



# Environmental Justice in Pima County

Sonoran Desert Conservation Plan 2002



**Pima County, Arizona  
Board of Supervisors**  
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**County Administrator  
Chuck Huckelberry**





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# MEMORANDUM

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Date: July 23, 2002

To: The Honorable Chair and Members  
Pima County Board of Supervisors

From: C.H. Huckelberry  
County Administrator

A handwritten signature in black ink, appearing to be "C.H. Huckelberry", is written over the typed name and title.

Re: **Environmental Justice in Pima County**

One goal of the Sonoran Desert Conservation Plan is to receive a federal endangered species Section 10 permit. In issuing a permit the United States Fish and Wildlife Service must assess the impacts of their federal action. The impacts of alternative actions must also be described. Pima County's assessment will be a full analysis known as an Environmental Impact Statement. These types of Statements have been drafted with increasing sophistication since the passage of a law in January of 1970 known as the National Environmental Policy Act, or NEPA. The attached study on *Environmental Justice in Pima County* provides the data and analysis necessary for the County's Environmental Impact Statement as it relates to the potential impact that issuing a permit could have on low income or minority people in Pima County. The study goes beyond this narrow assessment too, and discusses the cultural, social and fiscal issues related to the larger topic of environmental justice.

The basic questions of the study are: (1) have past governmental actions been taken because decision makers considered the impacts on the disadvantaged groups less important than they would have been if the group were high income?; and (2) is the official response to an action or incident different because the affected group is low income or minority? In nine chapters this one hundred page study by Ms. Barbara Tellman examines the impacts to minority and low income individuals in Pima County of past governmental decision making in the areas of air quality, transportation, water quality, water supply, land use, housing, fiscal decision making, and matters of cultural sensitivity.

With regard to past practices and actions, the study concludes that "environmental injustices have been numerous in Pima County for more than 300 years. This report cites many examples including loss of much of the O'odham homeland, groundwater pumping that affected San Xavier, siting of industries that cause illnesses among low income and minority people, exclusionary land use policies and others." With regard to the effect of the Sonoran Desert Conservation Plan as a government action, the study finds that while the Sonoran Desert Conservation Plan makes no pretense to righting wrongs of the past, it does not propose new policies that will lead to environmental injustice, and it "offers policies that are fully in harmony with environmental justice principles."

The *Environmental Justice* study is one of the most profoundly important research documents in the Sonoran Desert Conservation Plan series and marks the beginning of the release of dozens of studies over the course of the next weeks that will contribute to the development of the Environmental Impact Statement.

Attachment



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The cover photos depict outdoor art in the Tucson area from a variety of locations and by various artists. Locations include South Tucson, El Rio Neighborhood Center, downtown Tucson, Pueblo Gardens, Tucson Urban League, North Stone Avenue, South Sixth Avenue, and the Santa Cruz River Linear Park.

# Chapter One

## Introduction to Environmental Justice

*“Environmental justice should comprehend the claims of poor communities because they suffer from economic disadvantage, communities of color because they have chronically been victims of discrimination, and tribal communities because they typically have been denied full protection of their rights to culture and self government under the law.”*  
Getches and Pellow 2002

The goal of the national environmental justice movement is to assure that minority and low-income people do not suffer disproportionately from actions such as siting of landfills, air pollution, contaminated water, toxic waste, and other environmental pollution problems. In recent years the concept has begun to spread to other governmental actions, such as land use more generally. Although the environmental justice movement had its origins in African-American churches and has been centered around racial inequities, some people in the field believe that income levels are a more significant factor in determining environmental justice.

The purpose of this report is to look briefly at past and present situations where disadvantaged groups in Pima County have been disproportionately impacted by water and air pollution and the impacts of sprawl and to ask how the Sonoran Desert Conservation Plan (SDCP) might impact those people in Pima County. The first eight chapters examine specific issues and impacts in the past and present. Chapter Nine summarizes conclusions and the possible positive and negative environmental justice impacts that the SDCP may have in each of these areas.

An analysis of the impacts of the SDCP on environmental justice is required as part of the SDCP Environmental Impact Statement, but this analysis will go beyond what the federal government requires. This report includes cultural, social, and fiscal issues.

In looking at unjust situations, it is often not easy to determine cause and effect. If more low-income people live near industrial areas than do high-income people, is this because the industry was intentionally sited in a low-income area, or because the cost of housing is lower near industrial areas?

This report does not address all possible civil rights issues, but only those that could be affected by decisions made as part of the SDCP. The SDCP is not designed as a vehicle for correcting past envi-

ronmental wrongs, but part of its mission is to assure that the plan does not create new inequities. The SDCP cannot address wrongs against Native Americans of the 19<sup>th</sup> century, for example, but may offer some benefits to Native Americans today.

Two basic questions have a central role in environmental justice analysis:

1. Was the action taken because decision makers considered the impacts of the disadvantaged groups less important than they would have been if the group were high income? For example, is industry more often located in minority areas? If so, is this because the land was cheaper, the people didn't protest, or because it was close to potential employees? How much do zoning codes affect location of facilities? In Pima County there are only a few areas where new industry can be located without a zoning change.

2. Is the official response to an action or incident different because the affected group is low income or minority? For example, would elected officials have taken the TCE pollution in Tucson more seriously at an earlier date if it had occurred in the high income, predominately white foothills area rather than in the low income, predominately minority areas near the airport?

### Definitions of Race and Ethnicity

The dictionary defines “race” as “a local geographic or global population distinguished as a more or less distinct group by genetically transmitted physical characteristics.” It defines ethnicity as “a social group within a social or cultural system that claims or is accorded special status on the base of complex, often variable traits such as religious, ancestral, linguistic, or physical characteristics.”

Race is in many ways an arbitrary way of classifying human beings and the definitions are a subject of debate among anthropologists. The U.S. census has gone from only two classifications – “White”

and “Negro” to a multiplicity of classifications in the 2000 census. “White” usually refers to people of European heritage, but often excludes people of Spanish European heritage who fall into their own category. “White” includes people from a wide range of European backgrounds from Central Russia to the Mediterranean and Scandinavia. Ethnic groups within this category include Greeks, Italians, etc. Locally, the term “Anglo” refers to people of European heritage other than Hispanic. Hispanic (under various names such as Spanish, Latino, Mexican, or Chicano) generally includes anyone with a Spanish (or often also Portuguese) surname or with a portion of such ancestry, whether from Europe, South America, the Philippines, or Tucson. This only became a separate census category in the mid-20<sup>th</sup> century and is treated in the 2000 census as an ethnic group rather than a race. Native Americans are usually grouped into one category instead of recognizing the multiplicity of heritages they represent. Similarly the term “Black” or “African-American” refers to people at least partly of African heritage from areas south of the Sahara Desert, although they, too, represent a multiplicity of heritages. Finally, large numbers of Americans are a mixture of more than one of these categories, although traditionally a person with a partially minority heritage has been classified with the minority group rather than as “White” except in some Caribbean countries where part White is classed as “White.” For the first time in 2000 the census included a classification of “mixed.” Classification by color is especially misleading. “Blacks” come in shades of brown to beige and “Whites” come in shades of beige. We no longer refer to “Red Indians” or “Yellow Chinese” but these were common terms in the past. For the purposes of this report, we use the U.S. census classifications of “minorities” or “White.” It should be noted, however, that internationally “White” is not the majority group.

### **Definitions of Environmental Justice**

Environmental justice has been defined generally as the pursuit of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, and/or socioeconomic status. This concept applies to governmental actions at all levels — local, state and federal — as well as private industry activities. Some more specific definitions are below.

*Environmental Justice* is the right to a safe, healthy, productive, and sustainable environment for all, where “environment” is considered in its totality to include the ecological (biological), physical (natural and built), social, political, aesthetic, and economic environments.

Environmental justice refers to the conditions in which such a right can be freely exercised, whereby individual and group identities, needs, and dignities are preserved, fulfilled, and respected in a way that provides for self-actualization and personal and community empowerment. This term acknowledges environmental “injustice” as the past and present state of affairs and expresses the socio-political objectives needed to address them.

*Environmental Equity* is an ideal of equal treatment and protection for various racial, ethnic, and income groups under environmental statutes, regulations, and practices applied in a manner that yields no substantial differential impacts relative to the dominant group—and the conditions so-created. Although environmental equity implies elements of “fairness” and “rights”, it does not necessarily address past inequities or view the environment broadly, nor does it incorporate an understanding of the underlying causes and processes.

*Environmental Racism* is “Racial discrimination in environmental policy-making, enforcement of regulations and laws, and targeting of communities of color for toxic waste disposal and siting of polluting industries,” according to Reverend Benjamin E. Chavis, Jr., Ex-Chairman of the NAACP. Racial discrimination can be intentional or unintentional and is often a manifestation of “institutional racism.” This term acknowledges the political reality that created and continues to perpetuate environmental inequity and injustice.

*Environmental Classism* is the results of and the process by which implementation of environmental policy creates intended or unintended consequences which have disproportionate impacts (adverse or beneficial) on lower income persons, populations, or communities. These disparate effects occur through various decision-making processes, program administration (e.g. Superfund clean-up schedules), and the issuance of regulatory actions such as compliance inspections and other enforcement measures such as fines and penalties, and administrative and judicial orders. Flawed policies formation processes coupled with agency norms, priorities, traditions, and profes-

sional biases often make implementation subject to these disproportionate consequences. (Bryant 1995)

### **Principles of Environmental Justice**

In 1991 people from many nations met to discuss environmental justice issues in the People of Color Environmental Leadership Summit. The group adopted seventeen principles which are listed in full in Appendix A. The principles most relevant to this report are numbered at the end of each in the order they appear in the statement:

◆ Environmental justice affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction. (1.)

◆ Environmental justice demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias. (2.)

◆ Environmental justice mandates the right to ethical, balanced and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things. (3.)

◆ Environmental justice must recognize a special legal and natural relationship of Native Peoples to the U.S. government through treaties, agreements, compacts, and covenants affirming sovereignty and self-determination. (11.)

◆ Environmental justice affirms the need for urban and rural ecological policies to clean up and rebuild our cities and rural areas in balance with nature, honoring the cultural integrity of all our communities, and providing fair access for all to the full range of resources. (12.)

◆ Environmental justice calls for the education of present and future generations which emphasizes social and environmental issues, based on our experience and an appreciation of our diverse cultural perspectives. (16.)

Chapter 9 of the report looks at how the Sonoran Desert Conservation Plan fits in with these principles.

### **Beginnings of Environmental Justice**

Environmental justice had its beginnings in the speeches of leaders such as Martin Luther King who claimed that people of color were more often targeted for undesirable facilities and suffered from the impacts of pollution more often than whites.

The catalyst for the Environmental Justice was a

small, low-income, predominately African-American community in the south, Warren County, North Carolina. In the 1970s a landfill was planned on those lands to be used for the disposal of PCB contaminated soil, removed from 14 sites throughout the state. Many demonstrations occurred to protest this landfill.

At the request of congressman Walter Fauntroy, the US General Accounting Office conducted a study of eight southern states to determine the correlation between the location of hazardous waste landfills and the racial and economic status of the surrounding communities. The results showed obvious bias in the placement of the landfills: three out of every four landfills were located near predominantly minority communities.

Another study found that three out of every five African-Americans and Hispanics live in a community where there are unregulated toxic waste sites. The commission also noted that African-Americans were heavily over represented in areas with the greatest number of toxic waste sites. While race plays a great part in determining the location of hazardous waste landfills, the study found that economic status is also important.

Closely following this was a study by the National Law Journal. It found that the Environmental Protection Agency (the EPA) took 20% longer to cite abandoned polluted sites in minority communities as a priority, as compared to the time it took the EPA to prioritize sites in white communities. It also noted that polluters of minority communities paid fines 54% lower than polluters of white communities. This led to major changes in federal policy. (Bryant 1995)

### **Federal Policies on Environmental Justice**

In February 1994 President Clinton issued an Executive Order directing federal agencies to take environmental justice into account when taking actions that might affect minority and low-income populations. This begins with the following goal:

“To the greatest extent practicable and permitted by law, and consistent with the principles set forth In the report on the National Performance Review, each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies,

and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana islands.”

The full Order is in Appendix B.

As a result of this order, federal agencies developed policies on environmental justice. The U.S. Environmental Protection Agency plays a major role in this effort and has adopted a policy with includes the goal to assure that:

“No segment of the population, regardless of race, color, national origin, or income, as a result of EPA’s policies, programs, and activities, suffers disproportionately from adverse human health or environmental effects, and all people live in clean, healthy, and sustainable communities.”

Environmental justice is now one of the many factors that must be considered in Environmental Impact Statements.

In 1997 the federal Council on Environmental Quality issued guidance on environmental justice for federal agencies. When stating the general principles CEQ cautioned that each community or part of a community has its own history and situation and studies must be sensitive to the needs of each par-

ticular situation.

### Environmental Justice Organizations in Pima County

The most active environmental justice organization in Pima County has been Tucsonans for a Clean Environment (TCE). This group formed around the issue of TCE contaminated water on the south side. (see Chapter 3) TCE joined forces with Toxic Waste Investigative Group (TWIG), a Maricopa County based group involved with similar issues in that area. Local environmental groups have been slow to become involved in these issues. The Sierra Club has been involved in toxics issues throughout the state, but has not specifically focused on issues related to environmental justice. In the 1970s the Group Against Smelter Pollution (GASP) was instrumental in improving air quality by achieving tighter regulations on smelters and in some cases having smelters closed. The Arizona Lung Association has also been instrumental in improving air quality generally. Jeanne Clarke in a 1998 article asserted that the environmental groups have been remiss in not joining forces to deal with issues such as landfill siting on Tucson’s south side. (See Chapter 3) She also shows the importance of two Hispanic elected officials in Pima County in bringing these issues to public attention and achieving change. Other groups

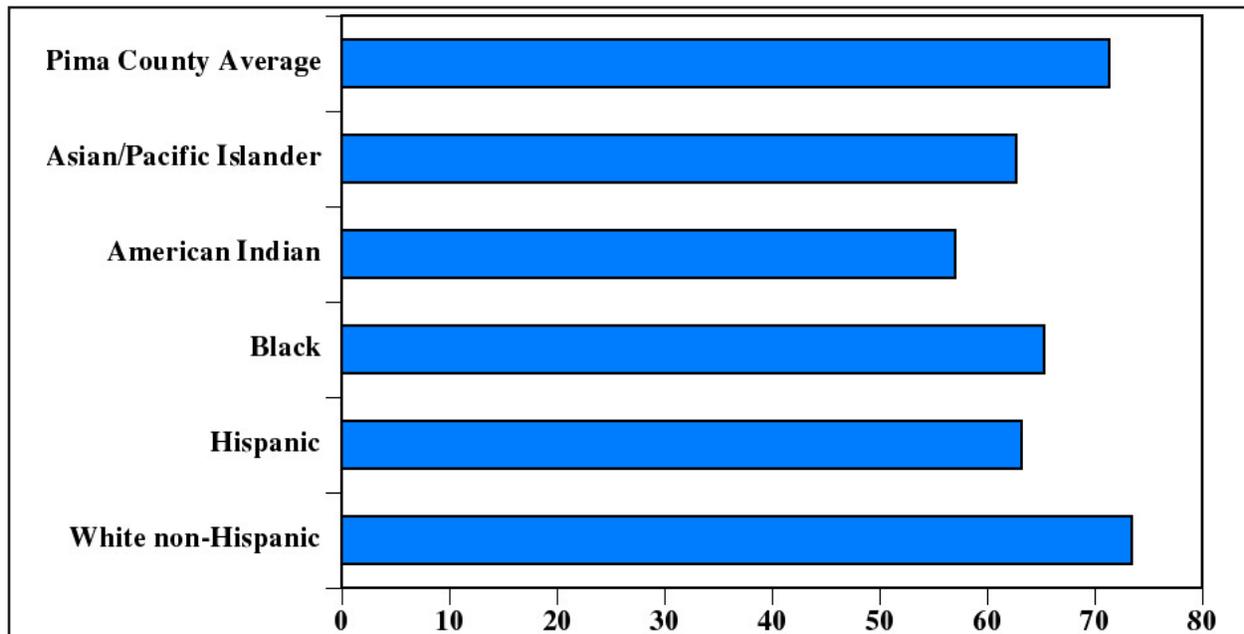


Fig. 1-1. Average Age of Mortality among Groups in Pima County

Source: Pima County Health Department

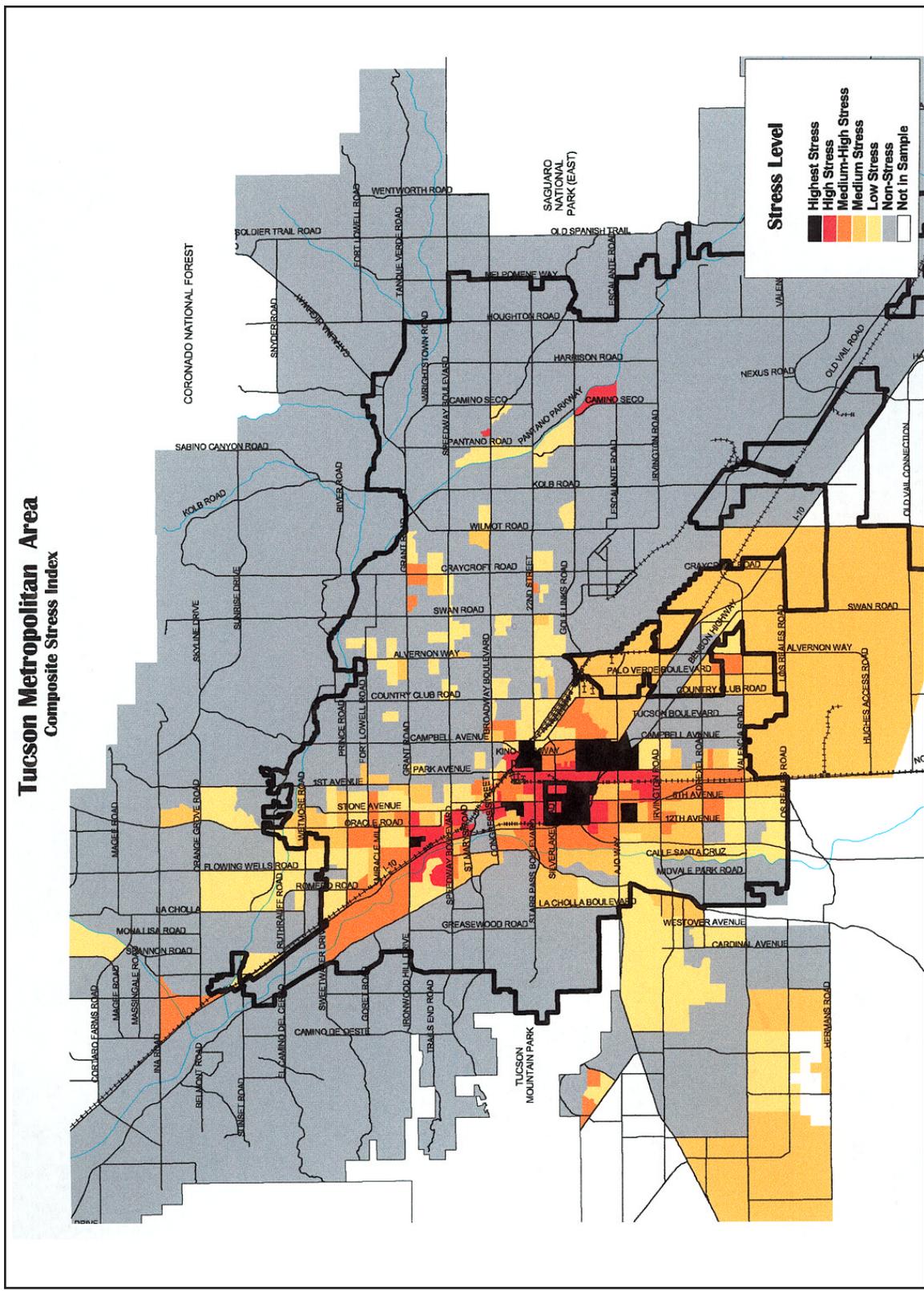


Fig. 1-2. Neighborhood Stress Index. Source: City of Tucson Planning Department.

that have been involved in specific issues are the Environmental Justice Action Group which was involved in the Brush Wellman situation (See chapter five) and the Southwest Network for Environmental and Economic Justice.

### **Health, Social Issues, and Environmental Justice**

The health of various ethnic groups varies greatly. Fig.1-1 shows the average age at death for the major ethnic groups in Pima County. This ranges from 81.2 for white females to a low of 51.1 for Native American males. Does it, however, follow that environmental factors are the cause of this disparity? No, many other factors influence longevity. American Indian and black children between the ages of 14 and 24 have a much higher mortality rate than Asian or non-Hispanic white children. Blacks get AIDS at a rate about three times the average for all Arizonans. Non-Hispanic whites are more likely to die of coronary heart disease than all other ethnic groups, but less likely to die of diabetes which disproportionately affects the O'odham. Whites are less likely than blacks to die of homicide but more likely to die of suicide.

The role of environmental pollutants is very difficult to separate out from the many other causes of disease and injury. Genetics, life style, access to medical care, inadequate diets and many other factors come into play. Epidemiological studies may reveal a cause and effect relationship between a pollutant and an effect, but this is often difficult to determine. Extraneous factors such as age, occupation, and life style have to be sorted out from the

potential environmental cause. Mobility of contemporary people complicates matters because people are exposed to a variety of possible causative agents in different locations. Sample size is critical. The number of people to be studied after those who do not qualify for various reasons may be too small to draw conclusions. Anecdotal information is inadequate to draw proper conclusions, especially in cases where there may be more than one explanation of an effect. (Talbot 1995)

The City of Tucson Planning Department produced a report on community stress and a map of indicators of stress in the community to assist with the Community Block Grant program. (Fig. 1-2) The criteria for determining stress levels included factors such as percentages of minors and seniors in the area, problems speaking English, disability, poverty, unemployment, crowding, sanitation, and age of housing. The areas with the greatest indicators of stress are predominantly low income and minority areas. Compare with Figs. 2-3 and 6-3.

Zero Population Growth did a similar study for metropolitan areas in the United States in 1988 (Urban Stress Test) that used different criteria to determine stress including violent crime, air quality, education, poverty level, water quality, rate of population growth, and crowding. At that time Tucson was average with a rating of 3.5 out of 5. The 2001 version of that study is called "Kid Friendly Cities" and the same general criteria are used along with new ones such as parks. This time the Tucson area earned a B+ while the Phoenix area earned a C-. That study looked at metropolitan areas as a whole and did not look at regions within urban areas.

# Chapter Two

## The Diversity of Cultures in Pima County

*“One thing I really miss about the Old Drachman is that courtyard. There were some beautiful rose bushes that just bloomed their hearts out, and they never had any care. ... in that courtyard a lot of things took place. I remember the Cinco de Mayo celebrations. The children would dance, and there would be lots of paper flowers ...” Kelly 2000.*

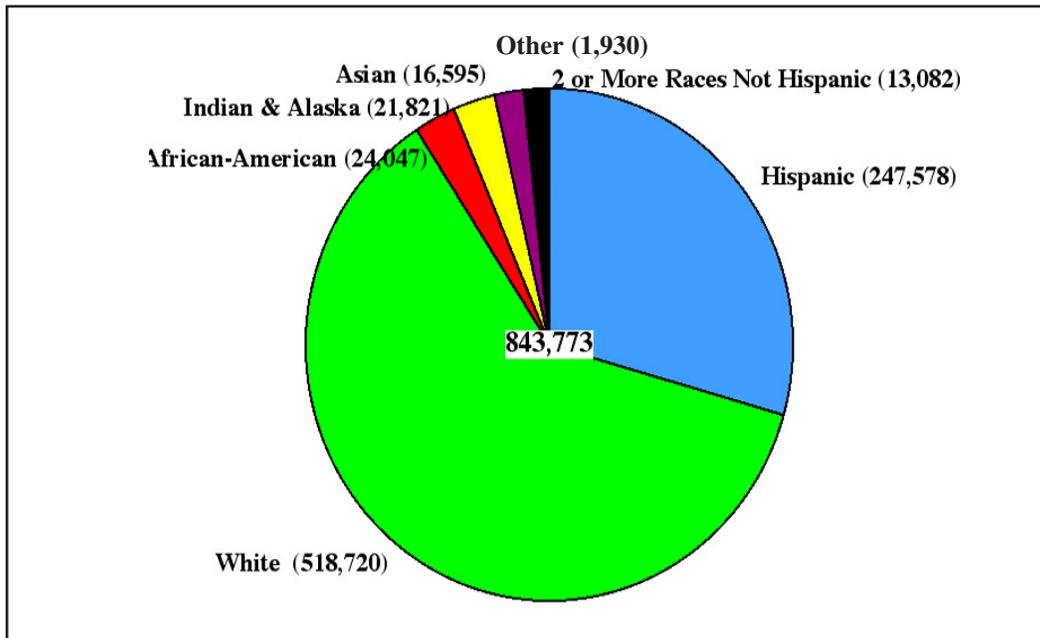
There are numerous examples of past environmental inequities in Pima County some of which affect the health and welfare of low-income and minority residents to this day. The major ones are described below. Because of the way Tucson grew, low-income and minority residents have a greater possibility of living in areas where the groundwater and soil are contaminated by old landfills, industrial pollution, and hazardous waste sites. This is because what was once the edge of town may now be a neighborhood with lower land values where the cost of living is lower. Within city limits 19.2% of the population is below the federally established poverty level while in Pima County as a whole, 15.2% is below that level. Nearly two-thirds of those below the poverty level are under the age of 18. (U.S. Census)

Higher income people have in most cases chosen to live in areas which are now the outskirts of town without a history of pollution. Industrial sites

tend to be along the transportation routes which traverse some of the low-income neighborhoods. Some established low-income minority neighborhoods were affected severely by construction of the freeway, construction of the city-county government buildings, and by urban renewal and construction of the Tucson Convention Center, as discussed below.

### Changes in Racial and Ethnic Distribution in Pima County Over Time

The various groups have arrived in Pima County at different times and for very different reasons. This affected housing patterns and racial interactions. Fig. 2-1 shows the current percentages of racial/ethnic groups in Pima County. Figs. 2-2 and 2-3 show racial distribution in Pima County in 1990 and 2000. For the purposes of this report, the only differences mapped are “white” and “minority.” It is clear that as the community has expanded, most of the new fringe areas continue to have very low minority population



**Fig. 2-1. Racial-Ethnic Composition of Pima County Population in 2000.**

Source: U.S. Census



# Percent of Whites by 2000 Census Tracts

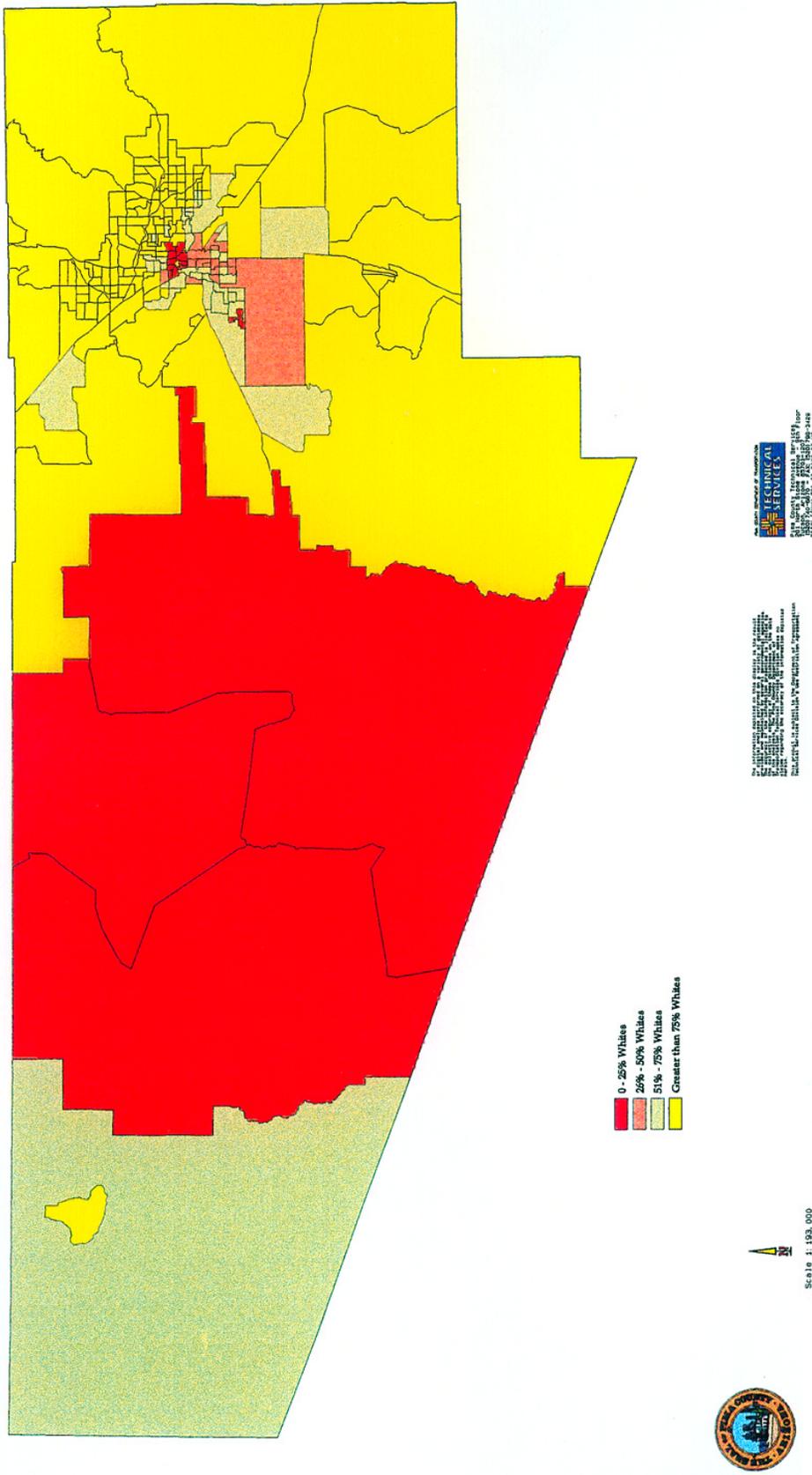
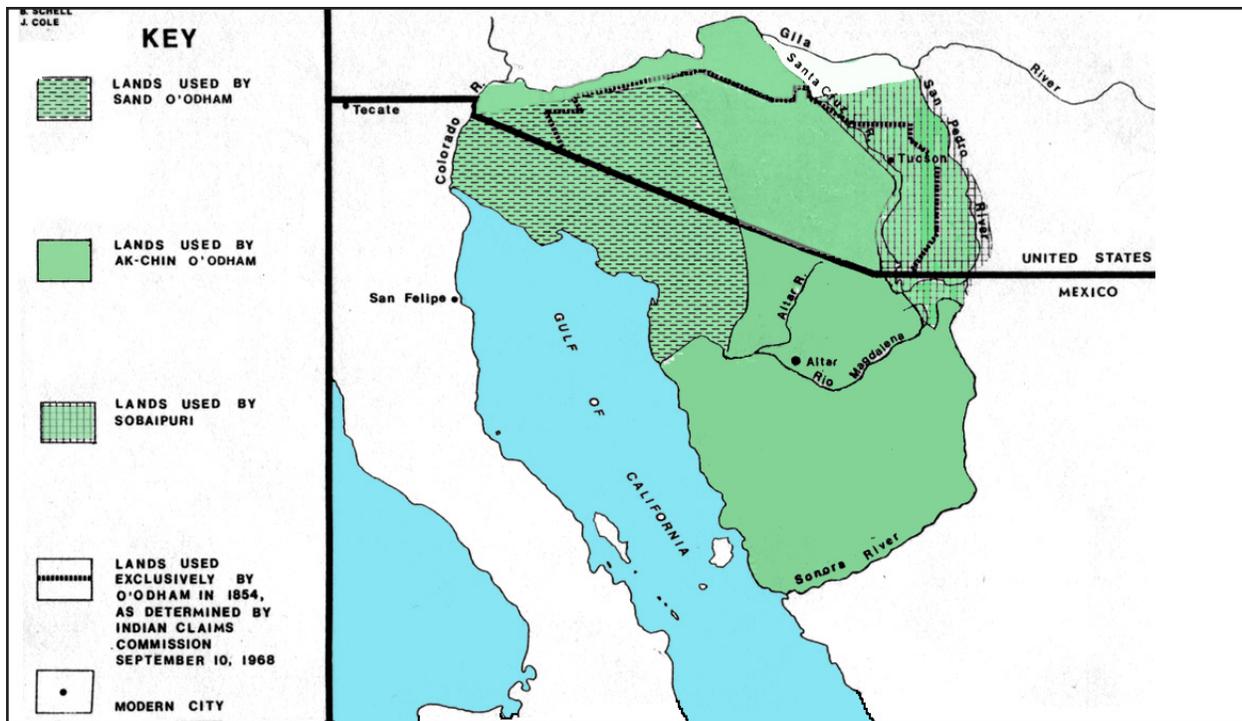


Fig. 2-3. Racial distribution in Pima County 2000. Source U.S. Census.



**Fig. 2-4 The Traditional O’odham Homeland.**

Source: Adapted from Tohono O’odham: History of the Desert People.

levels. Also see figures 6-3 and 6-4 for maps of income levels in Pima County.

### O’odham

For thousands of years the only inhabitants of the area were various Native American groups. The O’odham have been in the area for many, many centuries or as they say “since the dawn of time.” The O’odham themselves and many historians consider them to be descendants of the Hohokam people, although there are other theories. The ancestral homeland at the time of Spanish arrival included much of the land south of the Gila River from the San Pedro River to the Colorado River. It also extended into Mexico south to the Rio Sonora. (Fig. 2-4) The Spaniards occupied specific places within that homeland (usually prime locations where there were reliable water supplies), but the O’odham continued to occupy most of the entire area. When Arizona became part of the United States, the O’odham homeland was split between Mexico and the United States. Subsequently, the Anglos occupied much of the O’odham homeland within the United States. In 1864 the U.S. set aside the first O’odham lands – about 5 square miles at San Xavier. In 1874, President Grant set aside some 71,090 acres for the O’odham establishing the San Xavier Reservation.

In 1890 41,000 acres were allotted to 291 individuals there. Subsequently the U.S. Government established the Gila Bend Reservation but later took more than 12,000 acres away from it. In 1912 the Ak-Chin Reservation was established and in 1916 President Wilson set aside 3.1 million acres for the Papago Reservation, with its headquarters at Sells, but in 1917 took back 475,000 acres. This land was returned during the Depression. Additional lands were added at various times, but in 1937 the government took 520 acres for Organ Pipe National Monument. Subsequently, the size of the reservation was reduced even more for the Cabeza Prieta Game Range and Luke-Williams Air Force Base (including the Goldwater Bombing Range). In 1951 the O’odham petitioned the U.S. government for payment for land taken and in 1968, the U.S. government paid the O’odham \$26 million for lost lands. The O’odham Tribe’s (then Papago) 1985 book on O’odham history has a lot of good information.

### Apaches

The Apaches are an Athabaskan-speaking people closely related to tribes in northwest Canada and Alaska. These tribes were nomadic, moving towards food supplies such as caribou. For unknown reasons, probably related to the search for food, groups of

Athabaskan people moved south and eventually reached the southwest United States in the 16<sup>th</sup> century. Some of these people settled in the Four Corners Area and became known as “Navajo.” Others moved farther south – what we know today as the Chiricahua Apaches, the San Carlos Apaches, the White Mountain Apaches, and others. For the most part the Apaches continued their nomadic lifestyle augmented by horses that the Spaniards had brought to the area. Their nomadic lifestyle came into conflict with the lifestyles of the O’Odham who lived in villages. Apaches often lived in the mountainous areas, coming to the valleys to seek food and raid the local tribal groups, Spanish settlements, and later Anglo settlements. The U.S. government settled the Apaches onto reservations in east central and northern Arizona – the San Carlos Apache Reservation and the White Mountain Apache Reservation and some were sent to Florida or Oklahoma at the end of the nineteenth century. A detailed book on the Apaches is James L. Haley’s *Apaches : a History and Culture* portrait.

