AGRICULTURAL SUITABILITY CONSIDERATIONS INFLUENCING LAND USE PLANNING IN KANSAS

by

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Table of Contents

Tables

Figures

CHAPTER ONE

Introduction

> "To waste, to destroy, our natural resources, to skin and exhaust the land instead of using it so as to increase its usefulness, will result in undermining in the days of our children the very prosperity which we ought by right to hand down to them amplified and developed."
>
> Theodore Roosevelt, Message of Congress, Dec.3, 1907

Since the time of President Roosevelt, many steps have been taken to protect our nation's natural resources. Conservation of natural resources has become the primary focus of numerous individuals, private organizations, and government agencies. Significant pieces of legislation, such as the National Environmental Policy Act of 1969, have been passed in order to protect our nation's natural resources. Although, as a nation, we have begun to realize the importance of natural resources to the future of our country and the world, much work remains to be done in conserving these valuable resources for future generations.

Prime farmland is one of our nation's most valuable natural resources. In recent years there has been serious concern over the use, or misuse, of our nation's land resources. The primary concern is founded on the realization that the demands for these resources are increasing and will continue to increase as domestic and global populations expand.

Food represents one of the most basic human needs. As populations grow, the demand for food will also increase. As food demands increase, greater demands will fall on those resources currently necessary for large-scale food production, particularly prime agricultural land. Unfortunately, millions of acres of our nation's best agricultural land has already been irrevocably lost to nonagricultural uses (SCS, 1980). Although the United States has been blessed with a large amount of prime farmland, the supply is finite and steadily diminishing.

In lieu of significant federal action to preserve prime farmland, numerous states have begun to seriously address the problem of prime farmland conversion. Unfortunately, Kansas is not among them. This lack of concern in a state where agriculture represents the base of the state's economy would seem to be a bit short-sighted, to say the least.

The primary purpose of this paper was to identify and examine important factors concerning the inherent agricultural suitability of land that should be considered in the land use planning and decision-making process in Kansas communities. Social attitudes concerning agricultural land resources and the need for conservation of prime agricultural land was explored. A land resource inventory and analysis process was utilized in an actual case study as a means of obtaining important base information for local decision-makers concerning the inherent physical suitability of the landscape for various land uses, including agricultural production.

Land Ethics in a Developing World

Since the beginning of human existence, man has influenced the world around him. Initially this influence was small as man was dominated to a large degree by his surrounding environment. However, as numbers increased and man

advanced in learning and technology, a transition was taking place. He was no longer helplessly subject to his environment, but rather began to dominate it. Through this process, ethics toward nature and land resources emerged.

Substantial criticism has been directed at the early Christian ethic as one in which exploitation of the earth's resource for human benefit is implicated (McHarg, 1969:26). One verse from the Bible, found in Genesis (1:28) is often singled out as a direct order from God condoning such action:

> And God blessed them, and God said to them, 'Be fruitful and multiply, and fill the earth and subdue it; and have dominion over the fish of the sea and over the birds of the air and over every living thing that moves upon the earth.'

Although it is not the purpose of this paper to engage in a debate on early Christian theology, it is important to point out that the problem is not inherent in the scripture per se, but in the interpretation of the scripture. Two important words, subdue and dominion, can be interpreted in more than one way. According to the World Book Dictionary, subdue can be defined as meaning either to conquer or vanquish, or to bring land under cultivation. Dominion is defined as the power or right to govern or control. Thus, "subdue the earth" could imply an act of cultivating and developing the earth's resources and "dominion over" could be interpreted as the right to manage these resources, presumably in a responsible and intelligent manner to assure the continued integrity of God's creation. Verse 30 of Genesis indicates that God had planned for a continued co-existance for <u>all</u> living creatures,

> And to every beast of the earth, and to every bird of the air, and to everything that creeps on the earth, everything that has the breath of life, I have given every green plant for food.

Regardless of the underlying reason for man's attitude toward the land, the fact remains that throughout much of his history, man has been at odds with nature. Franklin D. Roosevelt once said, "The history of every nation is eventually written in the way in which it cares for its soil (Helfman, 1962:6)."

Civilizations such as the ancient Incas in Peru and the early North American Indians demonstrated a practice of land stewardship resulting in a harmonious existence with the land. Land resources were cherished and conserved in developing a society which avoided serious degradation of the environment (Helfman, 1962:61-67).

On the other hand, early civilizations such as those found in ancient Mesopotamia in the valleys of the Tigris and Euphrates rivers and in China along the Indus River eventually crumbled largely as a result of the deterioration of once fertile soil (Helfman, 1962:27). This deterioration was initiated by improper use of the land's resources resulting in severe erosion and soil degradation. Exploitation as opposed to conservation resulted in tragedy. The importance of agricultural productivity to the long-term integrity of human societies is readily apparent.

Early Agriculture

Agriculture began over seven-thousand years ago in the river valleys of the Nile and the Tigris-Euphrates rivers (Helfman, 1962:23). Agriculture represented an important step in the advancement of mankind. No longer was it necessary to relocate on a continuing basis in order to hunt and gather food. Instead, food was grown and harvested domestically in permanent locations. This transition resulted in many changes to an old lifestyle and early man was often amazed and puzzled by the natural processes to which he was subject.

The ancient Greeks believed that Demeter was the goddess of cultivated earth. According to mythology, Demeter's daughter Persephone, was stolen by Pluto, god of the underworld. In anger, Demeter refused to let anything grow on the earth as long as her daughter was gone. As a result, Zeus, father of the gods, forced Pluto to give back Persephone for eight months of every year.

During these eight months, plants would grow and this represented summer. During the other four months, nothing would grow and this time period represented winter (Helfman, 1962:9).

Modern Land Ethics

Obviously as time passed, a more scientific view of agriculture and land processes emerged than the one held by the ancient Greeks. Fear and respect for the land and its natural processes was replaced with more objective viewpoints. Land was no longer viewed as a life-giving resource but rather as a commodity presupposing wealth and power. Examples of this attitude were evident in Medieval Europe and during the settlement of our own country (see Chapter Two).

Aldo Leopold, a noted conservationist, was one of the first Americans to publicly advocate the concept of a modern land ethic. In his book A Sand County Almanac (1949), Leopold states, "That land is a community is the basic concept of ecology, but that land is to be loved and respected is an extension of ethics. In short, a land ethic changes the role of Homo sapiens from conqueror of the land-community to plain member and citizen of it. It implies respect for his fellow-members, and also respect for the community as such." Leopold's essays on conservation were farsighted in concept and in our present world of rapidly approaching resource shortages, of greater significance today than they were 30 years ago.

An important question arises as to what represents a sound land ethic. To many people, use of land resources is determined by economic considerations of supply and demand. However, the concept implied by Leopold is based on the idea of land as a resource, as opposed to a commodity. If prime farmland is considered an important nonrenewable resource, then conservation of prime farmland simply makes good sense, regardless of the potential for immediate

shortages. Unfortunately, the idea of sacrificing immediate economic gain in the hope of eliminating long-term social costs for future generations is a difficult concept for a capitalistic society, such as the United States, to accept.

Planning for the Future

There would seem to be little need to justify planning in a world as complex as the one in which we live. The harsh reality of limited resources and increasing demand should in itself justify a need to plan. In his book Living with Tomorrow, Stephenson (1981:74) points out, "There is absolutely no question , however, that sooner or later world population will overtake world food production and mass starvation will then become a way of life."

This grim situation would present some tough decisions for affluent countries, such as the United States. Stephenson introduced the concept of "triage" as a potential policy for future food distribution. Triage, a military medical term, refers to the classification process for wounded soldiers. In terms of food distribution, hungry nations would be classified into three general classes (Stephenson, 1981:73).

> Class 1. Nations with inadequate leadership where population growth has already greatly passed the agricultural potential. To send them food is to ..."throw sand in the ocean."
>
> Class 2. Nations that have adequate agricultural resources and/or foreign exchange for the purpose of food from abroad. These require no food aid to survive.
>
> Class 3. Nations having an imbalance between food and population, but where emphasis on agriculture and effective birth control offer the possibility of bringing these back into balance. To provide time for these nations to make the necessary changes all food aid would be devoted to Class 3, with the first two receiving nothing at all--as in the case of military triage.

Although this concept of food distribution sounds inhumane, it may become a reality if world agricultural resources continue to be consumed at current rates.

Planning for the future can do more than provide necessary services and allocate resources for increased numbers of people. Planning with consideration for natural resources, including prime farmland, will play an important role in maintaining world order in the future. People who are deprived of basic human needs, particularly food, soon become desperate. A. M. Woodruff (1980:18), noted educator, administrator and land economist, states, "From a pragmatic point of view, unstable countries, whose people have grumbling, painfully empty bellies, pose a vague but constant threat to countries like the United States with large food-producing resources."

The recent Global 2000 Report by the Council on Environmental Quality (1980:4) suggests that, "Vigorous new initiatives are needed in order to prevent worsening poverty and human suffering, and international tension and conflict."

The United States consumes over 30 percent of the world's energy resources and an even higher percentage of the world's natural resources, but accounts for only 5 percent of the world's population (Stephenson, 1981:5). Thus, planning from a global perspective, means more to our nation than meeting the needs and desires of an affluent society. Planning is essential for providing the basic necessities of an expanding, hungry world and in the process, helping to secure our own peaceful existence.

Planning in Perspective

A wholistic view of planning recognizes various levels of planning, from local to global perspectives. An important, but difficult question arises concerning how these various levels fit together within the planning process at a particular level. In other words, how does the global or national situation concerning prime farmland affect the planning process at the state or local level? The relationships between the various levels may be somewhat analogous

to the individual rungs on a ladder. Exclusion of one or more rungs will greatly reduce the efficiency and effectiveness of the ladder as a whole. Furthermore, it is important that the rungs maintain a consistent, uniform pattern in order to avoid serious and potentially tragic problems. Likewise, it is important that each level in the wholistic planning picture be consistent and compatible with the policies and programs initiated at other levels. Each level should be assessed in order to assure a comprehensive view, realizing the view may vary from one level to another. Therefore, local programs should be developed that consider state, regional, national and even global needs and programs when important natural resources are involved.

The situation concerning agricultural land resources is a typical example of the need to assess different levels in obtaining a comprehensive view. Assessing the situation at only the local or state level in Kansas would likely result in little need for concern, considering the large amount of prime farmland found throughout the state. However, viewing the situation from a national and global perspective dramatically influences the picture. It becomes essential that these larger scales be addressed. As a result, the following perspectives will be discussed: global, national, regional, state and local.

The Global Perspective

Increasing population will represent the primary increase in future demand for the world's agricultural land resources. According the the Global 2000 Report, world population is expected to reach 6.35 billion people by the turn of the century. This figure represents an increase of over 50 percent from 4 billion in 1975. By 2000, one hectare of arable land will need to support four persons compared to 2.6 persons in 1970. This is due to the fact that the amount of land under cultivation by the year 2000 is expected to increase only four percent from the present amount (CEQ, 1981:16).

The Global 2000 Report states that, "Long-term agricultural productivity will be threatened on a global basis, as agricultural resources are depleted. Perhaps the most serious environmental development will be the loss of the resources essential for agriculture (CEQ, 1981:32)."

The numerous causes for the loss of agricultural resources include soil erosion, cropland conversion for urbanization, and severe regional water shortages. The Global 2000 Report estimates that the amount of land being devoted to urban uses has been increasing twice as fast as population. Furthermore, additional cropland is being lost worldwide to a natural phenomenon known as desertification. Desertification is caused primarily by soil erosion, deforestation, and changes in climatic conditions. It is estimated that desertification is occurring at the rate of 6 million hectares per year (an area about the size of Maine), of which 2.5 million acres is nonirrigated cropland (CEQ, 1981:33). This rate of global desertification is expected to increase in the future.

In addition to the loss of agricultural land resources, other valuable resources are expected to disappear. The world's forests are currently disappearing at the rate of 18 to 20 million hectares (an area half the size of California) and it is projected that by 2000 nearly 40 percent of all remaining forest cover in less developed countries will be gone (CEQ, 1981:7).

Such extensive loss of forested lands could result in an accelerated rate of desertification, increasingly erratic water supplies and loss of wildlife habitat causing the disappearance of as much as 20 percent (2 million species) of the earth's animal species (CEQ, 1981:37).

The loss of agricultural land resources is not the only problem facing future food production. Serious problems exist with the present agricultural technology developed in a past, resource abundant world. There is little doubt that current technology must eventually be rebuilt or even discarded as being inappropriate due to its resource intensive nature in a world of limited resources.

Because of heavy dependence of current agricultural technology on petroleum-based chemicals and fuels, shortages of petroleum could seriously affect production levels. For example, within the United States, if nitrogen fertilizer (primarily a petroleum-based product) was limited to 50 pounds per acre, an additional 18 million acres of cropland would be required to maintain current production levels (Price, 1980:6). Increased productivity using current technology will require a substantial increase in energy input. During the 1950's, when agricultural productivity doubled, energy input into agricultural production quadrupled (Price, 1980:6). Unfortunately, world petroleum production is expected to peak before the end of the century (CEQ, 1981:27). Future shortages resulting in increased prices may significantly lower the point of diminishing returns making increased input economically impractical in light of anticipated returns. The concept of diminishing returns can be applied to modern agriculture in a more general sense. According to the well-known land economist, Raliegh Barlowe (Barlowe, 1958:107), "Simple logic indicates that if population continues to increase, man must either accomplish the highly unlikely miracle of ever-increasing production or someday face the problem of decreasing returns."

Another serious problem affecting agricultural productivity is the long-term condition of presently cultivated cropland. In the United States, the most agriculturally productive nation in the world, it is estimated that to sustain crop production indefinitely at present levels, soil losses from wind and water erosion must be cut in half (CEQ, 1981:33). W. E. Larson, president of the Soil Science Society of America, states,

> As the year 2000 approaches, mounting evidence suggests that our cropland resource base may be unable to satisfy projected domestic and foreign demands for food and fiber without sufficient increases in the real price of food. Our physical capacity to produce food at a reasonable cost may even become questionable if erosion and farmland conversion trends continue unabated through the remainder of this century (CEQ, 1981:26).

Soil erosion in other parts of the world, especially in humid regions, can be expected to accelerate in the future, severely decreasing the potential productivity of the soil (CEQ, 1981:33). Other serious problems associated with current agricultural technology include pollution of oceans and fresh water sources from soil erosion and inorganic fertilizers and pesticides, increased resistance of disease and insect pests to current pesticides, and increased susceptability of large monocultures to catastrophic losses (Stephenson, 1981:59).

Although preservation of prime agricultural land is only part of a long-term approach concerning the world's future food problems, it is indeed an essential one. It is only through the preservation of our most productive soils that we can buy the time needed to solve the serious problems that "advanced" technology has so pleasurably created. The Global 2000 Report summarizes the global situation as follows,

> The available evidence leaves no doubt that the world--including this nation--faces enormous, urgent, and complex problems in the decades immediately ahead. Prompt and vigorous changes in public policy among the world are needed to avoid or minimize these problems before they become unmanageable....If decisions are delayed until the problems become worse, options for effective action will be severely reduced (CEQ, 1981:5).

In light of available information concerning global food demands, population growth, and available agricultural resources in the near future, the following conclusions appear evident:

1. Increases in food supply necessary to meet the demand of future populations can be expected to come primarily from land presently under cultivation.

2. Unless significant conservation efforts are implemented in the near future, loss of essential agricultural resources, particularly prime agricultural land, will continue at an increasing and unsustainable rate.

3. If losses of agricultural land resources continue at present rates, the ability of the world to meet projected food demands in the near future is uncertain if not unlikely.

4. As resources necessary for current large-scale agricultural production become scarce, substantial increases in yield per acre appear unlikely in agriculturally developed countries, such as the United States, even though these countries will be expected to substantially increase exports of agricultural food products in order to meet world food demands in the future.

5. As world food demand surpasses world food supply a climate of increased international tension and conflict is likely to develop.

CHAPTER TWO

National and Regional Perspectives

Global food demands directly affect national and regional production within the United States. As world markets for agricultural products expand, increased production can be expected from the United States. In the past, the major problem facing U.S. agriculture has been overproduction rather than underproduction. Large surpluses of agricultural commodities have resulted in large amounts of land taken out of production in order to avoid larger surpluses. As a result of these past trends, the fear of underproduction is often ignored. However, as discussed in Chapter One, global demand for food and fiber is expected to increase dramatically in the near future. If the United States continues to undermine its agricultural productivity through the loss of prime farmland, based on the assumption that overproduction, not underproduction, is the problem, serious shortages of food and fiber products can be expected in the future.

National Perspective

The United States is currently facing substantial losses of the nation's best agricultural land every year. As the total demand for this invaluable resource increases and the total supply decreases, serious future shortages are implicated. Recognizing that prime farmland is a nonrenewable resource that is limited in total supply, it is extremely important that an adequate amount be preserved for future needs. If current trends affecting supply and demand continue unaltered, serious future shortages appear inevitable.

Historical Overview

Throughout the history of the United States, exploitation of land has been a common practice. Early settlers showed little concern for protecting the land resource base. In early colonial times land that was readily accessible was often the first to be cleared and cultivated regardless of its inherent capability to support continuous cropping practices. Accessibility was usually given priority over land quality (Barlowe, 1979:9). Unlike the land situation in Europe, the amount of land for farming appeared unlimited to the early settlers in the New World. As a result farmers were careless with the land, cultivating until it was no longer productive and then moving on to another area (Helfman, 1962:71). Thomas Jefferson, concerned about this common practice wrote, "We can buy an acre of new land cheaper than we can manure (fertilize) an old one." (Helfman, 1962:73)

Following the American Revolution, government policy began to play an increasingly important role in the land settlement process. The early Continental Congress was faced with the question of how our land was to be settled. In general, the founding fathers believed that the interior lands should be developed for farming as quickly as possible, and it became the active policy of the government to promote such development through private interests (Huemoeller, 1976:21). The orientation of the government was toward rapid disposal and settlement of land as opposed to careful planning and conservation of our nation's land resources. This opening up of large amounts of unsettled land, combined with the industrial developments in the east, resulted in a dramatic increase in the nation's population during the 1800's. In 1800 the population of the United States was around 5.3 million with only three cities over 25,000 people; by 1900, U.S. population had grown to over 75 million with 38 cities over 100,000 people (Stephenson, 1981:4).

