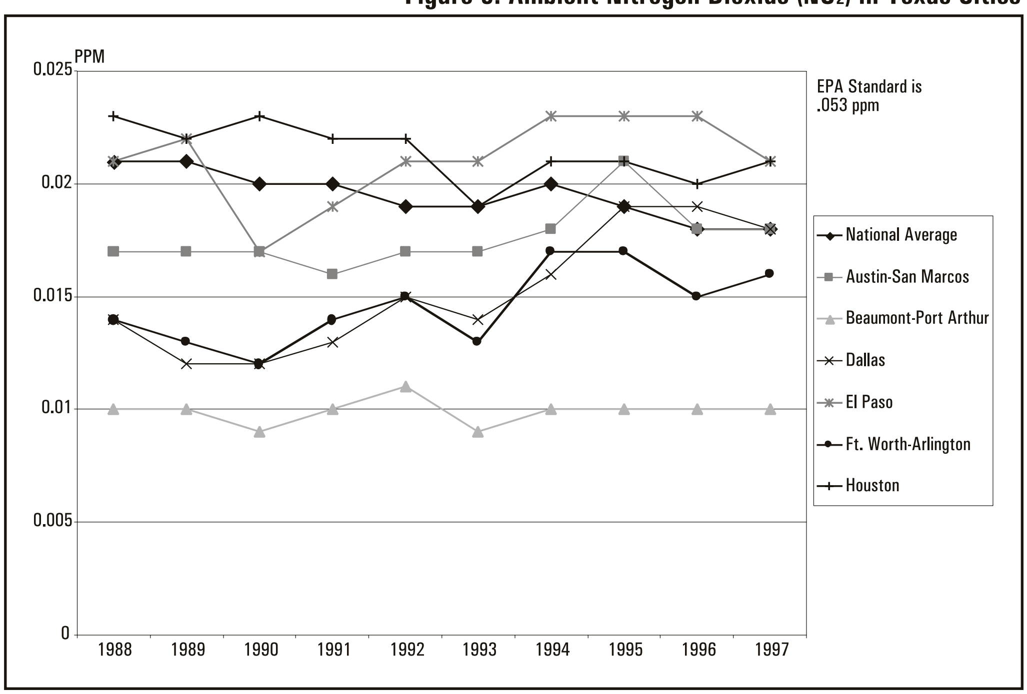
Source: EPA.

Figure 5: Ambient Particulates (PM10) in Texas Cities



Source: EPA.