### **Hispanics**

The first Spanish forays into the area were in the mid-16th century, but it was not until the late 17<sup>th</sup> century the first Spaniards began to settle in the area, but their numbers were very small compared to the O’Odham. Some of the original Spanish founding families became a wealthy elite who formed the basis for a group of influential Hispanic families over the years. When Pima County became part of the United States in 1854, Mexican settlers began to migrate north hoping for a better life, a trend that continues to the present. By the time the first Anglos settled in the area after 1854, Hispanics and Native Americans dominated Pima County, but intermarriage between Anglo men and women of the upper class Spanish families was relatively common. Sheridan’s book *Los Tucsonenses* provides a wonderful description of the Hispanic community from 1854-1941.

### **Anglos - Whites**

A few intrepid explorers from the United States entered Arizona as early as the 1820s, but it was the 1848 California Gold Rush that brought them traveling through in droves. After the Gadsen Purchase in 1854 more Americans came to stay, but it was not until after the Civil War and arrival

of the railroad that Anglo numbers increased rapidly until they became the majority population in the early twentieth century which they continue to be to this day, although the percentages have begun to decrease. Sonnichsen’s 1982 book describes the history of Tucson and its cultures, with emphasis on the spread of Anglo culture in the area.

### **African-Americans**

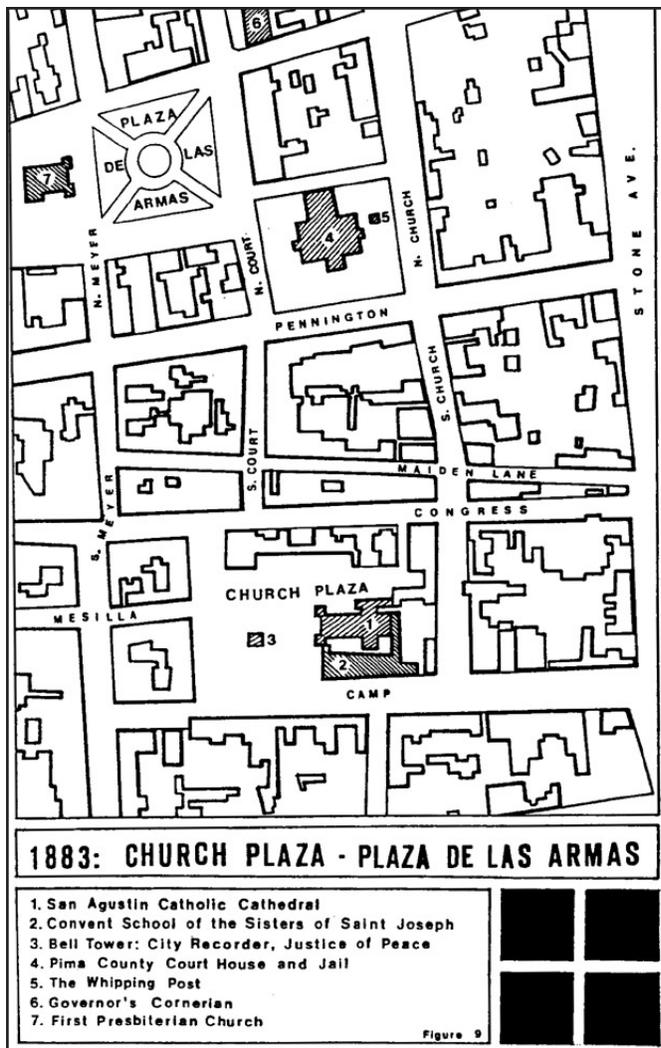
A few Africans arrived with the Spanish Conquistadors. The start of Afro-American immigration, however, really began with people who came to the area as Buffalo Soldiers in the 1860s. Some of them stayed or returned as the years progressed and slavery was abolished in the United States. Many intermarried with other minority groups. With the increased development of agriculture in the early 20<sup>th</sup> century other African-Americans came to work in the fields. Some worked as domestics and often lived at their employers’ home. Another wave of African-Americans arrived after World War II when people of many races settled in Tucson where they had been stationed during the war or where they had worked in the aircraft industry. Lawson’s two volume history of African Americans in Tucson is a wealth of information. (1996 and 2000)

### **Chinese**

A few people of Chinese heritage came to the area to work mines and even more arrived along with the railroad which they had helped to build in the 1880s. These people tended to be vegetable farmers and merchants. The first Chinese settlement was on the west side of the Santa Cruz River near Solomon Warner’s mill and the agricultural fields. By 1880 most Chinese lived along Main Street near Pennington but by 1900 the original settlement began to be deserted and Chinese lived along Main Street as far south as Cushing Street. Tucson never developed a true “Chinatown” as so many other western cities had. Chinese markets were an important part of Tucson life into the twentieth century. Lister’s 1989 book on the Chinese community provides much information.

### **Yaquis**

For centuries, the Yaqui have lived along the Yaqui River in the state of Sonora where they farmed in small communities. They came into contact with the Spaniards in the mid 16<sup>th</sup> century. By 1700 the



**Fig. 2-5. Downtown Tucson in 1883, based on the Spanish town layout.**

communities had organized into eight towns with a unified governmental structure. In 1887 Yaquis started coming to Arizona to escape political turmoil in Mexico. The major Yaqui communities were in the Tucson area and in Guadalupe, near Phoenix. In 1964 the federal government established the Yaqui Reservation on Tucson's southwest side and in 1978 they were officially recognized as a tribe. Pascua Village, however, continues as a major Yaqui community just north of downtown Tucson.

### Other Ethnic Groups

People of many other heritages live in the Tucson area: Vietnamese, Japanese, South Pacific, Armenian, and others. The Tucson Meet Yourself Festival, first organized in the 1970s, was a celebration of the diversity of cultures in the area and 40

different ethnic groups participated in the first festival.

### Changes in Housing Patterns over Time

In the early days Tucson was small and people lived within walking distance of each other and the stores and workplaces. The town was laid out as a typical community, combining elements from Spain and Mexico. Adobe was the most common construction material. House fronts were at the street, with no front yards, but many homes had gardens in the rear or in interior courtyards. In many cases the houses were connected row houses. The town layout also followed the Spanish pattern, in which a central plaza was the community meeting place. In Tucson as in many other western towns, there were also smaller plazas that served as meeting places. Fig. 2-5 shows the layout of Tucson in the Spanish period.

Spanish architecture prevailed until the early 20<sup>th</sup> century when architectural styles common in places like New England began to dominate the town. Houses were mostly built of brick or wood and set back from the street with front yards and back yards, but no interior courtyards. They often had outside porches and gabled roofs. The Anglos preferred detached houses on large lots rather than row houses. Fig. 2-6 shows the layout of Tucson in the early Anglo period.

The major streets ran east and west, with some important north-south streets such as Main Street (Camino Real) which was originally the main route from Tucson to Sonora. Other north-south streets developed over time as the community expanded north of Speedway. (Maclaury 1989). Oracle Road, for example, had a bridge for crossing the Rillito where the paving stopped although the road went on unpaved all the way to Phoenix in the early 1900s.

As growth extended to the east, Broadway and Speedway became major east-west thoroughfares that allowed people to live farther and farther from downtown. The town basically remained on a grid street pattern until the development of suburbs and planned developments after World War II. A new street pattern emerged in many of these new areas—one that featured curved streets and cul-de-sacs. Fig. 2-7 shows a typical neighborhood in the 1990s. This type of layout is discussed more in Chapter 6.

Nationally the civil rights movement began to

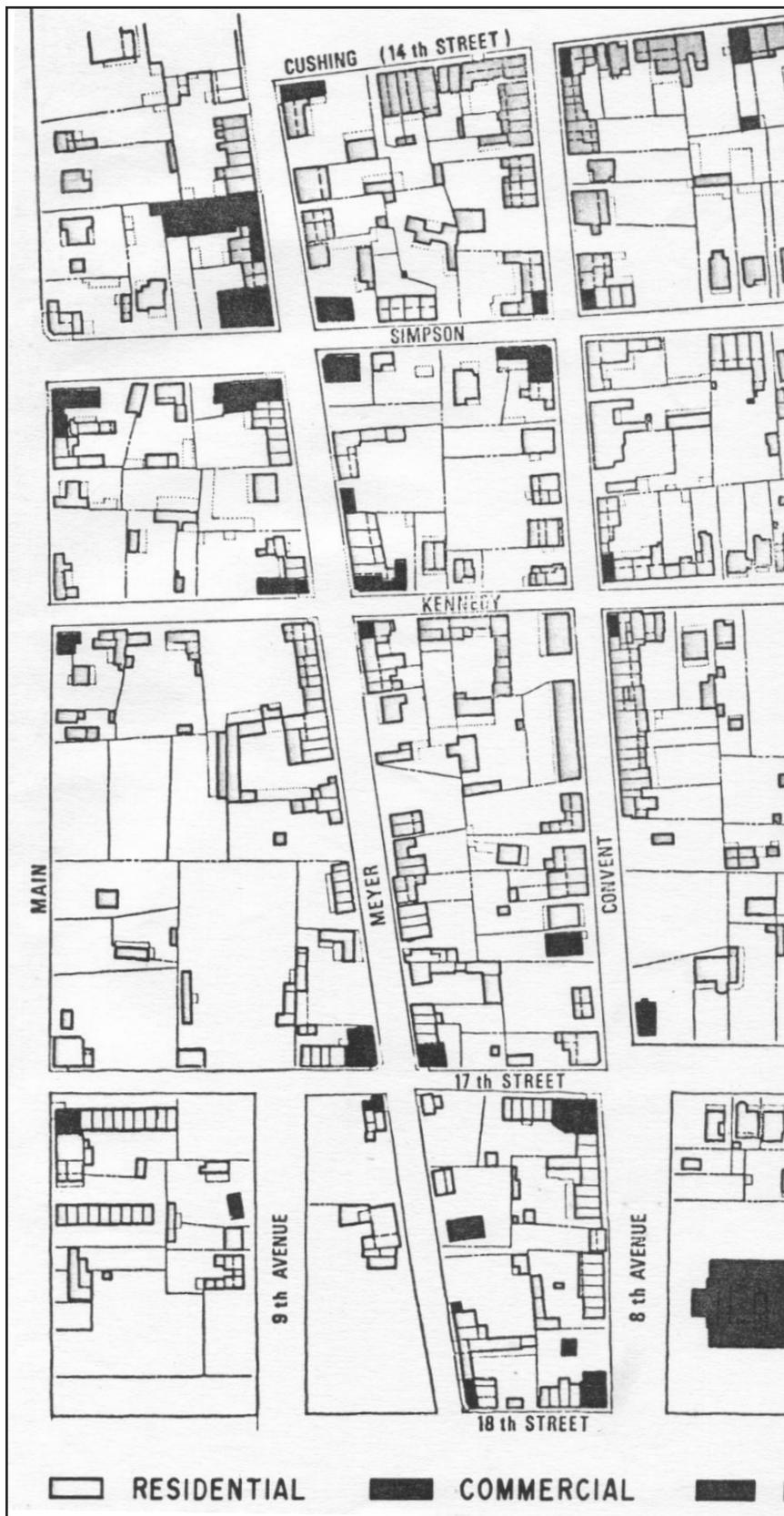


Fig. 2-6. Part of downtown Tucson in 1918. Source: Maclaury 1989.

open doors for racial equality after World War II. The Supreme Court made rulings about equality in transportation, employment, schooling, housing, and other areas. These rulings, of course, affected racial equality in Pima County and schools were integrated, as were other aspects of life. Housing patterns, however, changed much more slowly and were affected both by prejudice and by income levels. With improvements in employment opportunities, more and more minorities could afford homes in the more affluent areas, which in turn impacted racial distribution.

### Segregation and Integration

When Tucson was still a very small town, there was little room for segregation since most people lived within a few square miles of each other, except for the O’Odham who utilized lands from the San Pedro River to the Gulf of California and the Apaches whose territory went even farther east and north.

Native Americans lived at places like San Xavier, Sells, and to some extent on Tucson’s south side. Hispanics tended to live in the barrios in the downtown vicinity. Orientals and blacks tended to live on the south side and whites expanded to the north and east as the town grew. Schools were segregated until the 1950s and 1960s. Gertrude Mason, a progressive planning advocate in the 1930s made a radical suggestion that “Negro” and “Mexican” children should be allocated a place to play in the city parks, instead of parks



portation and employment. One response to this Act was development of a transportation system in Tucson, South Tucson and unincorporated Pima County that provided a wheelchair accessible van service to people unable to use the public bus system for health reasons. More recently Pima County passed an ordinance to require accessibility features in new housing.

Finally, people have been segregated by their ability to afford to buy or rent housing. While this is common in many parts of the world, the land use patterns in much of the West accentuate these distinctions. New homes and apartments must conform to zoning codes that divide areas into classifications such as single family on large lots or on small lots, commercial, industrial, and residential. See Chapter Six for more information and a zoning map. This pattern is different from that of many European cities or cities such as San Francisco where there is much more mixture of commercial and residential, with people living above stores, for example.

The housing patterns in Pima County often mean that a car is needed to get from home to work to shopping. See Fig. 3-2 in Chapter 3 for an indication of the percentage of people who drive to work. Distances are great and it is not economically feasible to provide public transportation in many parts of the community. This in turn segregates people to a certain extent by their ability to drive. Transportation issues are discussed in Chapter 3.



**Fig. 2-8. Tucson's barrios.** Source: Arizona Historical Society



# Chapter Three

## Air Quality and Transportation in Pima County

*“Sprawl keeps a person in the driver’s seat. The suburban family, on average, makes ten car trips a day (keeping in mind that most families have two vehicles). A commuter living an hour’s drive from work annually spends the equivalent of 12 workweeks, or 500 hours, in a car. Traffic delays rack up more than 72 billion dollars in wasted fuel and productivity.”*  
 John Mitchell in National Geographic 2001.

**A**ir quality continually varies depending on the weather, temperature, and time of day. In 1997, the Rating Guide to Environmentally Healthy Metro Areas listed Tucson as a city with one of the worst air pollution problems in the nation ranking it 256 out of 317 metro areas. Phoenix ranked 309. (Weinhold 1997) In recent years, however, Pima County has seldom violated national air quality standards, largely because of requirements established under the 1970 Clean Air Act that led to improvement in emissions controls for automobiles. Air pollution comes from stationary point sources such as smoke stacks and from nonpoint sources that are mobile, such as vehicles. Pima County’s major air pollution comes from vehicles. See Fig. 3-1.

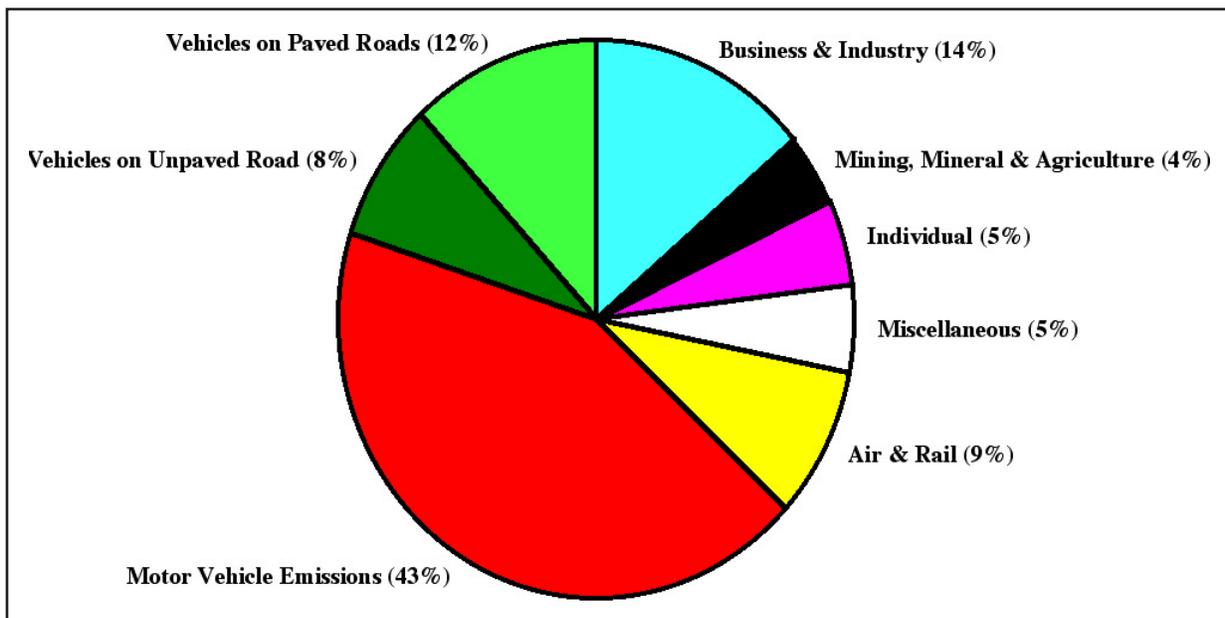
Responsibility for monitoring air quality is in the Pima County Department of Environmental Quality (PCDEQ) which produced a report for SDCP that

covers air quality in some detail. (Anon. 2001) The purpose of this chapter is to give a very short history of air quality in Pima County, summarize some of the information from the PCDEQ report, and then look at the question – “Are low income and minority neighborhoods in Pima County disproportionately affected by poor air quality?”

### Historic Problems

In past years, there were significant point sources of air pollution from industry in Pima County. The Rillito Cement Plant was at one time a major local pollution source, but now has installed control devices and is well controlled. When the plant was polluting, people living near the plant who were mostly low-income suffered disproportionately from pollution-related respiratory problems.

In 1971 the Tucson Advisory Committee on Air



**Fig. 3-1. Air pollution sources in Pima County 2001.**  
 Source: Pima County Department of Environmental Quality.

Pollution predicted that air quality would worsen as the population increase if corrective measures were not adopted. (Caldwell 1971) Significant changes were made and air quality has actually improved. The number of motor vehicles was expected to increase at an annual rate of 5.8 percent, which is lower than the actual increase, but pollution has not increased proportionately because of efficient emission controls. Automobiles have long been the major source of pollution, with the worst problems being in areas where many vehicles travel at peak times, especially in stop-and-start traffic situations. Although the number of vehicles has risen dramatically, the amount of vehicle-caused pollution has not increased because of pollution control devices required on new vehicles and the vehicle inspection program. Copper smelting was expected to increase at an annual growth rate of 8 percent. In fact, the smelters in the area have been closed mostly for economic reasons. The San Manuel smelter in Pinal County was at one time a major source of air pollution for north-eastern Pima County. Heavy clouds of pollution traveled north and south along the San Pedro River and entered the Tucson metropolitan area north of Saguaro National Park. This problem was resolved by installing scrubbers on the smokestacks. That smelter is now closed. There was at one time also a smelter in Ajo which was a major local pollution source. This smelter is also closed.

Another historic and continuing cause of pollution has been unpaved roads and construction sites from which dust blows. Along with the direct respiratory effects of dust, known to air quality professionals as "particulates," may come diseases such as Valley Fever. This disease is endemic to the southwest. Most people who get Valley Fever have only minor symptoms, but for others the disease can be serious or even fatal. The disease also attacks dogs and other animals.

Many residents of San Xavier and Tucson's south side had major air pollution problems when the Minerec Company had an air pollution release in June 1998. Some residents had previously complained of air quality problems from Minerec. The facility is located on San Xavier property southeast of the airport, but the state has jurisdiction over Indian lands in the area of air quality. The Pima County Air Quality Hearing Board conducted a public hearing on September 8. The quotes below are from the hearing minutes. The Board heard witnesses from the Minerec Company who denied a

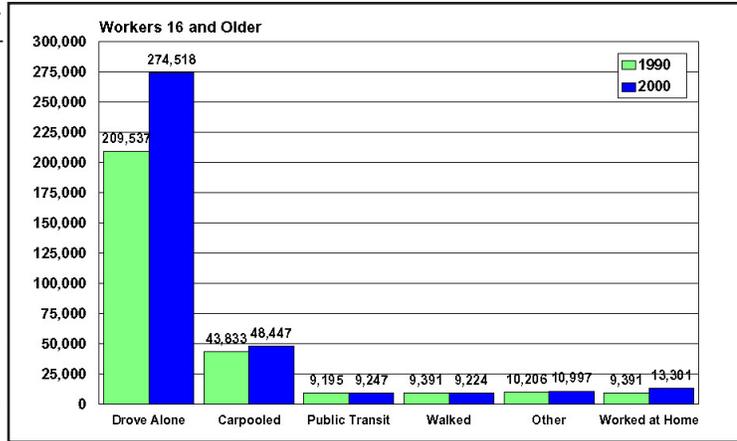
continuing problem and residents from the area. One resident said "I would like to speak about the continuing saga of Minerec. In 1992, Minerec released 5,834 pounds of toxic waste in the air. ... People were becoming ill in 1992. Minerec was given a permit in 1992 for a generator to burn their toxic waste. Minerec installed the first in 1993. We now have to put up with the releases of the toxic wastes of Minerec. ... Minerec was caught dumping toxic waste into the sewers around the Roger and Oracle area ..." Another resident who lived at San Xavier testified that "Minerec has released noxious fumes into the atmosphere not once but numerous times. ... The real issue is the constant violation of south-side residents' right to life, happiness and general well being guaranteed by the Constitution and the Bill of Rights..." " Another resident of a nearby mobile home park reported having complained about Minerec more than 30 times to the Department and the police. Another park resident stated that "people of color are being poisoned and this is the worst case of environmental racism I have ever seen." Following the hearing the Board of Supervisors upheld the department's order that Minerec be shut down.

In the mid-1990s city road workers worked on an unusual bubble in the pavement east of Davis-Monthan Air Force Base. The bubble turned out to be full of a dangerous gas and when the Pima County Department of Environmental Quality investigated the situation, they discovered an extensive problem that came from years of recycling old airplanes. In the process workers melted down the plane parts in order to recover aluminum. They tended to abandon the waste product, called "dross," from this process. Dross built up in the soil and migrated down washes. When the developer of the nearby subdivision bladed a wash through the subdivision they found a layer of this waste material. The Department worked with the residents to inform them and help them deal with the problem. It also set strict new rules for the recycling process. Companies may leave no new dross on site and must remove surface deposits. Staff decided that it would not be harmful to health or otherwise beneficial to remove subsurface deposits unless individual homeowners needed to dig in the ground. The Department did, however, recommend that people not grow vegetables in dross-contaminated soil. This is not a minority neighborhood, but tends to be occupied by low-to-middle income people working at the Base.

For industrial siting issues, see Chapter 5.

Finally pollen and molds can cause serious health problems for many people. The amount of pollen has risen along with the use in landscaping of certain nonnative as well as some native plants. Bermuda grass and mulberry trees, for example, are major sources of allergenic pollen. Local ordinances now prohibit planting of certain plants with high allergenic potential (Table 3-1) and new subdivisions have many fewer allergenic species than older parts of town where problematic pollen counts tend to be much higher than they are in the outlying areas. Pima County no longer monitors for pollen and mold and no longer has records of pollen concentrations.

Mold is primarily a problem in buildings where moisture accumulates. It can quickly become a very serious health problem if not controlled. Leaky pipes, leaky roofs, areas where water enters or exits the building are the major places where mold gets started. Leaking pipes under house foundations, for example, can accumulate moisture long before the leak is detected and repaired. Mold that gets started under the house can move upwards. Mold problems are not more prevalent in low income areas than in other parts of the community.



**Fig. 3-2. Means of Transportation to Work, Pima County 1990-2000.** Source: City of Tucson Planning Dept.

### The Current Situation

Today the major sources of air pollution are vehicles either because they pollute directly or because they drive on unpaved roads. As a result of federal legislation and a series of lawsuits, Pima County continuously monitors air quality for major pollutants. Air quality is continuously monitored at 11 sites as shown on Fig. 3-3. Each site monitors different pollutants, depending on regulations and the need to know the status of certain problem pollutants.

Table 3-1 Pima County Pollen Control Ordinance (Chapter 7.41)

The following plants produce large amounts of allergenic wind-borne pollens which are noxious and contribute to human disease:

**A. Common bermuda grass**

A. Any person maintaining lawn or open space planted in common bermuda grass shall mow that grass frequently enough to prevent pollination.

B. Any person owning land on which common bermuda grass has become established shall cause that grass to be cut or removed.

C. In no case shall bermuda grass be allowed to grow unchecked. Bermuda grass which is freely pollinating shall constitute a nuisance. (Ord. 1991-137 § 19 (part), 1991)

**B. Mulberry tree and Olive tree.** The provisions of this chapter shall not apply to Swan Hill olive trees and Wilson olive trees.

A. No mulberry tree or olive tree shall be sold in the county.

B. The sale of a mulberry tree or olive tree in the county shall constitute a nuisance.

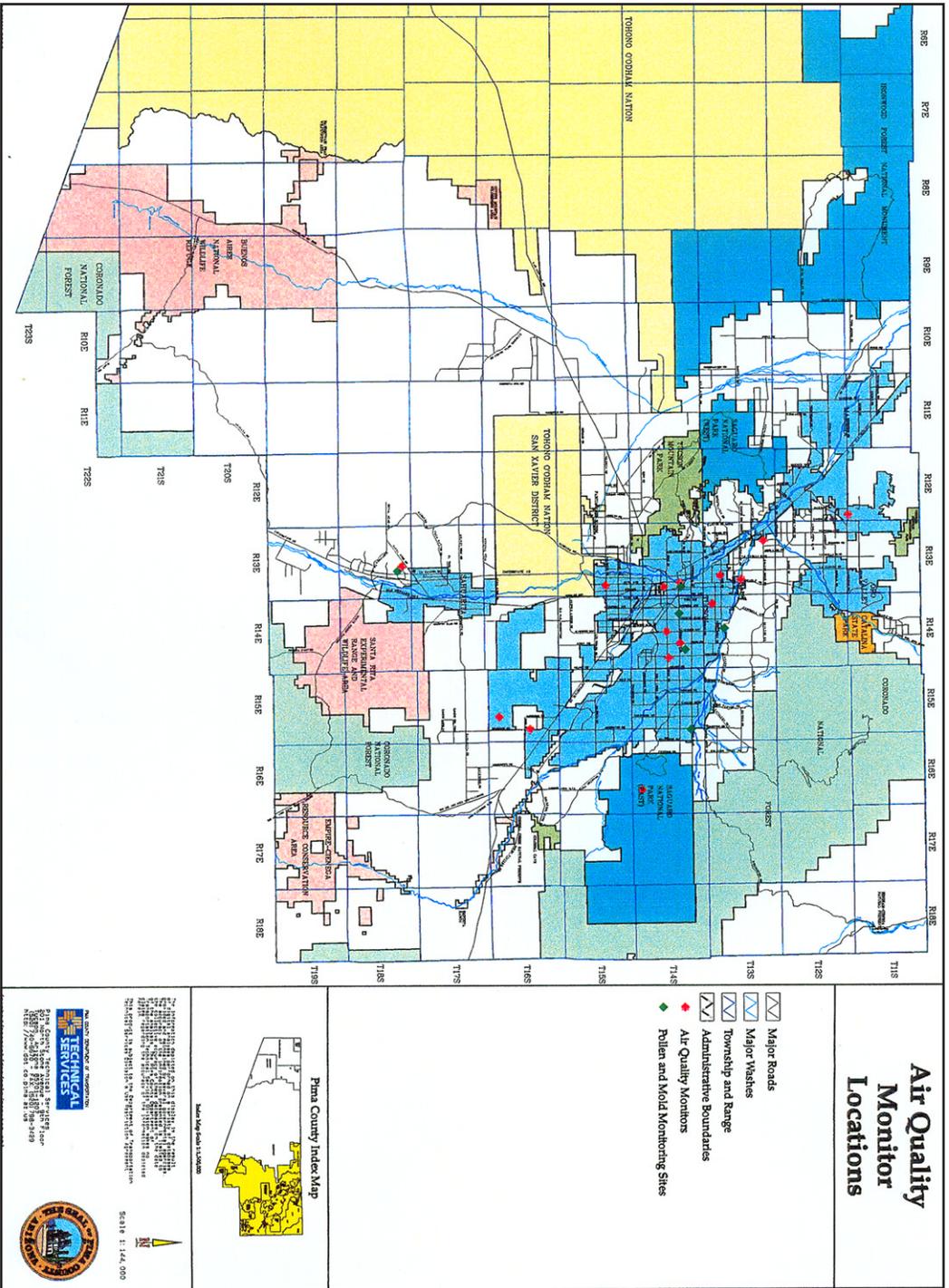
C. No mulberry or olive tree shall be planted in the county.

D. The planting of a mulberry tree or olive tree in the county shall constitute a nuisance.

**Abatement of nuisance.**

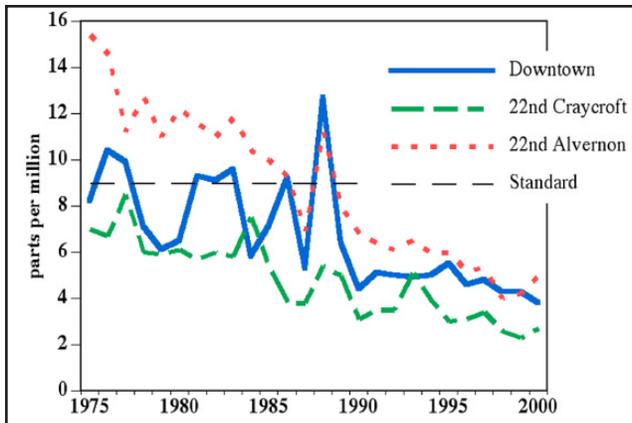
A. If a nuisance exists on private property, the director may order the owner or occupant to remove the nuisance within twenty-four hours at his/her own expense. The order may be given to the owner or occupant in person or left at his usual place of abode. If the order is not complied with, the director may cause such nuisance to be removed, and the expenses of removal shall be paid by the owner or occupant who caused the nuisance.

B. When a nuisance exists on public property, the director shall notify the responsible public official, who shall cause the nuisance to be removed.



**Fig. 3-3. Air pollution monitoring sites and former pollen monitoring sites in Pima County.** Source: Pima County Department of Environmental Quality.





**Fig. 3-5. Carbon Monoxide (CO) 8-hour concentrations in ppm.** Source: Pima County Department of Environmental Quality.

Is air quality worse in minority and low income areas than in other parts of the community? There is no evidence that this is the case. While South Tucson ranks high in pollutants from automobiles, so do the Orange Grove Road area and 22<sup>nd</sup> and Craycroft. In general, areas with the greatest traffic congestion are most susceptible to having poorer air quality. The rapidly expanding northwest part of the community has had some of the worst traffic congestion problems, contributing to the problem at Orange Grove Road. This rapidly growing area also is likely to have the most dust from construction sites, although efforts are made to water down the dust. Certain roads in the urban area are regularly very congested as vehicles from all parts of the community converge at peak hours when people travel to work or school.

### Transportation

Transportation and land use are closely related as mentioned above. Construction of new major roads opens up opportunities for development. On the other hand, the influx of people in a new area calls for construction new roads and expansion of existing ones. The way the community has grown has made it difficult and costly to provide public transportation. A rail transit system, for example, has been proposed many times, but never found to be cost-effective in this area. This is also true of most other sprawling cities. The BART system in the San Francisco area offers an attractive transportation alternative in that community because the community is developed in a compact fashion. For the destinations on the system it is usually faster and more convenient to go on BART than

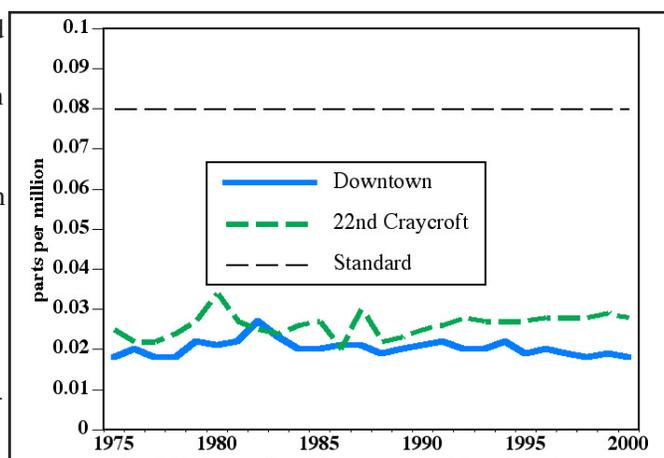
drive on crowded streets to areas where parking is scarce. In Tucson, it is usually faster and more convenient to go by car.

The current transportation system in Pima County favors people who can afford to drive at least one vehicle and whose health and age permit driving. Fig. 3-4 shows the public transit system in Pima County. The inner city has many routes, but there are few routes in the outlying areas probably because people in those areas prefer to use their cars even if bus service were available so bus service is not made available there. Also, distances are so great that it would be very difficult to design efficient bus routes. The way the community has grown has made it difficult to provide a transportation system that is not dependent on the automobile. The vast majority of people drive to work as shown in Fig. 3-2.

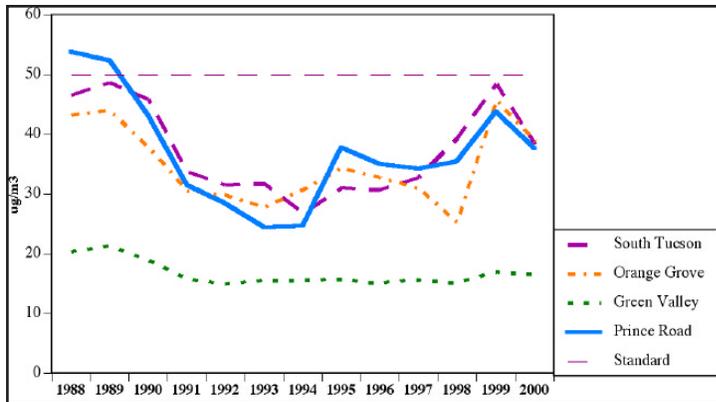
If low income housing were to be built on the urban fringes or were to be scattered around in higher income subdivisions, would lower income and minority people move there? Probably not in large numbers for various reasons, but largely because of the problems of transportation.

### The Major Pollutants in Pima County

The following information is summarized from the Pima County Department of Environmental Quality Annual Reports of various years. The sites in the graphs were chosen as representative of predominately minority-low income neighborhoods versus higher income non-minority areas. Because different monitoring stations measure different pollutants, a consistent comparison of the same neighborhoods is not possible.



**Fig. 3-6. Ozone one-hour average mean levels.** Source: Pima County Department of Environmental Quality.



**Fig. 3-7. Particulates (PM10) Annual Average.**  
Source: Pima County Department of Environmental Quality.

*Carbon Monoxide (CO)*

CO is a odorless, colorless gas produced by the incomplete burning of carbon-based fuels such as gas and wood. When inhaled, CO can enter the bloodstream where it inhibits the delivery of oxygen through the body. Low concentrations cause dizziness and fatigue. High concentrations can be fatal.

More than 70% of the CO in Tucson’s air is from vehicles. Concentrations are highest in the winter when temperatures and wind speeds are low and there is a temperature inversion. In the 1970s and early 1980s Pima County often did not meet federal standards for CO, but since 1984 there have been no violations. Fig. 3-5 shows CO levels at minority and non-minority monitoring sites in Pima County.

*Ground-Level Ozone*

Ozone is a variety of oxygen with three oxygen atoms. It comes from chemical reactions involving volatile organic compounds, nitrogen oxides and sunlight. Ozone is necessary at high altitudes to protect the earth from ultraviolet rays from the sun. At ground level, however, it impairs lung function and is especially dangerous for people with lung diseases such as asthma. Ozone levels are generally higher in the summer months because of intense heat and sunlight.