The short-sighted land policy of the early Congress led to enormous amounts of waste, exploitation, and mistreatment of our nation's land resources. Land was often treated as an item through which quick and easy monetary gain could be obtained. Speculation quickly became the primary basis upon which much of the nation's land was developed. In the book Man and Land in the United States, Marion Clawson (1964:78) observed that "Valuable lands were put up for sale, first come first served, with only modest rules and those often not enforced fully." Clawson adds, "It was like a vast grab bag at a party, with valuable gifts for those who could get them and hold them.....trespass, fraud, speculation, and waste were rampant." Unfortunately, Congress failed to effectively control these problems. Laws such as the Pre-emption Act of 1841, which allowed settlers to settle lands prior to surveying and then purchase the land (up to 160 acres) at $1.25 per acre without a public auction, and the Homestead Act of 1862, allowing settlers to own up to 160 acres of land without charge in return for settling and improving it, only served to promote further speculation and fraud (Huemoeller, 1976:22). Lack of sufficient man-power and court support made enforcement of these laws extremely difficult. Many congressmen were themselves speculators or dealers in land and numerous national leaders, including George Washington, bought and sold land for profit (Clawson, 1964:80).

Conservation of the nation's natural resources was virtually ignored until the latter half of the 1800's. In the book Lure of the Land, Everett Dick (1970:324) notes:

> Until the last decade of the nineteenth century it was commonly thought that the chief duty of the Commissioner of the General Land Office was to parcel out the public domain as fast as possible. Now and then, of course, a lone voice proclaimed the need for conserving the nation's land resources, but this advice was largely unheeded because Americans lived under the misguided idea that the assets of nature were unlimited in the richest nation on earth.

Eventually, concerned individuals and groups were able to convince Congress that legislative action was necessary in order to save the nation's land resources from further exploitation for private interests. In 1872 Yellowstone National Park was created and in 1891 the first forest reserve, the Yellowstone Timberland Reserve in Wyoming, was established by President Harrison. Since then much of the remaining public domain was withheld from private development and has become what remains the public domain today. Of the original 1,856 million acres of once public domain, approximately 1,140 million acres has been disposed of through various means (see Figure 2.1).

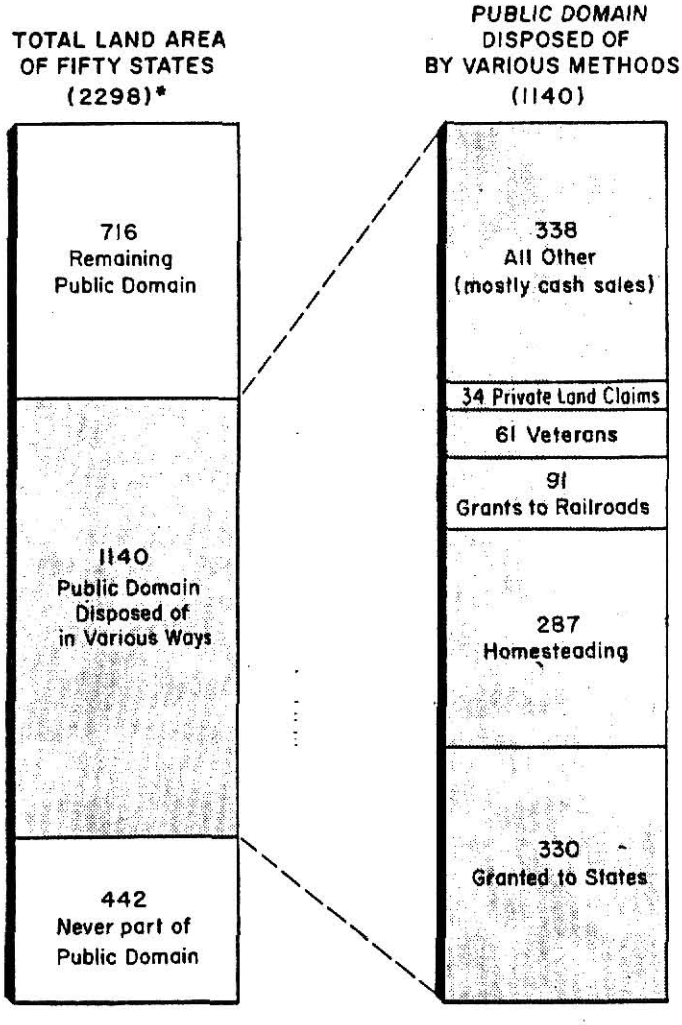


Figure 2.1

Land Disposal in the United States

Source: Marion Clawson, Man and Land in the United States, (Lincoln: University of Nebraska Press, 1964), p. 76.

Prime Farmland Supply

In 1977, according to the United States Department of Agriculture Soil Conservation Service (1980:1), the United States had 413 million acres in cropland. The nation's total cropland base, including all lands with high and medium potential for conversion to cropland, totaled 540 million acres, resulting in a cropland reserve of 127 million acres (see Figure 2.2). Use of American's cropland base in 1977 is shown in Figure 2.3. Unfortunately, the United States is gradually losing large amounts of its most product agricultural land. Between 1958 and 1977, cropland acreage decreased by eight percent (SCS, 1980:1). An estimated three million acres of agricultural land is lost each year through conversion to nonagricultural uses (SCS, 1980:5).

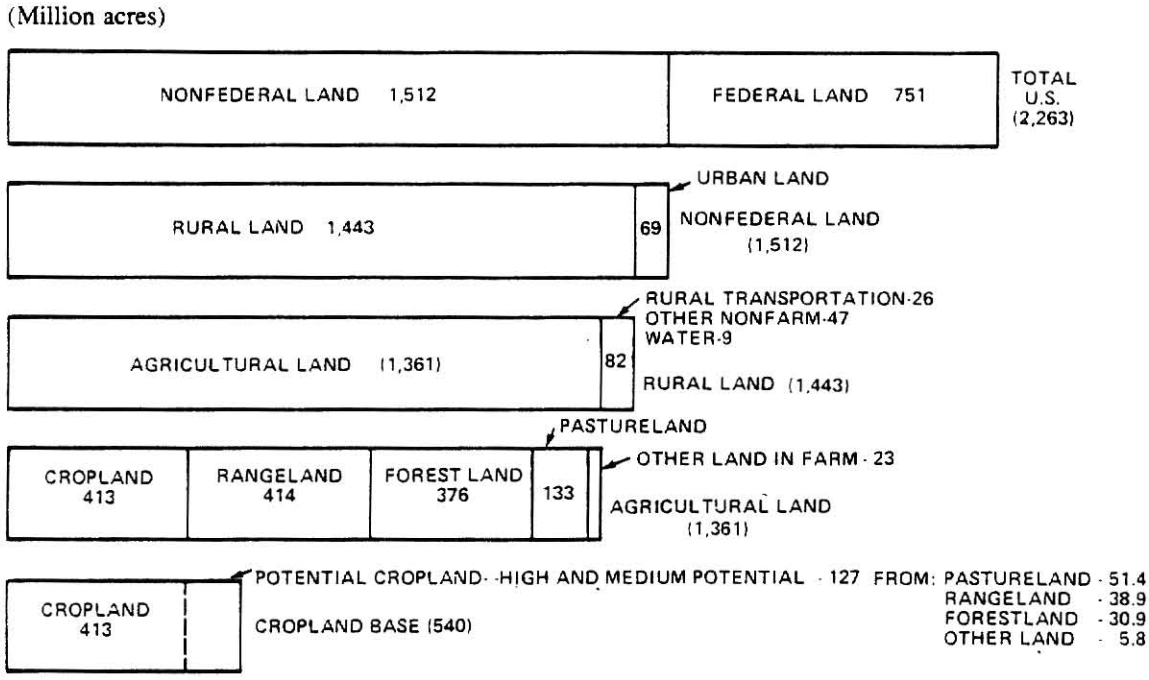


Figure 2.2

America's Land Base in 1977

Source: National Agricultural Lands Study, U.S. Department of Agriculture (Washington, D.C.: Government Printing Office, 1981), p. 28.

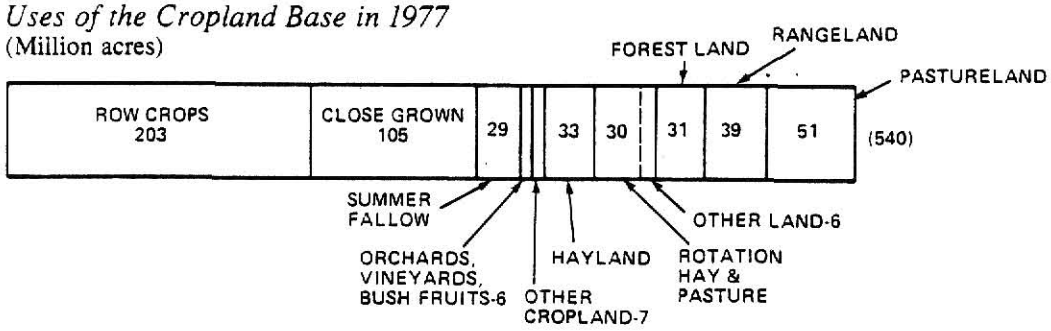


Figure 2.3

Uses of the Cropland Base in 1977

Source: National Agricultural Lands Study, U.S. Department of Agriculture (Washington, D.C.: Government Printing Office, 1981), p. 28.

Of particular importance is the situation concerning prime farmland. Only a portion of the nation's existing and potential cropland is considered prime farmland. Prime farmland is defined by the Soil Conservation Service (SCS) as land best suited for producing food, feed, forage, fiber and oilseed crops and also lands available for these uses. Prime farmland can be cropland, pasture-land, rangeland, forest land, or other land except urban and built-up areas. Prime soils have the quality, growing season, and moisture supply needed to produce sustained high yields of crops economically when managed properly (SCS, 1979:1).

According to SCS figures, the United States had an estimated 346 million acres of prime farmland in 1977. Approximately 230 million acres were used for cropland. Table 2.1 shows the use of the nation's prime farmland in 1977.

Table 2.1

USE OF PRIME FARMLAND
(1977)

Land Use	Acres (millions)	Percent
Cropland	230	67
Native pasture and pastureland	40	12
Rangeland	22	6
Forest land	42	12
Other land	11	3
Total	345	100

Source: Soil Conservation Service, America's Soil and Water: Condition and Trends, United States Department of Agriculture, (Washington, D.C.: Government Printing Office, 1980), p. 5.

According to these figures, the nation had a prime farmland reserve of about 115 million acres. This is not a true indication of the actual amount that would be available for cropland use in the future. The National Agricultural Lands Study (NALS) showed that of this 115 million acres, only about 50 million acres has a high or medium potential for conversion to cropland (USDA, 1981:38). The remaining amount (65 million acres) was considered as having a low to zero potential for conversion due to limiting factors such as small field size, accessibility, location within park and recreation areas, and use of this land for private timber operations. Another important consideration is that as additional cropland is brought into production, significant reductions will occur in acreages available for other uses. The SCS (1980:6) states, "Conversion to cropland (of lands in other uses) would mean a significant loss in forage and wood producing areas and, in some places, wildlife habitat.

Agricultural Demands for Prime Farmland

As mentioned in chapter one, world population and world food demand are expected to increase dramatically by the year 2000. This increase in world food demand will greatly increase the demand for U.S. agricultural exports. During the early 1950's, the U.S. accounted for only 2 percent of the world's agricultural exports (O'Brian, 1981:14). However, since then the U.S. has continued to play an increasingly important role in the world agricultural export market. In the late seventies the U.S. accounted for 11 percent of the world's agricultural exports and is expected to provide 15 percent by 1985 (O'Brian, 1981:14). As a result, an increasing amount of cropland has been used to produce products for exports (see Figure 2.4). A primary reason for the U.S.'s major role in supplying needed world agricultural exports is that the U.S. contains nearly 13 percent of the world's land that is suitable for cultivation (O'Brian, 1981:12). Large amounts of prime farmland combined with advanced agricultural technology has allowed the U.S. to emerge as a major producer of the world's important agricultural products. In 1979, the U.S. accounted for over 23 percent of the world's total production of grain and oilseed production (O'Brian, 1981:5). As a result, the volume of export demand is expected to triple over the next two decades (USDA, 1981:55). Domestic demand for food and fiber is expected to increase about one percent annually as the population of the U.S. is expected to grow from 214 million persons in 1975 to around 253 million people by the turn of the century (USDA, 1981:53).

Increases in population will also increase the demands on agricultural land for commodities other than food. For example, demand for wood products, fiber, feed for livestock, and corn for gasahol are expected to increase as well. It is estimated that between 15 and 23 million acres of corn will be required to meet the projected demand for ethanol by 1990 (USDA, 1981:54). The NALS estimates that about one-third of the projected growth in domestic demand can be attributed to an increase in per capita consumption and the remainder

of growth in domestic demand attributed to an increase in population (USDA, 1981:53).

Acreage of crops harvested, summer fallow, idle & crop failure U.S. 1940-1980

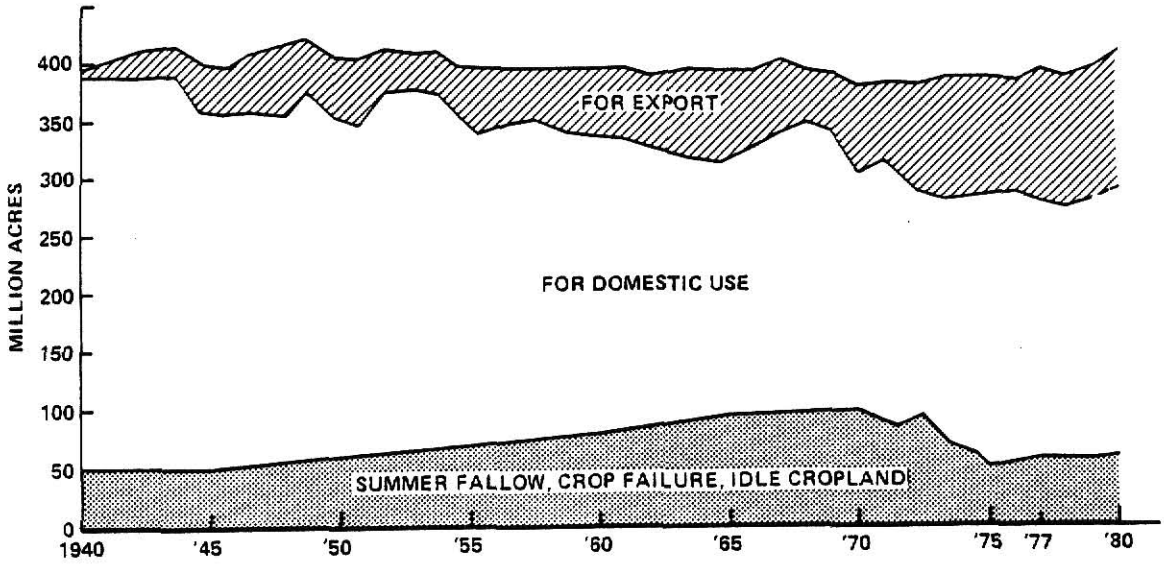


Figure 2.4

Cropland Usage 1940-1980

Source: National Agricultural Lands Study, U.S. Department of Agriculture (Washington, D.C.: Government Printing Office, 1981), p. 57.

Increased production required to meet increased demands can be obtained primarily from two sources. One source is through increases in crop yields and the other source is through bringing new land into production. The amount of increase which can be expected from increased yields is at best uncertain. Much controversy has been raised over the ability of technology to provide increases in crop yields as dramatic as yield increases of the past. A marked decline in the annual rate of gain in crop yields has occured in the last decade. Annual gains in crop yields declined from 1.4 percent annually during the 1960's to .75 percent in the 1970's (USDA, 1981:57). It is certain that future demands

for U.S. agricultural commodities will not be met entirely through increased yields on existing farmland. Additional cropland will undoubtedly be needed. Table 2.2 shows the amount of additional planted acreage which will be needed, based on NALS figures for various rates of crop yield gains.

Numerous factors play an important role in determining the actual rate of gain in crop yields. Several of these factors would appear to be unfavorable for excessive increases in yields per acre. For example, well over half of our cropland base needs additional conservation treatment and large amounts of pastureland, rangeland, and forest land also need conservation treatment (SCS, 1980:10). Figure 2.5 shows a summary of agricultural land needing conservation treatment. Other factors that may cause serious problems concerning crop yields include the rising cost of inorganic petroleum-based fertilizers, salination of irrigated soils, resistance build-up of disease and insect pests to presently used pesticides, environmental pollution from chemical fertilizers and pesticides, and depletion of ground water supplies for irrigation. Ground water supplies in the U.S. are being depleted at the rate of 21 billion gallons per day, more than 50 percent of which is occuring on the High Plains (SCS, 1980:27). This depletion in the High Plains could substantially reduce the amount of irrigated land in the future. Decline of irrigation has already occured in some parts of the High Plains (SCS, 1980:27).

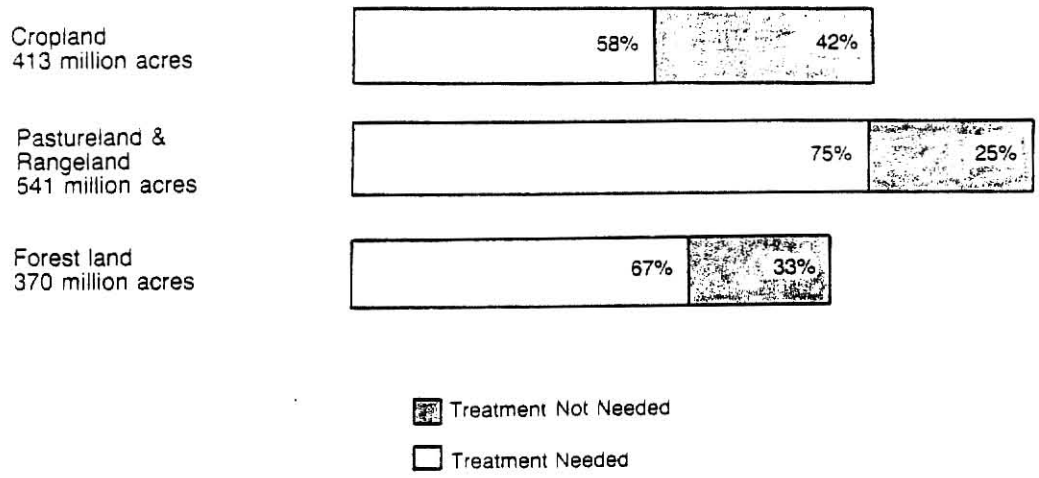


Figure 2.5

Conservation Needs in 1977

Source: Soil Conservation Service, America's Soil and Water: Condition and Trends, U.S. Department of Agriculture (Washington, D.C.: Government Printing Office, 1980) p. 10.

Assuming future demands for agricultural crops as indicated in the NALS with gains in yield per acre at the 1970's rate of .75 percent, an additional 113 million acres of cropland would be needed by 2000 (see Table 2.2). This represents almost 90 percent of the total cropland reserve! A higher rate of gain in crop yields of 1.25 percent would require 95 million additional acres by the turn of the century. If prime farmland reserves having a high and medium potential for conversion to cropland are brought into production first, these reserves would be depleted by the end of this decade! The remaining cropland needed for future demands would come from non-prime land. Cultivation of inferior soils typically results in higher energy costs for tillage operations, greater need for conservation practices, increased erosion and soil loss, higher fertilizer applications, and lower crop yields than prime soils.