Figure 6: Ambient Nitrogen Dioxide (NO_2) in Texas Cities

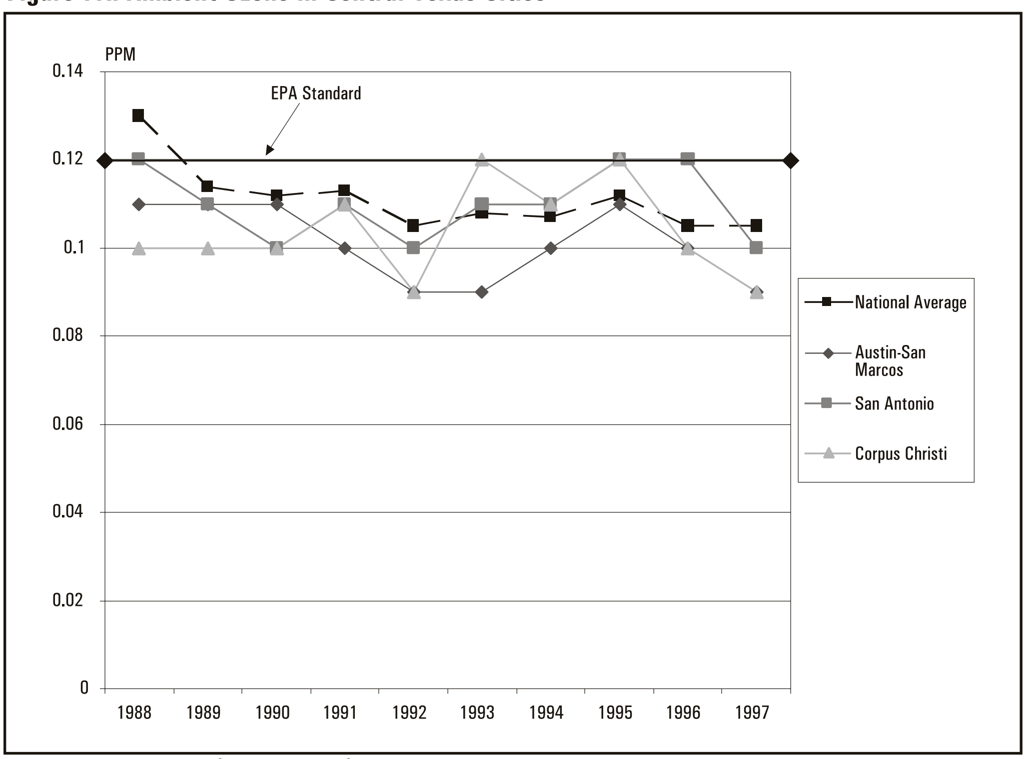


Source: EPA.

Ozone

Ozone is formed primarily from the combination of nitrogen oxides and volatile organic compounds in the presence of sunlight. (More background on ozone can be found in the national edition of this report at *www.pacificresearch.org*.) Ambient ozone readings for Texas cities, the most widely measured air pollutant in the state, are broken down into four regions as shown in Figures 7A–7D. (The only city in west Texas the EPA monitors is El Paso. These figures are based on the EPA's second daily maximum eight-hour readings.) As can be seen in Figure 7A, ozone trends for central Texas cities are found clustered around the national average, and are generally below the current EPA ozone standard. Northeastern Texas cities show an erratic pattern of ozone levels with no clear trend, and are closer to the national average and the EPA ozone standard. The ozone problem in Texas is predominantly confined to the southeastern region of the state, as Figure 7B shows.