Fig. 3-6 shows ground level ozone levels at minority and non-minority monitoring sites in Pima County.

*Particulates*

Particulate matter is any solid in the form of smoke, dust, and vapors that can remain suspended in the air. They are produced from burning of diesel

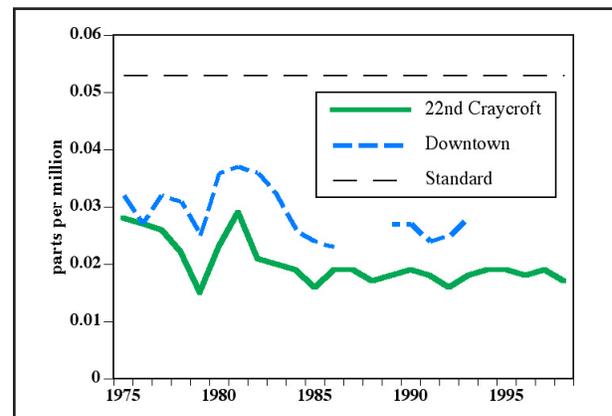
fuel, fertilizers, burning, and in Pima County one of the major sources is dust from construction and unpaved roads. Particulates create haze and reduce visibility and cause respiratory problems. Particulates come in many sizes. The current EPA standard of PM<sub>10</sub> refers to particulates with a diameter of 10 microns or less. In 1999 Pima County exceeded the federal 24-hour standards four times, but the annual averages met and continue to meet the EPA standards. Fig. 3-7 shows particulate levels at minority and non-minority monitoring sites in Pima County.

*Lead*

Lead is a highly toxic metal that causes nervous system damage, digestive problems and cancer. Now that lead is no longer used in gasoline, airborne lead is not a serious problem in Pima County. Nationally, after lead was phased out of gasoline, lead levels in the air decreased 96 percent between 1979 and 1998. Lead problems may still occur, however, in the form of old lead-based paint, some water pipes, and other sources.

*Nitrogen Oxide (No<sub>x</sub>)*

Nitrogen oxides are produced by burning fossil fuels. The most dangerous form, NO<sub>2</sub> is poisonous and highly reactive. It is one of the agents that helps form ozone and contributes to acid rain. NO<sub>2</sub> has declined since 1980 and there have not been violations of the standard. Fig. 3-8 shows NO levels at minority and non-minority monitoring sites in Pima County.



**Fig. 3-8. Nitrogen Dioxide (NO2) Annual Mean.**  
Source: Pima County Department of Environmental Quality.

### *Sulfur Dioxide (SO<sub>2</sub>)*

In Arizona, the main source of SO<sub>2</sub> is copper smelters. When there were active smelters in Pima County, SO<sub>2</sub> was a problem, but with the closing of the smelters at San Manuel, Ajo and Douglas, there is very little airborne SO<sub>2</sub> in Pima County.

### *Airborne Toxics*

This includes a variety of toxic air pollutants, including volatile organic chemicals, pesticides, herbicides, metals, and radio nucleides. These can cause a variety of health problems such as cancer, birth defects, and nervous system problems. They can be fatal. Sources include dry cleaners, auto paint shops, chemical manufacturers, and incinerators. Beryllium comes in this category. It has been a subject of controversy in Tucson. See Chapter 5 for a discussion of the beryllium problem.

### *Other Pollutants*

Other pollutants include carbon dioxide, chlorofluorocarbons, and some volatile organic compounds. These, too, do not appear to disproportionately affect low income or minority residents.

### *Odor*

Although odors are not generally health problems, they can be problems for people having to live near areas with odor problems. Temporary odor problems come from roofing, painting, and vehicle exhaust. More long-lasting odor problems can come from landfills, dairies, and wastewater treatment plants. Odor complaints are handled through the air quality permit process.

### *Radon*

Radon is a colorless, odorless, radioactive gas produced by the decay of uranium. It is present in minute quantities in many soils and can travel through soil and rock. The amount of uranium in the soil is a major factor influencing indoor radon concentration. Uranium is in many cases associated with limestone as it is in southwestern Tucson where the potential for radon contamination is the greatest in Pima County. This area is centered near the intersection of Cardinal Avenue and Valencia Road west of the airport. The levels are a maximum of

14 times the background level at this central point. Several dozen homes were tested here and found to have higher than normal levels of radon. This is a relatively low income area with high minority residency. This, however, cannot be considered an instance of environmental justice since the radon occurs naturally and is not manmade and the neighborhood was developed before radon levels were known.

Radon reaches homes by traveling as a gas through soil near and beneath the home. It decays quickly, so only the radon in the top ten feet or so is liable to reach the surface. It is quickly disseminated when it reaches the air. Cracks in concrete floors, open spaces around pipes, joints where floor meets wall and drainage outlets are good conduits for radon. The main factor in how much radon seeps into homes is the difference in air pressure between indoors and outdoors. An evaporative cooler increases the indoor air pressure, so the radon is forced out, while a heater or furnace decreases indoor air pressure and radon is sucked in.

Radon can also be trapped in groundwater. It dissipates quickly, however, once it reaches the surface and as it travels through pipes.

To learn more about radon, see *Radon: A Geological Hazard* by the Arizona Geological Survey. (Spencer 1992)

### **Urban Heat Islands**

In some large cities, the accumulation of pavement, walls, and buildings along with heat sources has led to higher temperatures in the city core than in the surrounding countryside and a steady increase in average temperatures is documented over the years. In Los Angeles, for example, the high temperature in the downtown area has increased from less than 100° to more than 105° while temperatures in nearby countryside have not shown similar rises. Similar rises have been documented for Phoenix, Washington DC, Tokyo, Shanghai, and Baltimore. In cities with proven heat island effects, the heat is generally the greatest in the inner city. No study has been done of the Tucson area, but there does not yet appear to be a significant heat island effect at the University of Arizona station, where long-term temperature records are kept.

## Chapter Four

# Water Quality and Supply in Pima County

*“A Tohono O’odham student may feel no responsibility for the toxic contamination of the aquifer beneath a Mexican American barrio in South Tucson until he discovers that the same political, economic, and social forces that removed the Tohono O’odham from their floodplain gardens along the Santa Cruz River later forced the removal of Mexican Americans from their barrios along that same river and subsequently placed them at a contaminated locale in an industrial section of Tucson. An earnest Anglo student may justifiably and resolutely refuse to accept responsibility for her great-great-grandfather’s relation to the removal of American Indians to reservations only a fraction of the size of their former territories or to the forced removal of Indian children to government boarding schools. However, she will be hard-pressed to abjure all responsibility for the cultural politics that give the dominant culture the power to deplete aquifers to keep her campus mall green ...”*

Joni Adamson 2001.

Pima County residents depend almost entirely on groundwater since there are no major flowing rivers with perennial surface water. Tucsonans have never had to deal with highly polluted rivers like the Ohio River which was once so polluted with fuels that it burst into flames. People living at the end of the Mississippi River must use water that has been used many times before upstream for cities, industry, and agriculture. Water in Pima County has, however, been contaminated by pollutants that seeped slowly through the soil down to the aquifer. Soils manage to filter out some pollutants, but others, such as salts and TCE can reach the aquifer. Since it may take many years for this to happen, the connection between cause and effect is not always obvious.

Water distribution in Pima County is quite complex. Most residents in the metropolitan area receive their water from the City of Tucson. Other important water providers in the metropolitan area are Metropolitan Domestic Water Improvement District, Flowing Wells Irrigation District, and others as shown on Figure 4-1. In addition, many people have their own wells, especially in rural areas. There are more than 20,000 private wells in Pima County.

Tucson Water serves about 80 percent of the metropolitan population and provides water both inside and outside of city limits. Most of the low income and minority residents in the metropolitan area get their water from Tucson Water. Tucson Water, however, does not serve the Tohono O’odham Nation. The University of Arizona has its own wells, but buys some water from Tucson Water.

Most of the Tucson Water system is intercon-

nected, but there are a few isolated service areas. Water for the main part of the service area comes from local wells, wells in the south and central parts of town, wells in Avra Valley, and most recently the Colorado River, via the Central Arizona Project (CAP). Because of this complexity, it is often not simple to say where the water comes from for any neighborhood as the source supply may be different at different times of year and supplies are blended. Often the blending occurs in reservoirs where water is stored until it is needed. A neighborhood may receive blended CAP and Avra Valley Water, treated water from the TARP plant (see below) and water from wells in the metropolitan area. In the summer during peak water demand times more water is pumped from wells in the metropolitan area than in the winter when there is less demand. It is certain, however, that few customers get their water entirely from wells beneath their homes. In the isolated service areas, however, supplies come from one or several wells in the immediate area.

People getting their water from other water providers are more dependent on one or a few water sources since the system is not connected to the Avra Valley system or the CAP. People with their own wells are entirely dependent on the water supply near their home. The Safe Drinking Water discussed below, requires that water delivered to customers at least meet minimum water quality standards.

Once pollution has reached groundwater it is liable to continue to move underground, flowing to a lower point. Since water is continually being pumped in the region, water may move toward areas being pumped because the level of the water table



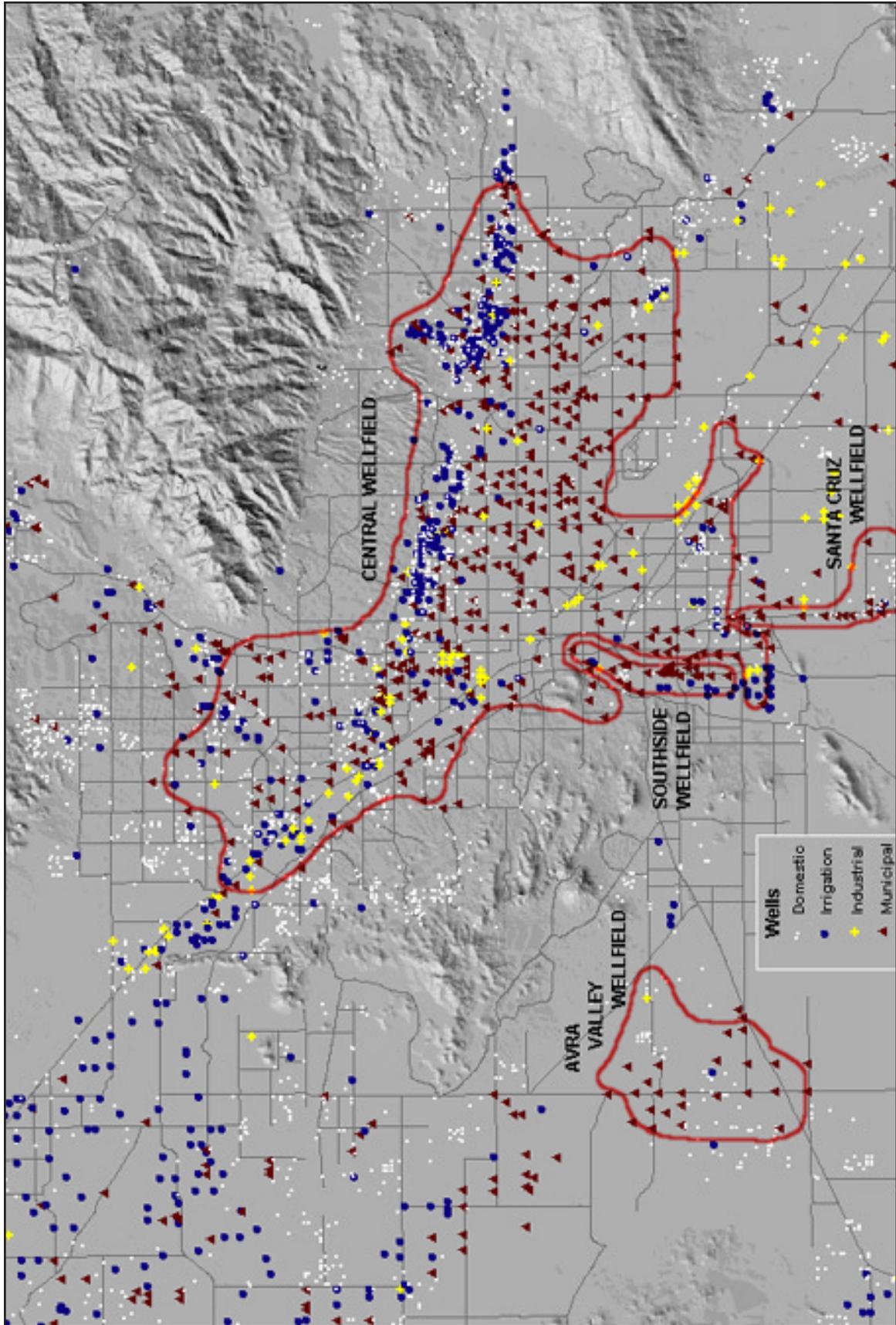


Fig.4-2- Major well concentrations in Eastern Pima County. Source: Gelt et al.

slants toward the pumping area. This is called a “cone of depression.” (Fig. 4-3) This fact makes cleanup efforts complex since pumping water to clean it up make actually promote movement of pollution toward the well. This also complicates decisions about where to recharge water, since new water entering the aquifer near the contaminated area may force the contamination to move towards wells.

### Water Quality and Health

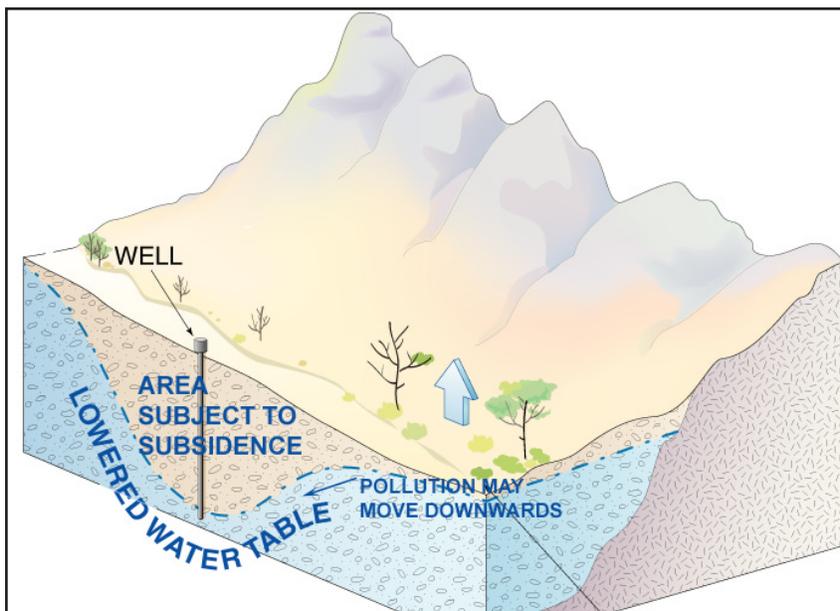
Water pollution can seriously affect human health. In the past the major health concerns were related to communicable diseases such as cholera. Modern disinfection eliminates most of those problems, but toxic materials are of concern. Even very small amounts of some substances can contribute to cancer, birth defects, lupus, and other diseases. These may be measured in parts per billion. Unfortunately, however, it is very difficult to determine cause and effect in any neighborhood or individual because there are so many other possible reasons for diseases to occur and very little is known about the causes of some diseases. A child who was born with birth defects, for example, may have them because of genetics, habits of the pregnant mother, or some environmental cause. In many cases no one knows why a child has a birth defect. If there are an unusual number of birth defects in a specific area,

health experts have reason to expect that there is something in the environment that is causing them in that location. It is difficult to prove cause and effect in situations where there is a long lag time between the cause and the effect. Cancer, for example, may take years to show up after exposure to the cancer-causing material. Since our society is so mobile, the person may live far from the area where he or she was exposed to the cause. This makes epidemiological studies very difficult. Researchers need to figure out how the person may have been exposed if it is determined that exposure to some toxic material was the cause. Often the numbers of people in a cluster of diseases is so small that even though there are, for example, four times as many cases of a particular of cancer in the region, that number of affected people is likely to be too small to draw meaningful statistical conclusions.

People are exposed to a great variety of possible pollutants including the air they breathe, the water they drink, the food they eat, smoking, alcohol, drugs and other sources. Some people appear to be predisposed to certain diseases because of their ethnicity or personal family background. Sickle cell anemia, for example, is found primarily in people of African heritage. Some kinds of disease appear to “run in families” so that more members of that family get the disease than the general population. Sometimes this

predisposition requires an environmental trigger.

Finally, there are hundreds of chemicals that have never been fully studied to determine their impacts on human health. The Environmental Protection Agency (EPA) has not been able to keep up with health impact studies of the many new chemicals as they are introduced. Studies of impacts are expensive and need to be conducted first on animals, but it is not always accurate to assume that a chemical that affects a mouse or other laboratory animal will similarly affect humans. It is not ethically possible to experiment on humans by exposing them to new chemicals. All of these factors complicate studies of cause and effect.



**Fig. 4-3. Stylized diagram of a cone of depression.** When there are many wells, the drop in the water table and subsidence potential can be region-wide. Source: Pima County Graphic Design.

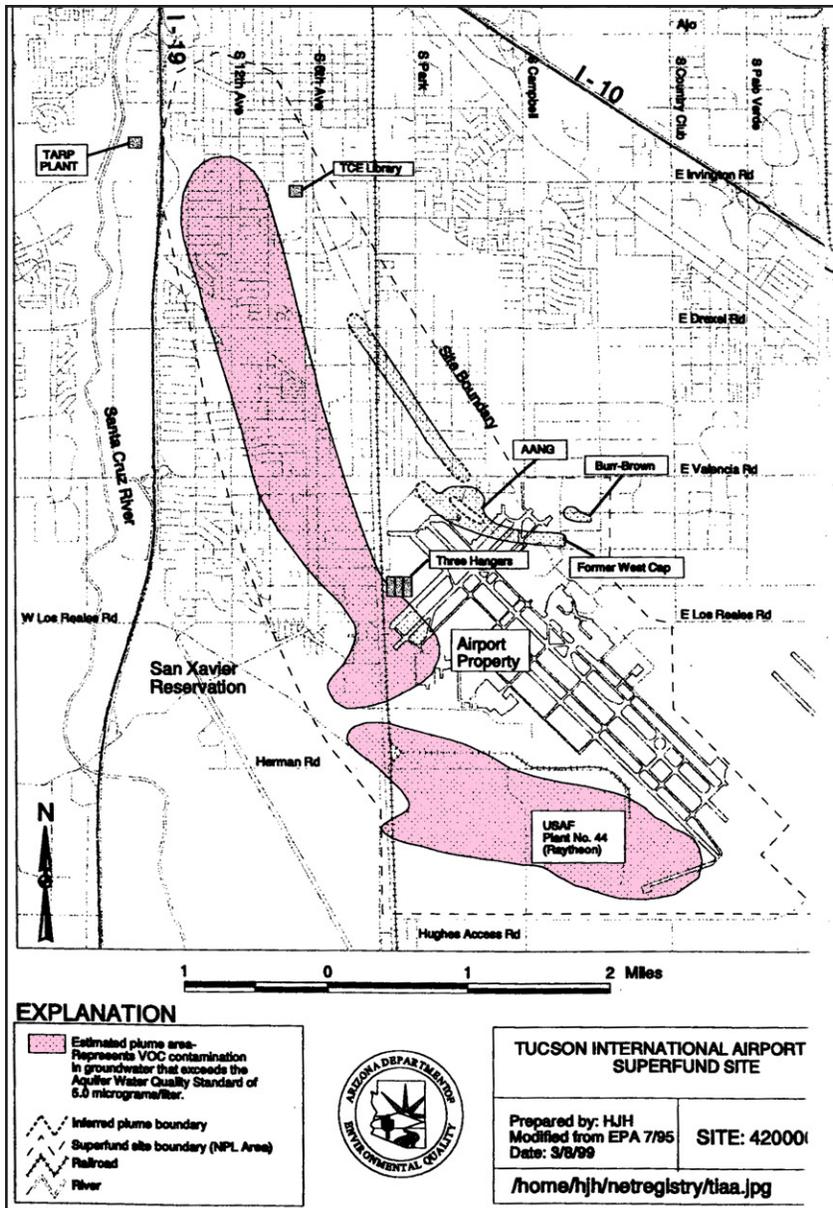


Fig. 4-4. Tucson's TCE plumes. The TCE slowly moves generally north-northwest. Source: ADEQ.

It is not feasible to test water for all possible pollutants as each test must be conducted separately which makes testing very costly. The EPA requires water providers to test for probable toxic pollutants in addition to standard pollutants such as nitrates.

### Major Water Quality Problems in Pima County

#### TCE

Tucson has little heavy industry that is usually the greatest source of water pollution nationally. In the 1940s and 50s, however, the aircraft industry

conducted activities that had a major impact on water quality on the south side of the metropolitan area, in the vicinity of the Tucson International Airport. The most notorious impact came from solvents used to clean airplanes. One of those solvents, Trichloroethylene (TCE) did reach the aquifer in problematic quantities twenty to thirty years after it was discharged. By 1981 residents convinced officials that a serious health problem existed, but the source of the problem was not clear. A Tucson Citizen headline in November, for example, read "City's polluted wells: The mystery remains." By then testing had shown problem levels of TCE in six city wells. By 1983 experts had mapped a plume of polluted water extending from Hughes Aircraft Company to a spot just south of Irvington Street, crossing the northeast corner of the San Xavier District. Many of the people affected were low income and Hispanic or Tohono O'odham. Some of them had moved to the area after being displaced from the downtown area by construction of the Tucson Convention Center and the City-County Government buildings in the 1960s.

Soon the plume was found to extend even farther, at least as far north as Michigan Street. Tucson Water shut down the affected wells, but some people had been drinking contaminated water for years and there appeared to be more than normal numbers of people with diseases such as cancer and lupus. Residents believed that this was related to the contaminated water and later studies confirmed that this was probably the case. One problem in making the connection between the contaminated water and illness was determining when people started drinking the water and when the contamination reached specific parts of the area. By 1980 some 20,000 people lived in the affected area, up 5,000 or so from 1960.

The Arizona Department of Environmental Quality and the Environmental Protection Agency joined the search for the source and ultimately decided that the problem stemmed from hazardous releases from Hughes Aircraft, Grand Central Company, and other businesses in the area that released their wastes into washes or disposal ponds. Residents formed Tucsonans for a Clean Environment (TCE) to ensure that the government agencies did everything that was needed to clean up the problem and deal with local health problems. In 1987, 1600 residents (of whom 70% were Hispanic) sued the City of Tucson saying the tainted water caused illness and death. The lawyers had found incriminating documents that showed that the city had known about the potential for problems as early as the 1950s. Fig. 4-4 shows the TCE plume.

The outcome of all these efforts was an agreement reached among the plaintiffs, the City of Tucson, Hughes Aircraft (now Raytheon), the Airport, the Department of Defense and others in 1991. Some of the companies that had contributed to the problem were no longer in business. Raytheon now removes TCE in its area in a treatment plant on its grounds. The City of Tucson operates the Tucson Airport Remediation Project (TARP) along the Santa Cruz River, with funding from parties to

the agreement, under EPA oversight. TARP uses an aeration process to remove the TCE and other volatile organics. The resulting water more than meets EPA standards for TCE and other contaminants and the quality is monitored in much more detail than is required for any other water in the system. There had been considerable controversy about what to do with the water from the facility. If it was injected back into the groundwater it would become contaminated again. Residents objected to releasing it into the Santa Cruz River fearing, among other things, that a health problem from mosquitoes would result. The water is now put into the Tucson Water system and delivered north of the polluted area as shown on Fig. 4-5.

There was still a problem for people with their own wells. The Pima County Department of Environmental Quality (formed by the Board of Supervisors partly in reaction to the TCE problem) identified private wells in the area with high levels of TCE and worked to help people connect to the Tucson Water system.

Another outcome was an epidemiological study and establishment of the El Pueblo clinic on the southside to serve people who might have TCE-related health problems. In a legal settlement residents with diseases that probably were caused

by TCE received monetary settlements. Clark documented that the official reaction to this whole problem was very slow until a second Hispanic was elected to the Pima County Board of Supervisors in 1985. Supervisor Grijalva's support was essential to raising the level of concern in the community, getting governmental action, and accomplishing the actions discussed above. (Clarke 1998)

### Central Arizona Project (CAP)

In 1992 CAP water began flowing to about 84,000 Tucson Water customers. Fig. 4-6 shows where CAP water was introduced in 1992. It soon became clear that there would be problems. The water that left the treatment plant met federal water quality standards, but in some homes it was discolored. At first Tucson Water did not believe that there was a problem, but so many people complained that something had to be done.

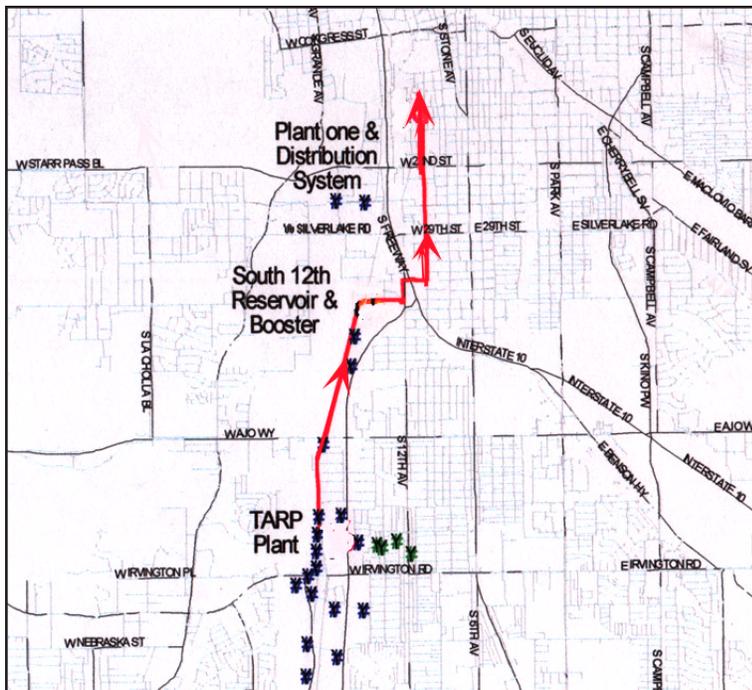
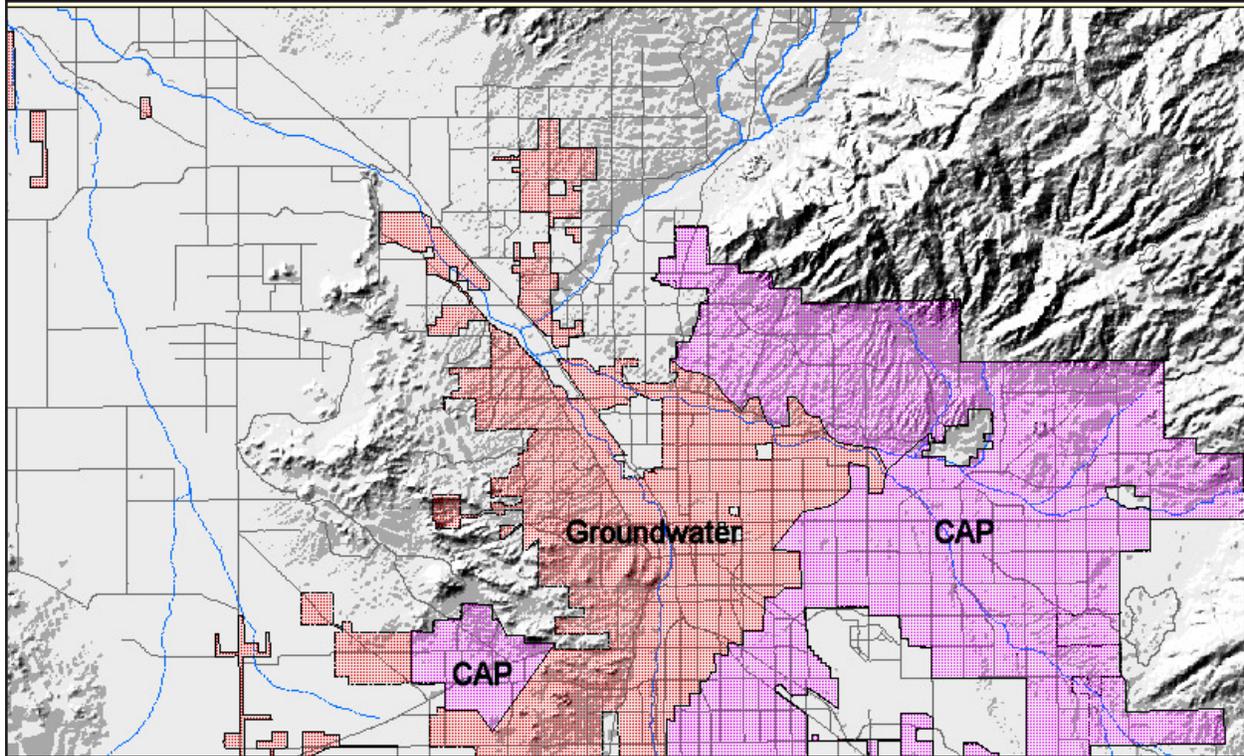
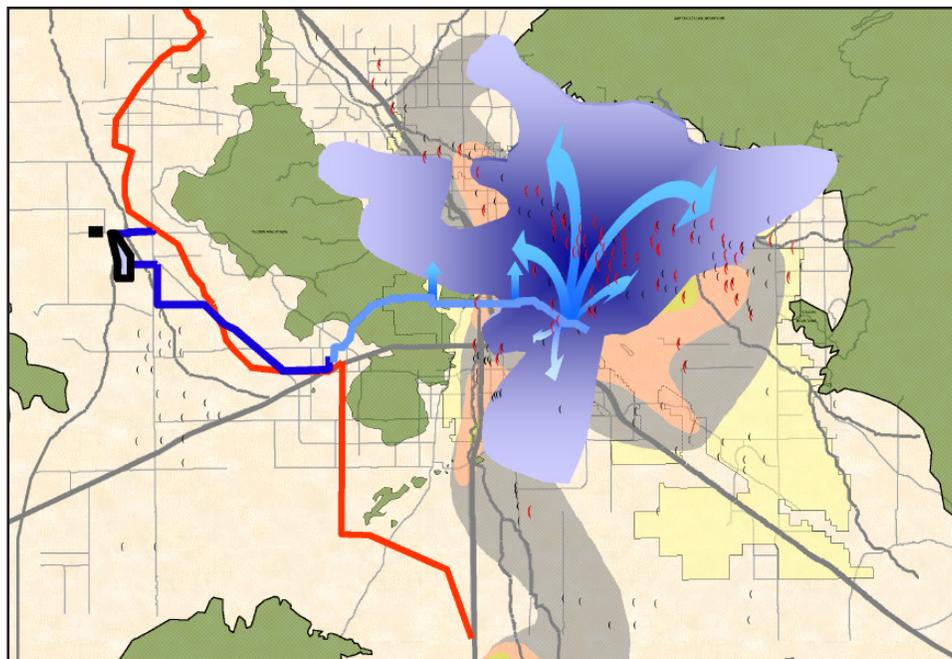


Fig. 4-5 Where TARP water is delivered. Water runs north from TARP to a reservoir from where it flows to customers.

Source: Tucson Water.



**Fig. 4-6.** Where CAP water was delivered in 1992. The minority and low-income parts of town generally continued to receive groundwater. Source: Gelt et al.



**Fig. 4-7.** Where Tucson Water intends to distribute the Clearwater blend of CAP and Avra Valley water by 2003. Most customers will receive the blend for at least part of their water supply. Source: Tucson Water.

Studies showed that the changed chemical characteristics of the water were causing scale within pipes to dissolve and if those pipes were made of iron, rust came off, turning the water brown. Pipes broke, coolers and hot water heaters were damaged and people had problems with their swimming pools. After citizen outcry the CAP water was turned off and a citizen initiative assured that it would not be used again in the city system for many years. A second election reaffirmed that decision, but a third election in 1999 reversed things and Tucson Water prepared to reintroduce CAP water, this time blended with Avra Valley groundwater. After careful preparation and changes to the treatment process, the reintroduction in 2002 was relatively uneventful. In the meantime Tucson Water had replaced most of the old water mains in the central part of town.

Most of the low income and minority neighborhoods continued to receive groundwater and were not directly affected by the fiasco. Fig. 4-7 shows where the CAP-Avra blend, referred to as the Clearwater Blend, will be delivered by 2003. The water comes into a reservoir at Star Pass and flows into the city system. The first deliveries were roughly north of 22<sup>nd</sup> Street, but gradually most of the city will receive this water. Introduction of the Clearwater blend went very smoothly and few if any water quality problems have developed.

This is a case where the south side managed to avoid the problems suffered by the rest of the community in 1992, but where by 2003 the south side will be drinking much the same water that the rest of the community drinks. Thus, there is no environmental justice problem in this case.

### **Polluted Groundwater in Pima County**

Figure 4-8 shows where the most polluted groundwater in the region is located. This map shows Superfund sites, areas that the federal government has declared to be in need of cleanup and Water Quality Assurance Revolving Fund (WQARF) sites, areas that Arizona considers in need of cleanup. The TCE plume shown is in the process of cleanup, but most of the other sites are not being treated, although other actions are being taken as indicated below.

Does this mean that people living near those sites are drinking polluted water? Not unless they have their own wells. The downtown area, for example, is polluted with diesel fuel and other pollutants from a long history of fuel leaks and spills. Tucson

Water does not pump water from this part of the aquifer but brings water into the area from elsewhere. Agricultural activities can also be sources of pollutants. In Pima County, however, the major agricultural water users are in the Avra Valley-Marana area, downstream from metropolitan Tucson and do not significantly affect low-income and minority residents in the city. There are high levels of nitrates in some groundwater in the Marana area, but the source is unclear. Wastewater and agriculture may both be implicated.

The following are all the officially designated polluted sites in the Tucson area as listed by the Arizona Department of Environmental Quality. (Anon. 2000a)

*West University* – a site at 6<sup>th</sup> and 7<sup>th</sup> Street between 7<sup>th</sup> and 5<sup>th</sup> Avenues is contaminated with TCE, PCE, and DCE above drinking water standards. The nearest well is at the University of Arizona, to the east.

*Silverbell Jail Annex* – This site is in the vicinity of Silverbell Road south of Sweetwater Drive west of I-10. Contaminants are primarily TCE, PCE and other solvents and arsenic. All concentrations are below the federal standards. The only drinking water well in the area is at a mobile home park used mainly by a transitory population. A remediation plan has not yet been adopted.

*Shannon Road-Rillito Creek* – This site is in northwest Tucson on both sides of the Rillito. The only contaminant above the regulatory level is PCE, but other chemicals have been detected below that level. Water is provided here by Metro Water and Acacia Gardens. It is treated to meet federal standards.

*Park-Euclid* – This site is in central Tucson, just south of Broadway on both sides of Arroyo Chico in an area where there have been laundry and dry-cleaning activities since the 1930s. Residents are currently involved in discussions about remediation. The area is served by Tucson Water which does not pump from wells in the area.

*Miracle Mile* – This site is in the Roger Road –Romero Road area. When problems were first detected with volatile organic compounds in 1993 the Flowing Wells Irrigation District took responsibility for providing water to the Mobile Home Park using water from outside the area.

*El Camino del Cerro* – This area is located between the Santa Cruz River and I-10 north of



El Camino del Cerro on both sides of the railroad tracks. The closed Camino del Cerro landfill is on the southwest corner of the site. Numerous organic compounds have contaminated the groundwater, but amounts have been decreasing. Private drinking water wells were affected with the result that Pima County at first shipped in bottled water to the businesses in the area and then arranged for connection to Tucson Water so no one there is using contaminated water at the present time.