Table 2.2

PLANTED ACREAGE NEEDED TO MEET PROJECTED DEMAND 1980-2000

(Million acres)	1980	1984	1989	1994	1999
Case A: .75% gain in Crop Yields	294	325	365	400	407
Case B: 1.25% gain in Crop Yields	294	317	346	370	389
Case C: 1.5% gain in Crop Yields	294	313	339	358	371

Source: National Agricultural Lands Study, U.S. Department of Agriculture (Washington D.C.: Government Printing Office, 1981), p. 59.

Nonagricultural Demands for Prime Farmland

There are a number of land uses that compete for agricultural land other than agricultural uses. These uses include residential, commercial, industrial, recreational, and public service uses such as lakes and reservoirs, airports, schools and other public facilities, transportation routes, and utility corridors, (Blobaum, 1974:32). Prime farmland is currently being lost at the rate of one million acres each year (see Figure 2.6). Loss of prime farmland for urban and built up areas alone totals over 800,000 acres each year (SCS, 1980:5). In rural communities, residential development is often a primary competitor for agricultural land. Between 1970 and 1979, the U.S. experienced a 22 percent increase in the number of households resulting in a large number of new homes being constructed, 40 percent of which were built on rural land (USDA, 1981:43). U.S. population is expected to grow at the rate of 1.4 million people each year resulting in an increasing demand on rural land to accommodate urban growth (USDA, 1981:43).

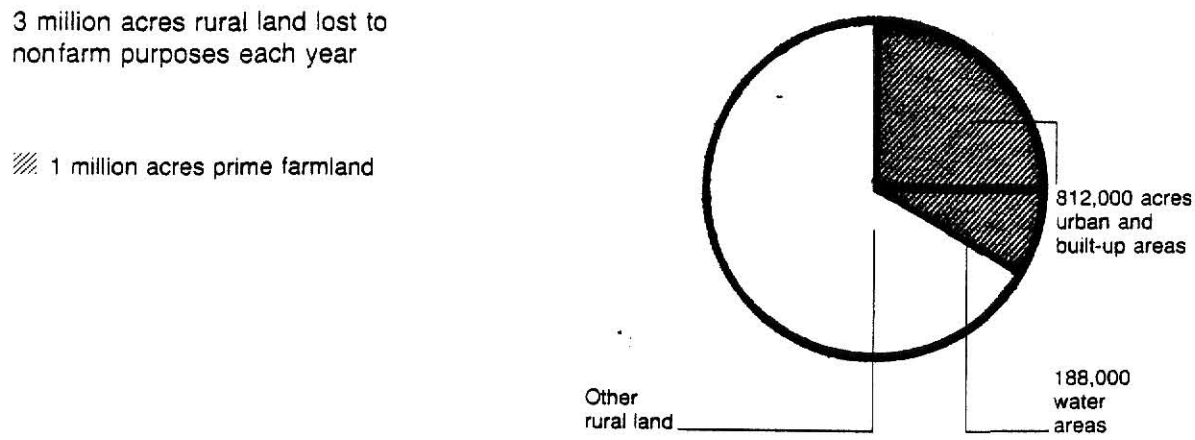


Figure 2.6

Loss of Rural Land in the U.S.

Source: Soil Conservation Service, America's Soil and Water: Condition and Trends, U.S. Department of Agriculture (Washington, D.C.: Government Printing Office, 1980) p. 5.

The demand for developable land in rural communities will increase significantly if present migration trends continue. These trends indicate a significant population migration from urban to more rural areas over the last ten years (USDA, 1981:43). According to the NALS, this urban to rural migration has resulted in a net increase of almost three million people in nonmetropolitan areas from 1970-1978. Furthermore, the highest growth rates in nonmetropolitan areas occured in the countryside and unincorporated areas. A comparison of growth rates between incorporated and unincorporated areas shows a 4.6 percent and 7.6 percent growth rate respectively (USDA, 1981:45). As a result of this growth in rural areas, 12 million new households will be added to nonmetropolitan areas between 1977 and 1995 (USDA, 1981:46). A significant amount of industrial development has occured in rural areas as well. In 1975, over 1,800 manufacturing plants moved to nonmetropolitan areas (Porter, 1981:5). Nonmetropolitan

employment grew by 12 percent between 1970 and 1976, compared with 8 percent employment growth in metropolitan areas (USDA, 1981:47).

Agricultural Land Conversion

Agricultural land conversion has been a common occurrence in urban fringe areas for many years. As cities and suburbs have grown, large amounts of agricultural land have been converted to non-agricultural uses. Many urban centers are surrounded by good quality farmland and eventual conversion of these farmlands is inevitable unless serious efforts are made to protect them. In recent years agricultural land conversion to residential and commercial developments outside of urban centers has been increasing. A growing number of non-farm families have chosen to live in the countryside resulting in a direct competition between residential, commercial and other demographically-based nonagricultural activities and farming during the 1970's (USDA, 1981:46).

The spread of urban developments into the unincorporated countryside has resulted in a growing number of "countryfied cities" (Porter, 1981:7). A "countryfied city" may be defined as "a loose collection of small towns, crossroad communities, and other development strung along country roads, bound together by common economic, social, and cultural pursuits which are basically urban in nature" (Porter, 1981:8). A Congressional Research Service in a 1978 report described the problem this way,

> Up to now, urbanization has often caused sprawl—the accrual of annual rings of development around existing city cores. Sprawl has created problems, but there has remained, nevertheless, a line—however fuzzy—between the "city" and the "country"....More recently, a different trend has been identified.....The phenomenon might better be described as buck-shot urbanization rather than sprawl (Porter, 1981:6).

In the book Exurbs: Urban Residential Development in the Countryside, Dinker I. Patel discusses the causes and problems of an urbanizing countryside.

The term "exurb" is defined by Patel (1980, xi) as, "a discrete, areally organized subdivision with an internal street pattern, located in a rural setting. It is located far enough beyond the frontier of suburban development that it will not be engulfed by the expanding city in the forseeable future and thus is an urban island in a rural setting." The effects of this type of "exurban" development are thoroughly discussed by Patel and Porter.

Threats to farming from conversation of prime farmland and raising of land prices are serious problems. Other problems associated with exurban developments include increased erosion and surface runoff, visual blight, inefficient energy consumption, increased road maintenance in rural areas, increased crime in rural areas, increased pollution caused by septic systems and garbage from residents, and conflict between old and new residents (Porter, 1981:10).

An important question exists concerning the cause of the recent migration to the rural countryside. Though economic concerns probably play an important role, the primary motivating factors are probably more a matter of attitudes than economics (Sofranko, 1980:185). A commonly offered explantion deals with the "quality of life" image of country living. Robert Coughlin (1980:5), in his booklet Agricultural Land Conversion in the Urban-Rural Fringe, states, "The demand for residential land in rural areas has grown because of the enduring image of country life as having greater dignity and respectibility, more permanence and as being more healthful, and less stressful than city life."

Although this attitude is undoubtedly part of the motivating force drawing people to the country, the most significant factor is the spread of technology to rural communities. Throughout the history of our nation, urban centers were the primary beneficiaries of new technology for more affluent living. As technology progressed, offering improved and more affordable luxuries, millions of Americans flocked to the city in hopes of a higher standard of living. As

cities grew so did the problems associated with urban environments such as pollution, crime, congestion, and noise. In fact, the desire to leave urban problems and urban environments appear to be a more important stimuli in the recent migration to rural areas than the natural ammenities of rural environments (Sofranko, 1981:187).

During the first half of this century, living in the country often meant doing without many modern conveniences available to urban residents. Only in recent years, as technology brought the modern conveniences of the city to the rural countryside on an affordable level, have urban dwellers begun to reconsider the attributes of country living in such large numbers. With the convenience of modern automobiles, millions of Americans are able to enjoy the "best of both worlds," at least for a time. As affluence and urbanization spread into the countryside, consuming valuable agricultural and natural resources, serious problems may be developing. Another factor contributing to the problem is an increase in per capita income, making it possible for homeowners to afford these conveniences in rural areas (Coughlin, 1980:7). Federal housing policies, providing low interest loans and allowing mortgage interest payments to be treated as deduction expenses has also added to the problem (Coughlin, 1980:7).

The Land Conversion Process

The conversion of farmland to urban developments represents a common economic transition in a free market system. This transition can be described as the principle of "succession in land use." Raleigh Barlowe, a noted land economist, explains the principle as follows,

> Land resources tend to move to those owners who bid the most for their control and to those uses that offer the highest return for their utilization.....According to this principle (succession in land use), whenever changes in the effective demand for different types of land use lead to changes in the use capacities of the lands available for these uses, the land resources in question tend to shift to their highest and best economic use unless prevented by institutional barriers, contrary goals, or individual inertia (Barlowe, 1958:220).

Urban development, in a pure economic sense, represents a higher and better use than farming. This often results in a transition from agricultural use to urban use where development pressures exist in a free market environment.

Economic forces play an important role in the converstion of agricultural land to nonagricultural uses. The forces can be grouped into two general categories: (1) push forces, and (2) pull forces (Flinchbaugh, 1975:43). Push forces tend to decrease profits and increase costs which tend to "push" the operator out of farming. For example, high interest rates, inflation, low market prices, and rising fuel prices could be considered push forces. Furthermore, in urban fringe areas, vandalism to crops and machinery, adverse affects of pollution on crops, and high taxes as a result of inflated land values could be additional push forces. Pull forces, on the other hand, are exerted by conditions which could result in substantial economic gain if the land were sold for purposes other than farming. For example, high prices offered to a farmer for his land by a developer who plans to use the land for urban development would represent a pull force. High land prices, caused by urban development, is one of the most serious widespread problems affecting farmland (Coughlin, 1980:12).

Other factors can play an important part in the conversion process. Land use controls such as zoning for urban development can accelerate the conversion process. Furthermore, local ordinances may be passed restricting normal farming practices which give off noise, odor, dust or other pollution to the environment

(Coughlin, 1980:10). Statewide controls restricting pesticide use, manure disposal, and other farm operations can become a problem. Personal considerations can also influence the conversion process. In many cases where development pressure exists, the land will eventually be sold for development, but only after the present operator dies or retires (Healy, 1980:98). This is especially true of middle-age farmers who "hold out" because they feel unable to start up a new farm and do not wish to establish a new livelihood, whereas farmers near retirement age and young farmers are more willing to sell (Coughlin, 1980:12).

Generally speaking, individuals or organizations playing a major role in the conversion process can be separated into four general groups: (1) rural landowners, (2) speculators, (3) developers, and (4) builders (Coughlin, 1980:17). Governmental bodies also serve to regulate or influence the process through local ordinances and public financing (see Figure 2.7). Often times a single individual or group may fill more than one role. For example, a rural landowner can also be a speculator, hoping to sell land for development purposes in the future. It is often common to find a single firm filling the role of both developer and builder. Furthermore, various roles may be omitted in some situations. For example, a developer may purchase land for development directly from a rural landowner particularly for exurban developments (Patel, 1980:36).

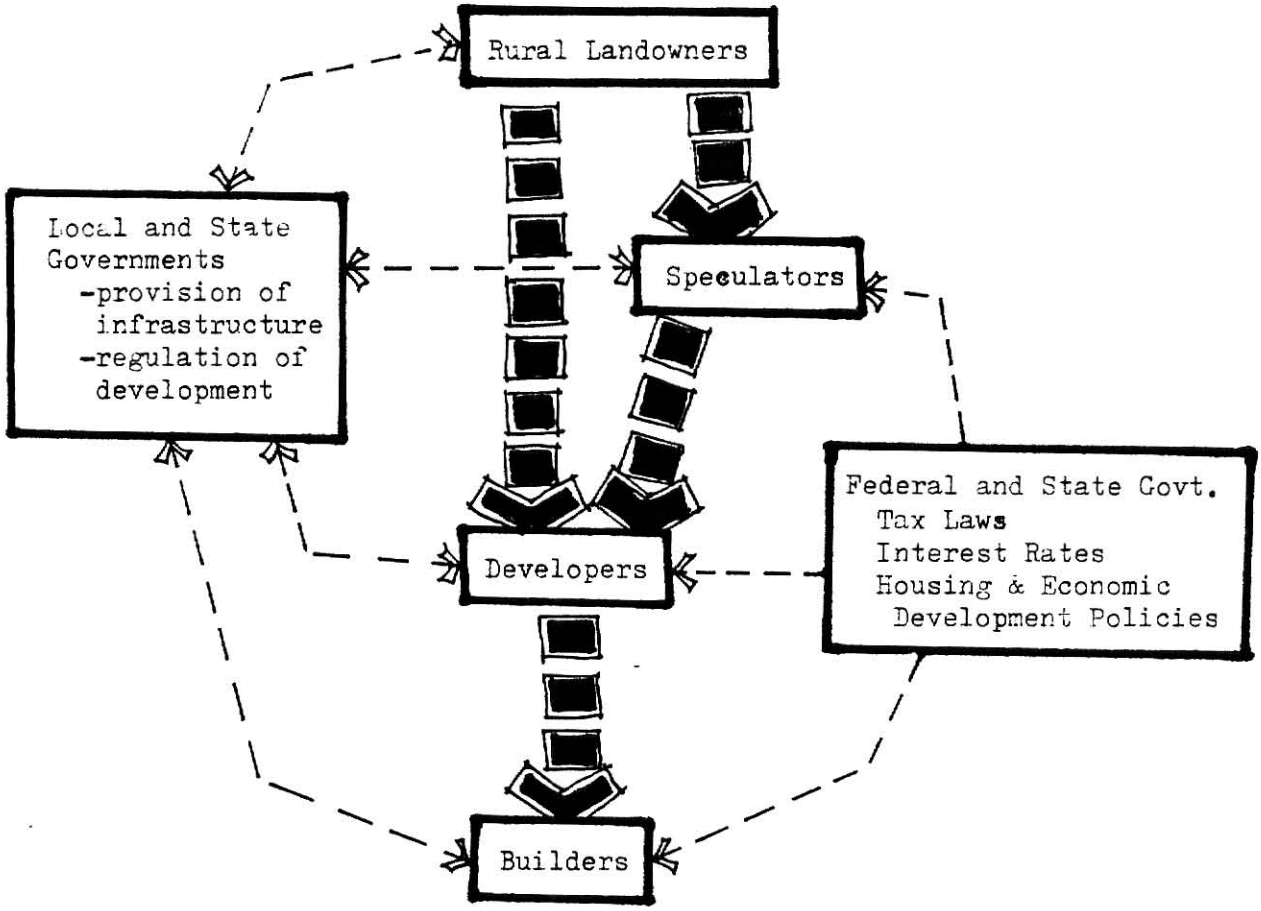


Figure 2.7

Role Models in the Land Development Process

Source: Robert E. Coughlin, Agricultural Land Conversion in the Urban-Rural Fringe, Regional Science Research Institute, 1979, p. 17.

Rural landowners form a large and diverse group of individuals and organization. According to a survey taken in 1978 by the U.S. Department of Agriculture, 38 percent of all privately owned acreage was owned by farmers, 14 percent by retirees (many retired farmers), and 11 percent by corporations including wood-producing companies, mining and petroleum companies, railroads, and agricultural corporations (Healy, 1980:92). The remaining owners include nonfarm rural families, urbanites, and various types of partnerships and syndicates including real estate dealers (Healy, 1980:93). Often times, a relatively small number of individuals own a large amount of undeveloped land

in outlying areas resulting in a situation where a single decision to sell for development purposes could cause a substantial amount of land to be lost for agricultural uses (Coughlin, 1980:16). It is interesting to note that 44 percent of the nation's farm and ranchland is owned by nonfarmers (Healy, 1980:92).

The land speculator is an individual or organization who purchases undeveloped land to be held and later sold for development purposes. The speculator seeks to invest his money in order to make the greatest return (Coughlin, 1980:16). A speculator typically purchases a piece of property from a rural landowner and then holds the land until it becomes "ripe" for development. This "ripening" process may take a decade or more (Healy, 1980:99). Often times it is advantageous for a speculator or developer to purchase a parcel of land which has not been properly zoned for urban development (Foster, 1975:30). In this way land can be purchased at present use value and then resold or developed at a much higher market value upon approval of a rezoning request. Speculators tend to purchase as much rapidly appreciating land as possible in order to increase the volume of returns (Coughlin, 1980:19). "Leverage" is an important economic concept in land speculation in which as small a down payment as possible is made and payments on interest or principal borrowed are put off as long as possible to allow for acquisition of more land with the initial funds (Coughlin, 1980:19). In this way a speculator can extend the purchasing power of his own money by utilizing borrowed money in a more effective manner. However, all speculators accept a certain amount of risk and there is always a chance that a willing buyer will not be available to purchase the land at the price or at the time the speculator had initially planned for.

Although land speculation is generally considered an acceptable and sometimes beneficial practice in the land market, serious problems concerning agricultural land consumption can result. Aside from raising land prices, speculation often results in a phenomenon known as "leap frogging." This refers to a situation in which a speculator decides to sell his property for urban development before another speculator or landowner who owns land nearer to existing development chooses to sell. Thus, a parcel or parcels of land are skipped over and eventually developed at a later time. This leap frogging effect tends to promote the dispersal of development and accelerates the conversion of surrounding rural land. This process generally occurs as different speculators require different rates of return on their investment (Coughlin, 1980:18).

Land developers can be described as entrepeneurs who transform raw land into development units. Generally speaking, developers are not speculators in land (Patel, 1980:37). It is typically at this stage in the conversion process that zoning changes are requested and major improvements such as streets and utilities are installed. Once a developer has acquired a parcel of land, conversion to urban uses is very probable (Coughlin, 1980:21).

Builders represent the final stage in the conversion process. Builders are responsible for the actual construction of buildings and supporting facilities. Often times, the developer is also the builder, but they can be represented by individual firms. In residential developments, lots are often sold and individual homes are built by a number of different builders. The same siutation can also apply to industrial and commercial developments.

The process of land conversion is typically a series of private transactions in which profit is the primary objective, and the highest and best economic use is the ultimate goal. Little, if any, consideration is given to

the long-term implications of a continued process which results in the irreversible conversion of productive agricultural land to urban uses. In the words of C. Lowell Harris (1980:127), a noted economist and educator,

> Individual farmers and businesses are concerned with particular parcels for particular purposes and have little reason to worry about the fixety of total land supply. Their concern is about land for specific uses. If one parcel is not available, another will usually (but not always) serve as well.

Aside from the consumption of a limited supply of agricultural land, numerous other consequences develop as a result of urban sprawl. Increased energy consumption, extension of public utilities and services, increased pollution and environmental degradation, and increased demand on rural resources are a few of the potential problems.