Figure 7A: Ambient Ozone in Central Texas Cities

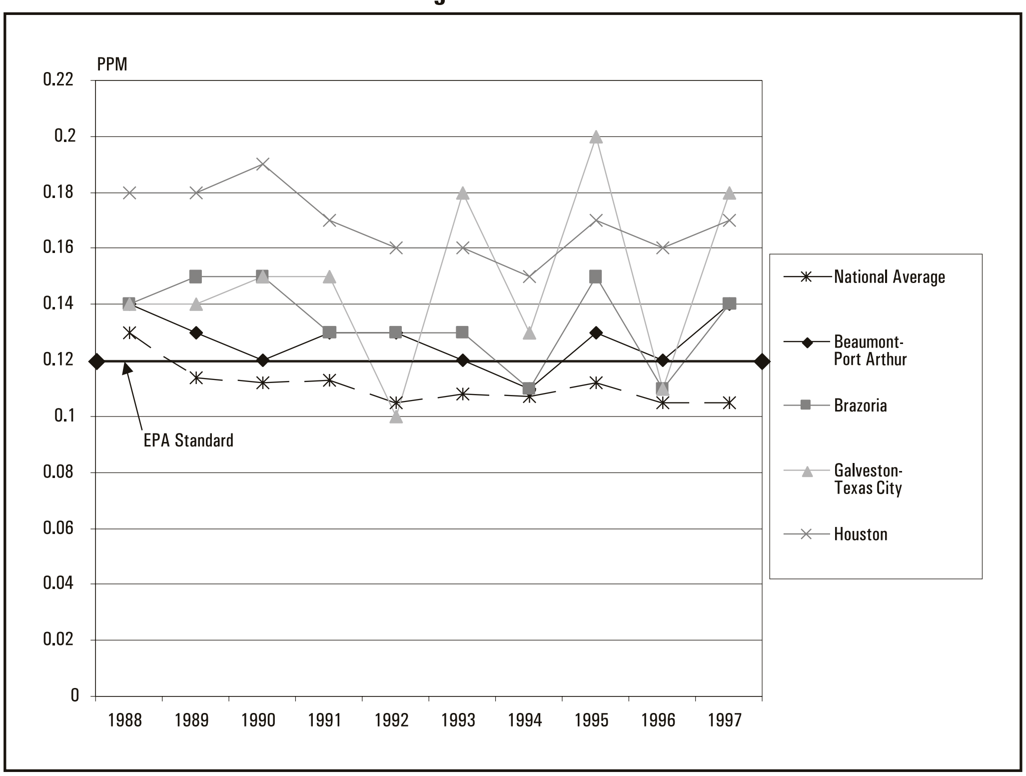


Source: EPA. The Clean Air Act standard is 0.12 ppm.

Ozone is proving to be the most persistent pollutant to conquer, not only in Texas but also in other cities with hot climates such as Atlanta and Los Angeles. Even though emissions of VOCs—the main precursor to ozone—fell by over 40 percent in Texas between 1995–1997, ambient ozone trends were little affected. Ozone, more than any other form of air pollution, is strongly affected by weather patterns, especially heat, humidity, and air pressure. This is why Houston's ozone levels have increased over the last three years while Los Angeles's ozone levels have declined. The continued ozone decline in Los Angeles can be largely attributed to cooler than normal summers due to La Niña conditions in the Pacific Ocean. Houston has not been similarly fortunate in its weather, and has suffered from hotter than normal summers over this period.

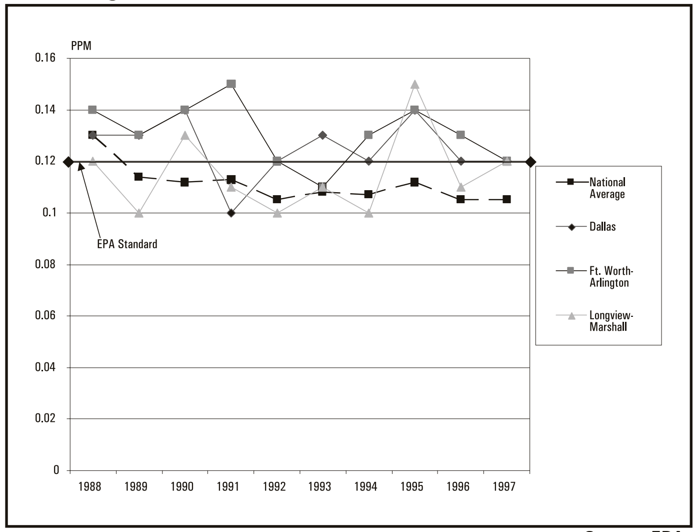
Figure 8 compares ozone trends in Houston with those of Los Angeles and Atlanta. Two trends are noteworthy. First, Houston experienced a declining ozone trend from 1990–1994 that was slightly greater than Los Angeles. Second, ozone readings for both Houston and Atlanta moved in tandem from 1995–1997, reflecting the common weather pattern of the southern U.S. and reinforcing the fact that ozone depends as much on weather conditions as human activity.

Figure 7B: Ambient Ozone in Southeastern Texas Cities



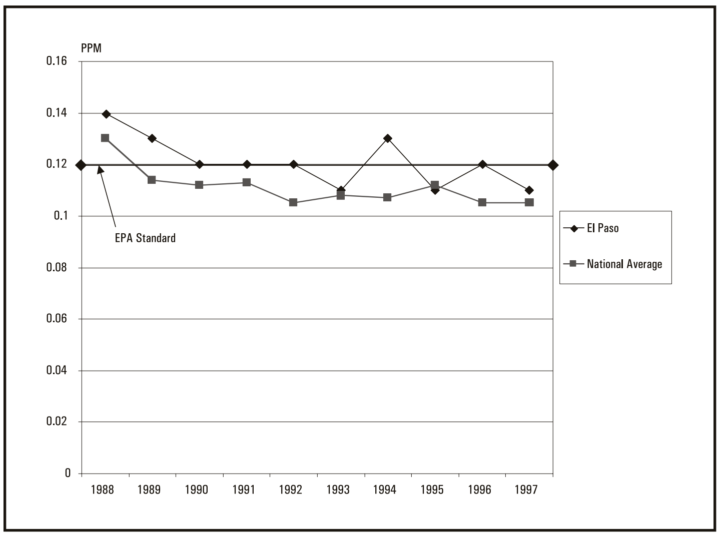
Source: EPA.