*Broadway-Pantano* – This site is on Tucson’s east side north of Broadway and east of Pantano Wash at the site of an old landfill. The problem contaminants are TCE, PCE, and vinyl chloride. There are several drinking water wells in the area, four of which are owned by Tucson Water. Whenever contaminant levels get higher than one half the regulatory level, Tucson Water ceases pumping at that well. St. Joseph’s hospital also has a well in the area, but has installed a wellhead treatment system which reduced the levels to non-detectable levels. There are also a few private wells in the area the owners of which must work directly with ADEQ to determine if there is a risk.

*Davis-Monthan Air Force Base* – This site is located entirely on the base. The main problems are with petroleum waste, aluminum dross from airplane melting and a jet fuel leak. The dross has been transported off base. The contamination is near the surface in the soil and no water contamination is known.

*Raytheon, Tucson International Airport, and National Guard Sites* – These are all located in the same area west of the airport extending from Hughes Access Road to Valencia. This is the major contamination site in the Tucson area, associated with the TCE problem discussed above.

### Contamination from Landfills

Old landfills have also polluted or might pollute groundwater. In May 1982 the Arizona Daily Star reported that the old Ina Road Landfill and the El Camino del Cerro Landfill along the Santa Cruz River north of Ruthrauff Road were leaking low levels of pollutants including TCE into downstream wells. Seasonal flooding in the river was eroding away parts of the dump. The Tucson Mountains Association, representing mostly white,

middle to high income residents, became involved when private wells of their members were contaminated.

See Chapter 5 for more discussion of landfill issues.

### Drinking Water Today

Does this mean that people who live in the affected areas are drinking unsafe water? No. First, the federal Safe Drinking Water Act, passed in 1974, requires water providers to produce water that meets certain minimum drinking water standards. Water must be tested regularly and any violations immediately reported to the consumer. Water providers do their own testing but there are stiff penalties for failure to test and report and

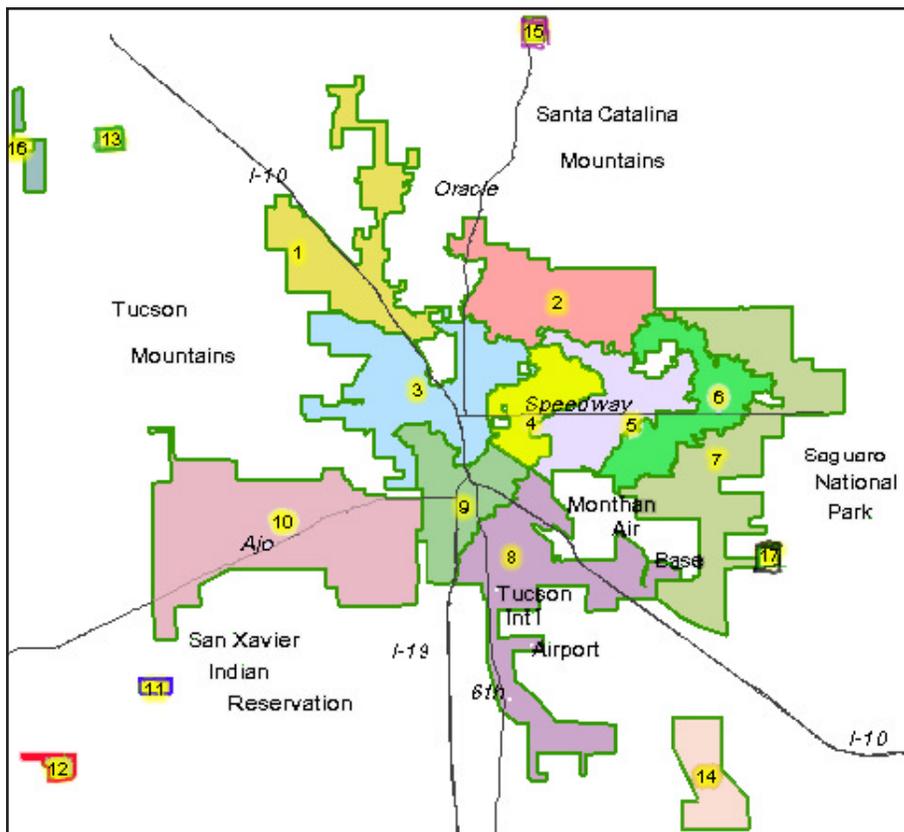
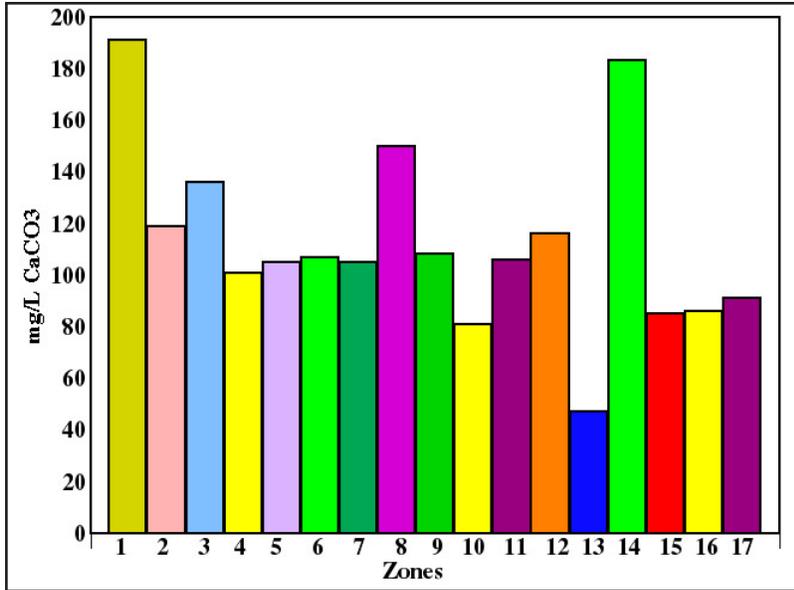


Fig. 4-9. Tucson Water Quality Zones. Source: Tucson Water.



**Fig. 4-10. Average hardness of Tucson Water at various zones in 2001.** Source: Tucson Water.

correction violations. Second and most important is that most people do not drink water from the aquifer beneath their homes unless they have their own wells. Most of the minority and low income neighborhoods are served by Tucson Water which gets its water from a variety of sources and transports that water throughout the entire service area. Only in a few isolated locations do residents drink water from wells near their homes.

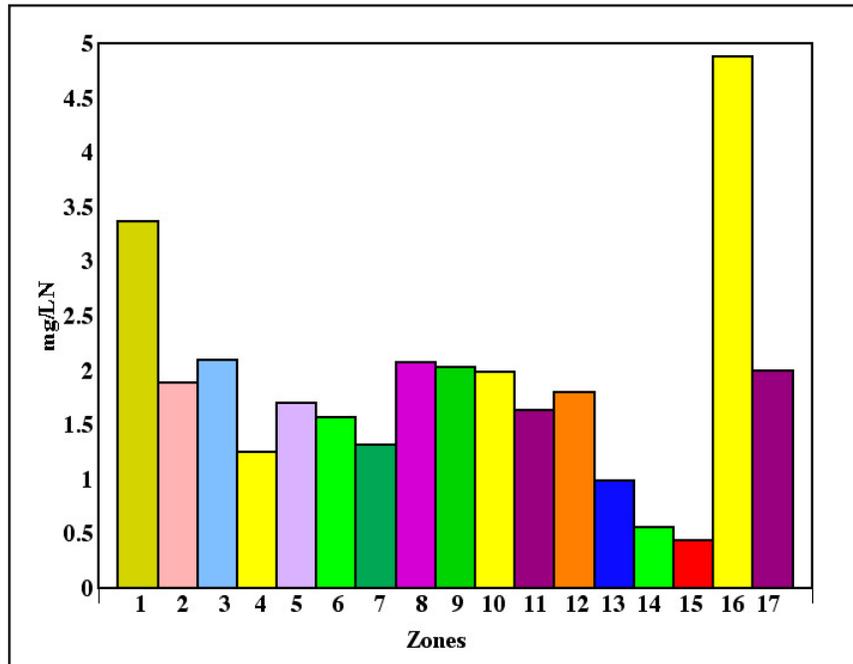
Much of the water used in the Tucson area is from Avra Valley wells and increasingly from the Colorado River. By 2003 Tucson Water anticipates that most of the metropolitan area will receive a blend of Avra Valley and CAP water as discussed above. Tucson Water also pumps from wells throughout the community, using that source more in the peak months of summer than in the low use months of winter. Wells that are in areas with contaminated water are not used. For the most part, water from more than one source is blended with water from another source and stored in reservoirs. Water quality does not generally differ greatly

between the low income areas and the higher income areas. Tucson Water maintains current water quality information by area on its web site.

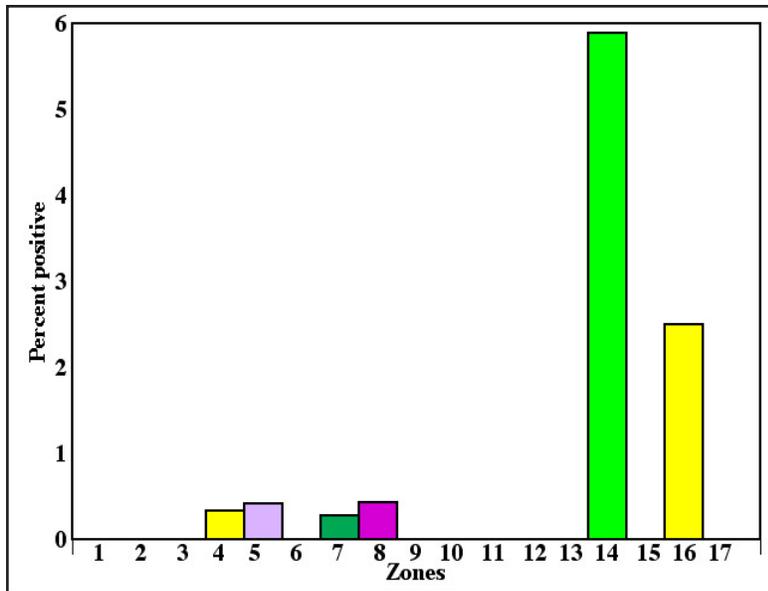
Some residents get their water from other water providers such as the Flowing Wells Irrigation District or the Metropolitan Water Improvement District. These providers have a much smaller number of sources that they use for their customers, but they too must conform to Safe Drinking Water Act requirements. Fig. 4-1 shows the service areas of the larger water providers in eastern Pima County.

People who have their own wells are slightly more likely to have a problem, especially if they are in locations where pollution potential exists, such as in abandoned farm land. They are responsible for their own water quality and testing and do not come under the Safe Drinking Water Act. In some cases, such users may live in “wildcat” subdivisions and may be low income, but they may also be high income users.

There appears to be no relationship today between income, race, and drinking water quality in



**Fig. 4-11. Average nitrate levels of Tucson Water in various zones in 2001.** Source: Tucson Water.



**Fig. 4-12 Average fecal coliform levels of Tucson Water in various zones in 2001.** Measured, but none detected in zones without columns. Source: Tucson Water.

Pima County. This is, however, a perception in some areas that the water is not safe to drink. This can be measured by the percentage of people who buy bottled water or who have home water treatment systems. A University of Arizona study revealed that in 2001 that people who lived in minority and low income sections of town, mostly south of downtown, were more likely to buy bottled water than people in higher income parts of town. There may be several reasons for this. People may still be suspicious after the TCE crisis, reacting to the CAP crisis of the early 1990s, they may be generally suspicious that health problems are caused by bad drinking water, people from Mexico are accustomed to using bottled water, or sellers of bottled water may be more active and successful in those parts of town. (Williams et al. 2001)

**Water Supply and Subsidence**

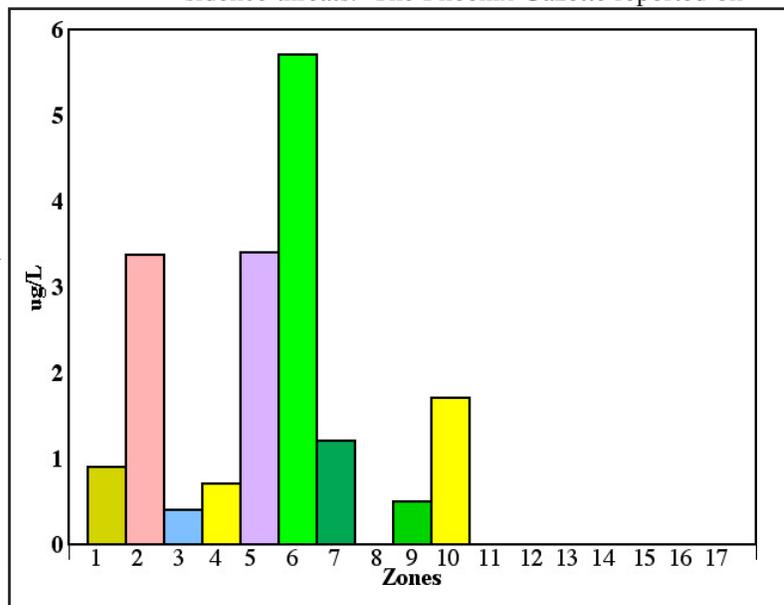
When groundwater is pumped the ground gradually compacts when the water between the bits of rock and sand is gone, leaving empty spaces. When the compaction is great and soil conditions right, the entire surface of the ground will sink. The sinking may

be uniform or differential, depending on the underlying geology. (Slaff 1993)

When the ground subsides unevenly (differential subsidence) the effect is liable to be that fissures will appear in the ground. Deep fissures can be seen in Pinal County and eastern Maricopa County. A major fissure can be seen north of Picacho Peak west of the freeway. Avra Valley has also had subsidence and some fissures occur there. Fissures can damage or destroy structures such as streets, houses, and pipelines.

When the ground subsides relatively uniformly, the area is lowered by inches or even feet, but the average person may not notice a change until the subsidence affects streets, gas, water and sewage pipes, house foundations, and other structures. The flow of water on the surface may change radically. In one place in Pinal County flood water actually flows in the opposite direction from which it flowed historically. A major impact in an urban area may be that sewage no longer flows downhill towards the treatment plant, but flows back towards homes.

As early as 1969 scientists were warning of subsidence threats. The Phoenix Gazette reported on



**Fig. 4-13. Average trihalomethanes in Tucson Water at various zones in 2001.** THM not measured in zones 11-17.

Source: Tucson Water

October 4 “The mammoth cracking apart of Arizona caused by overpumping of groundwater has reached a stage our expert described as “very critical. ... Arizonans have been fortunate that the mammoth cracks haven’t developed in heavily populated areas ...”

Fig. 4-14 shows areas of greatest potential subsidence in Pima County, based on underlying geology. One major area is located in the vicinity of Tucson Water south side well fields. Another is in central Tucson. Tucson Water has begun to cut back pumping in the central area now that CAP water is coming into the system, partially to limit subsidence problems. As of January 2002, 26 wells in that area were no longer in use. Tucson Water has not yet cut back pumping significantly from the south side well field, and does not plan to reduce pumping there in the near future, according to Tucson Water. Fig. 4-15 shows the origins of water that Tucson Water intends to distribute in 2003. The percentage of Tucson Water’s total water supply coming from the south side of Tucson would be unchanged from 2000. This does not mean that subsidence will occur, but is reason for caution.

**Water wells**

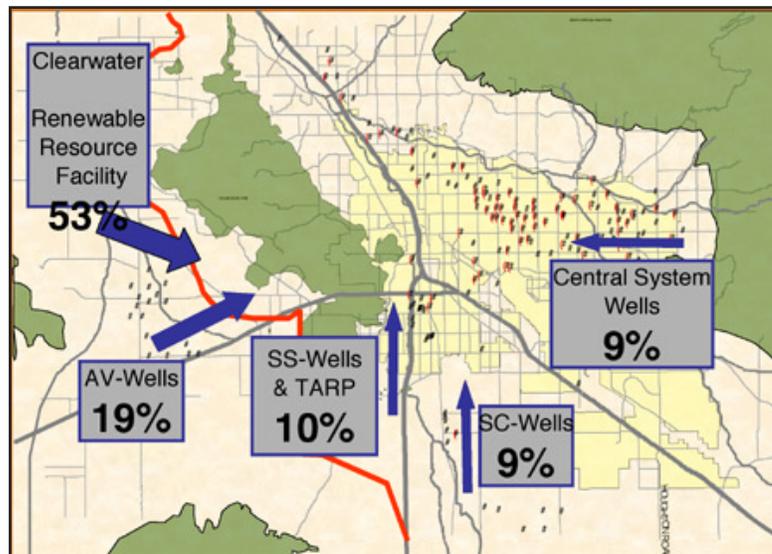
Water wells are located throughout the community, with the greatest concentrations just north of the San Xavier District of the O’odham Nation and in the Avra Valley. The primary negative

impact of water wells results when a great deal of water is pumped over a long period of time which can cause subsidence if more water is pumped than is recharged. This deficit of pumping over recharge occurs throughout much of the metropolitan area and subsidence is already occurring in parts of the area. One study shows that the area of greatest potential subsidence is in the vicinity of County Club Road and Speedway Boulevard. (See Fig. 4-14) Another area of potential subsidence is around Tucson Water’s south side well field. While the availability of CAP water has led Tucson Water to lessen its reliance on pumping in the central part of town, it is still actively pumping the south side well field.

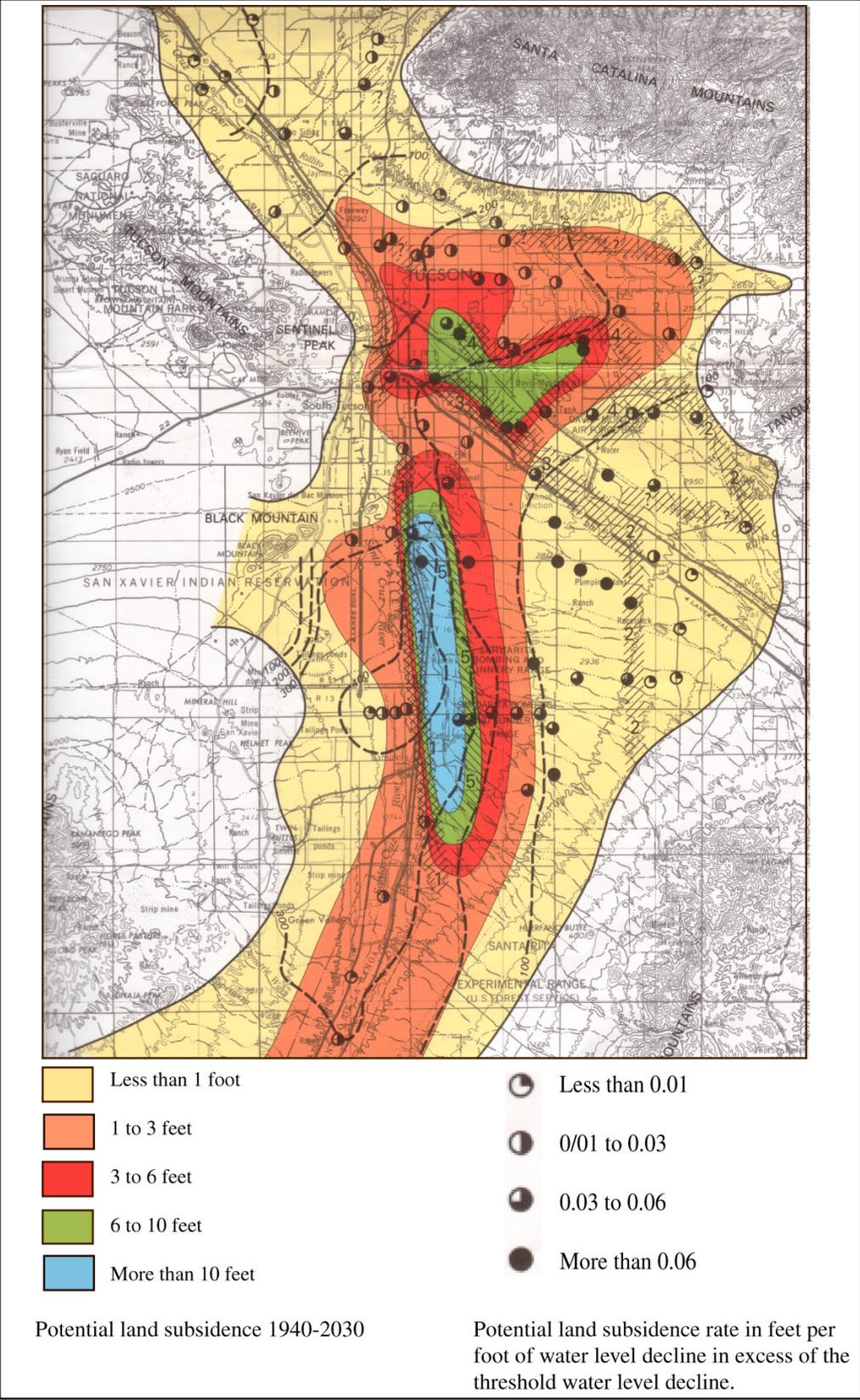
The most significant impacts of subsidence are damage to streets, water and sewer pipes, railroad tracks, and buildings. Buildings can crack and in severe cases the building may have to be abandoned. Some of the areas with actual and potential subsidence problems are in low-income and minority areas on Tucson’s south side. Other potential subsidence areas are in the more affluent parts of town, such as the El Encanto neighborhood.

**Water supplies at San Xavier**

Prior to the arrival of the Anglos the Santa Cruz River flowed intermittently from its headwaters to a



**Fig. 4-15. TucsonWater supply as a percentage of demand planned for 2003. Source: Tucson Water**



**Fig. 4-14 Potential land subsidence.** Source: Anderson et al. 1988.

spot near present day Marana. There were perennial reaches in many places. San Xavier was one of those places where several springs brought water to the surface along a shallow riverbed. During the Spanish period much of the water was diverted for agriculture but since there was no pumping the water table remained high. By 1940, however, diversions of water for Tucson and for agriculture and pumping had lowered the water table at San Xavier more than 150 feet in some places. (Halpenny 1962) In the 1970s, Tucson was pumping 40,000 acre feet annually from that area. In 1975 the federal government, on behalf of the O'odham, sued the City of Tucson, mining companies, and agricultural interests claiming that the defendants had damaged the tribe's water rights by excessive pumping. Finally, in 1982, parties reached agreement and Congress passed the Southern Arizona Water Rights Settlement Act (SAWRSA). The settlement gave the O'odham

37,800 acre feet of CAP water annually and 28,200 acre feet of effluent. It was not until 2001, however, that CAP water actually reached San Xavier amidst great ceremony and rejoicing. The water will be used for agriculture and for riparian restoration projects. Other CAP water reached the Shuk Toak District in Avra Valley in 2000 and is being used for agriculture. This replacement water helps rectify some of the wrongs of the past, but cannot bring the water table back to its former level. (Gelt et al. 1999)

More than 1,000 sinkholes and fissures have appeared in the San Xavier District. Many of these are on former farmland and on land where there was once a majestic mesquite bosque. Geologists believe that lowering of the water table by groundwater pumping is a major cause of these problems. (Anderson et al. 1997)



# Chapter Five

## Locations of Industry, Landfills, Roads, and Other Facilities

*“It is a perfect example of environmental racism. ... from a scientific viewpoint, the Rita Ranch site was the best one, but it as well as a Green Valley site, was located in the district of a Caucasian supervisor and his primarily Caucasian constituents fought successfully to keep it away from their neighborhood.”* Clarke 1999 quoting two Hispanic Pima County Supervisors on landfill siting.

**M**uch of the infrastructure of modern Pima County has been built on lands once used by others either in recent times or long ago. Construction activities have destroyed archaeological sites, displaced people, changed the landscape, and disrupted wildlife habitat and corridors. Facilities that have potential to contribute the most to environmental pollution include landfills and hazardous waste disposal sites, mines and smelters, industrial facilities, wastewater treatment facilities, power plants, water wells, highways, and other facilities.

### Industrial Facilities

Tucson has few large industries compared to many towns its size. None of the local industries are traditional “smokestack” industries, such as steel mills. While industry offers jobs and tax revenue, it may offer some negative aspects for neighbors, including noise, air pollution, water pollution, hazardous materials movement, or traffic congestion. Fig. 5-2 shows the concentrations of facilities with hazardous waste permits.

*Industrial zoning.* Fig. 5-1 shows the areas within Pima County that are zoned for industrial uses. Industrial zoning includes several categories with everything from heavy industry to small producing companies and even animal feed lots. Fig. 5-2 shows location of facilities that currently have permits to use hazardous substances. Most of the industry is located near the major transportation corridors of I-10, I-19, the airport, and the railroad, adjacent to low income and minority neighborhoods. Tucson’s largest industrial employer, Raytheon (formerly Hughes Aircraft Co.) which manufactures airplane parts with emphasis on the defense industry, is located south of the Tucson International Airport. This company is not, however, a significant polluter.

A major issue affecting people on the south side in recent times is related to an industrial facility

that involves beryllium. The City of Tucson worked hard to recruit the Brush Wellman Company believing that the company would create jobs. In the late 1970s city and county officials supported a \$3 million bond issue to help buy land and build the plant. The plant was built and jobs peaked at 256 in 1988, according to the Arizona Daily Star (May 10, 1999). The company assured the city and county that they would comply with safety and air quality standards. In 1982 the company moved to Tucson and later researchers documented that workers at the plant had the highest rate of illness of all Brush operations. Nine percent of the workers developed beryllium disease.

According to the EPA, acute (short-term) inhalation exposure to high levels of beryllium has been observed to cause inflammation of the lungs or acute pneumonitis (reddening and swelling of the lungs) in humans; after short-term exposure ends, these symptoms may be reversible. Acute pneumonitis may cause death. Chronic (long-term) inhalation exposure of humans to beryllium has been reported to cause chronic beryllium disease (berylliosis), in which granulomatous lesions (noncancerous) develop in the lung. The onset of these effects may be delayed by 3 months to 15 years. Employees in Tucson have been affected by beryllium in the workplace.

Although workers experience the most serious beryllium problems, nearby residents are concerned over air quality in their area, either because of routine releases or accidental high releases. The company currently meets EPA air quality standards, but residents testified at a public hearing that they thought the standards were too lax.

Fires in industrial areas can release toxic gases. In June 2001 some Maricopa County families who claim their health was harmed by smoke from an industrial fire sued Phoenix for alleged environmental racism. (Arizona Republic) The class-action lawsuit claims two decades of zoning decisions and

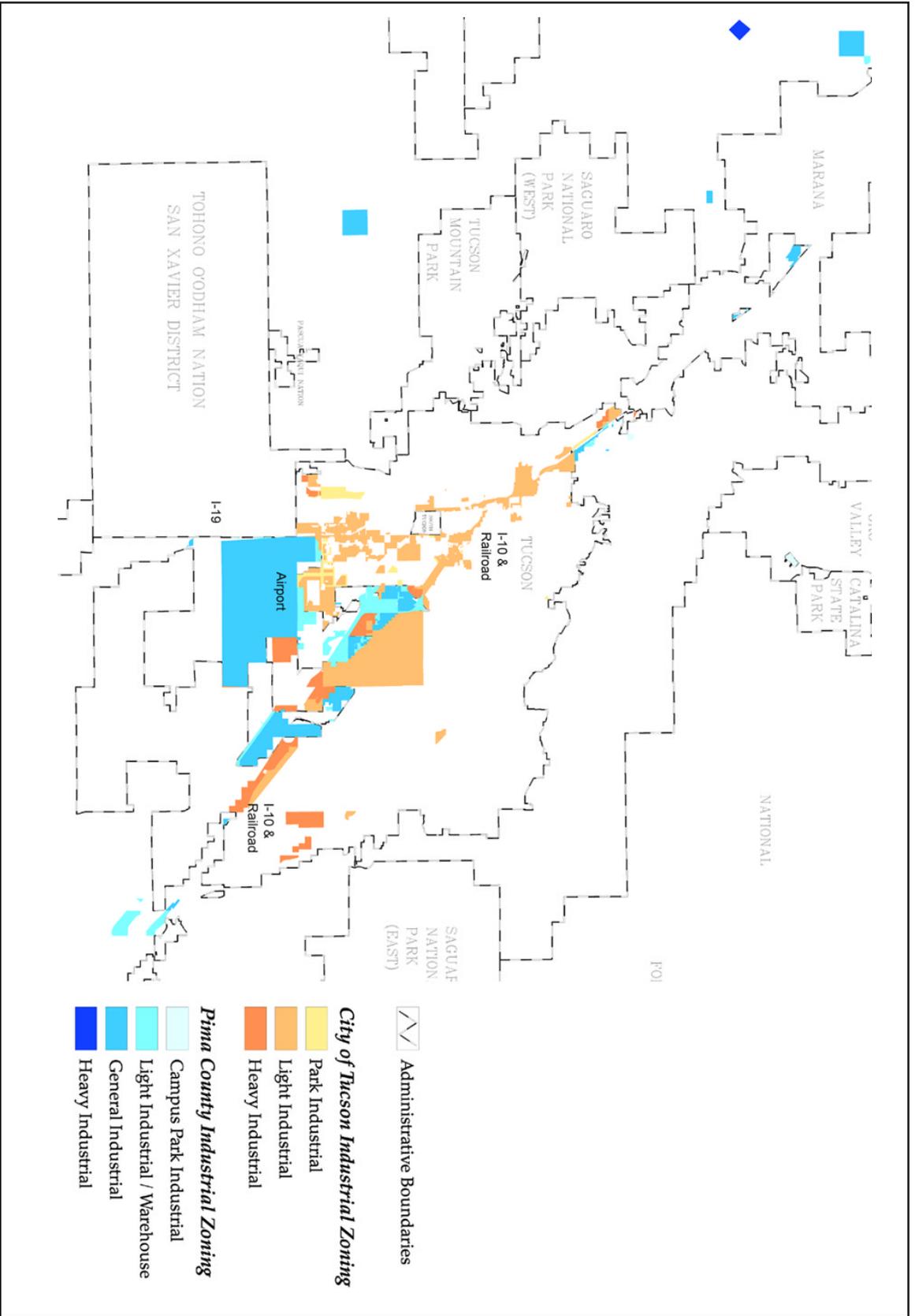
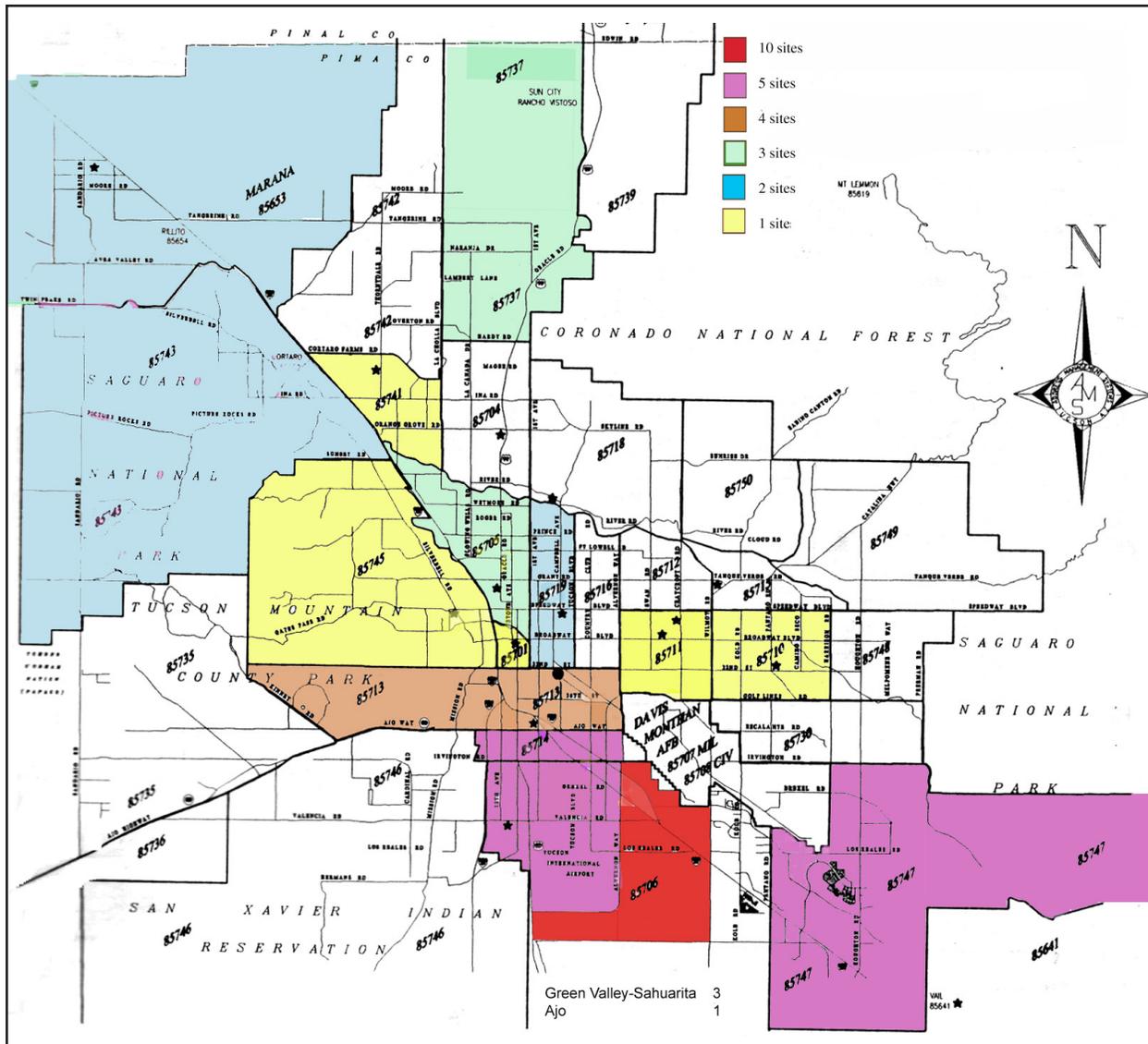


Fig. 5-1. Industrial zoning in Tucson and Pima County. Source: Pima County Technical Services



**Fig. 5-2. General location of facilities with hazardous waste permits from Pima County Department of Environmental Quality (by zip code).** A permit does not imply discharge of hazardous materials, but regulation of hazardous materials used by the facility. The list includes small facilities such as dry cleaners as well as large industrial production facilities. Compare with Figs. 2-9 and 6-3 showing distribution of people by race and income. Source: Pima County Department of Environmental Quality

tax credits were used to lure chemical companies and led to the situation. The lawsuit says more than 1,000 Phoenix residents suffered illnesses from asthma to rashes to eye problems as a result a fire at the Central Garden and Supply Warehouse. The city denied any responsibility or any proven health problems from the fire. The suit has not been resolved. There has not been a similar situation in Tucson, but there is potential. Several years ago, Tucsonans on the south side had problems when a large tire storage area caught fire and burned for days.

### **Mines and Smelters**

Pima County has three major copper mining areas and is adjacent to a fourth. It has no active smelters. The largest active mining area in Pima County is between the San Xavier District of the O'odham Nation (partly on District property) and Green Valley. The mine was located there before Green Valley became the large community it is today and the thousands of people who moved to that area were or should have been aware that the mine would be their neighbor since the tailings ponds are a predominant feature of the horizon, although people may not have been fully aware of the possible impacts. The O'odham Nation to the north, however, predates the mine. The Bureau of Indian Affairs assisted in drawing up a long term lease that became quite controversial among tribal members, mainly for financial reasons.

The major impacts of the mine result from blowing dust, possible contamination of groundwater, changes in land use, and aesthetic qualities. The large elevated tailings ponds are a predominant landscape feature west and northwest of Green Valley. The company has made attempts to vegetate the slopes with mixed success. Note in Chapter 3 that the particulate levels are relatively low in the Green Valley area. The Pima Association of Governments has studied the groundwater impacts intensely. The potential contamination areas are continuously monitored and measures taken to assure that contaminants do not reach groundwater. There is anecdotal evidence of pollution of washes on Indian land, however.