A Regional Perspective: The North Central Region

The North Central Region represents the most productive agricultural region in the United States. A potential shortage of prime farmland, in light of expected national and global demands, is evident if current trends continue. Loss of prime farmland in this region will have a direct impact on the nation's ability to meet future demands as most of the nation's prime farmland is located in this region.

Defining the Region

Regions can be defined in a number of different ways depending on the purpose for defining them and the perspective of the definer. Political boundaries such as state, county, or township lines are often used as regional boundaries for various planning purposes. A region represents an interaction of political, economic, biophysical, and socio-cultural factors integrated within a human ecological framework (Steiner, 1981:4). Although political

boundaries may be appropriate for some purposes, others may require boundaries defined by more physiographic elements. Watersheds represent examples of regions that are defined by natural features as opposed to political boundaries. Watersheds have proven to be desirable units for numerous planning purposes (Steiner, 1981:7). Planning for different purposes may require different regional boundaries, thus the characteristics of the factors involved should be carefully examined before defining the region.

In this study census regions were utilized for assessing the regional situation concerning prime farmland. Kansas is located in the North Central Region as shown in Figure 2.8. The primary reason for using regional census boundaries was that most of the available information concerning prime farmland was presented in this manner. Furthermore, virtually all of the efforts made to address the problem of prime farmland conversion have followed political boundaries. However, in developing programs for agricultural land preservation, physiographic boundaries may result in a more efficient use of agricultural land resources.

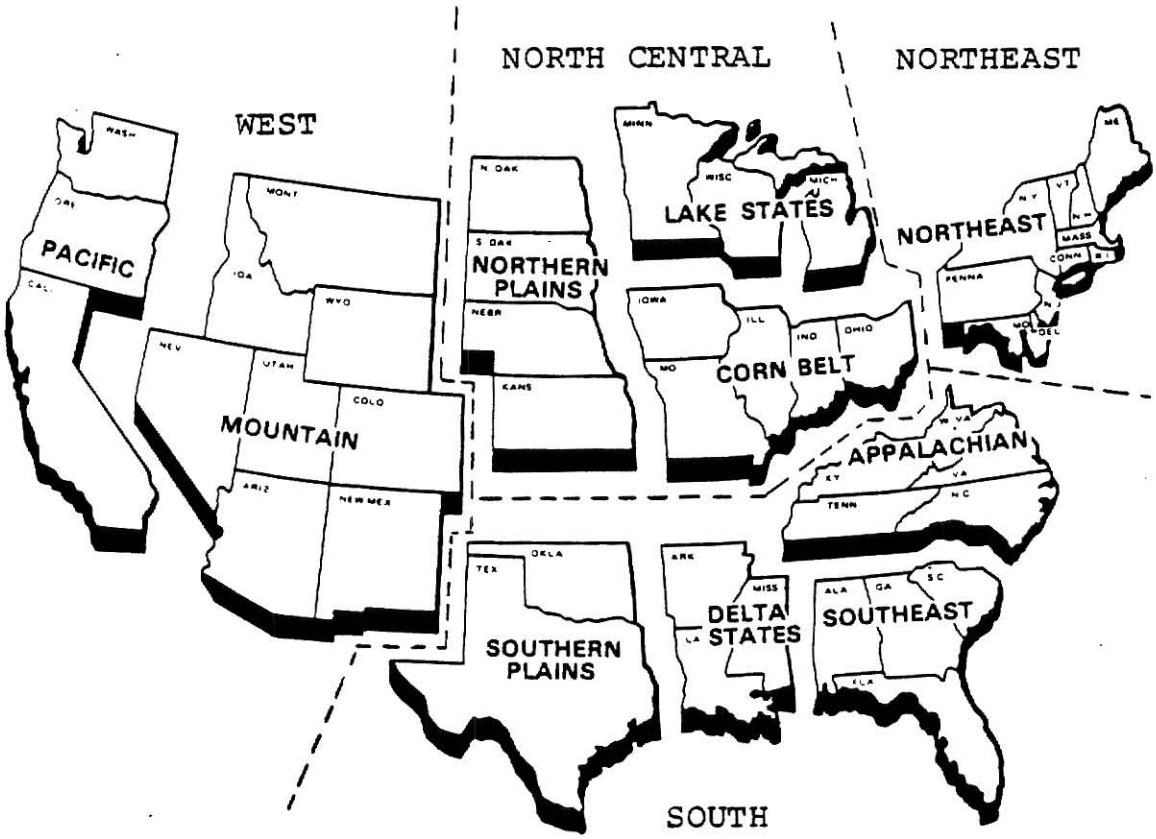


Figure 2.8

Farm Census Regions in the U.S.

Source: National Agricultural Lands Study, U.S. Department of Agriculture (Washington, D.C.: Government Printing Office, 1981), p. 31.

Historical Background

Prior to the 1880's, ranching was the major use of agricultural land in the North Central Region. This was primarily due to the lack of dryland farming technology. Thousands of Easterners moved west to seek new opportunities. Between 1860 and 1880, the number of cattle in Nebraska increased from 37,000 head to over 1 million head (Huemoeller, 1976:22).

Cattle ranching began to decline during the mid 1880's as a result of low prices due to an over-supply of cattle and the advancement of farming on the plains. An increasing migration of immigrants, bringing well adapted varieties of corn and wheat to the prairie region, began to change the character of the region from predominantly ranching communities to rapidly growing farming communities. Expanding markets for farm machinery brought Eastern manufacturing to Illinois, Wisconsin and Indiana (Huemoeller, 1976:23). Cropland in the U.S. increased from 188 million acres in 1880 to 402 million acres in 1920 shifting agricultural prominence from the eastern states to the North Central Region (Huemoeller, 1976:24). By the turn of the century, settlement in the North Central Region was generally complete.

Prime Farmland Supply

The North Central Region contains a large amount of the nation's prime farmland (see Figure 2.9). The region contains 179.7 million acres of prime farmland, accounting for 52 percent of the nation's total supply (SCS, 1980:5). Approximately 79 percent of the prime farmland (142.2 million acres) was under cultivation in 1977 (USDA, 1980). A large portion (32 percent) of the nation's cropland reserve having a high and medium potential for conversion to cropland is located in this region (SCS, 1980:6). Furthermore, this region has the highest percentage of high quality soils for farming than any other region in the country (see figure 2.10). The Corn Belt has more than three-fourths of its acreage suited for continuous cultivation practices and the remaining portion of the region has nearly 60 percent of its land suitable for such practices (SCS, 1980:4).

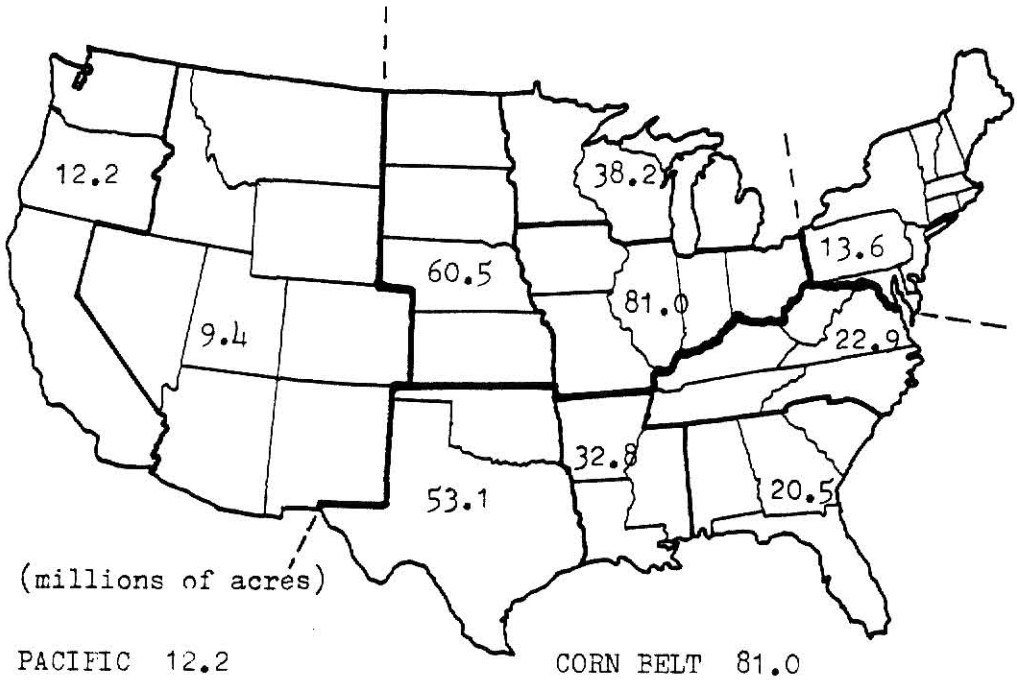


Figure 2.9

Prime Farmland in the United States

Source: Soil Conservation Service, America's Soil and Water: Condition and Trends, U.S. Department of Agriculture (Washington, D.C.: Government Printing Office, 1980) p. 5.

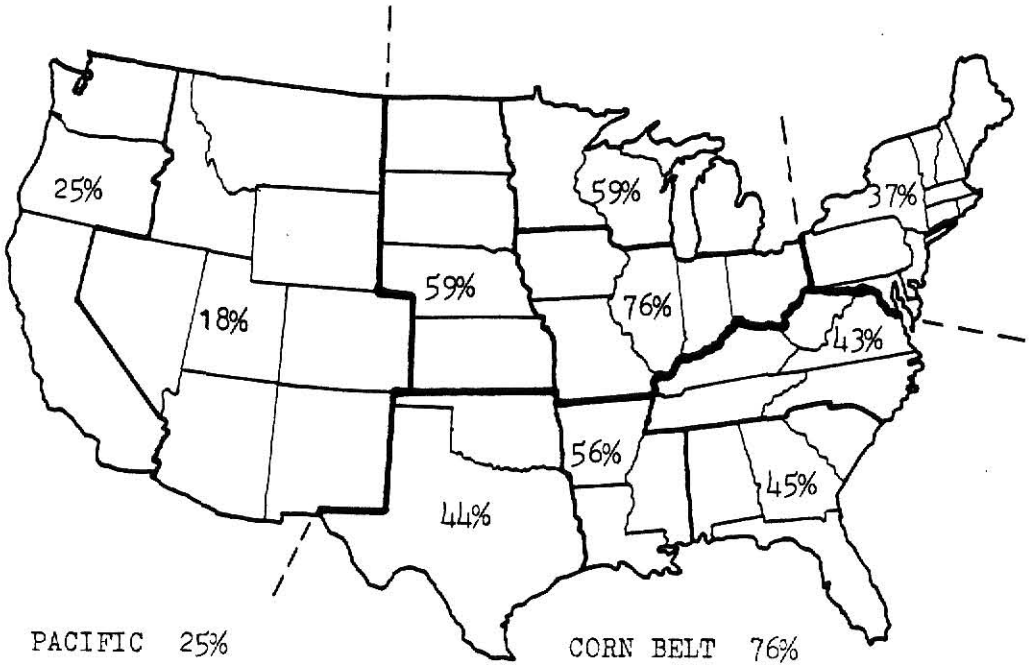


Figure 2.10

Percentage of Good Cropland in Each Farm Production Region

Source: Soil Conservation Service, America's Soil and Water: Condition and Trends, U.S. Department of Agriculture (Washington, D.C.: Government Printing Office, 1980) p. 4.

The North Central Region is experiencing dramatic reductions in its amount of prime farmland as a result of conversion of this land to nonagricultural uses. Between 1967 and 1977, this region lost over 7 million acres of agricultural land to nonagricultural uses (USDA, 1980). This represents an annual loss of over 700,000 acres. Michigan, Illinois, and Ohio each had average annual losses of over 100,000 acres. Iowa estimates that it is losing an area of agricultural land the size of an average county every ten years. Losses can be expected to continue as demands for nonagricultural uses are expected to increase in the future. Nearly half of all projected losses in the nation's cropland base can be expected to occur in this region (Huemoeller, 1976:109).

Agricultural Demands for Prime Farmland

Demands for agricultural products to meet national and international needs can be expected to increase significantly in the future. The North Central Region currently produces almost half of the value of all agricultural products in the U.S. (USDA, 1981:39). Approximately one acre in every three acres of cropland in this region goes for agricultural exports (USDA, 1981:39). With the possibility of export demands tripling by 2000, large increases in production will undoubtedly be required of this region. Furthermore, an estimated 15 to 20 million additional acres of corn will be needed for domestic ethenol production (USDA, 1981:54).

Nonagricultural Demands for Prime Farmland

Demands for residential and urban developments in the North Central Region can be expected in increase in the future, particularly in the more rural areas. Nonmetropolitan counties experienced a .77 percent annual growth in population as compared to .22 percent for metropolitan counties since 1970 (Sofranko, 1980:4). The highest average annual rates of growth in the region occured in the most rural counties with places of 2,500 or less (Sofranko, 1980:6). This pattern of migration from urban to more rural areas creates increasing pressure for residential development on agricultural land in rural areas. This trend is expected to continue throughout the North Central Region well into the future (Sofranko, 1980:201). In addition to urban pressures, an estimated 358,000 acres is expected to be disrupted annually between 1975 and 1999 for mining operations (USDA, 1981:39).

National and Regional Efforts to Protect Prime Farmland

Federal efforts to protect prime farmland have been extremely modest attempts at dealing with the problem. Federal use of agricultural land has been the responsibility of numerous federal agencies which are allowed to use these lands as they deem appropriate. According to the National Agricultural Lands Study (NALS), two of the 37 federal agencies reviewed had explicit policies for considering program impacts on agricultural land (USDA, 1981:76). In fact, several federal agencies, such as HUD and FmHA, had policies which actually contributed to the problem of farmland conversion to residential and urban uses (USDA, 1981:48). The National Environmental Policy Act of 1969 (NEPA) requiring the preparation of an Environmental Impact Statement (EIS) on federal actions significantly affecting the environment has proven ineffective in assessing the impacts on agricultural land and are completed on only a small number of projects involving agricultural land (USDA, 1981:76). Although a number of federal agencies have reassessed their policies concerning agricultural land, no specific universal federal guidelines exist that apply to all federal agencies directly influencing agricultural land use.

Efforts in the North Central Region to protect prime farmland have been limited primarily to individual state and local initiatives. Many of the states in the North Central Region have begun to recognize the seriousness of the problem. In fact, all of the states in the North Central Region except Kansas, currently have some form of differential taxation program concerning agricultural land (see Table 2.3). Several states and local communities have implemented rigid preservation programs for farmland. Examples of state and local programs for preserving prime farmland will be discussed in more detail in Chapter Five.

Table 2.3

COMPARISON OF STATE METHODS OF APPRAISING AGRICULTURAL LAND IN THE NORTH CENTRAL REGION

Market Value	Preferential Assessment	Deferred Taxation	Restrictive Agreements
Kansas	Indiana Iowa North Dakota South Dakota	Illinois Minnesota Missouri Nebraska Ohio	Michigan Wisconsin

Source: B. L. Flinchbaugh, Cooperative Extension Service, Kansas State University, Manhattan, Kansas, 1982.

CHAPTER THREE

State and Local Perspectives

As the situation concerning the loss of prime farmland at the national and regional level appears disturbing, the situation in Kansas is also rapidly becoming a serious problem. The state government as well as local governments must play an active role if the problem of farmland conversion is to be dealt with effectively. In order to understand the problem concerning the loss of prime farmland in Kansas it is important to carefully examine the current situation and the factors influencing farmland conversion.

Historical Background

Agriculture has played an important role in the history and development of Kansas. Fertile soil, suitable terrain, and a favorable climate made this area an excellent location for productive cropland and rangeland. The following historical narrative is composed of selected excerpts taken from a centennial publication entitled From Desert to Breadbasket: Developing Kansas's Land Resources (Agricultural Experiment Station, 1975: 1-7).

Up to 1854, the year Kansas Territory was created, the Kansas population (except for traders and missionaries) remained predominantly Indian. Of the historic Indian tribes in Kansas, at least four practiced some agriculture: The Wichita, Kansa, Osage, and Pawnee. Their permanent homes were earth or straw lodges near valley bottoms where they raised crops; they also

hunted. From the mid 1820's to 1854, Kansas was a pathway for frontiersmen en route to the far west and approximately the eastern third was a reservation for emigrant Indian tribes from eastern states. A number of the emigrant Indians became excellent farmers, using white man's methods and implements. Most, however, continued to make hunting expeditions to the central and western plains until they were removed to Indian Territory (Oklahoma) or the buffaloes were gone (which they were by the mid 1870's).

The Indians characteristically saw the land and its resources as a gift to all mankind, something that belonged to all, like air and water and sunshine, and hence no part of it could belong to an individual. In that perspective, the Indian lived with the land. He adapted to his environment. He tended not to abuse the land and the resources on it nor to waste its resources and wildlife.

Within the first year of the Kansas Territory, a number of westward-bound pioneers stopped in eastern Kansas. Although the Civil War slowed the western movement, two pieces of legislation enacted while it was being fought greatly influenced the settling of the "high prairies" after the war. They were the Homestead Act and the Morrill Act of 1862. One opened up the plains as a part of the public domain where land could be obtained cheaply or free except for nominal filing and patent fees; the other provided for the establishment of land-grant colleges.

Settlement under the Homestead Act was hastened by the incoming railroads. Favored by large land grants and having a large stake in peopling the Kansas plains, the railroads may have been overly optimistic in describing the "cheap, available land" and its productive potential, but their promotional literature did much to dampen the long held desert concept. They in fact helped make central and western Kansas appealing to two agriculturally oriented groups that were at first at odds; cattlemen who saw the area as rangeland and settlers who wanted to try their luck at cultivating the sod.

Especially after 1870, when plains Indians generally were no longer a threat, settlers (mainly from eastern United States and from Europe) began to surge onto the plains west of the 6th principal meridian, where the climate was subhumid but where by that time most of the "free" or "cheap railroad" land in Kansas lay. Already cattlemen were using the grasslands as open range; some even had preempted land along the water courses, extending their ranches onto the upland interior as soon as they could dig wells and install windmills to assure a water supply for stock some distance from the streams.

A Kansas blizzard in 1886 killed so many range livestock that the range cattle industry could not recover before the crop-growing newcomers had become at least semi-established. Nonetheless, this agricultural profile for the plains even then was emerging: ranching and farming were becoming allies, until eventually ranches having many acres of pasture would alternate with farms having many acres of cropland. Much trial and error accompanied that development, and during many seasons drought, grasshopper invasions, and other natural disasters plagued attempts to find the right crops to grow on the prairies in a subhumid climate. In 1874, Mennonites from the Volga region of Russia (where climate and land are similar to those of central and western Kansas) brought with them to the Kansas plains Turkey red wheat. They planted the seed and had a good harvest, indicating wheat's suitability to the Kansas area. Since then Kansas has developed into one of the most productive agricultural areas in the world.