Figure 7C: Ambient Ozone in Northeastern Texas Cities



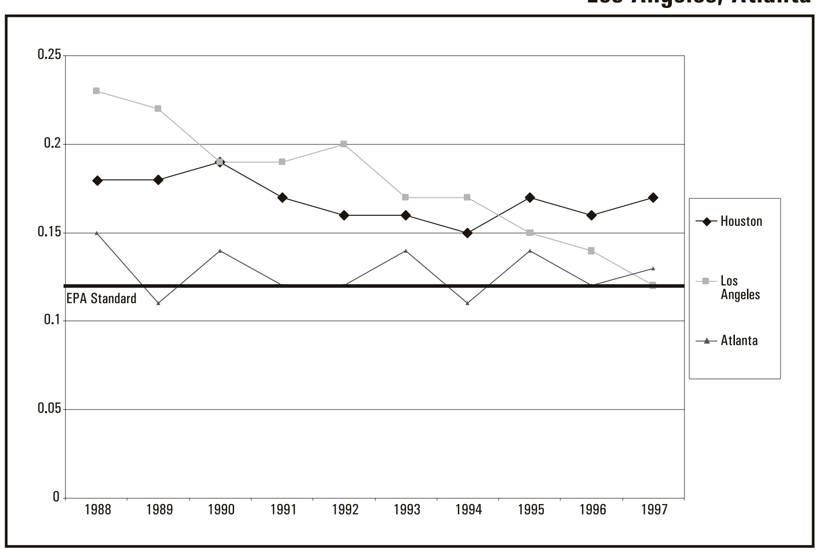
Source: EPA.

Figure 7D: Ambient Ozone in El Paso



Source: EPA.

Figure 8: Ozone Trends Compared: Houston, Los Angeles, Atlanta



Source: EPA.

Water Quality

Texas has 191,228 miles of rivers and streams, more than 6,900 reservoirs, 3 million acres of lakes, 6.47 million acres of inland wetlands, 1,991 square miles of bays, 624 miles of Gulf Coast shoreline, and 1.65 million acres of coastal wetlands. Texas ranks seventh among states in the contiguous United States in surface water acreage.

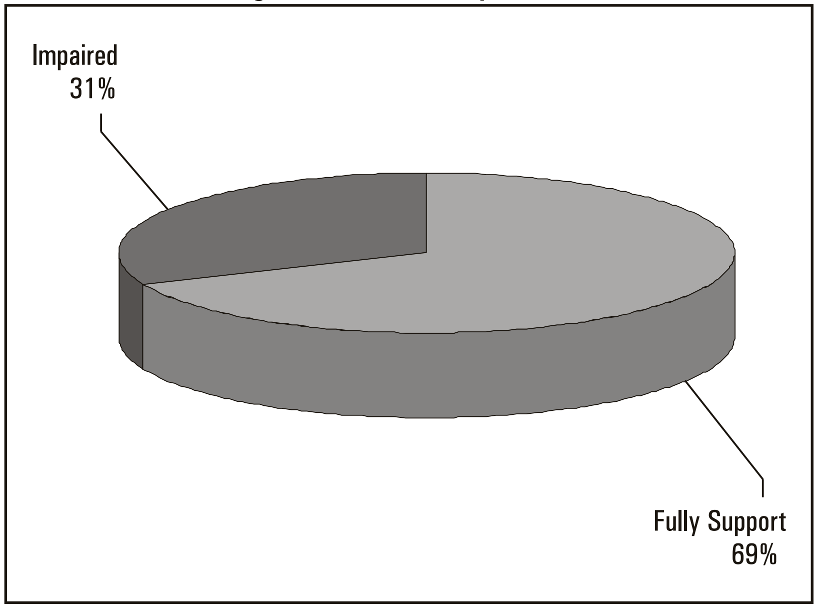
Evaluating surface water quality in Texas is difficult, because although there are 191,228 miles of streams and rivers in Texas, three-quarters of these stream miles are frequently dry during portions of each year. Hence, while the 1996 National Water Quality Inventory (NWQI) for Texas finds that the state only evaluated seven percent of the total miles of rivers and streams, this number is misleading because of the high number of dry riverbeds that are difficult to evaluate.