Another mining area, the Silverbell Mine, is on the northwest side of the metropolitan area, west of Marana in a sparsely populated area mainly occupied by ranchers. Proposed new mining could be within the newly created Ironwood National Monument (one of the first accomplishments of

SDCP), although new mining is not allowed under current management. There are efforts in Congress to allow mining in the National Monument or remove the areas of mining potential from the designated boundaries. In either case, impacts would not be felt disproportionately in minority and low-income neighborhoods.

Ajo was at one time a major mining and smelting area, but the mines are closed. At the time of active mining, per capita income in Ajo was higher than many other parts of Pima County. This is not true today. There are rumors, however, that the mine will reopen. The company has secured an air quality permit for the mine in case economic conditions are favorable for reopening the mine, but they did not request a permit for the smelter, according to PCDEQ.

Just outside of Pima County is the San Manuel Copper Mine. As discussed in the air quality section, the San Manuel smelter at one time affected the San Pedro River area within Pima County, but it is closed now for economic reasons, although copper processing still occurs there. The SDCP will have no impact on this mine.

Sand and gravel mining is an active industry in the metropolitan area. Sand and gravel operations can be found along the Santa Cruz River and Pantano Wash. These facilities are located in areas where there is a lot of sand and rock material that is replenished at times when water flows in the watercourses. These facilities are not located disproportionately in minority and low income areas,

### **Power Plants and Transmission Lines**

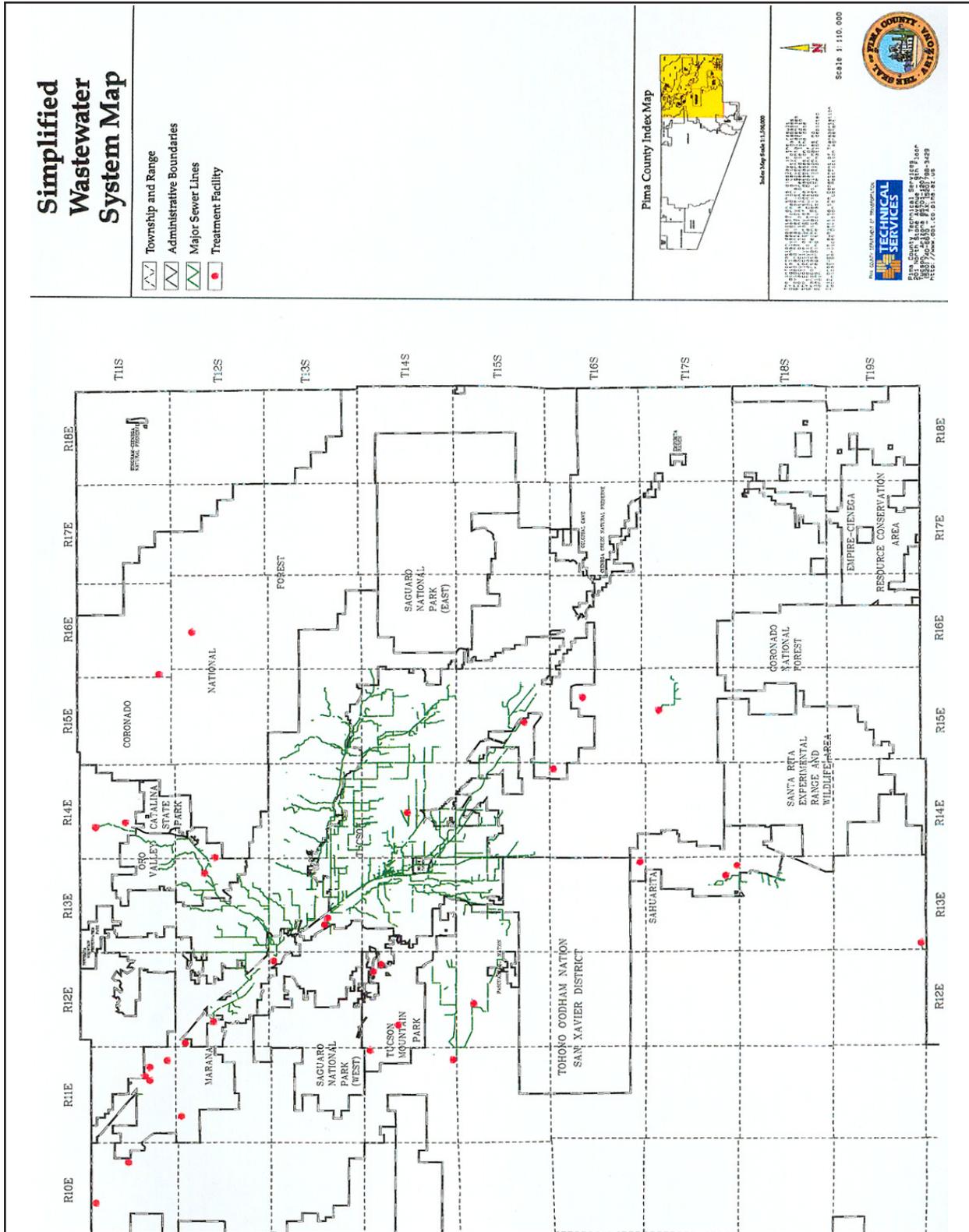
Pima County has one major power plant at Irvington Road and I-10 in an area that is primarily commercial and industrial. Pima County also gets power from a variety of other sources, including coal-fired power plants in Springerville and Page, and Hoover Dam which produces hydropower at the dam. Tucson Electric Power is connected to a regional power grid that exchanges power throughout a wide area. Major transmission lines radiate out from the power plant and along the Santa Cruz River. The power that Tucsonans use, therefore, has many of its environmental and social impacts in areas far from Tucson, such as the Navajo Nation. New power plants are proposed in various locations throughout central Arizona. Because of limits on new pumping of water in the Tucson Active Management Area, new power plants in the Tucson and Avra Valleys are high-



**Table 5-1. Present and Historic Landfills in Pima County**

1. "A" Mountain	1953-1962
2. Ajo	1974-present
3. Broadway North	1961-1972
4. Broadway South	1950s-1962
5. Cactus	1959-1961
6. Camino del Cerro	1973-1977
7. Catalina 1	1965-1970
8. Catalina 2	early 1970s-1991
9. Columbus	1960-1962
10. Cortaro	1965-1967
11. Cottonwood	1973-1985
12. County Parks	1970-1973
13. Dragoon	1964-1966
14. Harrison	1969-1996
15. Ina Road	1971-1984
16. Irvington	1978-1988
17. La Cholla	1968-1971
18. Los Reales	1967-present
19. Marana 1	1969-1971
20. Marana 2	1972-1983
21. Mission	1963-1970
22. Old Nogales	1965-1970
23. Prudence	1974-1978
24. Rio Nuevo N.	1960-1971
25. Rio Nuevo S (Congress)	1953-1960
26. Rio Nuevo S (Nearmont)	1960-1967
27. Rita Road	1972-1977
28. Ryan Field	1973-1977
29. Ryland	1960-1965
30. Sahuarita 1	1968-1973
31. Sahuarita 2	1973-present
32. Saint Mary's	1963-1973
33. Silverbell/Jail Annex	1966-1975
34. State Pit	1968-1970
35. Tangerine	1983-present
36. Tumamoc	1962-1966
37. 29th Street	1963-1967
38. Vincent Mullins	1976-1987
39. Walnut	1961-1965

Source: Pima Association of Governments  
Only includes landfills started after 1950.



**Fig. 5-4. Active and Abandoned Landfills in Pima County.**  
 Source: Pima Association of Governments.

ly unlikely. Transmission lines, however, are proposed, especially one that would traverse the Avra and Altar Valleys, relatively close to some sensitive areas such as the Ironwood National Monument. While these lines would have environmental impacts, they are not expected to have disproportionate impacts on low-income or minority areas.

### **Wastewater Treatment Plants**

Wastewater treatment plants are, for the most part, located along the river at the downstream end of the community so that sewage can flow by gravity from homes and businesses to the treatment plant. For this reason there are no major wastewater treatment facilities located in the downtown area, or the south side. Pima County is responsible for most of the wastewater treatment in Pima County. The two largest plants are along the Santa Cruz River at Roger Road and Ina Road, away from residential areas. (Fig. 5-3) These two plants treat most of the wastewater produced in Pima County. The most significant negative impacts of the wastewater treatment plant are possible water quality problems and the smell. People traveling along I-10 can sometimes detect a distinct odor from the Roger Road Plant and less so from the Ina Road Plant. People most affected by this live along Silverbell Road and vicinity in the Camino del Cerro road area down to an area south of Ina Road. None of this area is minority or low-income dominated.

In addition there are smaller wastewater treatment facilities in outlying areas such as Avra Valley and Green Valley. These small facilities have little impact on minority or low-income areas.

In some areas it is not feasible to connect to the community wastewater system and people use septic tanks for their household wastewater. The County Health Department has jurisdiction over approval of new septic tanks, under state regulation. The major low-income and minority neighborhoods in the area are connected to the county system, although some individual homes may remain on septic tanks. The majority of septic tanks tend to be in the outlying areas. In some of these areas people are liable to have their own wells. If problems occur because of poor maintenance or placement, the well water may be contaminated. This has not been a major problem in Pima County and does not disproportionately affect disadvantaged areas.

### **Landfills**

Landfills have generally been sited near the edge of settled areas. This is especially true for periods when transportation was not as easy as it is today. The prehistoric inhabitants dumped their trash very close to their villages, forming what archaeologists refer to as “middens.” They disposed of few, if any, toxic materials. The early Spanish and Anglo settlers also dumped their trash very close to home. There are numerous informal “wildcat” dump sites in the areas near downtown Tucson and south to 22<sup>nd</sup> Street. As the community grew, what was considered the “edge of town” moved outward as did the dumps (now called “landfills”). Now the new city and county landfills are located far from what used to be the edge of town. Fig. 5-4 and Table 5-1 provide information about the known active and landfills used since 1950. People still dump their trash illegally in many places. One such wildcat site is along the Santa Cruz River north of Camino del Cerro Road. Here it is easy to find refrigerators, coolers, kitchen trash, mattresses, and many other things. Some of the historic wildcat sites have been mapped, but little is known about them. Known wildcat sites are scattered around the county with concentrations along Ajo Way west of the Tucson Mountains, south and east of the Tucson International Airport, and west of Marana. (Anon. 1995)

The amount of waste to be disposed of also grew even more rapidly than the population as affluence increased and people tended to throw things away rather than salvage or repair them. It has become increasingly more expensive to dispose of waste materials. A growing trend toward recycling has helped the problem somewhat, but the lack of a market for recycled materials has limited the effectiveness of this method. At one time people were allowed to salvage materials directly from the landfills, but this has been stopped for safety reasons.

Until 1980 there were few if any state or federal restrictions on construction of landfills. They could be built in watercourses, taking advantage of old sand and gravel pits, for example. They did not have to be covered or lined. State law now requires that landfills be out of the floodplain. Federal laws regulate types of lining and cover. Modern landfills are far different from what they were even 25 years ago.

An ideal landfill site is either is a ready-made hole such as a gravel pit away from a watercourse or in an area where soil can easily be dug. Minimizing travel time to the landfill is also important to reduce

costs for trash collectors and to minimize wildcat dumping. Any agency or company proposing to build a new landfill must go through an extensive process requiring both federal and state approvals.

Some problems remain, however, from landfills constructed in past times. The decaying garbage releases methane but regular monitoring of these sites has not revealed problematic amounts. The Hilton Hotel at Broadway and the Pantano Wash is located on the site of an old landfill. The hotel owners installed methane scrubbers and must report problem levels of methane to the Tucson Fire Department. The hotel has been in place for more than 15 years with no reported methane problems.

The City of Tucson conducted a study of methane migration from closed landfills in September 1999. The Solid Waste Management Department studied methane production at five closed landfill sites in 1998 and 1999. This was a follow up to a study of 15 closed landfills in 1995-1997. Both studies indicate that degradation of landfill materials is very slow in the dry climate of Pima County and the researchers detected very low levels of methane. The City has proposed reclamation of one abandoned landfill site on the south side near Valencia Road with plans to use it as a park after mitigation measures, but although funds are available for the mitigation, they are not yet available for the park. (Leverenz and Dillard 2000)

In the early 1990s Pima County began to look for a site for a new landfill because capacity in the old one was rapidly declining. A major controversy erupted when one proposed site for the new landfill was southeast of the Tucson International Airport. Many people in the area were still reacting to the TCE contamination from sites near the airport (See Chapter 4) and felt that their neighborhood was being chosen once again as a pollution source, although the site was more than a mile from the nearest residential area. After great community controversy the site was rejected. The County continues to expand the existing landfill on the northwest side of town.

Probably the greatest impact of active landfills stems from the need to transport waste material to the landfill. This results in considerable truck traffic and some materials blowing off trucks, although tie-down is required.

Are landfills disproportionately in minority and low-income neighborhoods? For historical reasons there are abandoned wildcat and designated

landfills in the downtown area near low income and minority neighborhoods. The active landfills today operated by Tucson and Pima County, however, are located away from the urban center. Fig. 5-4 illustrates that contemporary active landfills are not disproportionately in minority and low income neighborhoods. Many of the closed landfills, such as the Broadway Proper Landfill are also away from disadvantaged areas.

The Tucson area has no active hazardous waste disposal site, except for a small site operated by the University of Arizona near Oracle for disposal of low level medical waste from the University Medical Center. State law currently forbids construction of hazardous waste disposal sites in Arizona, so hazardous wastes are shipped out of state and it is highly unlikely that any new disposal sites will be proposed in Pima County.

## Roads

Freeways have been a source of controversy since I-10 was proposed and built from 1958 – 1962 when federal funds became available. (See Chapter 7). Tucson became the first Arizona city to take advantage of the newly available federal highway funds when Phoenix declined to build a freeway. Construction of I-10 opened up many opportunities for Tucson at a time when it was beginning to have a rapid growth spurt. The freeway cut through Marana and along the Santa Cruz River through downtown Tucson and turned east on Tucson's south side. It had the effect of joining Tucson with an easy route east to New Mexico, west to California, and north to Phoenix. It also had the effect of damaging and cutting off some low income areas. Fig. 5-5 shows the Tucson area in 1955, with the path of the freeway marked. It closely followed the route of the old Casa Grande Highway and then ran north of the old Benson Highway. Construction of that highway had also affected neighborhoods in its path.

The main difference between the freeway and the old highways was that the freeway had many fewer crossings than the highway, effectively cutting off neighborhoods on both sides of the freeway and blocking some residents from easy access to the Santa Cruz River. The freeway right-of-way is also considerably wider than the highway right-of-way. I-10 came through just west of Barrio Anita, separated the Kroeger Lane neighborhood from its neighbors, and destroyed an area occupied by minorities at the Nogales Highway interchange (later the I-19

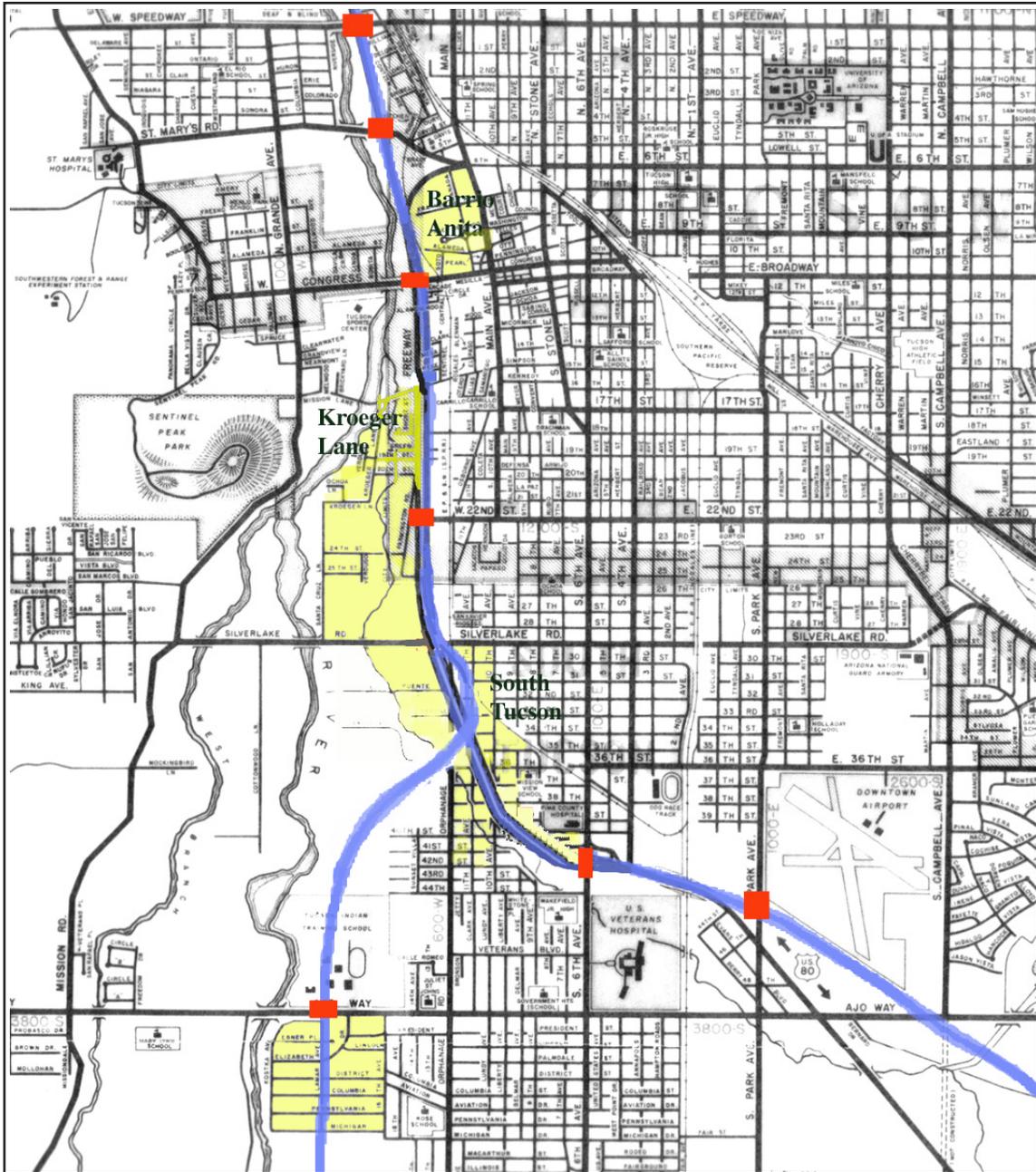
interchange). Thirty families living in the interchange area petitioned the federal government on the grounds that they did not receive adequate compensation for their destroyed homes. The City of South Tucson objected to the location of the interchanges which bypassed businesses there and objected to the path of the interchange which cut off part of the town. There were also impacts in the Marana area where the freeway construction involved taking some farmland out of production. The newspapers had numerous stories about the impact of the freeway on motels and other businesses who were concerned about loss of business, but scarcely mentioned the impacts on low income neighborhoods.

Since that time the Phoenix area has built numerous freeways and Tucson has allowed no more, except for I-19 from Tucson to Nogales. I-10 greatly decreased the travel time from Tucson to Phoenix and other destinations to the east and west. I-19 decreased travel time to Sonora. New freeways have been proposed and rejected twice in Pima County amidst demands for solutions to travel problems and rancor and public outcry. In January 1970 the Daily Citizen reported "Giant traffic jams predicted if freeway system isn't built. Tucson will be smothered

by traffic by the mid 1980s if an efficient freeway system is not built, the director of the Tucson Area Transportation Planning Agency warned..."

In the 1980s citizens rejected a major freeway north of the Rillito River. Residents displayed bumper stickers with admonitions such as "Keep it Kinky," referring to the winding road that followed the bends of the river. They preferred their rural, quiet life style and wanted to protect the environment. They also argued that freeways are not cost-effective.

Most of the new and widened roads are built in the rapidly developing areas to serve new subdivisions. The City of Tucson asked voters to approve a 1/2 cent transportation sales tax in a May 2002 election in which nearly 50% was for roads and interchanges to accommodate growth while less than 18% was to be used for public transit.



**Fig. 5-5. Neighborhoods directly affected by construction of I-10 and I-19 (in yellow).**  
 The base map is a 1955 map of Tucson, with the freeway added in blue and access spots in red.



## Chapter Six

### Land Use and Housing Issues

*“Most recent and rapid population growth in Tucson and the U.S. has taken place on the urban fringe. Development tends to leapfrog to the outer fringes as developers look for large parcels of inexpensive land on which to build. People move to the suburbs to enjoy the feeling of open space and get away from congested traffic and crowded living conditions. ... But an examination of suburbs...reveals some negative aspects of suburban development.”*

**P**lanning and zoning decisions are made at the local level and the local communities take pride in handling land use matters locally, but many of those decisions have actually been strongly influenced by federal policies and subsidies. Tucson would not be the rapidly growing type of community it is if left entirely to its own devices. These federal policies have influenced the rate and direction of growth and contributed to separation of neighborhoods by income and race or ethnicity.

#### **The Impacts of Federal Policies on Land Use**

##### **Land and Housing Availability**

“Manifest Destiny” was the slogan as the American West was acquired and settled. It was the fate of Americans to occupy lands from coast to coast and “put them to productive use.” The federal government encouraged people to settle in the West by offering nearly free land under the 1862 Homestead Act and the 1875 Desert Land Act. It made travel west easier when it subsidized construction of cross-country railroads and later land cross-country highways. These and other subsidies and policies for wastewater facilities, water supplies, and others are discussed in Chapter 7. This section looks specifically at the impacts of federal housing policies and subsidies on land use patterns for disadvantaged groups and others.

During the Great Depression of the 1930s, many people lost their homes, jobs, and savings. Banks failed as did many businesses. Remedies were needed and President Roosevelt’s New Deal policies included the Social Security System, the Civilian Conservation Corps, banking insurance and others. The most important innovation for housing and land use was the Federal Loan Bank which later developed into the Federal Housing Administration. It seemed to New Deal planners that guaranteeing home loans would give people security in home ownership, help the banks, promote housing construction,

and improve the economy by offering millions of jobs in construction all in one low cost program. The government would not loan people money for homes, but would guarantee private loans.

Before 1940 almost all home construction was by individual builders who built a small number of homes each year. Only the wealthy and upper middle class could afford to own a home and more than half the population rented homes. Home loans generally required a fifty percent down payment, with the rest to be paid off in seven years. Homes on farmland were a major exception because most farmers built their own homes, but many farm workers lived in rental or share-cropping situations.

New Deal planners envisioned a mass production approach to home building akin to the methods Henry Ford had devised for the auto industry. This would greatly speed up the number of new homes available and increase the number of jobs in construction. Congress passed the Federal Housing Act in 1934. The government would provide mortgage insurance that would guarantee 20-year loans for up to 80 percent of the value of the home. This was liberalized even farther in later years. This meant that many more people could afford to buy a home and at times it was actually cheaper to buy than rent.

While this program was designed to accomplish these goals, it was also designed to be run in a fiscally sound manner so that the government would not have to make good on very many loan defaults. To assure fiscal soundness, the government adopted policies which the designers believed would add stability and predictability to the process. These policies strongly influenced the type of towns we see today in the West and other rapidly growing parts of the country.

After World War II, mass production of homes became the norm. The federal government offered inducements to builders who would develop entire subdivisions, building infrastructure as well as homes. The government would provide a “conditional commitment” to guarantee the mortgages which in

turn allowed the developer to gain financing for the property with very little capital of his own. During World War II the federal government had helped stimulate the mass production approach by paying for construction of housing for defense workers. “Connie Chambers” in Tucson was one such project. In 1944 Congress passed a similar program as part of the G.I. bill offering veterans housing loans at even more favorable rates. The industry was ready to start building millions of homes by 1950.

The two agencies adopted standards that have become the standard nationally for homebuilding and strongly influenced how communities went about zoning. They explicitly favored loans for new construction in the suburbs, declaring that “interior locations in the metropolis have a tendency to exhibit a decline in quality.” They seldom guaranteed loans to refurbish older homes or to build on vacant property in the city. Older industrial communities got far fewer loans than did rapidly growing towns in the West. The policy manuals emphasized privacy and homogeneity rather than diversity. They favored single-family dwellings and did not approve of the traditional small-scale rental properties, such as apartments for the grandparents over the garage. They counseled developers not to arrange streets as grids, but preferred curving avenues and cul-de-sacs to preserve privacy. Neighborhoods were to contain all one kind and price of housing on similarly sized lots. This meant that everyone who lived in a particular subdivision was of a similar income level. Homes were to be occupied by traditional families, so female heads of households had difficulty qualifying for FHA mortgages.

The policies also favored developments that had curving roads and cul-de-sacs to promote privacy. Fig. 2-7 is an example of such a development in Tucson. There are only a few access roads to the main road out of the subdivision. While the curving streets may have more charm than the rectangular street grid, they do make it difficult to walk places, although cul-de-sacs are safer places for children to play. A person may live just a short distance from some desired destination, but with the street pattern may mean that it is actually much farther, possibly out of walking range.

Emerging Trends of Real Estate commented “Areas with sensible zoning (integrated commercial, retail and residential), parks, and street grids with sidewalks will age better than places oriented to disconnected cul-de-sac subdivisions and shopping

strips, navigable only by car.” (Anon. 2001j)

Most insidiously, the agencies strongly disapproved of neighborhoods that were not racially homogeneous. Builders were explicitly advised to write restrictive covenants into all deeds, legally barring purchase by specific groups. This type of deed restriction had begun much earlier, but was federal policy until the Civil Rights Movement of the 1960s. A deed written in 1929 in Country Club Manor in Tucson, for example, stated “No part of said property shall be sold, conveyed, rented, or leased in whole or in part to any person not of the White or Caucasian Race, except such as may be employed thereon as domestic servants by the owner or tenant of any lot of said property. . . . the restrictions referring to persons not of the White or Caucasian Race shall be perpetual.” This particular deed restriction was still attached to the deed when the house was last sold in the 1980s, although this type of deed restriction had been outlawed two decades earlier and cannot be enforced. While FHA and VA are no longer allowed to discriminate by race or creed, they still prefer to make loans in neighborhoods that are homogeneous by income level.

The old neighborhood concept that included corner grocery stores and other convenient shops was scrapped in favor of special areas zoned for commercial uses. This meant that for the most part it was not longer possible to walk to the store or work and people living in these areas were necessarily dependent on automobiles. In many cases children had to be driven to school or recreation. More than one car often became a necessity. See Chapter 3 for a discussion of the role that the federal highway program played in transportation.

## **Public Housing**

Another effort that had its beginnings in the New Deal of the 1930s was the attempt to provide low income public housing. The Housing Act of 1937 called for slum clearance and every new public housing unit had to replace a substandard one. This did not increase the low income housing supply but replaced old housing with new. In 1941 Tucson applied for federal funds for public housing and in 1942 plans for construction of “La Reforma” began. The project included 159 residential units and a health clinic. The first residents were families of defense workers. By 1947 there were only 12 low income families in the unit. The rest were defense workers above the income limits, but this began to

change when people above the maximum income level were evicted. It was not until 1963 that La Reforma was integrated.

In 1949 Congress passed the Housing Act that called for construction of 810,000 new public housing units. After considerable community debate and acrimony, Tucson finally applied for funds in 1963 and in 1967 residents began to move in to the first new units in a project that came to be known as Connie Chambers. To make way for this project 263 buildings were demolished in Barrio Viejo.

By 1974 the Star claimed that the city had built “an instant ghetto” and supported Councilman Romero’s proposal to move La Reforma families into scattered-site units, but this had to wait until money was made available to acquire those units. In 1995 the city finally received a grant to do a comprehensive redevelopment plan for the area and in 1999 demolition of the projects began along with a plan to build 60 affordable homes throughout Barrio Santa Rosa, a day-care complex and other amenities.

In No Me Veas Diferente, former project residents recall the many good times and neighborhood spirit of the projects as well as the bad times that mostly came later when crime and gangs became problems. (Kelly 2000)

In 1993 the People’s Law Center issued a report detailing racial discrimination and neglect in Tucson’s public and federally subsidized housing. (Bohlke 1993) The report concluded, among other things, that “The promise of a home in decent, safe and sanitary condition regardless of income has yet to be fulfilled.”

### **Urban Renewal**

In 1949 Congress passed the Housing Act, part of which came to be known as “Urban Renewal.” This Act enabled city governments to use their eminent domain powers to seize property in areas identified as slums, purchase it with the help of federal funds, and then sell the assembled area to a private developer for redevelopment. An important goal was to provide good housing in well-planned neighborhoods. The funds available, however, could only eliminate some 200,000 dwellings out of 5 million slated for removal. A 1954 amendment authorized the FHA to guarantee loans on older preexisting properties, but it was many years before Congress would change the racial segregationist policies of FHA. The program fell far short of its goals and in many cases the low-cost housing that was eliminated

was replaced by high-cost luxury housing or offices and the area was otherwise made unaffordable for the previous residents who were forced to move out without getting substitute housing.

By 1957 Tucson officials were concerned about the movement of people from the center of town to the suburbs, with the consequent decline of the downtown area. Shopping malls gradually replaced the downtown area for customers. Urban renewal appeared to offer a good solution. In 1962 the decline of downtown was becoming serious and officials proposed using urban renewal funds to eliminate the “slums” and replace them with a complex of buildings that would revitalize downtown. There was enormous opposition from people who lived in the neighborhood, from people concerned about historic preservation, and many others. In 1965 the urban renewal proposal was put to vote along with a proposal for a new community center and was defeated. The city council put a new proposal before the voters who approved it in 1966.

Many Hispanic residents of the area were outraged. The barrios were home and the old church plaza was a traditional civic center for the Mexican residents. People not only wanted homes, they wanted to maintain their historic neighborhood and the social relationships with which they were familiar. In protest, some as yet unnamed residents put sugar in the gas tanks of the construction equipment parked at El Tradito.

The pro-renewal forces won out and in 1972 the city received a \$2.25 million dollar loan. The bulldozers moved in and as Sonnischen said “the old landmarks vanished, including Sabino (Gay) Alley, several old hotels and stores, the building which had once been the Alianza headquarters, and dozens of saloons, rooming houses and business blocks whose 900 inhabitants scatters – uprooted and in many cases, resentful.” As the Arizona Daily Star reported in December 1978, “the old adobe homes that sheltered generations, the small, productive gardens, and the security of their neighborhood where everyone knew each other, shared the same culture and spoke Spanish ... Those who lost their homes ... were paid off but the money couldn’t compensate for the psychological blow...” In place of this barrio today the City has the Tucson Convention Center and the city-county government complex to the north. Both have helped to maintain downtown as an attractive place to work and recreate. Most of the old stores, such as Steinfelds, however, closed.

Table 6-1 Pima County and City of Tucson Selected Zoning Categories

COUNTY ZONES			CITY ZONES		
Zone	Descriptive Title	Area	Zone	Descriptive Title	Area
<b>RURAL</b>					
IR	Institutional Reserve	1,568,160	IR	Institutional Reserve*	1,568,160
RH	Rural Homestead	180,000	RH	Rural Homestead*	180,000
GR-1	Rural Residential	36,000	---		
SR	Suburban Ranch	144,000	SR	Suburban Ranch*	144,000
SR-2	Suburban Ranch Estate	72,000	---		
SH	Suburban Homestead	36,000	SH	Suburban Homestead	36,000
<b>RESIDENTIAL</b>					
ML	Mount Lemmon	36,000	--		
CR-1	Single Residence	36,000	RX-1	Residence	36,000
CR-2	Single Residence	16,000	RX-2	Residence	16,000
CR-3	Single Residence	8,000	R-1	Residence	7,000
CR-4	Mixed-Dwelling	7,000	R-2	Residence (Multifamily)	None
CR-4	Mixed-Dwelling (Single-Family)	7,000 5,000	R-2	Residence	
CR-5	Multiple Residence	6,000	--		
CR-5	Multiple Residence	6,000	R-3	Residence (Single-Family)	
	None		R-3	Residence (Multifamily)	
CMH-1	Mobile Home - 1	8,000	MH-1	Mobile Home	7,000
CMH-1	Mobile Home - 1	8,000	MH-1	Mobile Home (Multifamily or Park)	7,000
<b>BUSINESS/MIXED USE</b>					
MR	Major Resort	871,200	--		
--			O-1	Office	10,000
--			O-2	Office	None
TR	Transitional	None	O-3	Office	None
TR	Transitional (Residential)	10,000	O-3	Office (Single-Family)	5,000
TR	Transitional (Residential)	10,000	O-3	Office (Multifamily)	
RVC	Rural Village Center	None	RVC	Rural Village Center*	None
--			NC	Neighborhood Comm.	10,000
CB-1	Local Business (Res.)	10,000	C-1	Business (Residential)	None
CB-1	Local Business(Nonresi.)	None	C-1	Business (Nonresidential)	None
CB-2	General Business(Res.)	7,000	C-2	Business (Re.)	None
CB-2	General Business(Nonres.)	None	C-2	Business (Nonres.)	None
--			C-3	Business (Residential)	None
--			C-3	Business (Nonresidential)	None
TH	Trailer Homesite	18,000	RV	Recreational Vehicle Park	7,000
--			OCR-1	Mixed Use	None
--			OCR-2	Mixed Use	None
--			PAD	Planned Area Dev.	40 acres
MU	Multiple Use (Re.)	7,000	MU	Multiple Use (Sing.Fam.)	7,000
MU	Multiple Use (Re.)	7,000	MU	Multiple Use (Multifam.)	5,000
MU	Multiple Use (Nonres.)	None	MU	Multiple Use(Nonres.)	None



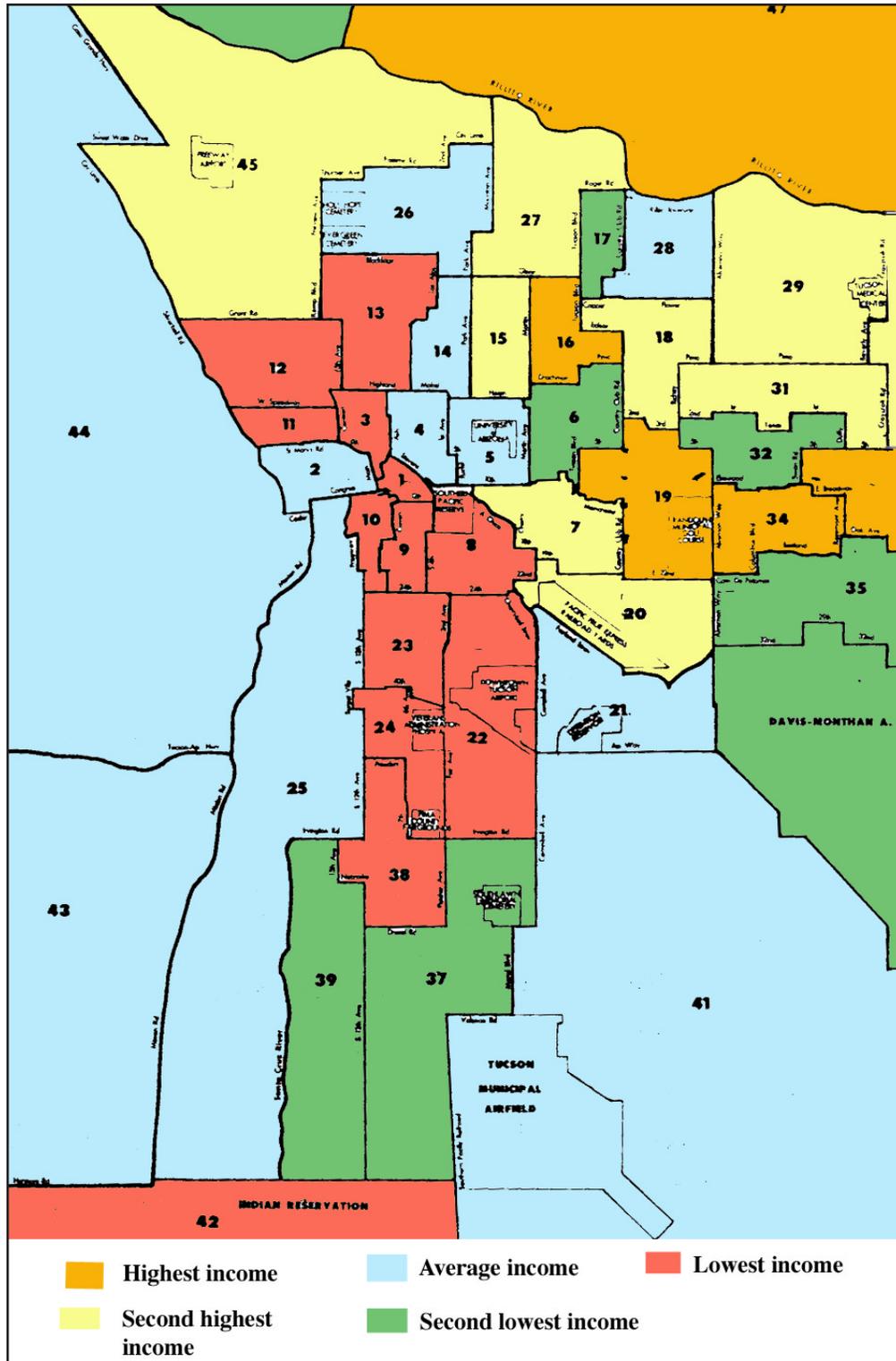


Fig. 6-2. Buying power in 1962. Adapted from Cole's Directory.