Kansas Agriculture

Agriculture is the foundation upon which the Kansas economy is built and should continue to represent the base of the state's economy through the turn of the century (KDED, 1975:53). Agriculture and manufacturing are expected

to provide the primary thrust in the growth of the state's gross product (Carlin, 1980:4). In 1980, cash receipts from Kansas farm marketings were estimated at $5.94 billion (KSBA, 1980:9). Because of the importance of agriculture to the Kansas economy, protecting the state's agricultural land resources is essential for maintaining a healthy Kansas economy.

Kansas agriculture has undergone significant changes through the years. Changes in agriculture have a direct influence on rural communities and local businesses. When local farming operations prosper and expand, an increase in goods and services is necessary to accommodate and sustain new growth. These goods and services represent additional business for local merchants. In a depressed farm economy, fewer goods and services are needed due to a lack of growth in local farming operations, which in turn adversely affects local businesses. In 1935, the number of Kansas farms totaled 174,589 farms and since then the number has been steadily decreasing. From 1969 to 1980 the number of Kansas farms decreased from 86,059 to 75,000 (KSBA, 1980:6). On the other hand, the average size of individual farms has been increasing, from 544 acres in 1964 to 619 acres in 1978 (Orazem, 1981:3). Therefore, as the size of farming operations have increased, the number of farming operations have decreased by more than 10,000 farms in the last ten years. These figures indicate that small farms (many family owned) are finding it increasingly difficult to stay in business. Such trends will probably continue unless current economic conditions affecting the farm community significantly improve.

Increases in production costs and low market prices for agricultural products have significantly affected the economic status of Kansas farms. Large gross dollar amounts are required to net a livable income. In 1978, a gross amount of $100,000 was needed to net $23,000 (Orazem, 1981:5). Thus, the number of farms selling more the $40,000 worth of agricultural products increased from 7,886 in 1969 to 20,370 in 1978 and the number of farms selling

$100,000 or more increased from 1,676 farms in 1969 to 6,928 farms in 1978 (Orazem, 1981:5). Numerous operators, unable to produce enough volume to provide a livable net income, are forced to sell or find additional means of support. In 1978 almost 75 percent of all Kansas farm operators reported working 200 days or more off the farm as compared to 44 percent in 1964 (Census of Agriculture, 1978). Small farms and small enterprises are finding it increasingly difficult to compete with large farms (Orazem, 1981:6).

A large portion of Kansas agriculture still remains a family oriented enterprise as a vast majority of Kansas farms are individually or family owned businesses. In 1978 family owned farms accounted for almost 90 percent of the farms and used over 80 percent of the land (Orazem, 1981:4). The average age of Kansas farm operators was around 50 years in 1978, slightly younger than in previous years (Orazem, 1981:4).

A changing attitude among many Kansas farmers appears to be emerging as a result of tough economic conditions. Economic pressures are forcing the farmer to put more emphasis on short term considerations as opposed to long range goals. This would not seem unreasonable in a farm economy which sees hundreds of farming operations "fold up" every year. Unfortunately, this change in perspective poses potentially serious problems concerning the state's agricultural land resource base. "Push" factors may be pushing many small farmers to a point where only a small amount of "pull" is sufficient to remove the land from agriculture for urban uses. Thus, conversion of farmland to urban uses offers the farmer the opportunity to make a handsome profit as opposed to years of economic uncertainty.

Another serious problem arising from the shift in attitudes concerns the management of Kansas farmland. In order to decrease capital expenditures, conservation practices necessary for long term productivity are being ignored by many farmers (SCS, 1979:10). Practices such as crop rotation and diversified

cropping programs have been replaced by excessive applications of inorganic fertilizers and monoculture cropping practices. Miles of hedgerows, originally planted for conservation purposes, have been ripped out in order to maximize crop yields. Removal of hedgerows could result in serious problems such as increased wind erosion and loss of wildlife habitat.

It would be unfair to place the total blame on the Kansas farmer. To a large degree, he is a victim of difficult economic times. Traditionally, the Kansas farmer has had a sincere concern for the land and the family farm was considered a land legacy to be passed on from one generation to the next. Undoubtedly, some speculation existed, although most farmers probably intended to continue farming until retirement. Although many farmers today probably prefer to continue farming, economic pressures have promoted a different view toward the family farm. In the past, a genuine concern existed for being a good steward of the land and assuring its long term productivity through crop rotation and conservation practices. In recent years, interest has partially shifted from land to be conserved for the future to a consideration of land as a real estate investment whose value increases with inflation regardless of the effect to the land's productivity (Orazem, 1981:12).

It seems apparent, from an economic viewpoint, that protection of our prime farmland must include more than regulating the use of this land. It hardly seems fair that farmers, who are already struggling economically, should pay the total costs of preserving prime farmland by having economic options eliminated. Viable long term solutions must address the economic problems of the farm sector as urban dwellers must share the costs of protecting our cropland. It is the urban community that depends on the farmer for food, therefore efforts to protect the cropland base are everyone's responsibility.

Future Changes in Kansas Agriculture

Kansas farms will most likely continue to decrease in numbers and increase in size. Furthermore, farm machinery will probably increase in size as farms become more specialized and industrialized. It is estimated that with currently available technology Kansas could be farmed with 10,000 farms instead of 75,000 (Orazem, 1981:8). In 1978 7,000 farms produced nearly 70 percent of Kansas farm output (Orazem, 1981:8).

Another important characteristic of future Kansas agriculture may be a significant shift in the western part of the state from irrigated land to dryland farming practices. In the past, large amounts of underground water from the Ogallala Aquifer have been used to transfer a large amount of land on the High Plains from semi-arid agriculture to highly productive water-intensive agriculture. Large portions of Western Kansas have become highly productive agriculturally as a result of irrigation. However, with the enormous amounts of groundwater withdrawn from the aquifer over the past 20 years, serious shortages are developing. Much of the groundwater in underground aquifers has accumulated over thousands of years and recharge is extremely slow, an average of 3 inches per year (SCS, 1980:24). Ground water levels in some parts of Western Kansas are declining more than two feet per year (Buller, 1981:15). With the enormous amounts of groundwater being withdrawn for irrigation purposes, an estimated 21 billion gallons per day, serious overdrafts are occuring (SCS, 1980:26).

The declining water table could have a dramatic effect on irrigated agriculture in Western Kansas. Irrigated acreage in Western Kansas has already begun to decline after reaching its peak in 1977 of 2.2 million acres, representing 35 percent of the total crop acres harvested in this area (Buller, 1981:3). According to a recent study, irrigated acres harvested in 2020 is

expected to be 75 percent less (1.6 million acres) assuming present trends in water use (Buller, 1981:8). This decline in irrigation acreage will occur primarily because of high energy prices, and a dramatic decline in the water table (Buller, 1981:10).

Prime Farmland in Kansas

Kansas has a relatively large percentage of its nonfederal land in cropland. In 1977 28.8 million acres (55 percent) of the 51.7 million acres of nonfederal land was in cropland (Kansas SCS, 1979b:4). Approximately 68 percent of all cropland was prime farmland. Prime farmland has been defined as our nation's best farmland, which can produce high crop yields with the least damage to the soil (SCS, 1980:5). Kansas has an exceptionally large amount of prime farmland. In 1977 Kansas had 27.3 million acres of prime farmland (Kansas SCS, 1981). Only Texas has more acres of total prime farmland, although Kansas leads the nation in amount of prime farmland currently under cultivation with 19.5 million acres, accounting for 71 percent of the state's total prime farmland (Kansas SCS, 1979a). Approximately seven million acres, 26 percent, was in range and pasture and the remainder in forest and other lands (see Figure 3.1).

An alarming amount of the state's prime farmland is being converted on a regular basis to nonagricultural uses. Around 100 acres of prime farmland is being lost every day (Kansas SCS, 1981)! This loss amounts to over 36,000 acres (56 square mile) every year or an area the size of an average county every 13.5 years! From 1967 to 1977 over 656,000 acres of agricultural land were taken for nonagricultural uses, of which 47,000 acres were prime farmland. For all practical considerations, the conversion of this land is an irreversible process (Harris, 1980:144). In a 1982 address to the Congress, Governor Carlin recognized the loss of farmland in Kansas as a serious problem which must be addressed (Carlin, 1982).

Another serious problem concerning Kansas agriculture is the present condition of the state's cropland. According to the Kansas SCS office, only 54 percent of the state's cropland is adequately treated and 57 percent of the state's range and pastureland needs additional conservation treatment. It is estimated that 36 percent of the state's cropland loses over 5 tons of topsoil per acre annually, which is above the amount allowable to maintain long-term productivity (Kansas SCS, 1981). These soil losses total over 193 million tons of topsoil each year which is roughly equivalant to a loss of three inches of soil over the entire state every 100 years (Kansas SCS, 1979b). This loss of precious topsoil is a serious concern in light of the fact that topsoil formation is a natural process requiring hundreds of years. Another contributing factor to excessive soil losses is the fact that over half a million acres of Kansas cropland is on soils unsuitable for cultivation resulting in excessive soil erosion (Kansas SCS, 1979b). Not all of the additional potential cropland is acceptable for future production. Only 6.2 million acres of the state's noncropland have a high or medium potential for conversion to cropland in the future (Kansas SCS, 1979b). This figure represents a potential increase in cropland of about 30 percent. From a national perspective, this figure represents about 5 percent of the nation's high and medium potential cropland.

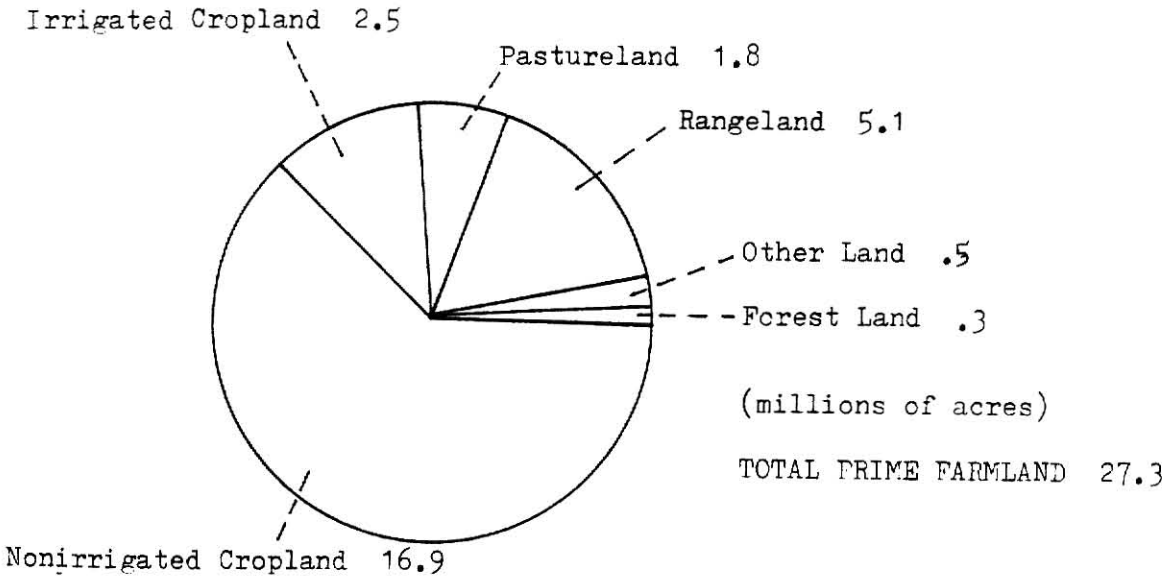


Figure 3.1

Prime Farmland in Kansas

Source: Soil Conservation Service, U.S. Department of Agriculture, 1977 Kansas Resource Inventory, (U.S. Government Printing Office, 1979).

Agricultural Demands on Prime Farmland

The increase in worldwide demands for agricultural commodities will undoubtedly affect Kansas agriculture. Kansas plays a major role in the nation's agricultural export market. In 1980, Kansas ranked fifth among the states in export of agricultural commodities and first in wheat and wheat products export shares (KSBA, 1980:6). As demands for the nation's agricultural exports increase, Kansas will be expected to play a major role in meeting these demands. A recent study estimates that over 2 million acres of additional cropland will be need in Kansas by 2020 in order to meet future export demands (Buller, 1981:32). However, this study assumes an 80 percent increase

in crop yields by 2020 which may prove to be overly optimistic as energy costs increase and technological questions influencing crop yields remain unanswered. Furthermore, reduced amounts of irrigated land will demand that more nonirrigated land be brought into production. As nonagricultural uses consume large amounts of existing and potential prime cropland in the eastern two-thirds of the state, inferior soils will be cultivated in order to increase overall production. A large amount of the increase in dryland farming will come from land marginal in terms of soil productivity, soil profile, and topography (Buller, 1981:32).

Geographically, the eastern two-thirds of Kansas has rainfall amounts averaging well over 25 inches per year (KSBA, 1980:124). In most areas, this amount of rainfall permits continuous cropping practices. The western third of the state received an average of around 20 inches per year requiring a summer fallow cropping program, unless supplemental irrigation is used. In a summer fallow program, each acre harvested requires an additional acre being fallowed for the following year's crop. In this way sufficient moisture is stored in the soil to produce an acceptable yield. This program requires twice the amount of cropland as continuous cropping, in order to harvest comparable acreage. High water use crops, such as corn, would generally be unprofitable in Western Kansas without irrigation. Although the state Board of Agriculture reports a relatively even distribution of the total acres harvested in 1980 throughout the state, declining water levels in Western Kansas will eventually shift increases in production to the central and eastern regions. Without irrigation, the western portion of the state is only suitable to more semi-arid region crops, such as wheat. As irrigated acreages decline, production demands for crops, particularly for high water use crops, will likely shift to the eastern two-thirds of the state where soils and climate are favorable for continuous cropping of most agronomic crops.

Nonagricultural Demands on Prime Farmland

Kansas population continues to grow every decade and according to 1980 census figures the growth rate is increasing. During the 1960's the growth rate of the population was 3.2 percent compared with a 5.1 percent growth rate during the 1970's (U.S. Census, 1980). In 1980, the state's population was estimated at 2,363,679 persons, an increase of approximately 114,608 persons from the 1970 population (U.S. Census, 1980).

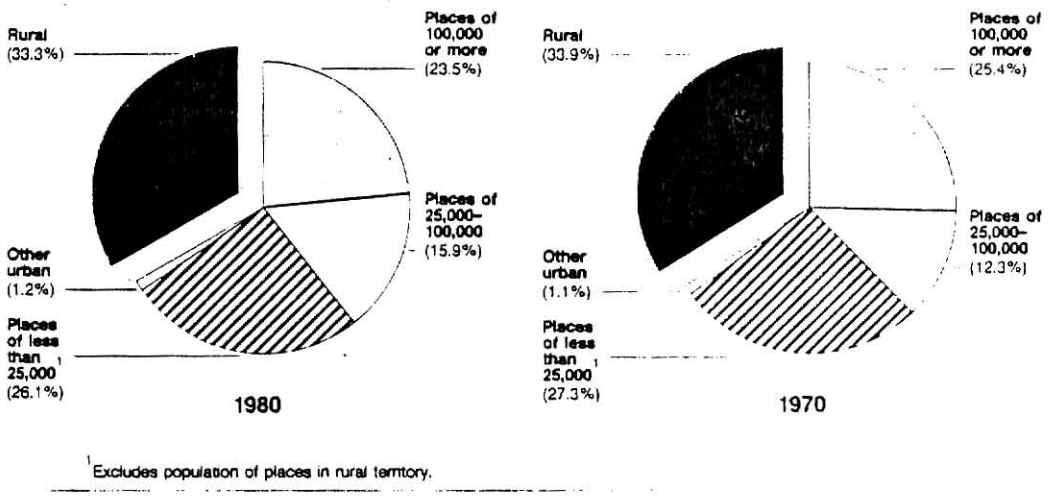
The anticipated population of Kansas by 2000 is subject to some controversy. In a 1974 Kansas 2000 study, the Kansas population was projected to show a net increase of only .8 percent by the year 2000 (KDED, 1974:11). However, these projections were based on an existing trend of rural to urban migration with Kansas experienceing net out-migration since 1910 (Carlin, 1980:75). However, as a result of a nation-wide migration from urban to more rural areas from 1974-1978, the entire state experienced net in-migration for the first time in over 60 years. Between 1970 and 1974, out-migration for the state was 34,300, whereas between 1974 and 1978 the state received in-migration of 28,100 persons (Carlin, 1980:75). In the 1975 Water Assessment Study, the Kansas Resources Board (KWRB) projected the Kansas population to reach over 2.9 million by 2000 (KWRB, 1975:11). This figure represents an average of 274,160 additional persons each decade from 1980 to 2000, over twice the number added during the previous decade. Assuming a growth rate similar to the last decade, Kansas population would reach about 2.6 million by 2000.

An important characteristic of the population is the urban-rural composition. According to the 1980 census, 33.3 percent of Kansas residents lived in rural areas and 66.7 in urban areas in 1980 (see Figure 3.2). The number of people residing in urban areas of 100,000 or more decreased by 2.6 percent from 570,000 in 1970 to 556,000 in 1980. The largest growth occurred in

urban areas of between 25,000 and 100,000. Population outside of Standard Metropolitan Statistical Areas (SMSAs) increased 3.4 percent while population inside SMSAs increased 7.1 percent (see Figure 3.3). However, all growth within SMSAs occurred outside central cities which increased by 12.6 percent while population within central cities decreased by .1 percent (Figure 3.3). Thus, all growth between 1970 and 1980 occurred outside of central cities in more suburban areas and a majority of the population, 53.2 percent, resided outside of SMSAs (U.S. Census, 1980).

Geographic distribution of the state's population in 1980 indicates increasing development pressure on agricultural land, particularly in the eastern portion. In 1980, the western portion of Kansas contained only 181,056 persons, 7.7 percent of the total population (U.S. Census, 1980). Growth rates were considerably slower in this region than the remainder of the state. During the 70's the western region grew 3.3 percent while the rest of the state increased by 5.2 percent. According to 1980 census figures, over 90 percent of the Kansas population is located in the eastern two-thirds of the state. The percentage of the population in the western region is not likely to increase in the future and may actually decline with a shift from irrigated to dryland farming (KWRB, 1975:6). Although densities are already much higher in the eastern half of the state, it is likely that densities in eastern counties will continue to increase as the eastern half of the state can be expected to absorb the vast majority of new residents. With most of the prime farmland located in the eastern two-thirds of the state, development pressures from expanding populations can be expected to increase significantly, resulting in an increasing amount of prime farmland converted to nonagricultural uses unless serious efforts are made to protect these lands.

A. URBAN AND RURAL RESIDENCE



[1] Excludes population of places in rural territory.