Figure 9 shows that of the 14,177 miles of rivers and streams monitored and assessed, 69 percent are rated as fully supporting all water classification uses (i.e., fishing, swimming, and drinking), while 31 percent are considered "impaired." (A waterbody is considered "impaired" if it is not suitable for any one purpose, even if it is suitable for others.) Because the comparable figure for all 50 states is 55 percent, Texas river and stream quality is considerably better than the national average. According to the NWQI, industrial point sources are the leading source of pollution in most rivers and streams that remain impaired.

Figure 10 shows that of the 1.5 million acres of lakes assessed (which include 100 percent of all lakes open to the public), 78 percent fully support all uses. The comparable figure for all 50 states is just 50 percent, so Texas is again substantially ahead of the nation as a whole. (National figures are available online from the 1999 edition of this report, at *www.pacificresearch.org*)

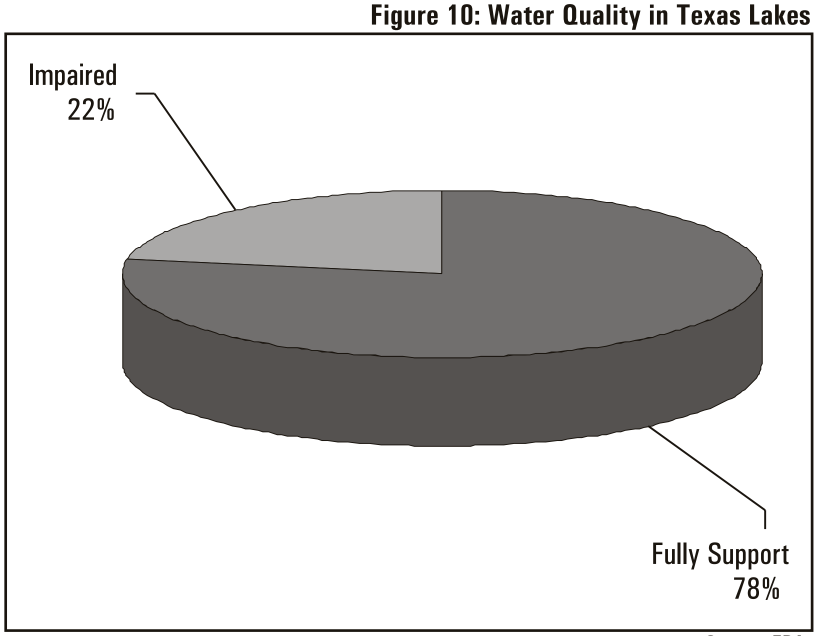
As is discussed in the national edition of this report, the NWQI does not provide adequate data for determining trends in surface water quality.

Figure 9: Water Quality in Texas Rivers and Streams



Source: EPA.

Figure 10: Water Quality in Texas Lakes



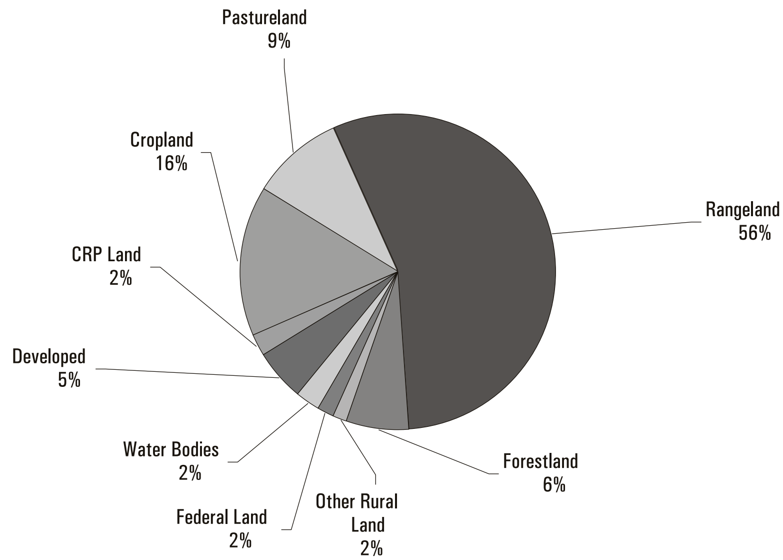
Source: EPA.