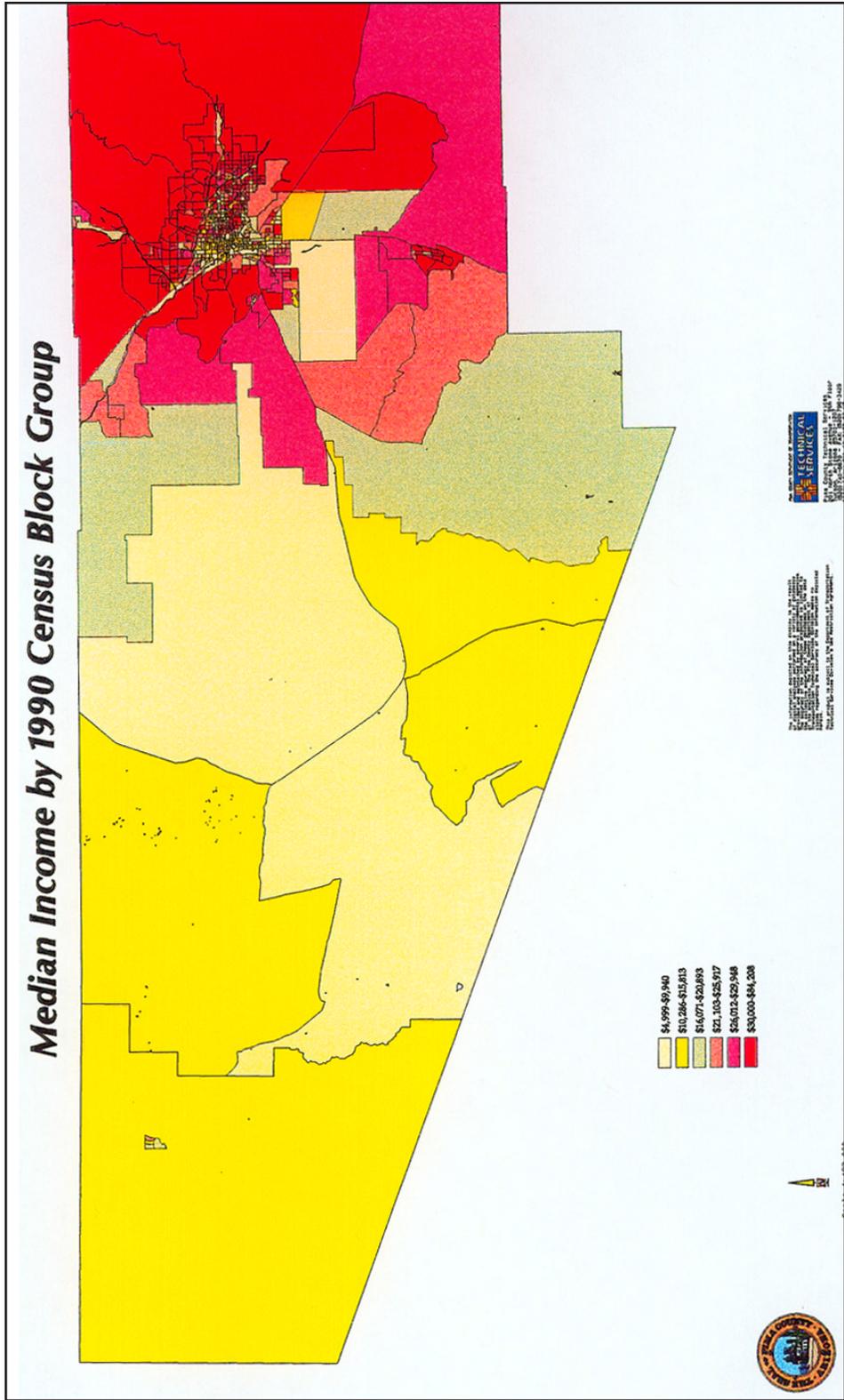


Fig. 6-3. Income distribution in Pima County in 1990. Source: U.S. Census.

Some people still are suspicious and resentful today as the City of Tucson considers the Rio Nuevo Project. Planners have been sensitive to these concerns and the possible problems of gentrification with accompanying increase in land values, rents, and taxes.

### **Beginnings of Planning and Zoning**

Before the 1930s zoning was virtually unknown in the United States. In Tucson, planning and zoning procedures in the city began to be developed in the 1930s, but it was not until the 1950s that the county got that authority and also implemented planning and zoning. While in some other areas zoning was a response to problems of overcrowded slums and unsanitary conditions, in Tucson zoning got its start as a way to direct land use in an area that was beginning to expand outside traditional living areas. As Gertrude Mason, the person most responsible for starting planning and zoning in Tucson, said in the 1930s:

“As we see it, a city plan guides the city’s growth; it benefits both the present and the future generations. ... We remember the Tucson of the past, when the Spanish atmosphere was much more apparent, when modern progress had not given us so many conveniences and taken away so much of the city’s charm. We hope it is not too late to save some of the things that have made Tucson different.” (Mason manuscript AHS)

She went on to call for underground utility wires, development that would be contiguous (rather than what we now call “leapfrog” development), and that it be kept compact to facilitate installation of sewers, etc. She believed that compact development was much more cost-effective than what we now call “sprawl.” Finally, she advocated for a subdivision approval processes that would include requirements that developers provide parks and schools. Some of Mason’s ideas were not implemented but fortuitously are reflected in the SDCP proposals.

At the end of the nineteenth and start of the twentieth in Tucson land uses tended to be mixed so that a neighborhood might contain residences of various income levels, corner stores, and other amenities. For the most part people lived within walking distance of work and shopping because the town was small and automobiles were rare, although the streetcar did run all the way to the university.

Roy Drachman recalled that “A common sight on Tucson streets in almost every part of town were corner Chinese groceries. They were small stores in the back of which the family lived and were an important part of Tucson life. ... The Chinese stores did not generally sell meat, leaving that to a few meat markets located along Meyer Street, Congress Street, and in one or two larger grocery stores in the downtown area.” (Drachman 1999)

America’s first comprehensive zoning code adopted in New York City in 1916 had a pyramidal approach to permitted uses. In the residence zone, nothing but residences were permitted. In the commercial zone both commercial and residential use was permitted. In the industrial zone all three kinds of uses were allowed. That is, residences were allowed anywhere.

In 1909 Los Angeles took a very different approach and created a multitude of different types of zones providing the framework for the exclusive “single-family only” residence zones. This became the model for most zoning codes today. The total exclusion of uses from zones and their isolation by vast distances really took hold after World War II. At a time when the U.S. Supreme Court was outlawing racial segregation, economic segregation was becoming institutionalized in zoning codes. (Gerckens 1994)

Since local zoning policies developed at about the same time that the federal policies above developed, it is no surprise that they developed along the same lines. Zoning today divides the community into areas in which the lot sizes are fairly similar to each other as are the costs of the house. Commercial and industrial uses are placed in their own zones with transition areas between them. At the present time Pima County has residential zoning classifications listed in Table 6-1. Most of the Catalina Foothills area is zoned for large lot single family residential uses, some town house uses, and commercial uses such as shopping centers and professional offices at some major intersections. Golf courses are also located in the area, but no industry or low income housing areas. Industry is primarily located along the major transportation routes – the railroad, the interstates and the airport. Fig. 6-1 shows general zoning, with all single family residential zones grouped together for simplicity and all commercial zones grouped together. Some rezoned areas are an

exception to this general pattern.

### Parks

Parks and recreation areas have been important to Tucsonans for more than one hundred years. Plazas were integral to the Spanish-era town. (See Fig. 2-5). The Elyssian Grove was a major gathering place for Tucsonans until the early 20th century. Neighborhood parks such as Himmel Park and Estevan Park are significant as well as the large natural parks such as Tucson Mountain Park and Saguaro National Park and the National Forests. Access to the public lands for hunting, fishing, picnicking, and camping is a major attraction of Pima County. Fig. 6-4 shows the location of city and county parks in the metropolitan area. Parks are located throughout the city, especially in the older areas. Newer areas of the city and county have far fewer neighborhood parks or recreation areas, although golf courses are located in some of those areas.

### Impacts of Land Use Policies

Since most minority and low-income neighborhoods are within city limits of Tucson and South Tucson much of the discussion below relates to those incorporated areas. Much of the sprawl, however, occurs in the unincorporated areas. This makes coordinated planning difficult.

While planning and zoning have played important roles in bringing order to a previously somewhat chaotic land use pattern and in preserving open space, it has also played the role of excluding people of lower income levels from large parts of the region. Fig. 6-2 is a generalized map of income levels in the area derived from Cole's Directory. This directory was produced to give merchants an idea of which parts of the community had the most wealth and were thus better potential customers. Fig. 6-3 is a map of income levels based on the 1990 census. (Similar information is not yet available for the 2000 census). Although the community has grown considerably, the areas of higher and lower income are still clear. Whereas in the past people by necessity lived close to their place of work, they now are frequently unable to do so.

The combination of FHA and VA policies, and the development of exclusionary zoning codes have led to an assumption that in a place like Tucson this is normal as well as preferred. Cities such as San Francisco or Paris follow quite a different pattern in which people may live above stores, in which hous-

ing prices are more mixed, and in which shopping and work are either close by or convenient by public transit. The older part of Tucson tends to have more mixed uses than newer areas.

An SDCP study of housing to be issued within the next few months will go more deeply into these issues, including mortgage and insurance policies and how federal policies have actually functioned on the Pima County level.

Pima County still has areas of strong minority residence despite four decades of civil rights legislation and a county-wide increase in percentage of minority population. This is partly by choice of residents and partly because of the exclusionary policies discussed above.

In the late 19<sup>th</sup> and early 20<sup>th</sup> century, communities considered mixed land uses the norm. In most cities people were able to walk to work and stores. While some neighborhoods had homes for wealthy people, they were usually not far from the places where their employees lived and people could walk to the market.

In 1926 the U.S. Supreme Court ruled that it was legal for communities to zone land for specific uses. This came when the automobile was becoming more prominent, and growing cities began to take on a new form. Present day cities in the sunbelt are designed with the automobile in mind. In cities like Tucson and Phoenix, it is difficult for people to live in most parts of town unless they own at least one vehicle. People depend on cars to get to work, go to the store, take children to activities, and many other tasks. People who are unable to drive for age, health, or economic reasons may become isolated or have depend on others to go to the store, library, school or doctor.

### Urban Sprawl

The Environmental Justice Research Center at Clark Atlanta University ([www.ejrc.cau.edu](http://www.ejrc.cau.edu)) has done studies on a wide range of environmental justice issues. A recent publication, *Sprawl Atlanta*, looks at the social equity dimensions of uneven growth and development.

"Ask ten people to define sprawl, and you will probably get ten different definitions." In this report, we define sprawl as: random unplanned growth characterized by inadequate accessibility to essential land uses such as housing, jobs, and public services like schools, hospitals, and mass transit. Sprawl-driven development has negatively impacted

the population, jobs, investment capital and tax base of the urban core. Typically, strip centers, low-density residential housing, and other isolated, scattered developments leapfrog over the landscape without any rhyme or reason.

“ Sprawl creates a car-dependent citizenry. Urban sprawl is consuming land faster than population is growing in many cities across the country. Historically, the decentralization of employment centers has had a major role in shaping metropolitan growth patterns. Government policies buttressed and tax dollars subsidized this decentralization through new roads and highways at the expense of public transit. Tax subsidies made it possible for new suburban employment centers to become dominant outside of cities, and to pull middle-income workers and home owners from the urban core. ...”

The book discusses the many ways in which sprawl affects low income and minority residents of Atlanta. They point out that all Americans pay for sprawl with increased health and safety risks, worsening air and water pollution, urban decline, disappearing farmland and wildlife habitat, racial polarization, city/suburban disparities in public education, lack of affordable housing, and the erosion of community. The authors believe that sprawl-fueled growth is pushing people further and further apart geographically, politically, economically, and socially. Some of the economic impacts they discuss are mentioned in Chapter 7 of this report.

The authors conclude after extensive research that the major impacts of sprawl on Atlanta’s minority and low income populations include automobile dependency, urban infrastructure decline, core city abandonment and disinvestment, increased energy consumption, air pollution, threat to farm land and wildlife habitat, and diminished quality of life. The social effects include urban core poverty, unemployment, limited mobility, economic disinvestment, social isolation, city/suburban school disparities, public health threats, and safety risks.

While this study is specific to Atlanta, many of the conclusions would undoubtedly be applicable to Pima County if a thorough study were done. Some clear similarities to Pima County include automobile

dependency and limited economic opportunity, loss of population in the core area, increased energy consumption and air pollution from the many miles that people travel to get to places from the suburbs, and disparity in school districts.

### **Other Forms of Community Planning**

“This increased exclusion of uses from zones, coupled with a penchant for low development density (low density is best density) resulted in vast spread cities of huge zones of developmental uniformity and life-style conformity. Most commonly, this meant the exclusion of all but the more affluent from participation in the new modern suburban-American society.” (Gerckens 1994) What are the alternatives to sprawl and to exclusionary zoning? The following are a few examples of ways other communities coordinate land use.

In Calgary, Alberta, Canada the entire metropolitan area is made up of “communities.” Sprawl never got started in Calgary. When a developer applies for permission to build, he does not plan a subdivision but a community. The community must be contiguous to the already developed area and must include provisions for a whole range of facilities necessary for that community. It must have provisions for different types of housing at different prices, a shopping area, school, parks, church, and access to public services. It must also have provisions for connecting to the public transit system. The edge of town is clear. The need for the new neighborhood must be demonstrated. ([www.gov.calgary.ab.ca](http://www.gov.calgary.ab.ca))

Another approach is termed “traditional neighborhood development.” This land use pattern attempts to imitate in modern form the old concept of “village” in which people lived near or above stores and workplaces and walking was the normal way to get places. It incorporates too many factors to list here. The major components are connection to the regional structure of transportation and other infrastructure, incorporation of natural components and parks, a balanced combination of houses, shopping, workplaces, and recreation areas, public buildings, sidewalks, easily accessible commercial buildings, and ecologically sensible design. Civano, on Tucson’s far east side was designed with some of these properties in mind.

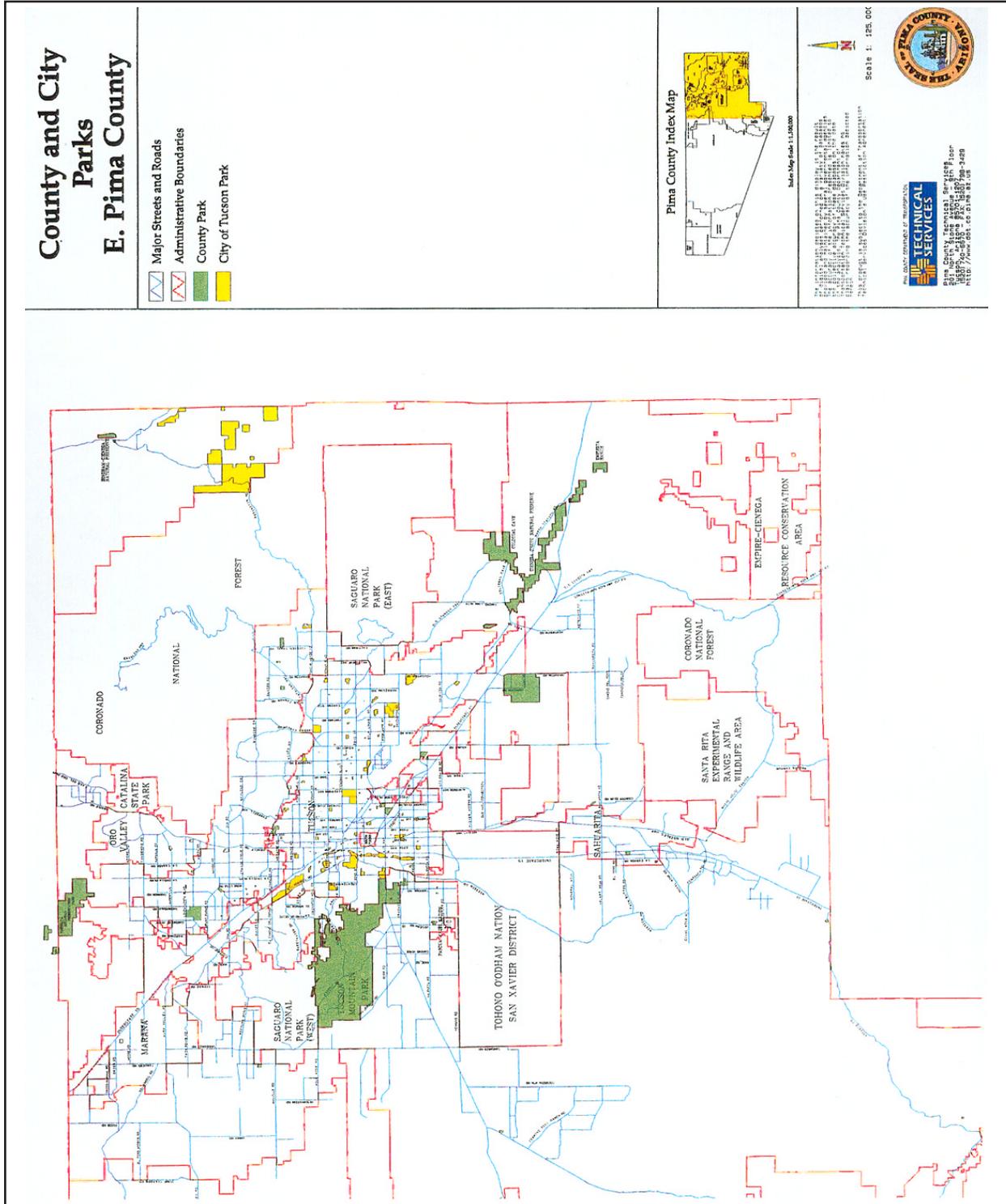
Suburban Town Centers are favored by some suburban residents. In the early 1990s, nationwide

surveys were conducted to determine what features and amenities home buyers would most like in a new community. One surprise was that people said they preferred “town centers” with a village green surrounded by shops and civic buildings to strip malls. ...” (McMahon 1999) In many ways this is a return to the Spanish-derived downtown of Tucson a hundred years ago.

Another approach to containing sprawl is to set an urban growth boundary around a community beyond which development is only allowed under certain conditions which vary in different proposals. A proposal on the Arizona ballot in 2000 would have required cities and counties to set such a boundary beyond which new development would only be allowed as an exception and beyond which extension of certain services would be denied. Decisions were left to local communities rather than mandated at the state level, although the state did set basic requirements. Existing uses were allowed to remain. The initiative failed. It was patterned on a similar law in Oregon that has been in effect for some thirty

years. This approach does not deal with issues of exclusionary zoning but is primarily aimed at controlling sprawl.

Inclusionary zoning is an effort to incorporate a certain percentage of low cost housing in new higher cost developments. Sometimes this takes the form of requiring that rentals be no higher than a maximum rate for a given number of years and at other times it requires a mixture of owner-occupied housing types. This approach is most successful when coordinated with the availability of public transportation. As one Hispanic south side resident said in a personal conversation, however, “We wouldn’t move out to the suburbs because few of us own even one car and because our extended families live here. In a suburban neighborhood there would be no way for the grandparents to live next door or in an attached apartment.” On the other hand, in neighborhoods, such as Menlo Park, people of the younger generation with relatively high incomes do move to areas such as the Tucson Mountains foothills.



**Fig. 6-4. City and County Parks in Eastern Pima County.**  
 Source: Pima County Technical Services

# Chapter Seven

## Fiscal Issues

*“The result of low density sprawl is that the total miles of water and wastewater infrastructure needed to serve the same number of people is doubled, tripled, quadrupled, and more.*

*And who pays: You and I do, through our taxes. ...”*

Jim Woods in Kemp-Rye 2001.

This chapter looks at four questions:

1. To what extent does growth pay for itself in Pima County?
2. Are the current growth patterns in Pima County the most cost-effective?
3. Who pays and who should pay for the costs incurred in making growth possible?
4. Are disadvantaged groups disproportionately affected by growth and land use policies?

This study is, however, in no way a comprehensive growth study for Pima County. This need for such a study is high. For many years officials have assumed that population growth is both economically beneficial and necessary. They have also seldom questioned whether the current growth patterns are the most cost-effective ones. On the other hand, there has been discussion of who should pay and the concept of impact fees has been at issue.

### Who Pays for Growth?

For more than 125 years, the federal government has paid a significant role in providing land and money to encourage people to settle the west. In the nineteenth century the government was eager to assure to protect the recent acquisitions of Arizona, California, and other states and territories from reconquest by previous owners. Congress passed acts to give settlers land, and to give funds to state and local governments for various projects that would encourage migration to the West. The amount of federal subsidies has decreased since the 1970s and 1980s and more and more of the costs are borne now by state and local government. These local governments must now decide how to fill the financial gap. Discussion of impact fees center around how the costs of growth should be distributed between existing residents and newcomers. There is, however, also increased discussion of reduction of the total costs of growth through more systematic

planning for infrastructure and land use planning that reduces the need for infrastructure.

The purpose of this section is not to conduct a study of the costs of growth or the costs of sprawl. This study has yet to be done for Pima County and will require economic expertise. This chapter raises questions that still need answers and asks what impacts rapid population growth and urban sprawl may have on low income and minority residents in Pima County.

### The Federal Role

The measures discussed below are the major ways in which taxpayers throughout the nation have helped pay for facilities in rapidly growing parts of the nation, most of which are in the “Sunbelt.” Many of these measures also benefited the less rapidly growing parts of the nation, but benefiting the Sunbelt disproportionately. In the 1970s, for every six tax dollar paid by an Arizona, ten dollars came back to Arizona. Since then, that ratio has continually decreased. The contributors were taxpayers in the “Rustbelt” of the Midwest and East. While those taxpayers helped to subsidize growth elsewhere, their cities were often losing population and experiencing decaying infrastructure. Arizonans who have a reputation for mistrusting the federal government have benefited from handsomely from federal subsidies.

The section below very briefly describes the most significant ways in which federal taxpayers have contributed to population growth and land use patterns in Arizona and other parts of the West. Gerald Nash describes many of these programs in much more depth in *The Federal Landscape*. In some cases the laws were specifically designed to encourage population growth in the West while in other cases the laws had that unintended consequence. (Nash 1999) In contrast to the prevailing thought, however, the

U.S. General Accounting Office in 1999 found that it was unclear to what extent federal policies were responsible for sprawl. They did find evidence that federal policies may have contributed to sprawl but that a whole range of local policies, economic factors, and social conditions were also responsible. (Anon. 1999)

### **Arizona Statehood Act (1912)**

At the time that a territory entered the Union, the federal government was deemed to own the land. It could distribute the land to individuals and businesses. When a state achieved statehood status, the federal government distributed certain lands to the state government. Under the statehood act for Arizona and the Arizona constitution, the revenue from those lands is supposed to help pay for education. The land initially allocated to Arizona largely came in a checkerboard fashion with certain lands in each township allocated for building schools. The state could choose other lands and the federal government could later trade state lands for lands it wished to designate for federal purposes. Because of this checkerboard approach, state lands are scattered around the state. This has led to conflicts between state and local governments about how state land should be used, since the state earns revenue both from leasing the land and selling it and is supposed to maximize that revenue for the benefit of education. Since statehood came after many parts of the state had already been settled, some of the best farmland and mining property was already occupied under the acts described below and did not become part of the state's pool.

### **The Homestead Act (1862) and Desert Land Act and (1875)**

Federal policies to encourage growth began with such laws as the Homestead Act and the Desert Land Act that provided land at a very low cost to people who agreed to develop it. Under the Desert Land Act anyone could obtain 640 acres of land for very little money if they would develop it for use. A family could apply for land for each adult member and assemble enough land for a working farm or ranch. Because of the arid conditions in the southwest, much larger tracts of land were needed for success than

in the wetter parts of the county where a farmer could succeed on just a few acres.

### *Federal Preserves*

At the time of statehood, the federal government set aside certain lands for federal use. In addition, the federal government acquired other lands in later years for various purposes such as National Forests, National Parks, and military bases. At the present time, the federal government controls about 24,000,000 acres of Arizona land, including about 750,000 in Pima County. Indian lands include 2,491,000 acres in Pima County and 20,239,000 statewide. Most of the federal lands are available for multiple uses including grazing, lumbering, and mining. People have grazing leases, for example, on most of the National Forest and Bureau of Land Management lands in Arizona. Mining on federal lands is discussed below. The existence of some of those federal lands, such as Saguaro National Park, Organ Pipe National Monument, and Sabino Canyon contribute greatly to attracting tourists to Pima County.

### *The Mining Laws of 1872*

The federal government believed it was important that the valuable resources in the West should be utilized and prospectors should be encouraged to locate and develop mineral resources. Anyone could make a mining claim on most federal lands and in return for a certain amount of annual work on that claim receive full use of the land for virtually nothing. These laws played a major role in subsidizing Arizona's mining industry that formed a major part of the backbone of Arizona's economy and played a significant role in the growth of the state. These laws remain in effect to this day and are sometimes used to claim federal land then use it for purposes other than mining.

### **Water Development**

The federal government began to build and subsidize western water projects early in the twentieth century. Roosevelt Dam on the Salt River was the first big dam building project of the newly formed Reclamation Service (later the Bureau of Reclamation). Hoover Dam and later Glen Canyon Dam were among the many Bureau proj-

ects with multiple purposes including power production. This cheap federally subsidized power was significant to Arizona's development. These federal projects combined with agricultural water projects in the Yuma and Phoenix areas played a major role in how Arizona grew.

The most recent federal water project is the Central Arizona Project (CAP). Originally proposed to save agriculture by providing cheap water, the project is now primarily operated to satisfy Indian water claims and provide water for population growth in Maricopa and Pima counties. The federal government built the project under the condition that Arizonans pay back part of the costs at very favorable interest rates. After some controversy, the City of Tucson decided to buy the largest amount of CAP water in Pima County so the customers of Tucson Water bear most of the Pima County part of the repayment and operating costs. It is highly doubtful if Arizonans could have afforded to build the CAP without federal assistance. Most people believe that the CAP was the last great water project the federal government would subsidize. Without the promise of CAP in the 1960s, it is very doubtful that Tucson would have been able to grow as it did subsequently on its limited groundwater supplies.

### **The New Deal of the 1930s**

The Great Depression affected virtually every level of society. Banks closed, mortgages were foreclosed, jobs were scarce, and many businesses had a hard time surviving or failed. President Roosevelt initiated a great variety of projects to help cure the severe problems.

#### **Civilian Conservation Corps (CCC)**

The CCC provided jobs for millions of people nationwide. In Pima County CCC workers built bridges, picnic areas, restrooms, buildings, small dams, park facilities, sidewalks and other structures. Many of the facilities in Sabino Canyon, for example, were CCC projects. Sidewalks in the Sam Hughes neighborhood bear the CCC seal today.

#### **Social Security Act**

So many older people lost their savings and old age pensions that Roosevelt believed that

the federal government should guarantee a minimum amount of income for retirees who had been employed. Social security is extremely important in protecting the needs of retirees to this day, although there are doubts about its long-term viability as the number of retirees increases while the number of wage earners decreases nationally. One impact of social security is that it has provided a fixed income for retirees allowing them to leave their homes in other parts of the nation and move to a warm climate for retirement. One reason that Pima County has been able to grow and prosper without a strong industrial base is the amount of retiree money (Social Security and private income) that is spent for homes in places like Rancho Romero and Green Valley as well as less costly mobile homes parks. The golf course industry has prospered partly because of incomes of retirees that moved to Pima County from other parts of the nation.

#### **Federal Home Loan Bank**

The major role that the Federal Home Loan Bank and later the Federal Housing Administration have played in making housing available and influencing how communities grow is discussed in Chapter 6.

#### **Federal Tax Policies**

Federal income tax policies encourage people to buy homes when possible rather than rent and when changing homes to buy a home of at least the same price as the previous home. Mortgage costs and property taxes may be deducted but rental costs and the costs of refurbishing an old home may not. As Hanchett (2001) said: "Poor Americans reaped no benefit from these home ownership subsidies. Middle-income taxpayers say small individual gains. The deductions were largest for the nation's wealthiest citizens, who had the greatest income to shelter." When the house is sold, the seller has to pay capital gains taxes on the increased value of the home beyond a certain level unless the money is used to buy another home of equal or greater value. This strengthened the market for more costly homes. Tax law also subsidizes new commercial construction through accelerated depreciation. The write-off is greater for new construction than for reno-

vation and since the law forbade write-offs for depreciation of land, it became more attractive for developers to buy cheap land rather than higher cost urban land.

Federal tax law also gives a tax break for preservation of historic places and this stimulated some urban revitalization. Another tax law designed to help urban areas is the Community Reinvestment Act that encouraged lenders to invest in all neighborhoods, not just suburban ones.

### **The Federal Highway Act of 1956**

After World War II and the Korean War, President Eisenhower believed that it was important to develop an interstate highway system for national defense purposes as well as to improve the opportunities for people to get from one city to another. The Congress debated whether to fund the construction through bonds or on a pay-as-you-go basis. The result was the highway trust fund in which revenues are collected as taxes on gasoline sales as well as an initial appropriation of \$25 billion. Tucson was the first Arizona city to apply for and get highways for its section of what became I-10. The construction program was very ambitious and resulted in thousands of miles of highway being constructed in just a few years. (Lewis 1997)

Probably few people could anticipate the many impacts of that bill. It made it possible for people to travel long distances quickly in their cars and truck drivers to deliver supplies to areas not served by trains. It spurred the tourism industry and contributed to Arizona's growth. Over the long run it contributed to the sprawl form of growth in many communities. Whereas people in the pre-freeway days had to live relatively near work or a railroad line, the new fast roadways made it possible to live an hour's drive or more from work. As discussed in Chapter 4, Tucson did not allow any more freeways after I-10 and I-19, but the Phoenix area did and this contributed to the sprawling growth form of Phoenix.

### **The Water Pollution Control Act of 1972**

Congress passed this law at a time when concern for the environment was very high. The primary intent was to stop severe water pollution and clean up contaminated rivers. The new sys-

tem that required polluters to get permits for discharging possibly contaminated water to a watercourse (NPDES permits) played a major role in improving the quality of the nation's waters. One unintended side effect of the law and later amendments, however, was to provide funds for rapid population growth. The government would pay for much of the costs of building municipal wastewater treatment plants and the pipe system to get the water to those facilities.

In Pima County, the Roger Road and the Ina Road Wastewater Treatment Plants were built and/or expanded with a large infusion of federal funds as were major sewer lines to Oro Valley and elsewhere.

In 1974 the Council on Environmental Quality commissioned a study on Interceptor Sewers and Suburban Sprawl. The authors concluded that "current financing procedures – on both the local and federal level – may encourage the construction of sewerage systems tailored to the needs of future developers rather than the control of pollution problems. Where communities intend to finance the local share of projects costs by connection fees on new development, this creates pressure to encourage rapid growth and thus ensure the financial viability of the project. . . . Communities often view the EPA program as a one-time-only opportunity to obtain federal funds, and thus there is a definite incentive to design a future-oriented system. . . ."

Congress no longer provides this kind of subsidy for new facilities to accommodate growth so local taxpayers and ratepayers must pay the full cost. Increasingly stringent NPDES permit requirements have somewhat increased local costs to upgrade the treatment plants to meet new standards. Pima County Wastewater has taken the lead in Pima County in assessing connection fees to help pay for wastewater facility construction.

### **The Costs of Growth**

A full-blown costs of growth or cost of sprawl study is far beyond the scope of this report, but is sorely needed as stated above. It has long been assumed that population growth is good for the economy because it creates jobs, brings new money into the community and contributes to overall financial well-being. Studies in other parts

of the country, however, have shown that quite the opposite is the case. Other studies show that the costs of growth are directly related to how a community grows in addition to its rate of growth. These are briefly discussed below.

There are four types of costs: construction costs, maintenance costs, cost of providing service, and the marginal costs of replacing a resource as it is depleted.

*Construction costs*

These are the costs of acquiring land and constructing facilities including roads, water lines, buildings, flood control structures, schools, and water treatment facilities. These costs are sensitive to distance. That is, a long road or sewer line frequently costs more to build than a shorter one, although there are other factors such as type of terrain and cost of acquiring land. How land uses are distributed affects the cost of construction. See the discussion below on the cost of sprawl.

*Operating and Maintenance Costs*

These are the costs of doing such activities as

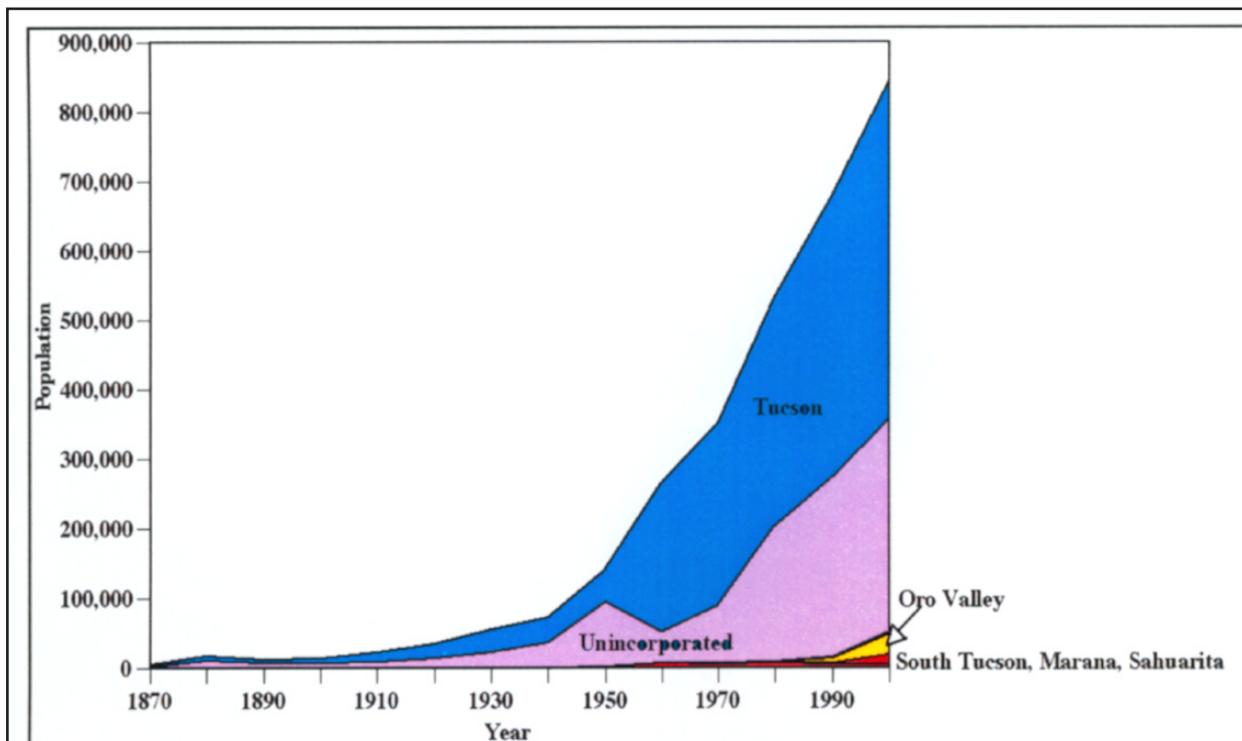
repairing roads, paying for water treatment chemicals, providing energy to run facilities, providing gas for vehicles, and keeping buildings in good repair. These costs are less sensitive to distance .