B. INSIDE AND OUTSIDE STANDARD METROPOLITAN STATISTICAL AREAS (SMSA'S)

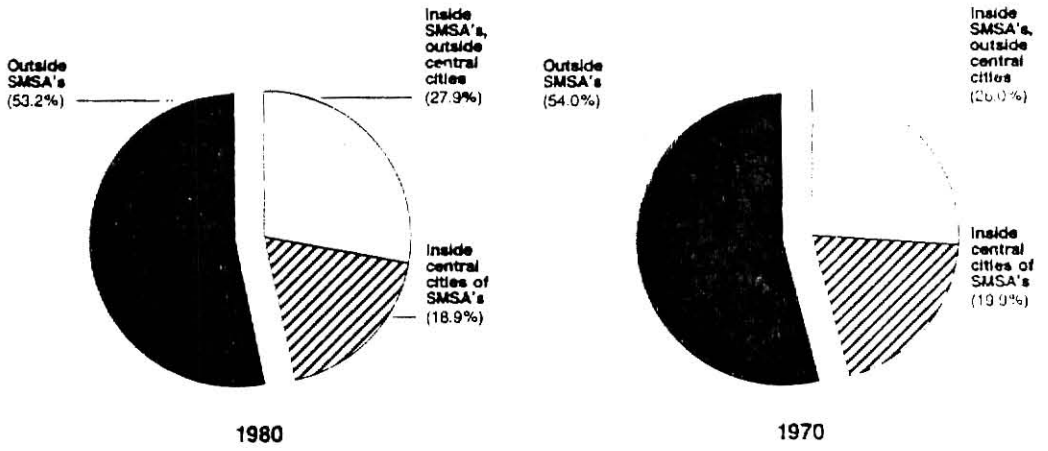


Figure 3.2

Urban-Rural Distribution
of Kansas Residents

Source: U.S. Department of Commerce, Bureau of the Census, 1980.

As the population expands, increases in the number of housing units can also be expected. During the last decade, 165,000 new housing units were contructed in Kansas (U.S. Census, 1980). With all of the additional growth in population occurring outside of central cities, the large majority of new housing units will most likely be built in suburban and more rural areas. Along with housing units comes the need for goods and services and public facilities, such as schools and parks. In order to provide employment for a growing number of people, new business and industry will be needed. According to a recent study, Kansas ranks fourth among the 48 states in terms of a favorable "business climate." Although factors used in assessing this "climate" were somewhat arbitrary, "the reaction of Kansas business, government and economic development leaders couldn't be happier (Wichita Eagle-Beacon, 1982)." The Kansas Department of Economic Development (KDED) actively promotes the economic development of the state through the promotion and development of business, commerce, and industry (ACOE, 1972:2). According to the KDED, 108 new manufacturing facilities began production in the state in 1981 and an additional 71 firms already operating in the state expanded their facilities (Wichita Eagle-Beacon, 1982).

Although commercial and industrial development can be beneficial in terms of employment and the economy, increased threats to valuable natural resources, including prime farmland, must be recognized. Efforts must be made to conserve and protect the state's land resource base, particularly prime farmland, before urbanization and economic development permanently remove these lands from agricultural use. It is apparent that both agricultural and nonagricultural demands on Kansas farmland will continue to increase in the future, perhaps at an even faster rate. Increasing demands and decreasing supply would indicate that at some point in the future, a shortage of prime farmland is inevitable.

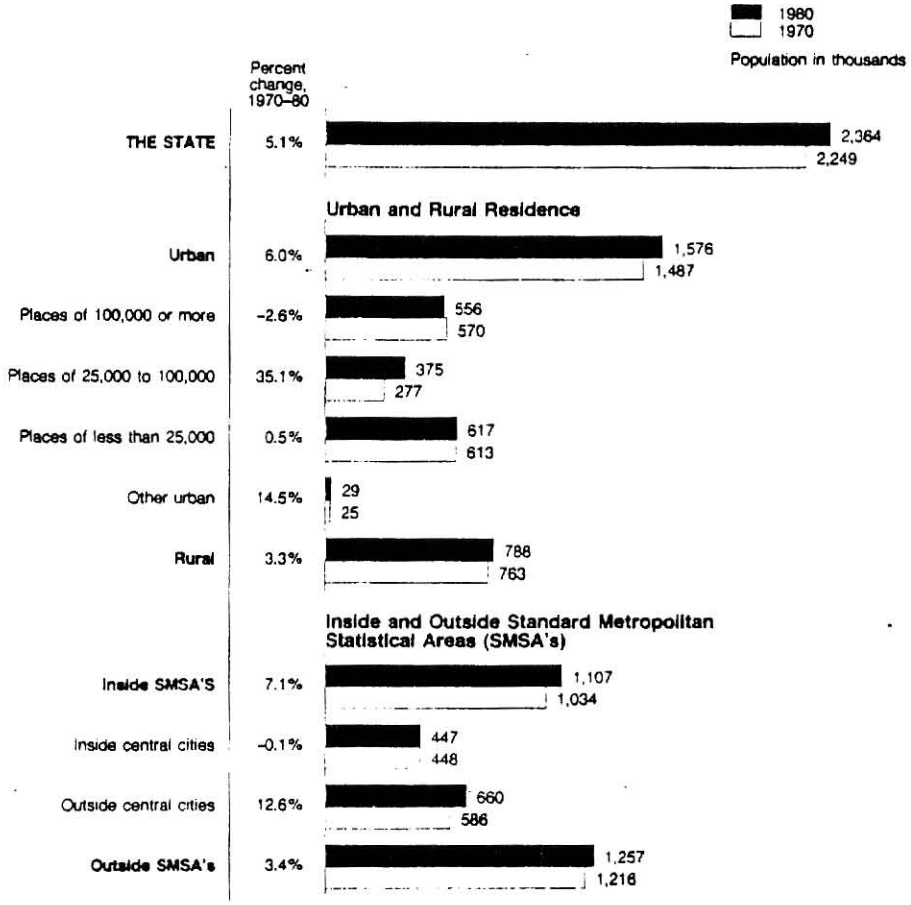


Figure 3.3

Kansas Population and Percent Change
by Type of Residence: 1980 and 1970

Source: U.S. Department of Commerce, Bureau of the Census, 1980.

State Efforts in Farmland Protection

In Kansas, efforts made at the state level to protect prime farmland remain minimal to say the least. According to a Kansas Congressman "the fight is all on the local level (Vanabber, 1975:28)." In 1976 a state-wide referendum was passed by Kansas voters approving a constitutional amendment authorizing the state legislature to implement a process of assessing farmland on the basis of its use value as opposed to market value. Six years later, agricultural land is still taxed on a market value assessment as no method for implementation of the 1976 amendment has been approved.

According to KSU extension economist, Barry Flinchbaugh, a reappraisal bill has recently been introduced in the legislature which will provide as an option, use-value assessment, but as of yet has not been approved. According to the NALS, Kansas is one of only two remaining states in this country with no form of tax incentives for farmland preservation. Other than the possibility of future tax reform concerning agricultural land, no current legislation exists in Kansas where protection of farmland from nonagricultural uses is a primary concern. Although a number of agencies have direct influence on the state's natural resources, no universal policy exists concerning treatment of prime farmland in planning land uses. Examples of various state and local programs for farmland protection which have been implemented in other states will be reviewed in Chapter Five.

Local Perspectives

In local communities, the primary means of guiding urban growth and directing the use of land resources is through a public planning process commonly referred to as land use planning. Land use planning is not new, probably originating in ancient times, thousands of years ago. Although definitions may vary concerning land use planning, fundamental characteristics

can be identified. Land use planning in local communities that serves to regulate urban expansion and rural development is primarily a function of local governments such as municipal or county governments. It is this type of governmental planning of public and private land that most directly influences the problem of farmland conversion to nonfarm uses. Therefore, it is within this process that efforts to identify and preserve prime farmland should be incorporated.

The Comprehensive Plan and Land Use Planning

The comprehensive plan for a community serves to provide a basis on which decisions concerning community growth and development can be made. The comprehensive plan generally includes at least (1) a statement of general goals and specific objectives of the several functional elements composing the plan and (2) a statement (usually in text and maps) of development and redevelopment proposals for the ensueing twenty to twenty-five years (Chapin, 1978:63). The land use plan serves as the land use element of a comprehensive plan. Other elements of the comprehensive plan may include transportation, housing, community facilities, and implementation (Figure 3.4). Daniel Mandelker (1978:30) explains the importance of comprehensive planning to the land use planning process,

> At the local level...comprehensive planning provides a policy basis for the land use control process to help ensure that the process has internal consistency. In the absence of a local comprehensive plan, zoning and rezoning actions by local governments may be ad hoc and arbitrary.

Often times, however, the land use sections of county plans are very weak as county land use planning is more policy-oriented and conceptual in nature than city plans making it difficult for county planning boards in Kansas to utilize their plans effectively (Foster, 1975:36).

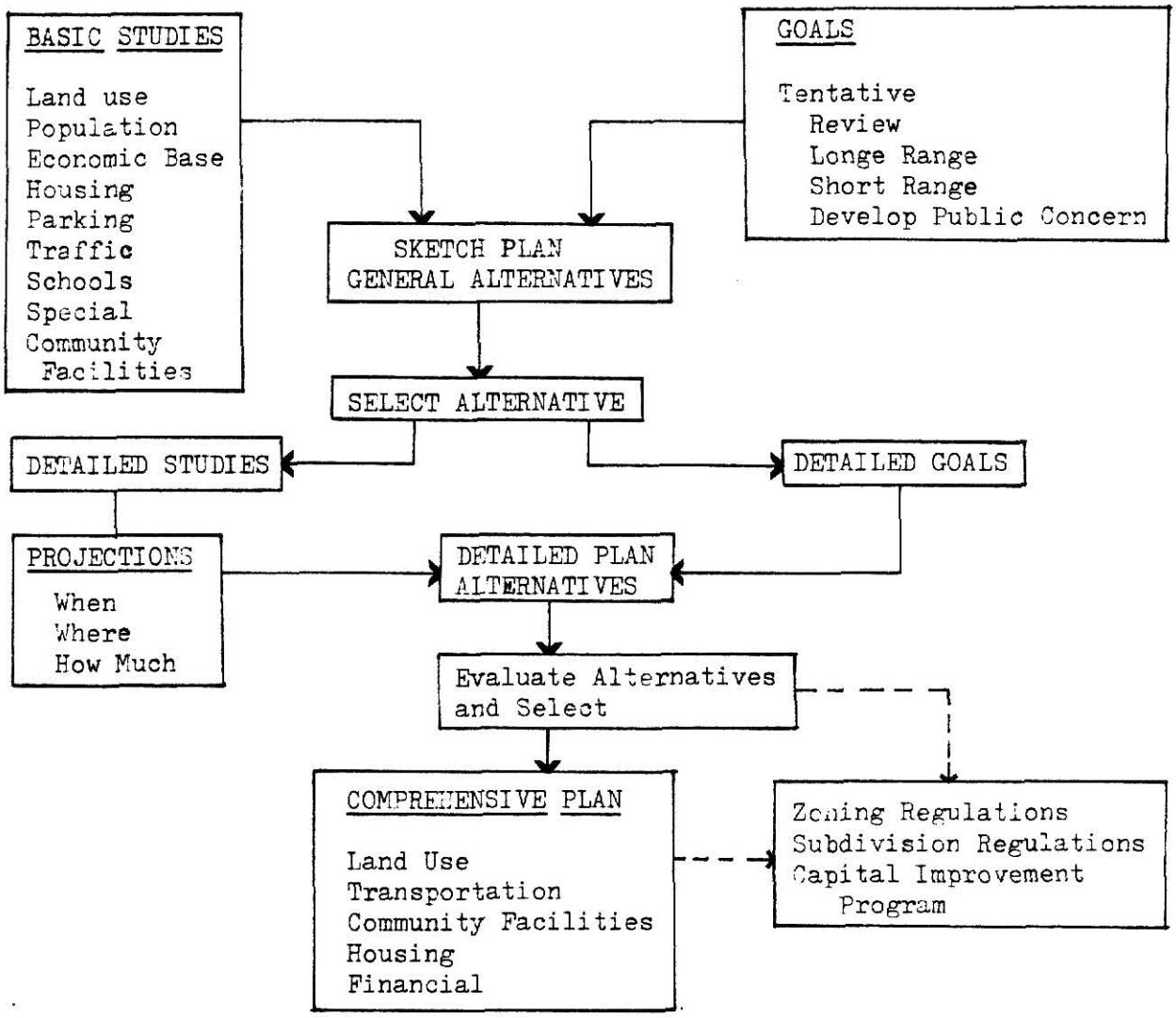


Figure 3.4

Comprehensive Planning Process

Source: Department of Regional and Community Planning, Kansas State Univerity.

The Land Use Planning Process

The planning process can be summarized in six basic steps (Roberts, 1979:49).

1. Formulation of goals and objectives

   This includes community needs and desires and should actively involve local citizens and community groups.

2. Study, inventory and analysis

   This can include a number of studies assessing the social, political, economic and physical aspects of the community. Typical studies include population, transportation, natural resources and economic base.

3. Development and evaluation of alternatives

   Several alternatives are generated and evaluated in terms of stated goals and objectives.

4. Selection or adoption of a plan or course of action

   This includes preparation of a final plan as approved by the various governmental bodies and by local citizen groups.

5. Implementation

   Development of the means by which the final land use plan is to be implemented. Includes regulatory mechanisms such as zoning ordinances, subdivision controls and official maps.

6. Feedback: Monitoring of Results

   Evaluation of the plan in action including alternation of the plan as necessary to achieve the desired goals and objectives.

An example of a land use planning process is shown in Figure 3.5. Notice that the inventory and analysis step may precede the formulation of goals and objectives in order to provide a factual basis for goal information.

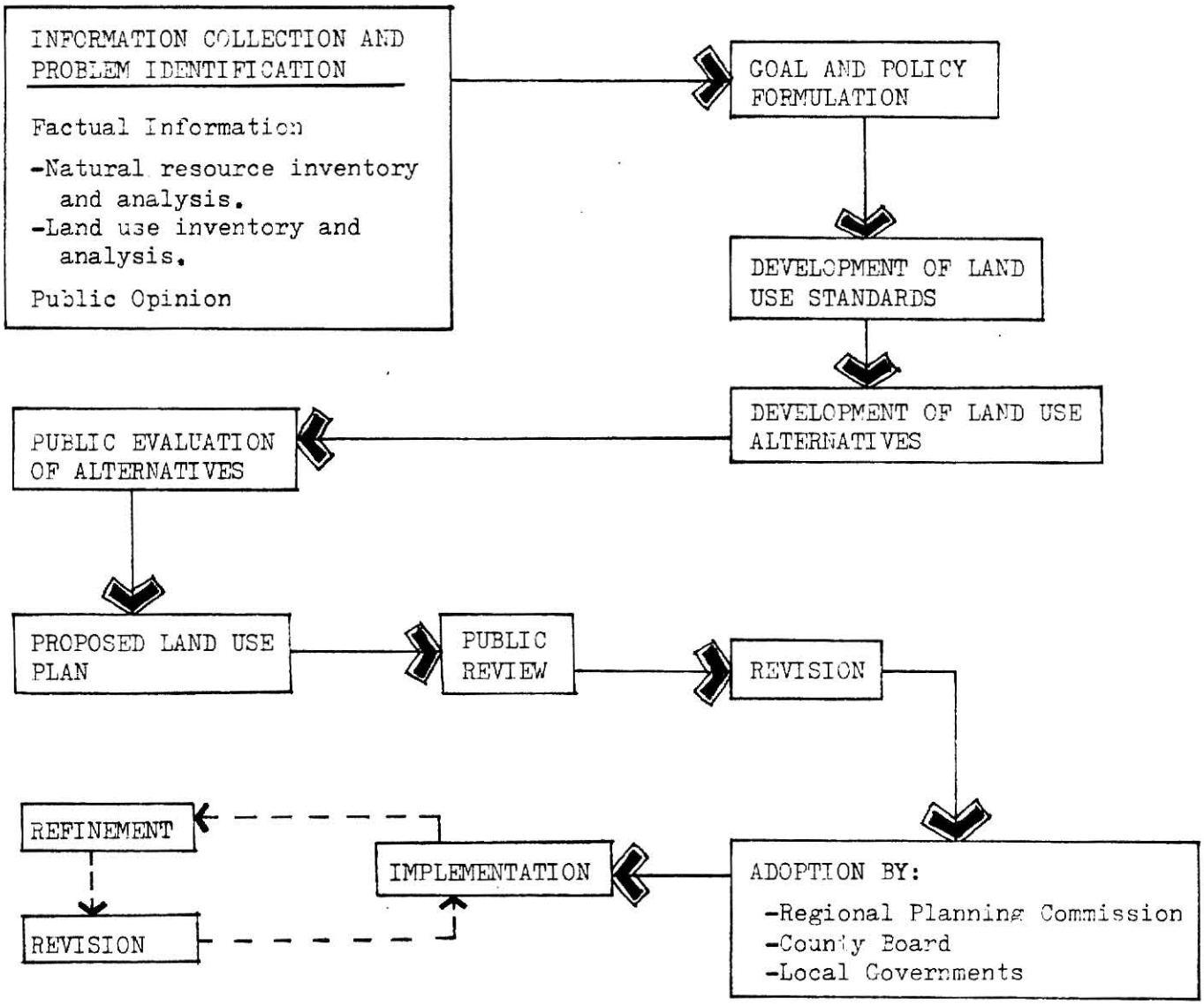


Figure 3.5

Land Use Planning Process

Source: Dane County Land Use Plan, Dane County Wisconsin, 1977.

Agricultural Land Resources and Land Use Planning

Traditionally, land use planning in this country has been associated with urban centers. Because of the awareness in recent years of the fixed and limited nature of many natural resources, including agricultural land, land use planning for rural areas has received increased attention. However, the urban origins of land use planning in this country pose serious problems in the treatment of land resources. According to Chapin (1978:40), urban land use planning, in its purest sense, is man centered and nature exploiting. At urban scales land is valued more for its locational characteristics than its inherent physical qualities. However, at territorial scales involving large land areas, land is valued as a resource and "land use" means "resource use" (Chapin, 1978:52). Therefore, if rural land use planning is merely an extension of urban land use planning, resource exploitation, as opposed to conservation, is inherent within the planning process.

An attitude of resource exploitation can be seen in many local zoning ordinances. Agricultural land is often treated as a holding zone for future urban development and is often viewed as "raw" land waiting for "better" use. This "raw" land is readily zoned for various urban uses as development pressures occur. This treatment of agricultural land can be partially explained by the fact that in many rural farm communities a seemingly endless amount of good agricultural land exists. In fact, a town may be literally surrounded by good agricultural land. Thus, conservation of such an abundant resource seems particularly unnecessary. James Ridenour (1975:247), of the Council of State Governments in Lexington, Kentucky, explains the problem this way,

> People are not convinced that we have a problem! When you fly or drive over this country it looks awfully big. It is hard to imagine that a zoning change here and there on an acre or two can have much of an effect.....