Land Use and Condition

According to the summary of the 1997 National Resources Inventory (NRI), from 1992–1997 Texas developed over 1.1 million acres of land-—the most of any state in the nation. The national edition of this *Index* discusses some of the anomalies and discrepancies of the NRI preliminary data, though in the case of Texas rapid population growth necessarily involves developing a large amount of land. A number of factors need to be kept in perspective. First, if the 1.1 million acre figure is accurate, it represents 0.64 percent of the state's total land area. Texas has slightly more than 170 million acres of land. In other words, even at a purported rapid rate of development, *Texas is developing only a little more than one-tenth of one percent of its land every year*. Second, a ratio of the amount of land developed compared to population growth shows that Texas used less land per new person than states such as Maryland or fast-growth Georgia. (See Table 3.) Given the rapid economic growth of Texas, these figures suggest land is being used very efficiently.

Third, Figure 11 displays the various land use categories in Texas according to the NRI. It shows that Texas is only about five percent developed, which is slightly below the national average for all 50 states. Texas is not in danger of "running out of land." (For more information and analysis about land use and the National Resources Inventory, see the national edition of this *Index*, available at *www.pacificresearch.org*.)

Figure 11: Land Uses in Texas



Source: 1997 NRI. "CRP Land" is land enrolled in the U.S.D.A.'s "conservation reserve program."

Table 3: Comparison of Population Growth and Land Development

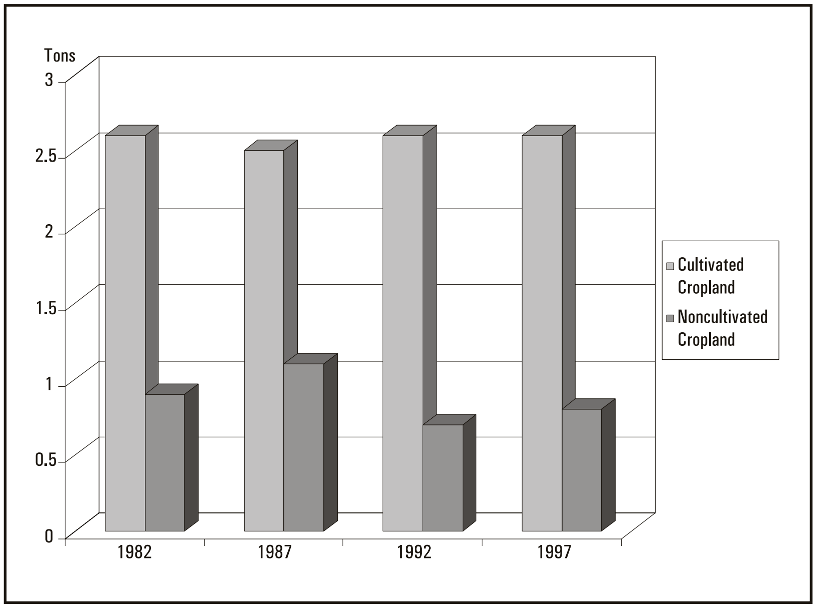
	Population increase, 1992–1997 (1,000)	Land developed, 1992–1997 (1,000 acres)	Acres developed per new resident
Nevada	344	36.6	0.11
California	1,376	685.3	0.50
Oregon	268	141.6	0.53
Texas	**1,609**	**1,145.7**	**0.71**
Maryland	190	218.7	1.15
New Jersey	229	282.3	1.23
Arizona	129	181	1.40
Georgia	725	1,050.5	1.45
Ohio	186	519.3	2.79
New York	57	484.5	8.50
Pennsylvania	39	1,102.7	28.27

Source: 1997 NRI and U.S. Census Bureau.