*Service Costs*

These are the costs of paying people to provide services such as police protection, teaching, court trials, public transportation, and library services.

*Marginal Costs*

These are the costs of finding replacements for materials that are used up. Finding new water sources is the primary example in Pima County. The first water to be pumped is generally the cheapest. When wells could be hand-dug or water gathered from springs, water was comparative cheap. Bringing water in from more distant sources, such as the Colorado River, for example, is more expensive . The federal government helped subsidize the Central Arizona Project as discussed above. The marginal costs of providing energy are becoming an issue in American politics as American oil reserves are depleted.



**Fig. 7-1. Population growth in incorporated and unincorporated areas in Pima County.**

Source: Arizona Department of Economic Security.

### Does Growth Pay for Itself?

Many elected officials, business people, and the news media have assumed that growth has positive economic impacts for a community. For example, in a recent KUAT newscast, the reporter said; “Good news. Housing permits reached record levels in Pima County ...” Is growth really economically necessary or desirable? Eben Fodor (1998) addressed these questions by examining ten common myths concerning growth. Four of those myths are discussed below:

#### *1. Growth reduces unemployment*

If this was true, rapidly growing areas would have lower unemployment rates than slow or no growth areas. He found no correlation between growth and unemployment. The Sierra Club in 1988 found a similar result in Pima County (Tellman 1988). The unemployment rate

in that study fluctuated with the national unemployment rate and not with growth spurts.

#### *2. Growth builds up the tax base, providing needed revenues*

Fodor compared the per capita tax rate of rapidly growing communities with slower growing ones and found that larger cities have higher per capita taxes. While there may be temporary tax windfalls, this is not always the case. Springfield Oregon, for example, had a decade of rapid growth that left its municipal funding decimated. He also cited the City of Eugene, Oregon which levies a \$2,000 impact fee for new single family homes, but conservative estimates of the actual cost of public infrastructure is more than \$20,000. In fact, he conducted a survey of large cities and found that larger cities have higher tax rates than smaller ones. A study in the Chicago area found that fast growing areas that do not increase their tax rates must resort to cuts in services.

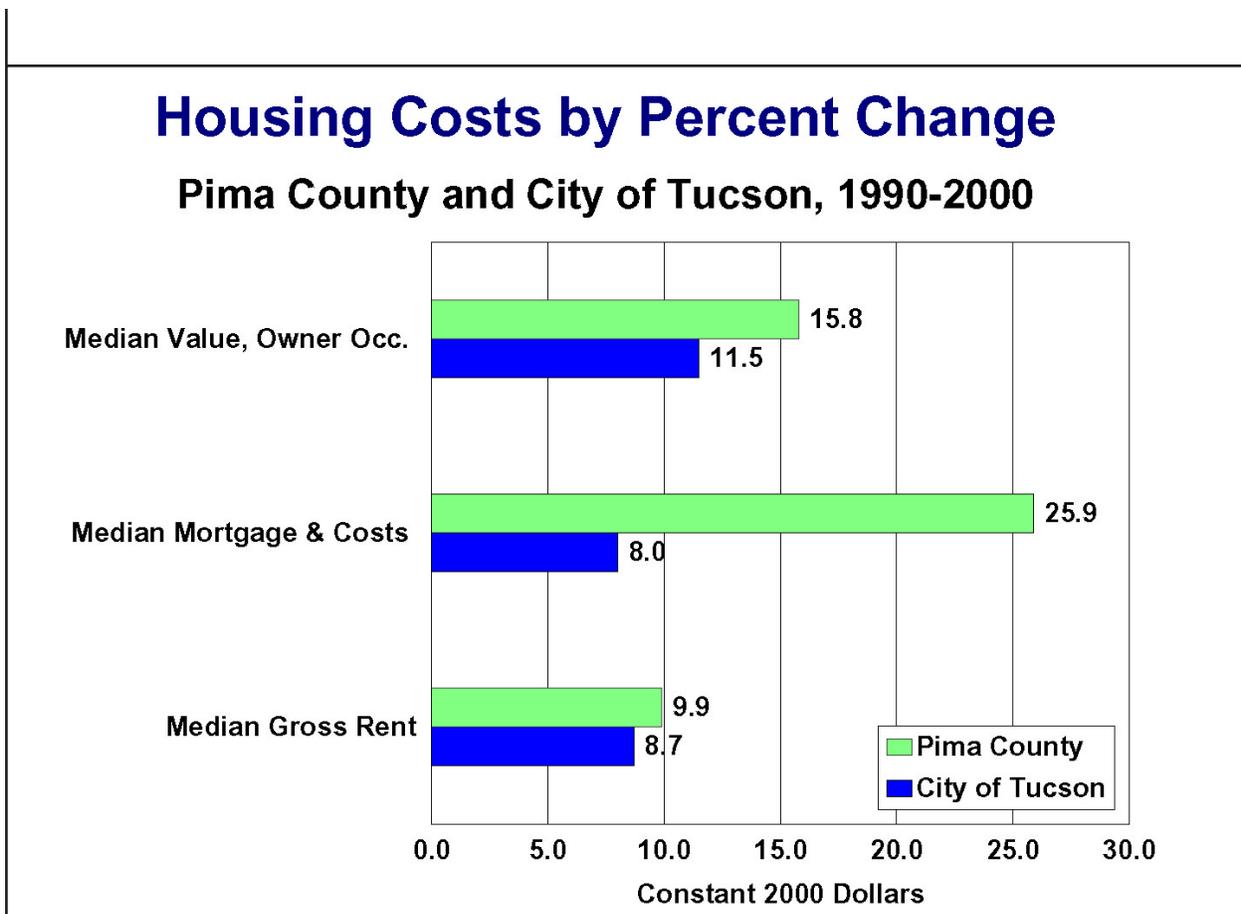


Fig. 7-2. Percent change in housing costs in Pima County and Tucson 1990-2000.

Source: Tucson Planning Department.

3. *We must subsidize and support business growth to have good jobs*

A “good business climate” says Fodor, translates to one with less government regulation, lower taxes and a higher level of business subsidies. He cites a University of Wisconsin study that came to the conclusion that states with good business climates (defined as little government regulation and much financial support of business) had worse economic outcomes and that states with the worst business climate rating experienced \$585 to \$1,000 more growth in per capita income than the ones with the best ratings.

4. *If we try to limit growth housing prices will shoot up*

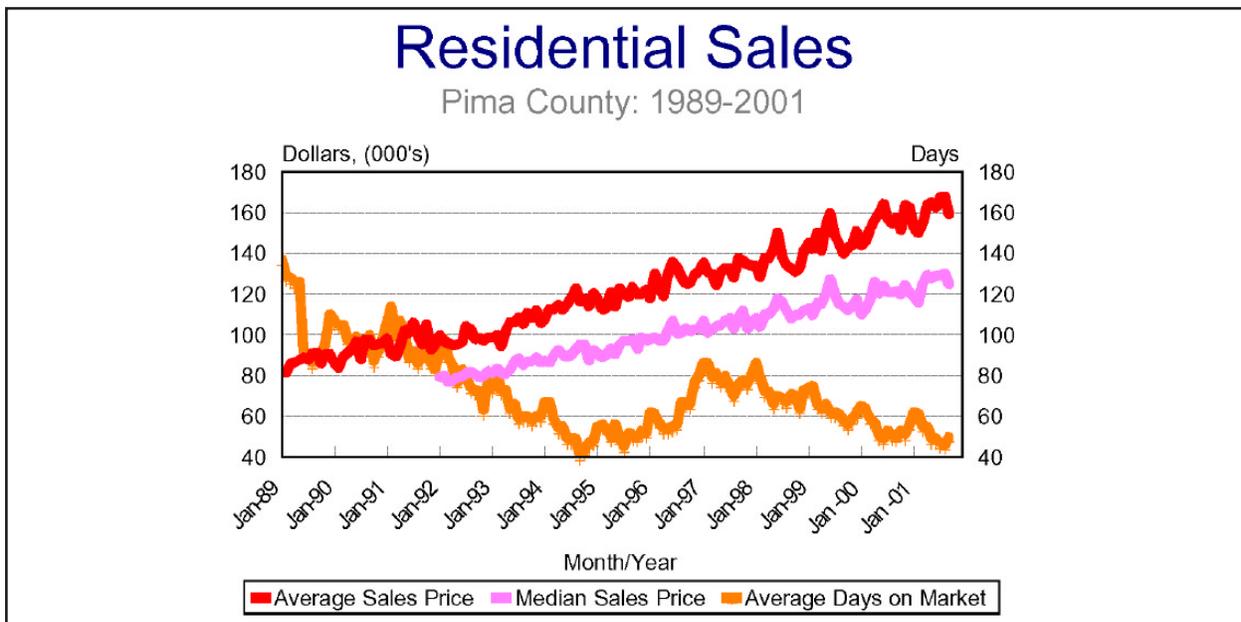
Fodor cites a California study that compared cities with growth controls and those without and found no correlation between growth controls and housing prices. A look at “Silicon Valley” where sprawl is rampant and housing prices were among the highest in the nation makes it clear that other factors such as supply and demand are far more significant. As the computer firms in the area went out of business in 2000 and people left the area in droves, the cost of housing declined precipitously, leaving many people with houses of

less value than the remaining mortgage payments.

Fig. 7-2 and 7-3 show how much housing prices have risen in the past decade in Pima County. Costs have risen much more rapidly outside city limits than inside, primarily because less low-income housing is located away from the urban area.

What are the economic effects of rapid population growth?

There have been numerous studies of the cost of growth throughout the nation and all reach similar conclusions. The American Farmland Trust has conducted studies in a many communities where urbanization is creeping into farmlands and developed a systematic approach for doing these studies. For example, in Lake County Ohio they looked the entire range of revenues and expenditures and found that for every dollar of revenue that was received for residential development, it cost an addition \$.54 to satisfy the demand for community services annually. 44% of the costs were for education, 18% for public works, 17% for public safety, Only 4% of the costs were for health and human services. Open space and farmland did not generate much revenue, but it needed few expenditures. Industry was also less costly to service. For this area for every dollar in



**Fig. 7-3. Changing prices of homes sold in Pima County.**  
Source: City of Tucson Planning Department.

revenue, the costs were \$1.54 for residential, \$1.23 for commercial and industrial and only \$.34 for farm, forest and open land. They concluded that the most cost-effective land use pattern for that community was to de-emphasize population growth.

Since that time the American Farmland Trust has assisted local communities in conducting similar studies in eighteen states, but none in Arizona. In every case residential growth costs the community more to provide services than it earns in revenue from those areas. Construction costs are not part of the calculations. The residential ratios of revenue to cost ranged from a low of 1:1.01 in Groton, Montana to a high of \$1:\$2.11 in Stewardson Township, Pennsylvania. The median ratio was \$1:1.15. The median ratio of revenue to cost for commercial development was \$1:.27 and \$1:.36 for farmland and open space. (Anon 2001)

Studies in many other communities have come to similar conclusions. Fodor cites a study in Redmond, Washington in which costs exceeded revenues for all kinds of residential development. In Loudon County, Virginia the annual cost to the community per dwelling in 1986 ranged from \$705 for 4.4 houses per acre to \$2,232 for 0.2 houses per acre. In Pima County, an SDCP study showed that unregulated (wildcat) growth does not pay for itself even for public safety costs. (Anon. 2000.) Similar studies need to be done for other types of land uses in Pima County. We just do not know whether growth pays for itself in Pima County. Two indications that it may not are the financial crises that are happening in 2001 at both the local and state levels at a time when the growth rate is one of the highest in the nation. Similarly, when California was experiencing rapid growth, the state experienced a tax crisis and citizens voted in a measure that made it very difficult to raise taxes.

### **The Costs of Sprawl**

No detailed study has been made in recent times of the costs of various growth patterns in Pima County. It is obvious, however, that dispersed growth patterns increase the road miles that must be built, the length of sewer lines, the distances that the sheriffs must travel to provide public service and many other structures and services. Some costs are fixed no matter where the growth

occurs. The wastewater treatment plant must be the same size no matter where the people live, but the pipes that move the sewage are sensitive to distance. Water wells and treatment systems are not sensitive to growth patterns, but the transmission lines are and energy costs increase to pump the water farther and uphill. Providing infrastructure in a more compact fashion reduces costs. In 1972 Pima County, Tucson and the City of South Tucson commissioned what appears to have been the very first cost of sprawl study in the United States. (Booz, Allen 1974) The consultant looked at four different growth patterns: Peripheral Expansion (sprawl), Contained Growth, Activity Centers, and Satellite Cities. The study also looked at the impacts of these growth patterns at both high (1,000,000 ) and low (800,000) population levels. The full chart with the cost conclusions is in Appendix D.

In brief, the consultant found that at the low population level capital needs would be from \$1.4 to \$1.8 billion in 1974 dollars. 2000 dollars would be slightly more than 3 times this amount.

At both the low and high population levels, the contained growth alternatives would cost significantly less than any other alternative. At the high population level, contained growth will save approximately 30% over the peripheral expansion alternative. The main costs are in construction, but peripheral expansion will be more costly to public agencies in serving scattered areas and significantly increase travel time and cost of residents to reach public facilities and services. Property taxes under contained growth at the high population rate were projected to be \$9.01 per \$100 per assessed valuation as opposed to \$11.83 for peripheral expansion in 1974 dollars. The accompanying maps projecting peripheral expansion at full population levels are very similar to today's actual map. The map projecting contained growth has many similarities to the SDCP proposed today, except that some of the areas that SDCP proposes for no development are already in use.

The federal Council on Environmental Quality published the first major national study of the costs of sprawl in 1974. (Anon. 1974) Their study was comprehensive and looked at costs of a wide range of factors including schools, transpor-

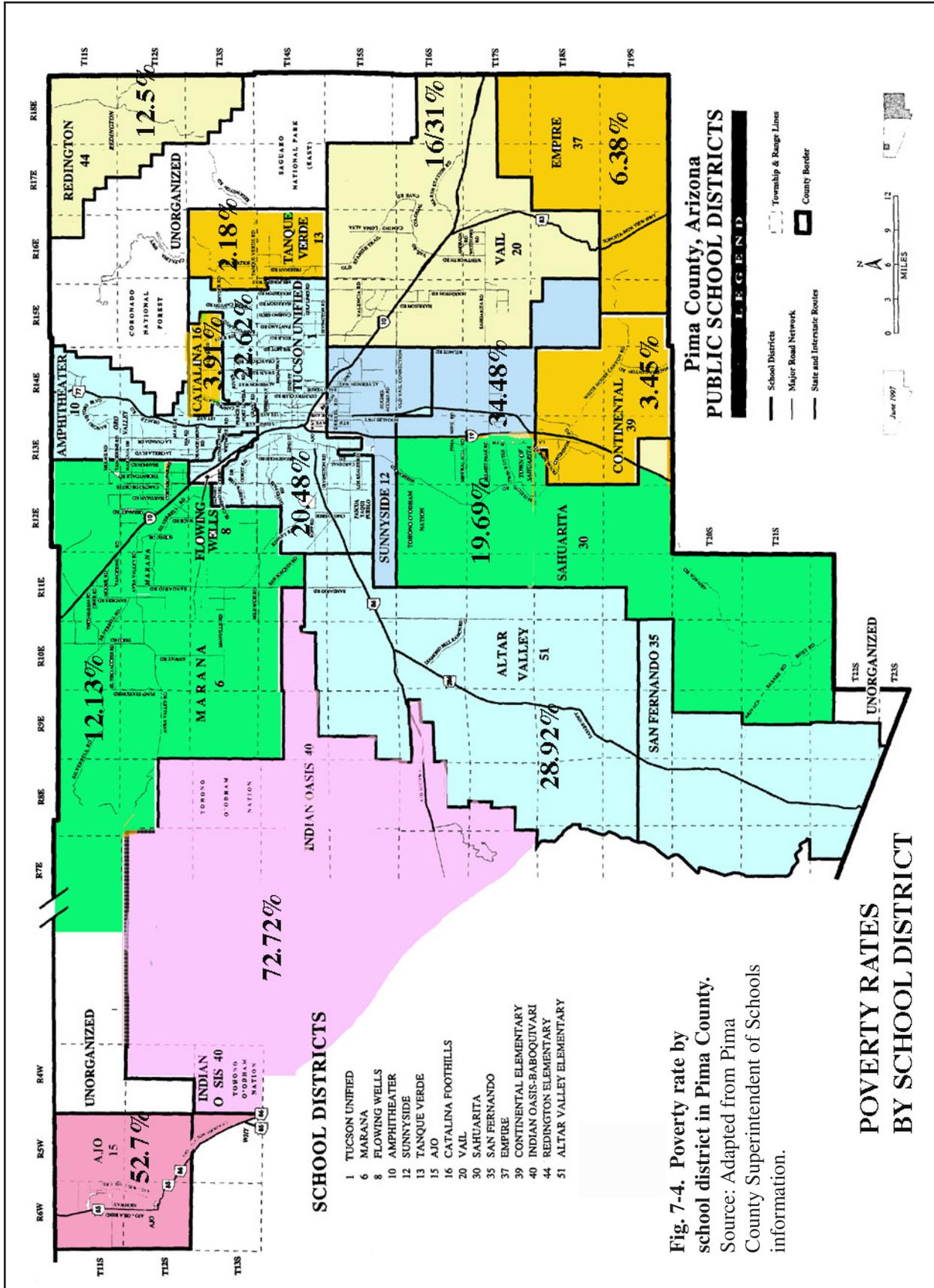


Fig. 7-4. Poverty rate by school district in Pima County. Source: Adapted from Pima County Superintendent of Schools information.

tation, police, infrastructure, air pollution, library services, health costs and many others. The major conclusions were Planned development of all densities is less costly to create and operate than sprawl. Economic and environmental costs (as well as resource consumption) are likely to be significantly less at higher densities to house and service a given population.

The greatest cost advantages occur when higher density planned developments are contrasted with low density sprawl.

When alternative residential developments are considered for a given site size, development costs increase with density, but not as rapidly as the increase in the number of dwelling units which can be accommodated.

The Sierra Club cited twelve cost of sprawl studies in its 1998 study. These are a few examples. In California's Central Valley a study showed that compact growth would save \$29 billion over 50 years in the cost of taxpayer-financed services than sprawl. Another result of that study was that the cost of providing services to urban sprawl will exceed the tax revenues by nearly \$1 billion a year. The New Mexico Local Government Division estimated that the state already faced a backlog of more than \$15 billion in infrastructure needs and that in some parts of the state foreclosures and bank failures followed periods of rapid unmanaged growth. A Utah study found that sprawl development would lead to a cost of \$10,121 per household. The report also reports that a consulting firm found that the actual cost of providing infrastructure to a single family home was \$6,390, but the city was only collecting \$2,511. The Town of Gilbert came to the conclusion that growth was costing taxpayers 16% more than it brings in in revenues and fees.

### **Who Pays for Growth and Sprawl?**

Costs are paid for by federal taxpayers, state taxpayers, local payers of sales tax or property tax, consumers, fee payers, and private funds. The elected officials making a rezoning decision may not feel responsible for increasing costs for some other jurisdiction such as a school district. The system is often so complex that it is very difficult to determine just who is paying what. For example, school districts do not follow political

lines of city limits. School property taxes are collected from taxpayers within the school district. The cost of schools is also partially subsidized by state funds under a tax equalization program to help make up the difference between districts with high land values and those without high land values. Through property taxes, Tucson Electric Power customers help pay the costs of schools in Springerville where a portion of Tucson's electric power originates. Because of the property value of the power plant, this district is relatively wealthy. The Sunnyside School District, on the other hand, has low property tax revenues. The state helps to partially equalize these differences. The recently voter-approved 1/2cent increase in the state sales tax is another source of funds for local schools. In some cases developers help pay for schools by donating land for a new school. Federal programs also provide funds for local schools. (Fig. 7-4 shows income levels in various Pima County school districts).

Construction costs may be paid on a pay-as-you-go basis from annual funds or from borrowed funds, most commonly bonds that are paid back through revenues from the project (e.g., water rates) or through the general fund. There are arguments for and against each method. The advantage of pay-as-you-go is that the total costs are lower because there is no interest to pay, but the disadvantage is that current residents pay all the costs of construction up front. The advantages of paying through bonding is that future taxpayers help pay for the facilities that benefit them, but the disadvantage is that costs are increased because of interest and the pay-back calculations assume a certain rate of population growth which can be an incentive to help attract that growth.

Utilities such as gas and telephone generally pay for expansion by charging customers connection fees and by including those costs in the rates. One argument given at rate increase hearings is that the utility cannot keep up with the costs of growth without raising the rates.

Maintenance and service costs are almost always paid for through taxes and commodity rates spread evenly among the customers, usually according to their rate of use. Continued sprawl increases costs for many kinds of services as discussed below. It has even been argued that the

cost of postage stamps has gone up faster than inflation because of the need to deliver mail to more and more distant and spread-out locations in the suburbs.

### **How Does Population Growth and Sprawl Affect Disadvantaged Neighborhoods?**

The purpose of this section is not to analyze the costs of growth in Pima County. This must be the subject of a detailed economic study. As federal and state subsidies to local governments continue to decrease, more of the costs of growth will be borne by local residents. In the following section we raise questions that need answers.

### Who Should Pay for Growth?

The two basic approaches are to borrow (i.e., sell bonds) and pay-as-you-go. Borrowing has the advantage is that it spreads the costs out over a longer period of time and with population growth, there are more people to help pay back the costs. Newcomers help existing residents pay the costs. Borrowing, however, means higher costs because of the need to pay interest. Borrowing also is a problem if the projected population growth does not materialize so it creates an incentive for continued population growth, which in turn leads to more borrowing. The pay-as-you-go approach can be through taxes and/or through impact and connection fees. Impact fees increase the one-time cost of a new home, but lessen the tax burden while taxes have the opposite effect.

SDCP proposes much more use of the impact fee approach to cover many of the costs of providing infrastructure for new construction. Partly in response to withdrawal of federal funding for wastewater facilities, Pima County Wastewater has been charging connection fees for many years to help pay for the costs of new sewer lines. Developers argue that an impact fee would add too much to the cost of new homes and would penalize newcomers and that it is unfair because existing residents never had to pay those fees. They prefer to spread the costs out over the community. Tucson is actually unusual in its paucity of significant impact fees. Scottsdale has impact fees that cover a wide range of costs and such fees are common in California and elsewhere. Seldom, however, do impact fees actually cover the full

infrastructure costs and even more rarely do they deal with annual operating and service costs.

### Do People in the Core Area Help Subsidize Growth on the Fringes?

This too is an unanswered question because of the complexity of the tax and fee systems, the multiplicity of taxing entities (city, county, school district, state, federal, and private) and the lack of a study for Pima County. It seems clear, however, that if the total costs of growth must be paid on a community-wide level, everyone who pays property taxes (either as a homeowner or renter) is helping to subsidize growth at the present time. Since gas taxes help subsidize road expansion, everyone who uses a vehicle is helping to subsidize those roads. If voters approve the city's half cent sales tax proposal, everyone who buys many kinds of goods will help subsidize new roads. At the state level, income taxes and sales taxes are also used to help subsidize growth. All gas and electricity customers share in the costs of extending the infrastructure for growth.

In the 1970s the Tucson City Council proposed that people who live at higher elevations pay more for their water since it costs more to pump water uphill to them. The lowest areas in the Tucson Water service area are along the Santa Cruz River where most of the disadvantaged areas are. The higher elevations are in the Catalina Foothills and Tucson's far east side. It seemed like a sensible notion at the time, but when it was introduced along with a rate structure that encouraged conservation by charging more for higher water use in the summer, high water users in the higher elevations revolted. The four responsible members of the council were recalled or resigned and the City Council has never again seriously considered "lift charges," although the other aspects of their rate structure remain. So all water rate payers help pay to provide water to Tucson Water customers in the higher income parts of the service area.

### Are Minority and Low Income People Disproportionately Affected by Paying for Growth?

The preceding discussions all lead up to the main question of this chapter whether minorities

and low income groups are disproportionately affected. This is another question to which we do not have the answer because no studies have been done locally.

Lower income people may get subsidies in the form of certain social services, but they do not require the large expenditures to build infrastructure or provide services that higher income people in the suburbs do. Duany et al. (2000) said "This situation is exacerbated by the costs of sprawl. Everyone's taxes – from rich and poor alike – fund the construction of new far-flung infrastructure. ... The American tendency toward building ever anew is most damaging to the poor because it is inextricably linked to the abandonment of the old. As we neglect older neighborhoods, we also neglect their residents."

Hanchett (2001) argues that because of the FHA and federal tax policies discussed in Chapter Six, all taxpayers are subsidizing new suburban development. He argues that by the 1960s the

tax break alone was costing the U.S. Treasury more than \$700 million per year, while the federal government spent that same amount over ten years on Urban Renewal projects. By 1984 the subsidy totaled \$53 billion annually, about five times greater than all direct federal expenditures for housing.

People in low income neighborhoods do not pay more than other residents to help pay for growth in the new higher income areas, but what they pay is a larger percentage of their total income. \$100 per year may not mean much to someone earning \$100,000, but it may mean the difference between buying food or medicine to a low income person. People whose families have lived in Pima County the longest have contributed to paying the costs of growth and sprawl much longer than have newcomers. The Hispanic neighborhoods on the south side have many families that have lived in Pima County for generations, as opposed to the newer mostly white suburbs.

## Chapter Eight

### Cultural and Environmental Issues

*"I think ecology has something to tell us about the nature of a healthy city. ... We know that when we clearcut an uneven-age, deciduous and evergreen climax forest and replace it with a monocultural, even-aged species like Douglas Fir, we not only change its arboreal characteristics, but also drastically change the surrounding plant and animal communities ... We know from ecology that those plant and animal communities that are the most diverse are also the most stable and enduring. ..."* Helm and Tukel 1993.

**N**ative American cultures traditionally tend to view humans in the context of the entire surroundings and emphasize the interrelationships between animate and inanimate parts of the world. For desert cultures such as the O'odham living in harmony with their surroundings was not only culturally significant, it was essential for survival.

Significant cultural places range from specific places such as I'Itoi's cave on Baboquivari to trails and places where people traditionally gathered foods, hunted, or conducted religious ceremonies. Some cultural places are sacred and their locations are not to be revealed to outsiders. Others do not have specific locations but may include the entire top of a mountain that had and has religious significance. Burial sites have strong significance for all the cultures in Pima County and archaeologists must follow strict protocol including consultation with the appropriate tribe before excavation and repatriation of human remains.

Many culturally significant sites have already been destroyed, damaged, or made inaccessible to the group that valued it. The Star reported in November 2000 that a group of 50 spiritual leaders, medicine people and dancers from various tribes visited the site of a planned three-level I-10-I19 interchange to call attention to the desecration of sacred burial grounds as a result of the construction. They noted that the archaeologists were taking artifacts to the museum and that the bones would be repatriated, but that this was still serious desecration they could not accept.

#### **Pima County's Traditional Cultures**

Traditional cultures of minority populations are important aspects of the human environment in Pima County. Traditional cultures encompass values about the natural and physical environments that are rooted in a community's history and beliefs. In many cases, the basis of each of these traditional cultures is, to a considerable degree, grounded in the natural envi-

ronment. Environmental justice issues include the human environment as defined by the traditional cultures of minority populations.

A number of minority populations, Indian and non-Indian, have traditional cultures that are part of the affected human environment in Pima County. Indian cultures include those of the Tohono O'odham, Pascua Yaqui, Apache, Hopi, and Zuni tribes. Tohono O'odham and Pascua Yaqui populations are resident on reservations in Pima County today, whereas the Apache, Hopi, and Zuni are not.

The Tohono O'odham traditional culture has a long history in Pima County, and the affected human environment of the Tohono O'odham people includes their cultural values regarding many traditional cultural places, and cultural and natural resources throughout Pima County. Many of the places important to the O'odham are on Indian lands, but since they once occupied lands from the San Pedro River to the Gulf of California, other important places are on non-Indian lands.

The traditional culture of the Pascua Yaqui community in Pima County does not have the time depth of the Tohono O'odham, because of their more recent arrival in the area. Even so the Pascua Yaqui traditional culture is part of the affected human environment in Pima County.

The Apache Tribes have many historical and cultural connections with places in Pima County, and these places have important values in traditional Apache history and culture. Today the Hopi and Zuni cultures are centered in the Four Corners area, but they, too, have cultural affinities with places in Pima County where their ancestors once lived and traveled. In traditional Hopi and Zuni cultures, the many buried ancestors and established shrines in Pima County have roles that are integral to Hopi and Zuni present-day beliefs. Consequently, traditional Hopi and Zuni cultures are part of the affected human environment in Pima County.

Non-Indian traditional cultures in Pima County

include the Hispanic culture. The four centuries of Spanish experience in Pima County have left many cultural sites of importance, such as San Xavier Mission, the Convento and the Camino de Diablo to the west.

Numerous historical sites are of importance to the Anglo culture, including historic ranches, houses, and mines. Other cultures also consider certain places and events significant parts of the human environment in Pima County.

Environmental justice issues apply to all minority traditional cultures that are connected to the area within Pima County. Sometimes there are conflicts between values of the different minority populations. Some Native Americans, for example, may view the Spaniards as conquerors and not wish to preserve sites offensive to them while others have enthusiastically embraced the Catholic religion brought by the Spanish missionaries, as shown by the O'odham's strong commitment to the San Xavier Mission. The conflict is sometimes clear when Anglo military monuments emphasize Anglo victories over native peoples rather than their struggles against Anglo occupation.

### **Cultural Values and the Environment**

Different cultures share values but also have many distinct value systems. The importance of the natural world is often a significant part of American Indian cultures. An example of this comes from the 1994 hearing on the Minerec Company cited in Chapter 4. Mr. Daniel Preston, Vice-Chairman of the Tohono O'odham Nation, stated that "at some point the Nation will be coming out with regulations which will be more stringent than what your regulations are because we do have a culture and tradition to protect the environment." Another speaker at the hearing quoted the Peacemaker of the Iroquois Confederacy "Think not forever of yourselves, O Chiefs, nor of your own generation. Think of continuing generations of families, think of our grandchildren and of those yet unborn, whose faces are coming from beneath the ground."

### **Cultural Values and SDCP**

Several SDCP studies have concentrated on archaeological and historic sites as well as cultural landscapes. Proactive identification and preservation of significant locations is an important part of SDCP.

Continuation of the present trend to fragment landscapes into small blocks of privately owned land

is detrimental to many cultural values. Many traditional cultures place a high value on large unfragmented swaths of natural open space, a value that will be greatly diminished if landscape fragmentation continues. Almost all tribes in the Southwest historically described the extent of their lands at the time the United States assumed control by identifying mountains, river, or places such as shrines. In the case of the Tohono O'odham, Picacho Peak is a point on the northern boundary while the crest of the Rincon Mountains is part of the eastern boundary. Spanish methods of dividing the land, on the contrary, were based on the use of natural points, and the use of somewhat arbitrary rectilinear areas. The U.S. introduced an entirely revolutionary means of dividing up the land, based on city grid plans with intersecting lines along the cardinal directions. These arbitrary lines cut across mountains, prairie and watersheds from the Atlantic to the Pacific. (Anon. 2001a) The international through Arizona boundary consists of straight lines that cut through deserts, mountains, and river valleys and through the O'odham homeland.

The most sacred peak to the O'odham is only partly within the Nation. Water has always been extremely important to the Native Americans. Mountains are regarded by the Tohono O'odham as the locations of rainhouses, positioned in the cardinal directions, which have all the trappings of rain - winds, clouds, and rainbows. Another important mountain, Frog Mountain, also known as Mount Lemmon, is named for an animal closely associated with water. Most of the important water and mountain sites have been appropriated by non-Tohono O'odham people and in many cases fragmented into various jurisdictions and private landholdings. In SDCP the County attempts to delineate large areas in need of protection, based not on arbitrary rectilinear mapping, but based on natural features such as watercourses and on the habitat needs of a variety of sensitive species.

Continuation of the current trends also perpetuates the unabated assault on species of plants and animals that are important and integral aspects of traditional cultures in Pima County. Each traditional culture attributes certain species with significance in religious rites, in their cultural history, and for their traditional subsistence practices. The continued loss and diminution of culturally important species and the increased fragmentation of the landscape if no changes are made will dramatically restrict the abil-

ity of practitioners to perpetuate the time-honored customs of traditional cultures.

If the full conservation alternative is adopted with all the SDCP proposals for preservation, this will provide the greatest protection for traditional cultures and the values they embrace. This alternative will protect the greatest diversity of species and retain the largest swaths of traditional cultural landscapes as natural open space. Traditional cultural practitioners will have the maximum ability to continue their customs and rites with the minimum impact to the human environment, as long as access to those areas is assured.

Preservation of more recent historic sites is also a significant element of SDCP. A proactive approach to identification of significant sites will attempt to assure either preservation of sites or an opportunity to fully study sites that cannot be protected indefinitely into the future. Additional educational opportunities for school children and adults are proposed to inform them about our cultural heritage and involve them in appreciation for the need to preserve significant sites.

### **Environmental Issues and SDCP**

Most Native American cultures had and have a strong relationship to the natural world – its resources, wildlife, and vegetation. Appendix C. contains the cooperative agreement between the Tohono O’odham Nation and Pima County. This agreement points out the strong feelings and knowledge that the O’odham have about the natural world. It recognized that “for the Sonoran Desert Conservation Plan to be truly comprehensive and meaningfully conserve the resources important to the original and new residents of the Sonoran Desert, a cooperative and collaborative effort is needed between Pima County and the Tohono O’odham.”

Perceptions of the natural environment vary according to the cultural background and experiences of the individual. If you are totally dependent on

the local natural environment for your food, clothing, and shelter, your values will be quite different from the values of people who import most of their necessities and luxuries from distant places. No culture in Pima County today lives entirely on local resources, but the cultural values of those whose background includes this experience differ from those whose culture was developed elsewhere. On the other hand, people arriving from elsewhere may view the environment with a fresh view because it is so different from what they have experienced. (Anon. 2001a)

Culture-related impacts to minority groups include impacts on the people and their culture, and to the landscapes and places that sustain the culture. Both are important.

The Sonoran Desert Conservation Plan cannot restore the land to its previous condition, but it does propose to work to save large areas of significant wildlife habitat and wildlife corridors. The plan includes preservation and restoration of riparian areas and wetlands that can still be restored, although it cannot return most of those areas to pristine conditions. The plan offers respect for all forms of life, including Threatened and Endangered Species as well as those not officially listed but facing threats from human encroachment, such as cottonwood-willow riparian forests.