However, when viewed at national and international scales, the cumulative loss of prime farmland is indeed significant.

Another serious problem exists with the traditional concept of what constitutes good land use planning. Traditionally, planning developed in a time when resources were abundant and the need for serious conservation was often ignored. Planning served to assess the desires of a community in which the supply of natural resources appeared infinite. Little concern was given to the need for conserving land resources for future generations. William Reilly (1978:80), former president of the Conservation Foundation and past senior staff member of CEQ, describes the traditional concept held by many land use planners that "the essence of sound planning is to assess the level of facilities and services people want before they will need it and then provide it in time to meet demand" as a myth. Reilly suggests that this philosophy is a carryover from a time when resources appeared unlimited. Obviously this time has passed and land use planners must realize and accept the fact that we must move away from demand-oriented to resource-oriented planning.

As mentioned earlier, city land use planning provides an inherently difficult situation in which to perform resource-oriented planning. Therefore, county-wide planning and zoning could provide a more efficient and effective use of land resources. Unfortunately, large amounts of agricultural land in Kansas are still regulated by municipal planning departments. This is due in part to the absence of county-wide planning and zoning throughout much of the state. In 1977, only 27 of a total 105 counties in Kansas had county-wide zoning (McKenzie, 1982). In the absence of county zoning, cities are entitled to zone up to three miles beyond city limits (KDED, 1978:50). Even where county planning does exist, implementation of county plans is often difficult. This is due primarily to the fact that county plans are often

policy-oriented, making them difficult to uphold. County planning commissions are often supplied with only vague guidelines and general information on which to make planning decisions resulting in a substantial amount of arbitration and flexibility in making land use decisions. Furthermore, planning commissions and local governing bodies are often free to employ a "good ole boy" approach to rezoning requests. In other words, it's not what you know but who you know. This characteristic of planning commissions in rural areas can present serious problems concerning the implementation of county-wide land use plans (Foster, 1975:31). Furthermore, many rural communities are seriously concerned about future growth and often discourage rigidly enforced policies that could inhibit future economic development.

Another problem commonly encountered in rural communities concerning agricultural land is that, often times, the land with the most desirable physical qualities for urban development is also prime farmland. This is due in part to the fact that prime agricultural soils often contain desirable physical properties for construction purposes. In addition, prime farmland is typically found on slopes that are also desirable for most urban developments. Thus a serious conflict exists between suitability for urban development and agricultural uses. Unless conscious efforts are made to preserve prime farmland for agricultural purposes, this land is often first to be developed. In recent years various resource analysis techniques have been utilized to identify lands best suited, in terms of inherent physical qualities, for particular types of urban developments. However, care must be taken when using resource analysis techniques in the land use planning process. If agricultural uses are not included in the analysis process, conversion of prime farmland may actually be accelerated. In many cases, this conversion of prime farmland may occur virtually unnoticed if recognition of agricultural

land resources is not a primary element within the process. Thus a wholistic approach to land use planning is essential in order to protect agricultural land resources in local communities.

Ecological Planning

In recent years the term "ecological planning" has become popular among various professionals involved in the area of land use planning. The ecological planning concept has its roots in the ideas put forth by such individuals as Aldo Leopold, a noted conservationsist, who emphasized the importance of a "land ethic." Leopold, along with other concerned ecologists, emphasized the concept that land is an ecological community in which man is simply a member rather than ruler. Accepting this idea of land as a community rather than a mere commodity, the inherent physical characteristics of the landscape begin to play an increasingly important role in land use planning.

An ecological planning process may be defined as primarily a method of studying the biophysical and socio-cultural systems of a region to reveal where a specific land use may be best practiced (Steiner, 1981:496). Ian McHarg, a noted ecological planner and landscape arichitect, in his book Design with Nature, stresses the importance of understanding the man-nature relationship in making land use decisions. McHarg's ecological planning process seeks to identify land areas for a specific land use which will result in the least social costs identified through a process of inventorying and analyzing important natural and cultural components of the landscape and determining intrinsic suitabilities for a particular use or uses. Other factors that must be considered before final land use decisions are made include legal, social, economic and political factors as well as needs and desires of the users. A flow chart showing McHarg's Ecological Planning Process is shown in Figure 3.6. McHarg suggests that the pattern of land uses assigned to the landscape could be controlled to a large degree by the characteristics and properties of the landscape.

The Ecological Planning Process can be viewed as a new methodology for making land uses decisions. However, it would seem more accurate to describe this process as a reorientation of more traditional land use planning processes. Literature concerning this subject can be confusing with regard to what is "ecological planning" as opposed to "land use planning." Ecological planning is a type of land use planning which strongly emphasizes ecological considerations and constraints within the process. These ecological considerations should be part of a comprehensive approach to land use planning. Therefore, a sound ecological planning process should contain all of the elements characteristic of a sound land use planning process as described earlier in this chapter. McHarg (1979:937) explains it this way:

> The method of landscape analysis is one part of a more comprehensive planning process which includes the social, legal and economic factors which must be molded into a comprehensive plan that responds to the needs, desires, and perceptions of the people for whom the planning is being done.

As urbanization expands into the countryside, unnecessary conversion of prime farmland will result unless a conscious effort is made to incorporate agricultural suitability considerations into the land use planning process. At the local level, ecological planning concepts can provide valuable information to be used in making land use decisions. Inherent physical characteristics of the landscape can be analyzed in terms of suitability for particular uses including agricultural suitability. In this way, lands best suited for agriculture based on physical properties of the land can be identified. Obviously agricultural suitability of a particular piece of land encompasses more than evaluating inherent physical properties of the landscape. Numerous other planning factors such as accessibility, parcel size, relative distance from urban areas and adjacent land uses must be evaluated before final land use decisions can be made. However, a land resource inventory and analysis should constitute an essential primary element of the planning process.

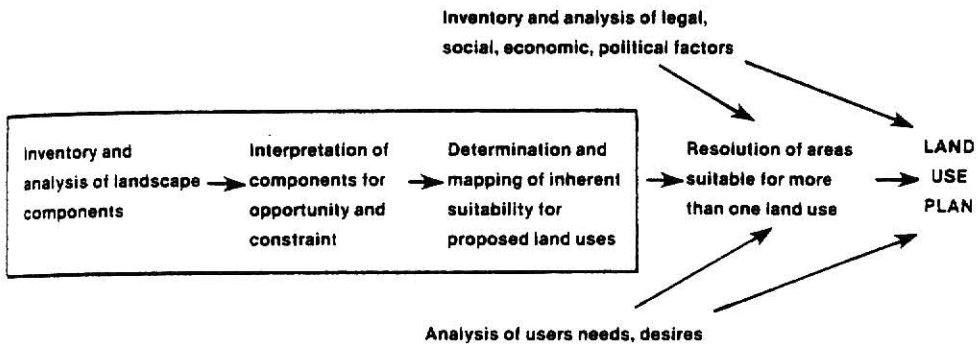


Figure 3.6

Ecological Planning Process

Source: Ian McHarg, "A Case Study in Ecological Planning: The Woodlands, Texas" in Planning the Uses and Management of Land, M. T. Beatty, G. W. Peterson, and L. D. Swindale, eds., (Madison: Soil Science Society of America, 1978), p. 937.

Resource Inventory and Analysis for Local Communities

Recognizing that a land resource inventory and analysis should be an essential part of a sound land use planning process, it is important that fundamental characteristics of the resource inventory and analysis process be examined. Although a number of techniques concerning resource inventory and analysis exist, general characteristics can be identified. The basic process of resource inventory and analysis can be described in two general phases (see Figure 3.7):

1) Inventory and Analysis of Landscape Components

2) Suitability Analysis for Specific Land Uses

Phase One: Inventory and Analysis of Landscape Components

This step involves the collection of data concerning physical characteristics of the planning area. Physical characteristics include the natural, cultural and visual components of the landscape. Information concerning landscape components can be acquired from a number of sources including soil surveys, USGS topographic maps, aerial photographs, governmental agencies, college or univerity libraries, and private companies and consulting firms. Efforts should be made to utilize readily available local sources of information. Government agencies such as the Soil Conservation Service (SCS), Agricultural Stabilization and Conservation Service (ASCS) and State Fish & Game offices can provide valuable assistance.

Once the data has been gathered, information concerning individual landscape components is summarized on individual inventory maps. The information to be transferred to individual maps should be presented in a format which will be useful in analyzing suitabilties for various land uses. Therefore, inventory categories should be selected with prior knowledge of the land uses being considered. Relationships between the various landscape components should be identified and evaluated. A matrix format can provide a useful means of identifying relationships between components and assessing impacts of proposed actions (Steiner, 1981:500).

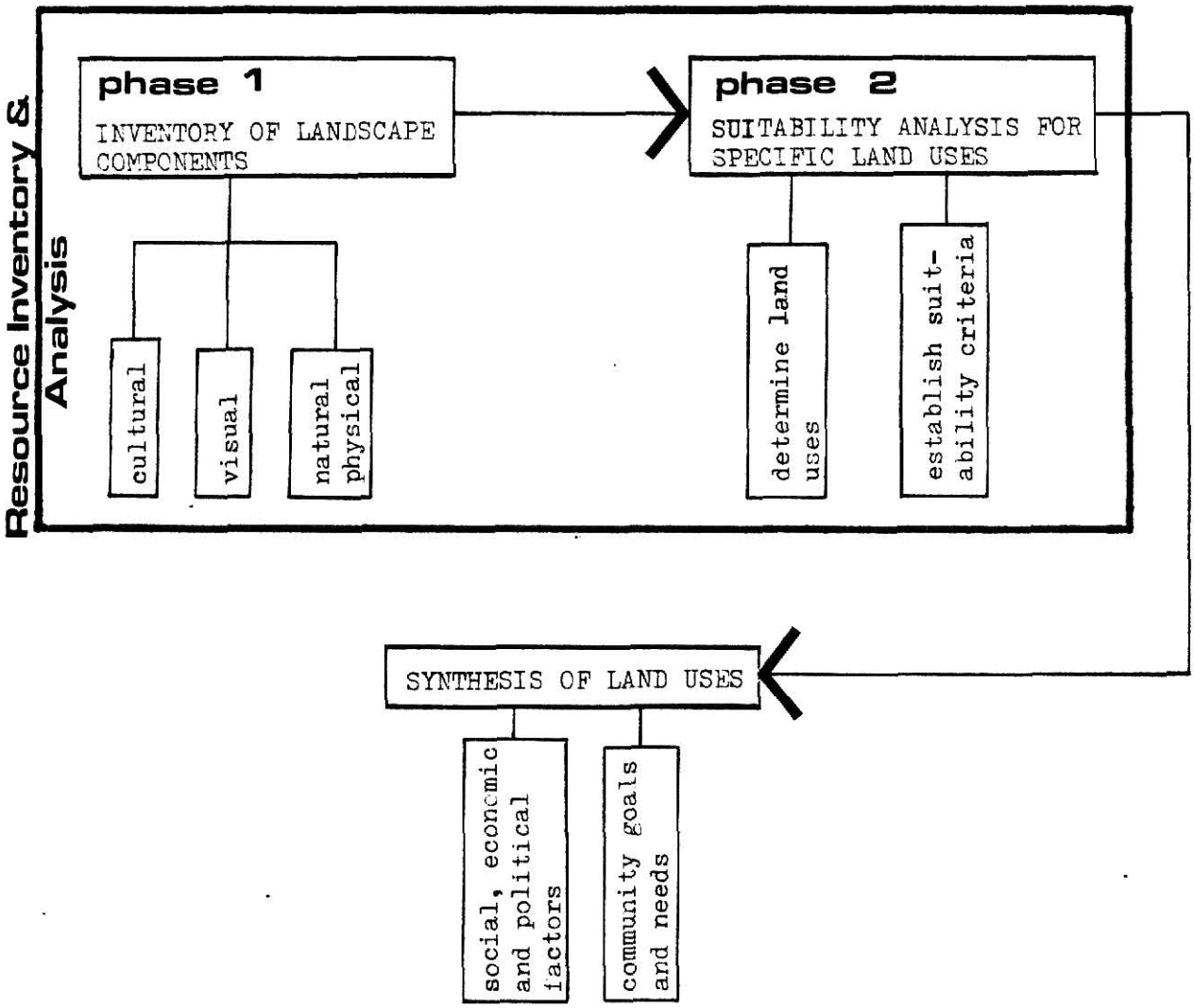


Figure 3.7

Resource Inventory and Analysis Process

Phase Two: Suitability Analysis for Specific Land Uses

For each landscape component, individual suitability maps are produced for each particular land use being considered. Suitability of a particular component should be evaluated on a set of well-defined criteria. Suitability categories can then be mapped using graphic or numerical techniques (Hopkins, 1977: 400). After the individual suitability maps are generated, a composite suitability map for each land use can be developed using various overlay techniques. Although computer mapping techniques are becoming widely used, hand-drawn overlays may provide a more practical means of developing suitability maps for rural communities. Hopkins (1977) provides a comparative evaluation of hand drawn and computer generated overlay techniques.

Once composite suitability maps are generated they can provide valuable information concerning physical suitabilities of the landscape for various land use activities and incoroporated with political, social and economic information into the land use planning process. It should be emphasized that in order for resource inventory and analysis techniques to be useful in protecting prime farmland, agriculture must be considered as a land use within the process. In this way prime farmland can be identified and through a system of prioritizing land uses, conflicts between agriculture and urban land uses can be resolved. Chapter Four provides an example of a resource inventory and analysis process and its application to county land use planning.

CHAPTER FOUR

Case Study: A Resource Inventory and Analysis in Harvey County, Kansas

Introduction

Harvey County is located in South Central Kansas with a total land area of about 345,360 acres (see Figure 4.1). Most of the county's land is fertile, productive farmland with over 75 percent of the total land area considered as prime farmland by the Soil Conservation Service. Like many other Kansas counties, Harvey County has experienced a substantial increase in population during the 1970's. Population increased from 27,236 in 1970 to 30,531 in 1980 (U.S. Census Bureau, 1980). These figures represent an increased rate of growth, from 5.3 percent during the 1960's to 12.1 percent in the 1970's.

As a result of population growth, density in Harvey County has also increased to over 56 persons per square mile. This figure ranks Harvey County sixth among Kansas counties, excluding Standard Metropolitan Statistical Areas (SMSAs). As the population density increases, rural agricultural land is continually converted to nonagricultural uses. From 1967 to 1977, rural land conversion to urban and other nonfarm uses totaled nearly 4,000 acres in Harvey County (SCS, 1977:26). From 1975 to 1980, over 3,600 acres were rezoned from an agricultural classification to a residential classification and another 80 acres of agricultural land were rezoned for commercial and industrial use. Furthermore, an additional 1,088 acres of agricultural land were rezoned to permit higher densities (Harvey Co. Planning Dept., 1982).

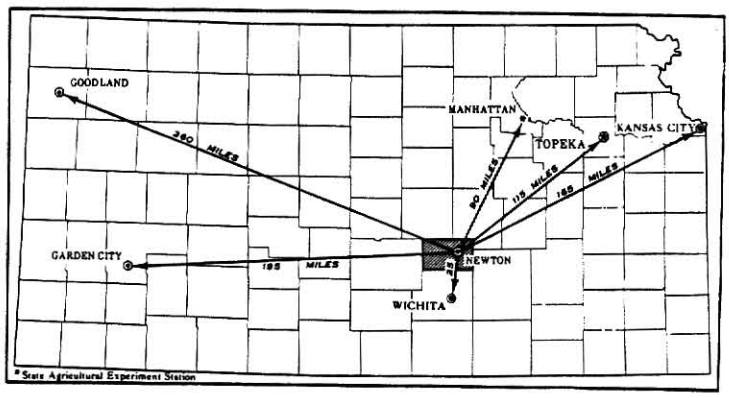


Figure 4.1

Location Map of Harvey County

Source: Soil Conservation Service, Soil Survey of Harvey County, Kansas, 1974, p. 1.

Purpose of the Study

The study was initially undertaken as a pilot study to provide base information for use in an ongoing process of developing a revised comprehensive land use plan for Harvey County. The case study attempted to utilize a recognized resource inventory and analysis process introduced by Ian McHarg (McHarg, 1969).

The primary purpose of the study was to utilize a resource inventory and analysis process to obtain important base information concerning physical characteristics of a particular planning area for use in the comprehensive land use planning process. This information was then analyzed in terms of suitability for various land uses. An important element of the study was

to include agricultural suitability in the analysis process in order to identify conflict areas between agricultural and potential nonagricultural land uses that could result in the loss of prime farmland.

The study area chosen was a 20 square mile site located in eastern Harvey County (Figure 4.2). Included in the study area is East Lake Park, established a few years ago with the development of the East Lake Reservoir. The remaining area is predominantly agricultural land including cropland and rangeland. However, according to county planner, Jeff Beach, a number of rezoning requests to permit additional residential developments had been received by the Planning and Zoning Department and several had been approved by the Planning Commission in past years.

Process Description

The resource inventory and analysis process utilized in the East Lake study was primarily an adaptation of the environmental analysis process outlined by Ian McHarg (1979:935). A diagram of the process is shown in Figure 4.3. A user survey was included in order to provide additional information concerning user attitudes on various land use related issues. The base map used in the study was developed using 7.5 minute USGS maps and transposing this information onto mylar sheets. Although this was performed manually in this particular study, photographic techniques are readily available. The USGS 7.5 minute topographic maps provide excellent base information and are at a scale that allows sufficient detail for most land use planning studies.