Soil Erosion

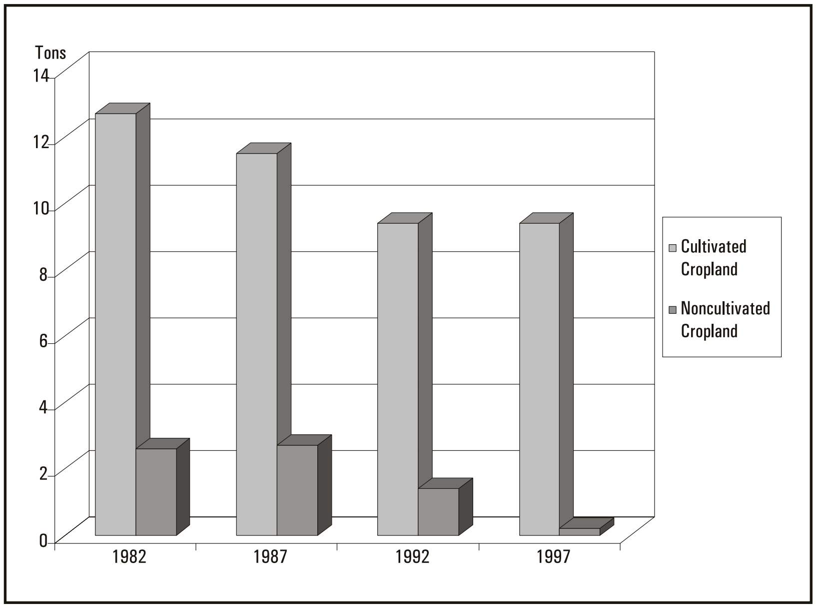
The 1997 National Resources Inventory also provides data on soil erosion for all 50 states. The U.S. Department of Agriculture (USDA) measures two kinds of soil erosion: wind erosion, and what is called “sheet and rill” erosion. Wind erosion is self-explanatory; everyone recalls images of the “dust bowl” during the 1930s, when high winds blew away tons of drought-parched topsoil in the heartland of the nation. Wind erosion is prevalent in the arid western states that have drier soil and less natural ground cover, while many eastern and southern states experience no measurable wind erosion at all. Sheet erosion is the removal of thin layers of soil over the whole surface chiefly through raindrop splash and surface water flow. Rills are channels small enough to be obliterated by normal tillage operations. Figures 12 and 13 display average soil erosion findings for Texas. Texas has been below the national average for rates of both types of erosion on cultivated cropland. While there has been no trend in sheet and rill erosion, Texas has experienced a declining trend in wind erosion. (For background and national trends in soil erosion, see the national edition of this report, available at *www.pacificresearch.org*.)

Figure 12: Sheet & Rill Erosion Per Acre in Texas



Source: EPA.

Figure 13: Wind Erosion Per Acre in Texas



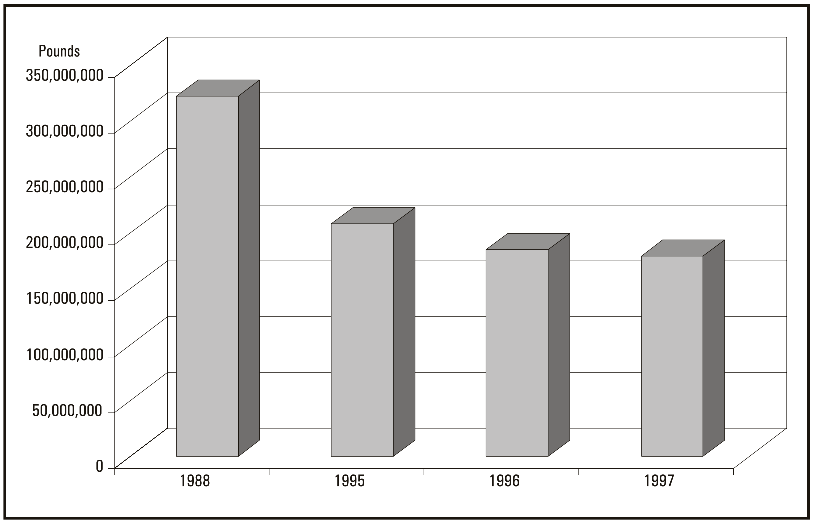
Source: EPA.