### **Closing Thoughts**

The SDCP report, *People and Places*, closes with this thought. “Biodiversity, a complex mosaic of interrelated natural components, is high in riparian contexts and in the mountain “sky islands” of Pima County. Biodiversity is prized as an essential element of both cultural landscapes and scientific landscapes. Conserving places with high biodiversity is good for plants, animals, people, and cultures. A rich and diverse environment is the basis for the richness and diversity of cultures. ... Preservation is not just about places; it is about people’s lives.”



# Chapter Nine

## Conclusions

*“We are the children of the Earth. She is our Mother, and it’s our right and duty to protect her. There are forces in the universe beyond anything Europeans can imagine. From our traditional ways, we know that we do not have the right to degrade our Mother and that we must live in harmony with all creation. The Europeans’ lopsided emphasis on human beings at the expense of the rest of the created order and their presumptuous assumption that they are somehow outside the chain of interrelatedness of all things have led inevitably to imbalance and disharmony and will result in a readjustment that will cut arrogant human beings down to size, give them a taste of that ultimate reality that is beyond their ability to manipulate or control, and restore balance and harmony. ...”*

(Russell Means in Weaver 1997)

The purpose of this chapter is to assess whether the Sonoran Desert Conservation Plan (SDCP) would have a disproportionate impact on low income and minority populations as opposed to continuing the current trends. Environmental injustices have been numerous in Pima County for more than 300 years.

This report cites many examples including loss of much of the O’odham homeland, groundwater pumping that affected San Xavier, siting of industries that cause illnesses among low income and minority people, exclusionary land use policies and others. SDCP makes no pretense to righting the wrongs of the past. SDCP does propose no new policies that will lead to environmental injustices and offers policies that are fully in harmony with environmental justice principles.

The National Environmental Policy Act requires that projects conducted under federal aegis include an Environmental Impact Statement. Agencies are required to the fullest extent possible and using all practical means to “avoid or minimize any possible adverse effects of their actions upon the quality of the human environment” which includes “the natural and physical environmental and the relationship of people with that environment.” Further it calls for preservation “of important historic, cultural, and natural aspects of our natural heritage, and maintain, where possible, an environment that supports diversity and individual choice.” (NEPA Section 101 and 40 CFR 1500, sections 101b et al.).

### **The Draft Sonoran Desert Conservation Plan in Brief**

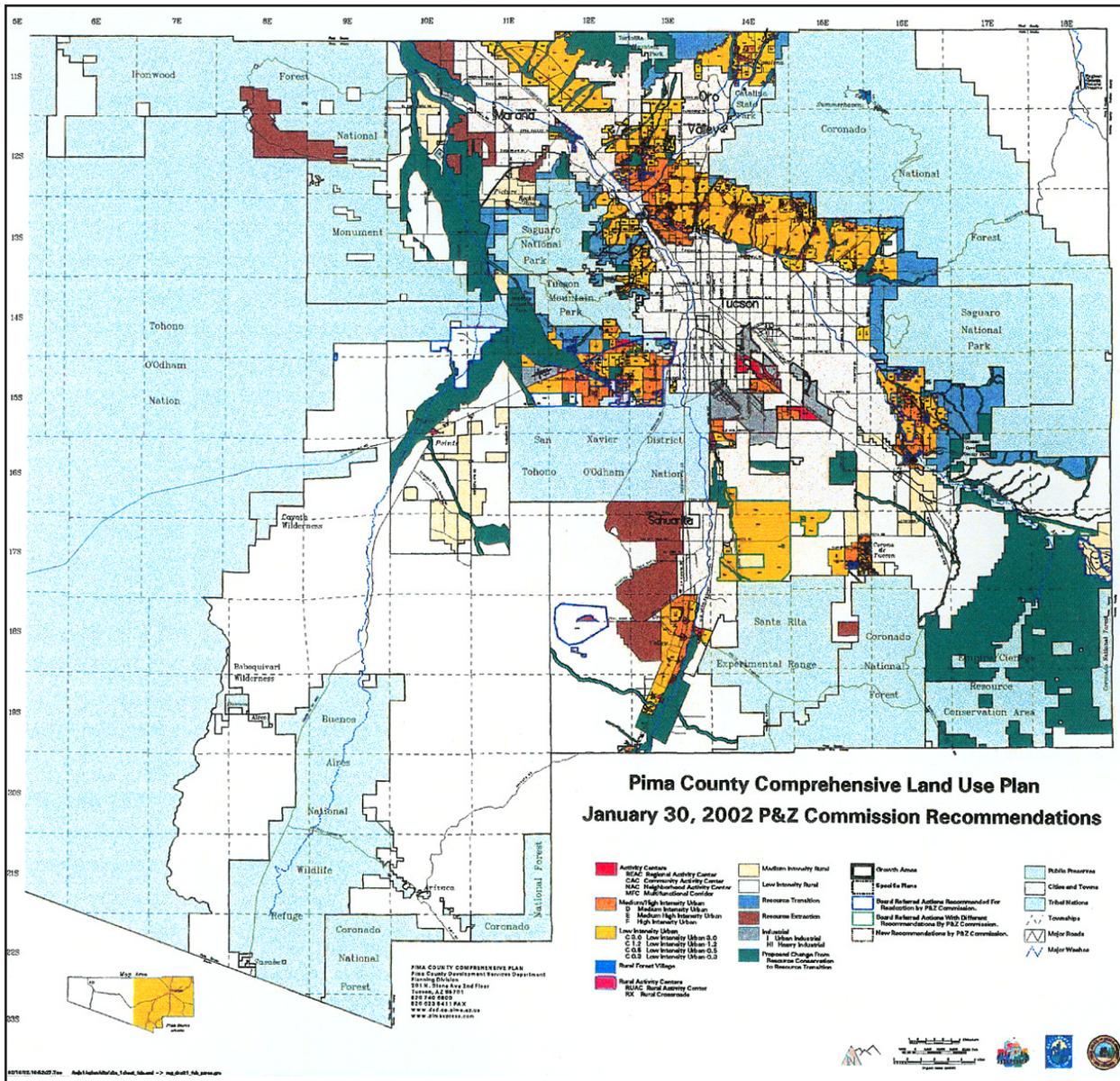
SDCP is a comprehensive county-wide plan that establishes where new development should and should not occur within the unincorporated areas

of Pima County (not including the O’odham Nation). Extensive studies were made of areas where sensitive species of plants and animals occur today and which habitats should be protected for the benefit of those species. Studies were also conducted into archaeologically and culturally important sites and areas and recommendations made for protection of those areas. In many cases the cultural and historic sites were in the same locations proposed for species protection. It also proposes that natural parks with recreation potential be expanded. SDCP then designates areas where development should occur to accommodate continuing population growth. SDCP proposes an approach to providing infrastructure such as wastewater facilities and roads in a cost-effective orderly fashion to prepare for new development, rather than the predominant current trend of providing infrastructure in response to development. Fig. 9-1 shows the draft land use plan. See Appendix E. for a list of some of the many relevant SDCP publications which contain much more information.

### **Does SDCP Conform to the Principles of Environmental Justice?**

In Chapter 1 the principles adopted by the 1991 People of Color Environmental Leadership Summit were mentioned. The group adopted seventeen principles that are listed in full in Appendix B. SDCP is in harmony with all of the applicable concepts. The most significant ways in which SDCP meets those principles are discussed below. The principles are numbered at the end as they are in the declaration.

◆ *Environmental justice affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction. (1.)*



**Fig. 9-1. Draft Sonoran Desert Conservation Plan.**  
Source: Pima County Technical Services.

One of the cardinal underlying concepts of SDCP is the importance of ecological interdependence and the need not only to preserve individual species, but to protect entire ecosystems. The plan for large connected preserves is designed to preserve many species, their food supplies, their breeding areas, and their ability to move between preserves to the extent possible in a county that has been occupied by humans for thousands of years. SDCP goes beyond the requirements of federal law by including not just federally listed species, but all species that the scientists agree are in need of protection.

◆ *Environmental justice demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias. (2.)*

SDCP involves numerous studies of cultural issues and includes proposals to preserve diverse cultural values in implementing the plan. In numerous cultural and historical reports, a respect for a variety of cultures, past and present, is stressed. The SDCP proposal reflect a commitment to work proactively to preserve Pima County's cultural heritage.

◆ *Environmental justice mandates the right to ethical, balanced and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things. (3.)*

The underlying concept of SDCP is to change land use trends in order to optimize responsible uses of land and resources in Pima County. Preservation of riparian areas, for example, is crucial to preserving the integrity of those areas for resident and migratory wildlife while in many cases also offering flood control benefits and reduced flood damage costs for humans. Some of these riparian areas, such as the Cienega Creek Preserve also offer important recreational opportunities for all humans where the only cost to humans is the cost of getting there.

◆ *Environmental justice must recognize a special legal and natural relationship of Native Peoples to the U.S. government through treaties, agreements, compacts, and covenants affirming sovereignty and self-determination. (11.)*

SDCP has worked cooperatively with the O'odham but has not attempted to force its will upon the Nation, recognizing that it does not have jurisdiction over those sovereign lands. Cooperation should provide greater opportunities to preserve traditional

cultural places off the reservation. In particular, Pima County has a agreement with the Tohono O'odham Nation to work cooperatively in developing and implementing the plan.

◆ *Environmental justice affirms the need for urban and rural ecological policies to clean up and rebuild our cities and rural areas in balance with nature, honoring the cultural integrity of all our communities, and providing fair access for all to the full range of resources. (12.)*

Pima County has been fortunate in that it does not have major problems with toxic wastes, air-polluting industry, or polluted surface water, although some problems do occur with groundwater. Major clean up efforts are not needed or planned as part of SDCP. Pima County has, however, suffered from land use patterns and policies that encourage sprawl and inefficient use of the land and other resources. These patterns have led to dependence on the automobile with its consequent heavy use of petroleum resources and lowered air quality. The proposals in SDCP cannot return the community to a pre-sprawl condition but they do promise to help contain future sprawl in a reasonable way. These policies will lead to more sensible land use, preservation of scarce natural resources, and lower costs of providing services and infrastructure which will benefit all residents, including low income and minority people.

◆ *Environmental justice calls for the education of present and future generations which emphasizes social and environmental issues, based on our experience and an appreciation of our diverse cultural perspectives. (16.)*

Education is an important element of SDCP. To this end, staff developed an environmental education program to acquaint children with a variety of facts and ideas important to the plan. The SDCP web site includes a variety of ways in which young people can learn about plant and animal species, ecosystems, cultures, and their interrelationships. The County works cooperatively with groups such as the Tucson Audubon Society to support workshops and other programs that work directly with children. In addition, staff have spoken to a wide variety of adult groups about SDCP in an effort to educate them on the basic concepts and how the plan will work in practice. The more than 200 reports contain a wealth of information available to interested people.

## **Air Quality and Toxic Materials**

### The Past and Present Situation

Air quality varies throughout the community but for CO, NO<sub>2</sub> and ozone there is no evidence that disadvantaged populations are currently disproportionately affected. These pollutants come primarily from vehicular traffic and impacts tend to be greater in areas with heavier start-and-stop traffic. Another major source is particulate matter that comes primarily from unpaved roads, construction, and mine tailings. These activities are not conducted disproportionately in disadvantaged areas, rather the most rapidly growing areas tend to have more construction activity and in some cases worse traffic congestion problems than established neighborhoods. Some established neighborhoods, however, are impacted by traffic congestion. Grant Road, for example, was not designed for the amount of traffic that currently uses it and there are congestion problems at peak travel hours.

Businesses and industry that have air quality permits are currently disproportionately located near low income and minority neighborhoods. These neighborhoods may potentially be affected by accidental releases of materials that would impact health.

### Potential Impacts of SDCP

There are no proposals that would increase the number or location of facilities with air quality or hazardous waste permits and there should be no positive or negative impacts on disadvantaged areas. There are no new landfills proposed under SDCP, although new landfills be eventually be needed as the community grows. There is virtually no possibility that a new landfill would be located within the most populated part of the urban area.

There should be few if any new air quality impacts from increased traffic through disadvantaged neighborhoods that are predominantly on Tucson's southwest side and South Tucson. Areas proposed for new development are largely on the southeast side of the community and there are few popular regular travel destinations that would require increased travel through the area. If development is in places more concentrated then air quality generally would be less affected than projected by making public transportation systems more feasible and use of the private auto for regular trips less attractive.

## **Drinking Water Quality and Supply**

### The Past and Present

Although there have been drinking water quality problems in the past, most notably problems with TCE in the area northwest of the Tucson International Airport, people throughout the Tucson Water service area receive very similar quality drinking water. There are contaminated groundwater areas in the community, mostly in the older parts of town. These are, however, not the source of drinking water for customers. All water providers must meet Safe Drinking Water standards and regularly report and fix any problems. The only people who might have drinking water problems are those with their own wells or who get their water from very small water providers who are not covered by the Safe Drinking Water Act. These are not disproportionately in disadvantaged areas, although some of these areas may be where wildcat subdivisions occur, some of which may be low income.

Groundwater supplies throughout the area have been severely impacted by continually increasing water use over the past century. The minority group most severely impacted by groundwater pumping is the San Xavier District of the O'odham Nation. The water table here dropped to the point that the giant mesquite bosque died. The water deficit was partially rectified when CAP water reached San Xavier in 2001.

Drop in groundwater levels has the potential to affect parts of the county quite severely. This has already been detected at San Xavier where thousands of sinkholes and fissures have appeared, apparently because of excessive groundwater pumping. Subsidence is occurring the central part of the metropolitan area, centered approximately at Country Club Road and Speedway. With the arrival of CAP water, Tucson Water has lessened its groundwater pumping in the central area but continues to pump the south side well field without closing wells. This area has potential for subsidence that would affect disadvantaged areas if pumping is not reduced appropriately.

### Potential Impacts of SDCP

SDCP will have no positive or negative impact on drinking water quality which is the responsibility of municipal and private water providers that are not under county jurisdiction. The county also does not have the authority to deal with groundwater pumping and subsidence issues. SDCP should have no disproportionate impact on water quality or water supply

for disadvantaged areas or any other areas.

### **Siting of Industry and Other Facilities**

#### The Past and Present

In the past, some minority neighborhoods have been severely impacted by siting of new government facilities, most notably the City-County Government buildings and the Tucson Convention Center. They were also affected by construction of I-10 and I-19 in the 1950s and 1960s.

Areas zoned for heavy industry are along the major transportation routes and that disproportionately affects many of the low income areas where the industry is located. Unused old landfills are disproportionately in the downtown and near southside areas, but more recent ones are not. Wastewater treatment plants are located downstream from the urban area and do not significantly affect disadvantaged areas. Tucson's only power plant is not near a disadvantaged area.

#### Potential Impacts of SDCP

SDCP does not propose new industry, freeways, government buildings, landfills, power plants, wastewater treatment plants, hazardous waste disposal sites or similar facilities. It does put sensitive areas out of bounds for building such facilities in the future, however, and this may mean that they might be built nearer to the urban area. This is not likely to disproportionately impact disadvantaged areas. The City of Tucson's Rio Nuevo Project may affect neighborhoods in the downtown area, but this is not a part of SDCP.

### **Land Use, Affordable Housing, Transportation, and Access to Services**

#### The Past and Present

Under the patterns of growth that have occurred for the past half century, new subdivisions have been predominately built on the outskirts of town and have not met standard criteria of affordability for lower income people. Because of their design and location most people must own at least one vehicle to get to work, shopping, or recreation. The subdivisions are not designed to encourage public transportation. Lending policies make it somewhat difficult to renovate older areas or build homes within vacant parts of the urban area. Federal lending policies and local zoning codes encourage segregation by income levels, although past federal policies that discouraged mixed-race neighborhoods

were stopped in the 1960s. Both federal and local policies discourage mixed-use neighborhoods. The income gap between owners and renters has increased, especially for lower income residents.

#### Potential Impacts of SDCP

SDCP cannot change federal lending policies, but it can affect county zoning and building codes and encourage types and location of development conducive to the use of public transportation. SDCP proposes more flexibility that will allow for and encourage more mixed-use development.

Will new construction in some areas increase the cost of housing for low income people? Most new housing in the unincorporated area is not affordable for low income people today. The median price of a new house in Tucson is about \$130,000, up from about \$80,000 in 1990, even without new land use controls or impact fees. At a time in the future when land becomes more scarce, the median price will undoubtedly continue to rise in response to the cost of land and many other factors, but cost will be most directly related to supply and demand. SDCP may, however, encourage better use of vacant land within the urban area, the best place to put new affordable housing to minimize dependence on the auto and increase access to jobs and public services.

SDCP also contains an element to make housing more accessible to the disabled. The Board of Supervisors passed an ordinance in 2002 requiring accessibility in new housing.

### **Taxes, rates, and fees**

#### The Past and Present

At the present time the costs of growth are paid for through a complex mixture of property taxes, sales taxes, federal highway user fees, state and federal income taxes, user fees, commodity charges, and private funds. Local taxing entities include Pima County, municipalities, and school districts and in some cases special districts. It is very difficult to determine the actual cost of growth in the community because of this complexity and the amount of state and federal subsidies which have begun to decline. It is clear, however, that the new homeowner pays only a small portion of the cost of providing the roads and other facilities needed for that home. The remainder is shared by taxpayers at the local, state and federal levels. It is highly likely that low income and minority groups in the core city are helping pay the costs of providing new homes in outlying areas.

### Potential Impacts of SDCP

SDCP will not change the complexity of this structure. It may lessen the burden on inner city residents in two ways. The proposed impact fee will help fund some of the infrastructure costs, relieving current residents. More significantly, by containing growth within certain predetermined areas and by taking a proactive stance toward phasing in of infrastructure, overall costs to the community should be lowered, thus lessening the burden on new and existing residents alike. Pima County has no jurisdiction over land use or fiscal policies of the incorporated areas, but can affect the direction of growth outside those areas.

### **Cultural Sites and Values**

#### The Past and Present

Many traditional cultural and archaeological sites were destroyed as the population grew, but some have been preserved or at least studied before they were destroyed. Some important sites are on Tohono O'odham lands or federal preserves such as Organ Pipe National Monument or Coronado National Forest, but many are on state or private land. At the present rate and pattern of development sites continue to be destroyed. An increasing number of traditional cultural sites have become inaccessible to all but private landowners and their guests.

#### Potential Impacts of SDCP

SDCP has mapped known areas of archaeological or historic value and has prioritized areas most in need of preservation and protection. It also proposes a pro-active program of studying the most valuable sites in advance of development if they cannot be preserved. It is much more difficult to map traditional cultural sites as they tend to be secret or cover large areas where traditional activities such as saguaro harvest once occurred. Many of the areas proposed for habitat protection also include traditional cultural areas. Where this occurs the benefits to the affected population, primarily American Indian, will be positive for those groups as long as access is assured.

### **Open Space, Wildlife, and Habitats**

#### The Past and Present Situation

Thousands upon thousands of acres of wildlife habitat and riparian areas have been damaged because of population growth in Pima County. Because of dispersed growth patterns, people have

encroached on the land at a far greater rate than population increase. People are also using more land per person than in the past and the average house size has nearly doubled in the past fifty years. Increased water use has led to the loss of flowing streams and springs that were once important to both people and wildlife.

The government, however, has also set aside thousands of acres of land as National Parks, National Forests, Wildlife Refuges, State Parks, and city and county natural parks. Many of these lands contain important wildlife habitat and flowing water. Private land stewards and non-profit groups have also protected thousands of acres of land. Federal laws protect certain threatened and endangered species.

Subdivision development on the fringes of some of those preserves, on the other hand, has limited public access and cut off long-used trails within them. Areas that were once "the boondocks" where people hunted are now covered with subdivisions or fenced off from public use. The ability of low income people to enjoy the desert is still there, but much limited from what it was even in 1950 when one could roam the Catalina foothills to hunt deer, watch birds, or walk the dog without conflicts with private landowners.

#### Potential Impacts of SDCP

A significant element of SDCP is its coordinated approach of viewing the county as an interrelated place. SDCP looks to set aside certain areas where protection of wildlife habitat and vegetation will be the primary goal. The plan is to connect these areas as much as possible to allow wildlife movement between those areas. SDCP also includes cooperative efforts to restore species that have declined or even disappeared from the area. Finally, the plan also includes natural areas available for public recreational use at no cost other than the cost of getting there.

A fully implemented SDCP will benefit vegetation and wildlife and the people who value nature, no matter what the income level.

### **Summary of the Anticipated Impacts**

There are no foreseeable negative environmental justice impacts from SDCP and some positive impacts. SDCP will not right injustices of the past but will help mitigate some of the damage that would occur in the future without benefit of SDCP.

# Appendix A

## Principles of Environmental Justice

The following list was adopted by 61 nations as the Principles of Environmental Justice at the People of Color Environmental Leadership Summit on October 27, 1991, in Washington, D.C.

1. Environmental justice affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction.
2. Environmental justice demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias.
3. Environmental justice mandates the right to ethical, balanced and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things.
4. Environmental justice calls for universal protection from nuclear testing, extraction, production and disposal of toxic/hazardous wastes and poisons and nuclear testing that threaten the fundamental right to clean air, land, water, and food.
5. Environmental justice affirms the fundamental right to political, economic, cultural and environmental self-determination of all peoples.
6. Environmental justice demands the cessation of the production of all toxins, hazardous wastes, and radioactive materials, and that all past and current producers be held strictly accountable to the people for detoxification and the containment at the point of production.
7. Environmental justice demands the right to participate as equal partners at every level of decision-making including needs assessment, planning, implementation, enforcement and evaluation.
8. Environmental justice affirms the right of all workers to a safe and healthy work environment, without being forced to choose between an unsafe livelihood and unemployment. It also affirms the right of those who work at home to be free from environmental hazards.
9. Environmental justice protects the right of victims of environmental injustice to receive full compensation and reparations for damages as well as quality health care.
10. Environmental justice considers governmental acts of environmental injustice a violation of international law, the Universal Declaration On Human Rights, and the United Nations Convention on Genocide.
11. Environmental justice must recognize a special legal and natural relationship of Native Peoples to the U.S. government through treaties, agreements, compacts, and covenants affirming sovereignty and self-determination.
12. Environmental justice affirms the need for urban and rural ecological policies to clean up and rebuild our cities and rural areas in balance with nature, honoring the cultural integrity of all our communities, and providing fair access for all to the full range of resources.
13. Environmental justice calls for the strict enforcement of principles of informed consent, and a halt to the testing of experimental reproductive and medical procedures and vaccinations on people of color.
14. Environmental justice opposes the destructive operations of multi-national corporations.
15. Environmental justice opposes military occupation, repression and exploitation of lands, peoples and cultures, and other life forms.
16. Environmental justice calls for the education of present and future generations which emphasizes social and environmental issues, based on our experience and an appreciation of our diverse cultural perspectives.
17. Environmental justice requires that we, as individuals, make personal and consumer choices to consume as little of Mother Earth's resources and to produce as little waste as possible; and make the conscious decision to challenge and reprioritize our lifestyles to insure the health of the natural world for present and future generations.

# Appendix B

## Federal Executive Order on Environmental Justice

### FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS

By the authority vested in me as President by the Constitution and the laws of the United States of America, it is hereby ordered as follows:

#### **Section 1-1. IMPLEMENTATION.**

##### 1-101. Agency Responsibilities.

To the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Marian Islands.

##### 1-102. Creation of an Interagency Working Group on Environmental Justice

(a) Within 3 months of the date of this order, the Administrator of the Environmental Protection Agency (“Administrator”) or the Administrator’s designee shall convene an Interagency Federal Working Group on Environmental Justice (“Working- Group”). The Working Group shall comprise the heads of the following executive agencies and offices, or their designees: (a) Department of Defense; (b) Department of Health and Human Services; (c) Department of Housing and Urban Development; (d) Department of Labor; (e) Department of Agriculture; (f) Department of Transportation; (g) Department of Justice; (h) Department of the Interior; (i) Department of Commerce; (j) Department of Energy; (k) Environmental Protection Agency; (l) Office of Management and Budget; (m) Office of Science and Technology Policy; (n) Office of the Deputy Assistant to the President for Environmental Policy; (o) Office of the Assistant to the President for Domestic Policy; (p) National Economic Council; (q) Council of Economic Advisers; and (r) such other Government officials as the President may designate. The Working Group shall report to the President through the Deputy Assistant to the President for Environmental Policy and the Assistant to the President for Domestic Policy.

(b) The Working Group shall: (1) provide guidance to Federal agencies on criteria for identifying disproportionately high and adverse human health or environmental effects on minority populations and low-income populations;

(2) coordinate with, provide guidance to, and serve as a clearinghouse for, each Federal agency as it develops an environmental justice strategy as required by section 1-103 of this order, in order to ensure that the administration, interpretation and enforcement of programs, activities and policies are undertaken in a consistent manner; (3) assist in coordinating research by, and stimulating cooperation among, the Environmental Protection Agency, the Department of Health and Human Services, the Department of Housing and Urban Development, and other agencies conducting research or other activities in accordance with section 3-3 of this order;

(4) assist in coordinating data collection, required by this order;

(5) examine existing data and studies on environmental justice;

(6) hold public meetings at required in section 5-502(d) of this order; and

(7) develop interagency model projects on environmental justice that evidence cooperation among Federal agencies.

1-103. Development of Agency Strategies.

(a) Except as provided in section 6-605 of this order, each Federal agency shall develop an agency-wide environmental justice strategy, as set forth in subsections (b) - (e) of this section that identifies and addresses disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. The environmental justice strategy shall list programs, policies, planning and public participation processes, enforcement, and/or rulemakings related to human health or the environment that should be revised to, at a minimum: (1) promote enforcement of all health and environmental statutes in areas with minority populations and low-income populations; (2) ensure greater public participation; (3) improve research and data collection relating to the health of and environment of minority populations and low-income populations; and (4) identify differential patterns of consumption of natural resources among minority populations and low-income populations. In addition, the environmental justice strategy shall include, where appropriate, a timetable for undertaking identified revisions and consideration of economic and social implications of the revisions.

(b) Within 4 months of the date of this order, each Federal agency shall identify an internal administrative process for developing its environmental justice strategy, and shall inform the Working Group of the process.

(c) Within 6 months of the date of this order, each Federal agency shall provide the Working Group with an outline of its proposed environmental justice strategy.

(d) Within 10 months of the date of this order, each Federal agency shall provide the Working Group with its proposed environmental justice strategy.

(e) Within 12 months of the date of this order, each Federal agency shall finalize its environmental justice strategy and provide a copy and written description of its strategy to the Working Group. During the 12 month period from the date of this order, each Federal agency, as part of its environmental justice strategy, shall identify several specific projects that can be promptly undertaken to address particular concerns identified during the development of the proposed environmental justice strategy, and a schedule for implementing those projects.

(f) Within 24 months of the date of this order, each Federal agency shall report to the Working Group on its progress in implementing its agency-wide environmental justice strategy.

(g) Federal agencies shall provide additional periodic reports to the Working Group as requested by the Working Group.

1-104. Reports to The President.

Within 14 months of the date of this order, the Working Group shall submit to the President, through the Office of the Deputy Assistant to the President for Environmental Policy and the Office of the Assistant to the President for Domestic Policy, a report that describes the implementation of this order, and includes the final environmental justice strategies described in section 1-103(e) of this order.

**Sec. 2-2. Federal Agency Responsibilities For Federal Programs.**

Each Federal agency shall conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations)

the benefits of, or subjecting persons (including populations) to discrimination under, such, programs, policies, and activities, because of their race, Color, or national origin.

### **Sec. 3-3. Research, Data Collection, and Analysis**

3-301. Human Health and Environmental Research and Analysis. (a) Environmental human health research, whenever practicable and appropriate, shall include diverse segments of the population in epidemiological and clinical studies, including segments at high risk from environmental hazards, such as minority populations, low-income populations and workers who may be exposed to, substantial environmental hazards.

(b) Environmental human health analyses, whenever practicable and appropriate, shall identify multiple and cumulative exposures.

(c) Federal agencies shall provide minority populations and low-income populations the opportunity to comment on the development and design of research strategies undertaken pursuant to this order.

3-302. Human Health and Environmental Data Collection and Analysis To the extent permitted by existing law, including the Privacy Act, as amended (5 U.S.C. section 552a): (a) each federal agency, whenever practicable and appropriate, shall collect, maintain, and analyze information assessing and comparing environmental and human health risks borne by populations identified by race, national origin, or income. To the extent practical and appropriate, Federal agencies shall use this information to determine whether their programs, policies, and activities have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations;

(b) In connection with the development and implementation of agency strategies in section 1-103 of this order, each Federal agency, whenever practicable and appropriate, shall collect, maintain and analyze information on the race, national origin, income level, and other readily accessible and appropriate information for areas surrounding facilities or sites expected to have substantial environmental, human health, or economic effect on the surrounding populations, when such facilities or sites become the subject of a substantial Federal environmental administrative or judicial action. Such information shall be made available to the public unless prohibited by law; and

(c) Each Federal agency, whenever practicable and appropriate, shall collect, maintain, and analyze information on the race, national origin, income level, and other readily accessible and appropriate information for areas surrounding Federal facilities that are: (1) subject to the reporting requirements under the Emergency Planning and Community Right-to-Know Act, 42 U.S.C. section 11001-11050 as mandated in Executive Order No. 12856; and (2) expected to have a substantial environmental, human health, or economic effect on surrounding populations. Such information shall be made available to the public unless prohibited by law.

(d) In carrying out the responsibilities in this section, each Federal agency, whenever practicable and appropriate, shall share information and eliminate unnecessary duplication of efforts through the use of existing data systems and cooperative agreements among Federal agencies and with State, local, and tribal governments.

### **Sec. 4-4. Subsistence Consumption Of Fish And Wildlife.**

4-401. Consumption Patterns. In order to assist in identifying the need for ensuring protection of populations with differential patterns of subsistence consumption of fish and wildlife, Federal agencies, whenever practicable and appropriate, shall collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. Federal

agencies shall communicate to the public the risks of those consumption patterns.

4-402. Guidance. Federal agencies, whenever practicable and appropriate, shall work in a coordinated manner to publish guidance reflecting the latest scientific information available concerning methods for evaluating the human health risks associated with the consumption of pollutant-bearing fish or wildlife. Agencies shall consider such guidance in developing their policies and rules.

#### **Sec. 5-5. Public Participation and Access to Information**

(a) The public may submit recommendations to Federal agencies relating to the incorporation of environmental justice principles into Federal agency programs or policies. Each Federal agency shall convey such recommendations to the Working Group.

(b) Each Federal agency may, whenever practicable and appropriate, translate crucial public documents, notices, and hearings relating to human health or the environment for limited English speaking populations.

(c) Each Federal agency shall work to ensure that public documents, notices, and hearings relating to human health or the environment are concise, understandable, and readily accessible to the public.

(d) The Working Group shall hold public meetings, as appropriate, for the purpose of fact-finding, receiving public comments, and conducting inquiries concerning environmental justice. The Working Group shall prepare for public review a summary of the comments and recommendations discussed at the public meetings.

#### **Sec. 6-6. General Provisions.**

6-601. Responsibility for Agency Implementation. The head of each Federal agency shall be responsible for ensuring compliance with this order. Each Federal agency shall conduct internal reviews and take such other steps as may be necessary to monitor compliance with this order.

6-602. Executive Order No. 12250. This Executive order is intended to supplement but not supersede Executive Order No. 12250, which requires consistent and effective implementation of various laws prohibiting discriminatory practices in programs receiving Federal financial assistance. Nothing herein shall limit the effect or mandate of Executive Order No. 12250.

6-603. Executive Order No. 12875. This Executive order is not intended to limit the effect or mandate of Executive Order No. 12875.

6-604. Scope. For purposes of this order, Federal agency means any agency on the Working Group, and such other agencies as may be designated by the President, that conducts any Federal program or activity that substantially affects human health or the environment. Independent agencies are requested to comply with the provisions of this order.

6-605. Petitions for Exemptions. The head of a Federal agency may petition the President for an exemption from the requirements of this order on the grounds that all or some of the petitioning agency's programs or activities should not be subject to the requirements of this order.

6-606. Native American Programs. Each Federal agency responsibility set forth under this order shall apply equally to Native American programs. In addition the Department of the Interior, in coordination with the Working Group, and, after consultation with tribal leaders, shall coordinate steps to be taken pursuant to this order that address Federally- recognized Indian Tribes.

6-607. Costs. Unless otherwise provided by law, Federal agencies shall assume the financial costs of complying with this order.

6-608. General. Federal agencies shall implement this order consistent with, and to the extent permitted by, existing law.

6-609. Judicial Review. This order is intended only to improve the internal management of the executive branch and is not intended to, nor does it create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity by a party against the United States, its agencies, its officers, or any person. This order shall not be construed to create any right to judicial review involving the compliance or noncompliance of the United States, its agencies, its officers, or any other person with this order.

William J. Clinton  
THE WHITE HOUSE,  
February 11, 1994.

# **Appendix C**

## **Declaration of Intent to Cooperatively Participate In the Sonoran Desert Conservation Plan**

**The Tohono O'odham Nation  
and Pima County Government**

WHEREAS, the Sonoran Desert is homeland to the Tohono O'odham Nation; and

WHEREAS, Members of the Tohono O'odham Nation have made a most significant contribution to the cultural resource base of the Sonoran Desert; and

WHEREAS, Members of the Tohono O'odham Nation have great knowledge about the natural resource base of the Sonoran Desert; and

WHEREAS, Members of the Tohono O'odham Nation have demonstrated wisdom in utilizing scarce water resources in the Sonoran Desert; and

WHEREAS, on March 2, 1999, the Pima County Board of Supervisors committed to preserving and protecting the Sonoran Desert through the adoption of the Sonoran Desert Conservation Plan in concept; and

WHEREAS, the Sonoran Desert Conservation Plan seeks to protect and preserve cultural and historic resources; and

WHEREAS, under the Sonoran Desert Conservation Plan, 12 habitat types, 20 plant communities, 108 vulnerable species are being considered for protection; and

WHEREAS, for the Sonoran Desert Conservation Plan to be truly comprehensive and meaningfully conserve the resources important to the original and new residents of the Sonoran Desert, a cooperative and collaborative effort is needed between Pima County and the Tohono O'odham;

NOW THEREFORE BE IT DECLARED THAT THE BOARD OF SUPERVISORS OF PIMA COUNTY, ARIZONA,

Will seek to collaborate with Tohono O'odham Nation in developing and establishing the Sonoran Desert Conservation Plan.

SIGNED THIS 11<sup>th</sup> day of December, 1999.

Edward D. Manuel  
Tohono O'odham Nation

Sharon Bronson  
Pima County

## Appendix D

### 1974 Projected Costs of Alternate Plans for Growth

Summary of Cost Impacts (In Millions of Dollars)

	<b>Low Population</b>		<b>High Population</b>			
	Peripheral Expansion	Contained Growth	Peripheral Expansion	Activity Centers	Contained Growth	Satellite Cities
<b>CAPITAL</b>						
Total Capital Cost	1,769	1,409	2,563	2,308	1,732	1,985
Savings over Peripheral Expansion		360		255	831	578
Percent of Peripheral Expansion		79.6%		90.1%	67.6%	77.4%
<b>OPERATING</b>						
Total Annual Cost	242	233	343	339	328	330
Savings over Peripheral Expansion		9		4	15	13
Percent of Peripheral Expansion		96.3%		98.8%	95.5%	96.2%

Source: Cost/Revenue Analysis Four Alternative Plans for Growth. Prepared for the Pima County Comprehensive Planning Process. Booz, Allen and Hamilton. San Francisco. 1974. p. 8.

Figures are in 1974 dollars. The equivalent in 2000 dollars would be approximately 3.2 times the 1974 dollar amounts.

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