Toxics Release Inventory (TRI)

Environmental groups have recently tarred Texas as the largest emitter of toxic chemicals. This claim is true, but misleading. Sixty percent of the nation's entire petrochemical production capacity is located in Texas (though, significantly, Texas does not account for 60 percent of the Toxics Release Inventory for the petrochemical industry), and 25 percent of the nation's oil refining capacity is also located here. As such, it is to be expected that Texas would rank high in the use of toxic chemicals. This does not mean, however, that the environment is threatened in Texas. A closer look at the data shows a sharply declining trend in toxic "releases" (a "release," as the EPA patiently explains every year, does not constitute an exposure, or risk to human health or the environment).

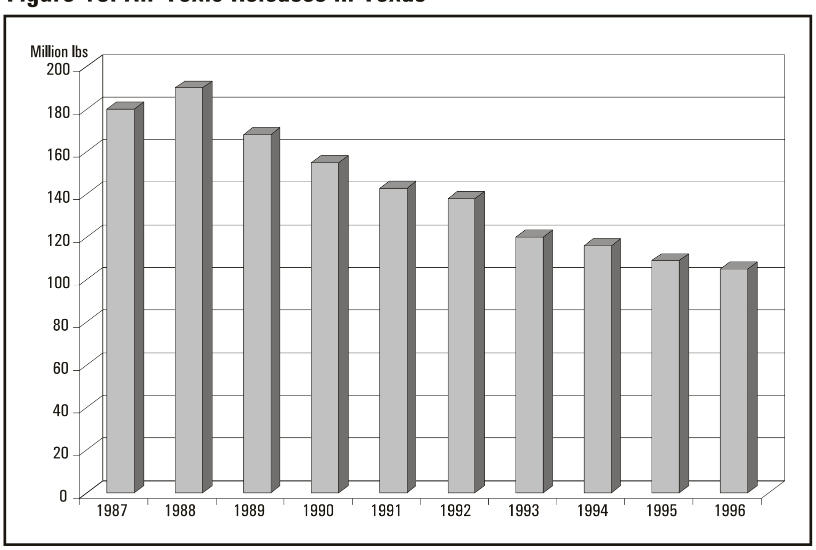
Figure 14 shows the TRI data for Texas for the period 1988–1997 using the EPA's 1988 baseline data. These data demonstrate a 44-percent decline in toxic "releases," a remarkable record considering the growth in economic activity and population growth in Texas during these years. Figure 15 shows data for releases of air toxics calculated by the TNRCC, which also shows a 44-percent decrease in emissions. These are some of the largest reductions of all 50 states.

Figure 14: Toxics Release Inventory for Texas (1988 Baseline)



Source: EPA.

Figure 15: Air Toxic Releases in Texas



Source: EPA.

Conclusion

This report is intended as an introduction to environmental trends based on data collected for purposes of monitoring progress toward national policy objectives and comparison among states. It is not the last word about all environmental conditions because there are gaps in our data, and more importantly because many kinds of environmental problems are local in nature and difficult to capture in broad-gauge national statistics. (Groundwater and watershed management are good examples of environmental conditions whose severity and solution vary widely from place to place and make uniform measurement problematic.) The lesson of the national data presented here, however, is applicable to myriad local issues. Where we have identified genuine environmental problems and applied our technical and economic resources to attacking the problem, rapid progress soon follows. The challenge of environmental quality should not be a source of gloom, but rather a cause for continued optimism that future generations of Texans will inherit a cleaner and more resourceful state.

Notes

1 TNRCC Strategic Plan, 1999–2003, p. 111.