User Survey

One of the first tasks which was undertaken was to develop and distribute a survey designed to assess the attitudes of property owners and park users concerning various land use related issues in the study area. A survey was

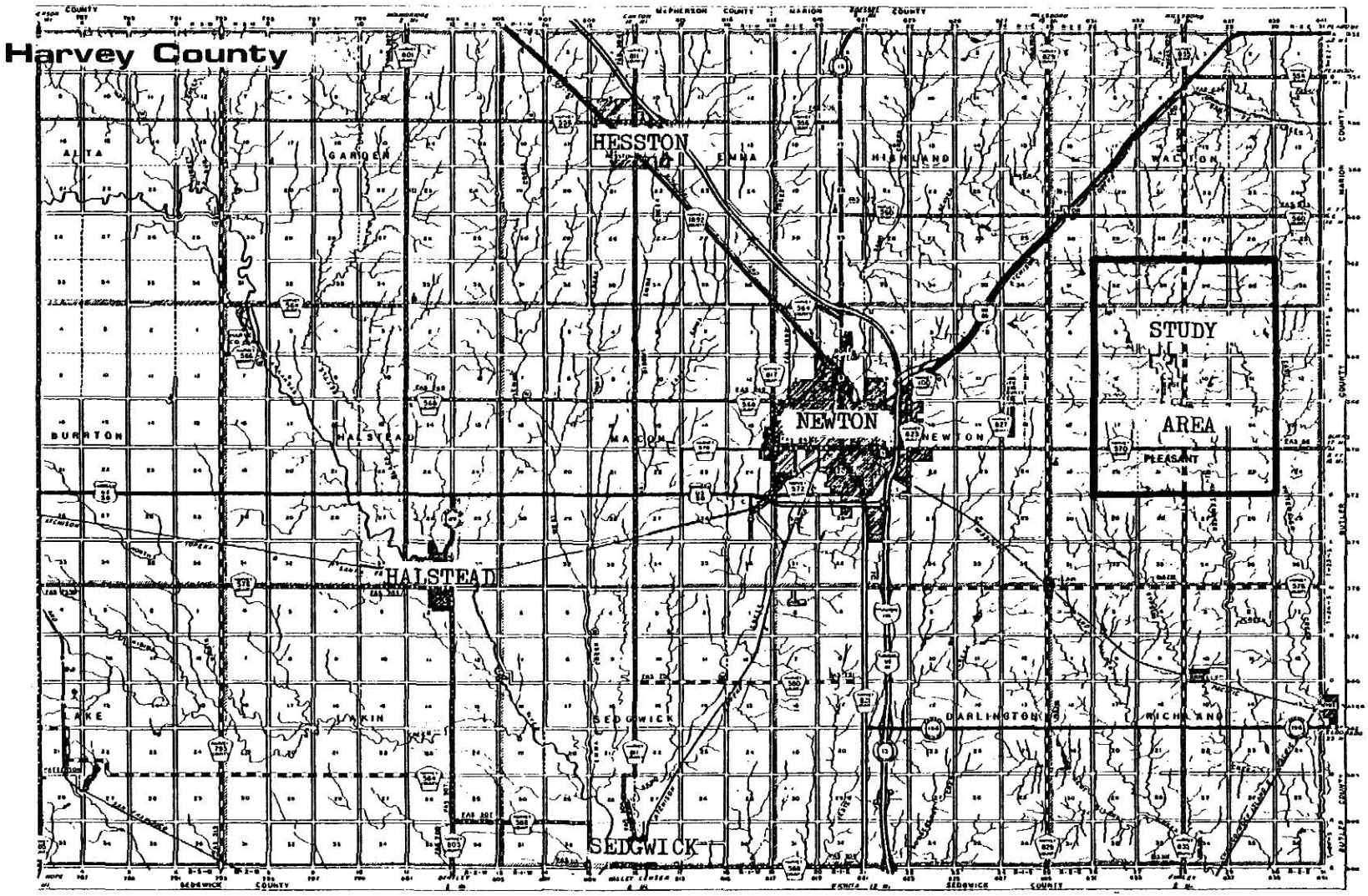


Figure 4.2

East Lake Study Area

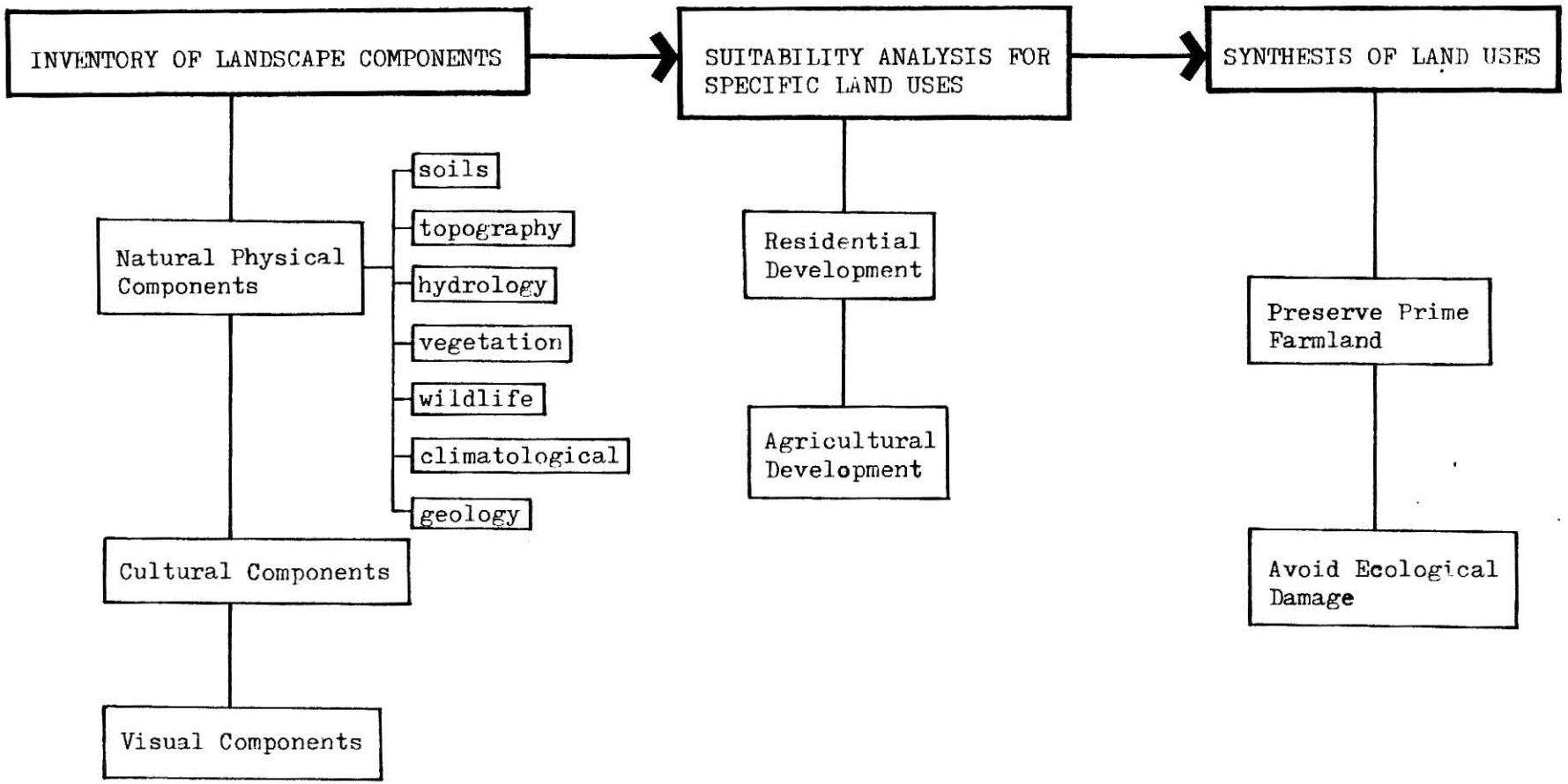


Figure 4.3

East Lake Inventory and Analysis Process

distributed to all property owners within the study area and results were tabulated using a standard computer program (Appendix I). The survey provided useful information and showed a strong desire by property owners to preserve prime agricultural land within the study area. Furthermore, the majority of those surveyed opposed allowing residential or commercial developments within the study area.

Information generated by the survey was utilized by the Harvey County Planning Department in the development process for revising the county's comprehensive land use plan and by the County Parks Department for assessing park improvement needs and developing management policies.

Inventory of Landscape Components

The first phase in the resource inventory and analysis process is the determination and inventory of landscape components. Landscape components can be classified into two general groups; 1) Natural physical components, and 2) Cultural/visual components.

Natural Physical Components

The following natural physical components were indentified and inventoried:

1. soils
2. topography
3. hydrology
4. vegetation
5. wildlife
6. climate

Soils. Soils are a primary consideration in determining the suitability of an area for a particular land use. Soil types can vary considerably throughout a study area and each soil type has unique physical properties that will determine the suitability of that soil for a specific use. Soil characteristics such as infiltration rate, bearing capacity, shrink-swell potential, fertility, texture, permeability, erosion potential, plasticity, liquid limit, structure and depth can be important considerations depending on the type of land uses being considered. Associated geologic information should also be obtained in order to identify parent material characteristics and the location of unstable geologic formations.

Soils and geologic inventory elements included soil associations, soil series, permeability, depth, texture, erosion potential, fertility, shrink-swell potential, drainage, underlying parent material, and depth to bedrock.

Sources of information included the Harvey County Soil Survey, United States Geological Survey (USGS), Soil Conservation Service (SCS), the Center for Public Affairs at the University of Kansas, and the Agronomy Department at Kansas State University. For detailed information concerning the soil types found in the study area see Appendix II.

Topography. Topography refers to the natural surface features or relief of the earth. Soil erosion and stability are directly related to topographic characteristics such as the degree of slope. Therefore, it is important that land uses be responsive to existing terrain. The terrain of a particular area will also affect con-

struction costs and accessibility to a particular site. An important consideration is the effect of proposed land uses on existing drainage patterns. Severe alteration and disruption of natural drainage patterns can result in serious environmental consequences such as localized flooding or excessive soil erosion.

Topographic inventory elements included slope gradients, drainage patterns, and physiographic region characteristics.

Sources of information included the Harvey County Soil Survey, USGS 7.5 minute topographic maps, Center for Public Affairs at the University of Kansas and additional USGS information (see Appendix III).

Hydrology. Hydrologic elements of an area can significantly influence land use decisions. Land uses should be compatible with existing water features to avoid serious problems such as flooding of buildings and active use areas, interference with groundwater recharge and depletion of existing water supplies. Alteration of major drainageways can result in serious erosion problems causing loss of valuable topsoil, sediment pollution of streams and rivers, and significant changes in the volume and velocity of flow. Sewage effluent can also contaminate fresh water supplies resulting in a serious health hazard unless adequately planned for.

Hydrologic inventory elements included major drainageways, watershed boundaries, watershed structures, water bodies, flood prone areas (100 year flood), lake levels, water quality, and estimated groundwater capacities.

Sources of information included the Harvey County Soil Survey, Soil Conservation Service (SCS), United States Geologic Survey (USGS), HUD flood insurance maps, Center for Public Affairs at the University of Kansas, Harvey County Planning Department, and Kansas Groundwater Management Districts Association. See Appendix IV for information concerning the study area.

Vegetation. Vegetation refers to the plant life of an area such as trees, shrubs and grasses including indigenous and introduced species. The vegetation inventory should include both wild and cultivated plant types. Natural processes such as soil erosion, soil fertility, wildlife activity and micro-climatic variations are directly related to the vegetation of an area. Therefore, removal of plant cover can have a dramatic impact on the entire ecological community. Plants can also serve as indicators of existing environmental conditions. Thus, identification of vegetation types can provide valuable information concerning land suitability for particular uses.

Vegetation inventory elements included plant cover types and representative plant species. Sources of information included the Harvey County Soil Survey, Agricultural Stabilization and Conservation Service (ASCS), Rural Water District, Kansas Fish and Game Commission, and the SCS (see Appendix V).

Wildlife. Destruction of wildlife habitats and disruption of wildlife activity should be carefully evaluated before land use decisions are made. Special attention must be given to the presence of rare and endangered species and the location of

critical habitats within the study area. These factors have important ecological and often legal implications that can significantly affect proposed land uses.

Wildlife inventory elements included rare or endangered species, critical habitats, wildlife habitat, and representative species. Sources of information included the Harvey County Soil Survey and the Kansas Fish and Game Commission (see Appendix VI).

Climate. Climatic data can provide valuable information for use in the land use planning process. Land uses considered for an area should be responsive to macro- and micro-climatic conditions. Careful planning of an area in relationship to climatic conditions can result in increased energy efficiency, increased usability of the site, more desirable plant growth, decreased susceptibility to adverse conditions, and numerous other benefits.

Climatological inventory elements included precipitation amounts and seasonal distribution, prevailing winds, average temperatures, freeze dates, length of growing season, solar radiation, and relative humidity.

Source of information included the Harvey County Soil Survey and the Center for Public Affairs at the University of Kansas (see Appendix VII).

Cultural Components

Cultural elements should be identified and inventoried to allow for careful evaluation in terms of local, state or national significance. Cultural components within the landscape can include a number of elements such as farmstead locations, farmstead design, boundary elements, circulation systems,

plantings, cemeteries, historic and archeological sites, land uses, building types and uses, and landscape organization. The cultural inventory for the study area is shown in Figure 4.4. No historic and archeological sites of local or statewide significance were discovered in the study area.

Sources of information included the State Historical Society, Harvey County Historical Society, USGS 7.5 minute topographic maps, ASCS, Rural Water District, Harvey County Parks Department, and the Harvey County Planning Department.

Visual Components

Visually sensing the surrounding environment is perhaps the most frequently used and most impressionable form of experiencing a particular landscape. Unfortunately, the potential impact of proposed land uses on the visual environment is often totally ignored in most land use planning processes. During recent years more consideration has been given to assessing the effect various land uses will have on the existing visual quality of an area. In order to adequately assess visual impact it is necessary to first evaluate the study area in terms of visual criteria including viewing distance, visual sensitivity, and inherent scenic quality (Hittle, 1980).

A visual resource analysis was done in an area immediately surrounding the East Lake Park. The visual study was undertaken as a result of concern by local residents and park users about potential visual intrusion from future development around the park which might distract from the visual experience of the park. The visual resources analysis process utilized was primarily an adaption of the Visual Management System (VMS) and the Visual Resource Management (VRM) system developed by the U.S. Forest Service and the Bureau of Land Management respectively. See Appendix VIII for a detailed description of the East Lake visual study.

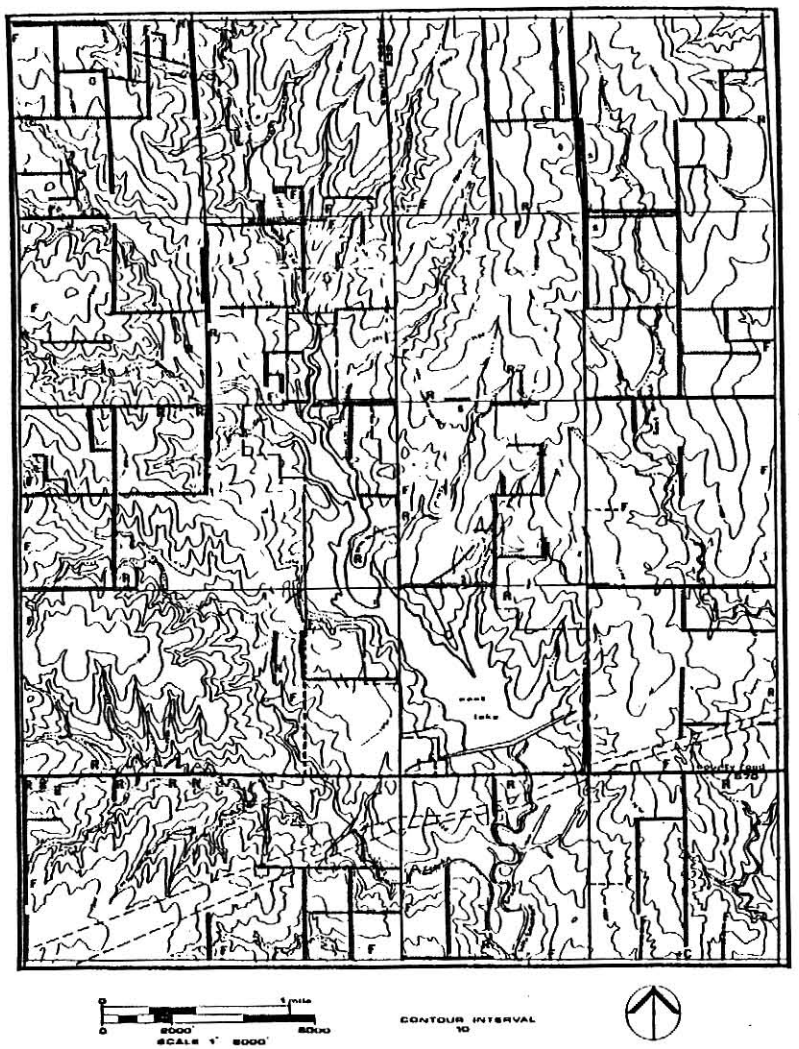


Figure 4.4

Cultural Inventory Map

Relationships Between Landscape Components

Once the individual landscape components have been inventoried it is important to identify relationships which exist between individual components. An example of the relationships between various landscape components is shown in a matrix format in Figure 4.5. In this matrix, each number represents a direct relationship between landscape components. For example, a significant change in vegetation can have a direct affect on wildlife (34). On the other hand, a significant change in vegetation may have very little affect on the geology although the geology of the area directly influences the vegetation type (6). This information can be useful in assessing how a particular land use might affect various natural and cultural processes. Environmental impact assessment can play an important role in providing very detailed information when selecting a specific site for a given land use among areas with similar relative suitability ratings.

	GEOLOGY	PHYSIOGRAPHY	CLIMATE	SOILS	GROUNDWATER	SURFACE WATER	VEGETATION	WILDLIFE	LAND USE
GEOLOGY		1	2	3	4	5	6	7	8
PHYSIOGRAPHY			9	10	11	12	13	14	15
CLIMATE				16	17	18	19	20	21
SOILS					22	23	24	25	26
GROUNDWATER						27	28	29	30
SURFACE WATER							31	32	33
VEGETATION								34	35
WILDLIFE									36
LAND USE									

Figure 4.5

Relationships of Resource Factors

Source: Frederick Steiner, "Ecological Planning: A Review," Environmental Management, 1981, Vol. 5, No. 6, p. 500.

Suitability Analysis for Specific Land Uses

The next phase in the process is to analyze the relative suitability of each landscape component in terms of specific land uses. The two land uses to be considered in this study are (1) agricultural crop production (farming), and (2) small scale residential developments.

Agricultural Crop Production

The primary purpose for including agricultural suitability was to identify inherently productive soils and not to assess whether or not farming should be permitted on any particular parcel of land. Therefore, agricultural suitabilty was derived directly from the Harvey County Soil Survey utilizing standard SCS capability classifications and estimated yield per acre information. It is important to point out that an acre having a high agricultural suitability rating indicates a highly productive soil but does not necessarily reflect a high suitability for farming in terms of other planning criteria (Appendix IX).

Residential Development

Based on inventory information, the natural components selected as primary determinants in the suitability analysis for residential development were:

1. Soil
2. Slope
3. Hydrology
4. Vegetation/Wildlife Habitat

All determinants were analyzed in terms of high, medium, and low suitability and individual suitability maps were generated (Appendix X).

Composite Suitability Map (Natural Physical Components)

In this step the individual component suitability maps generated for residential developments are combined using an overlay process. Areas with a low suitability for any of the components received a low composite suitability rating. Areas with no low suitability ratings but more than one moderate suitability rating received a moderate composite suitability rating. Areas with one or no moderate suitability ratings and no low suitability

ratings received a high composite suitability rating. These relative composite suitability ratings for residential development are shown in map form in Figure 4.6.

Cultural/Visual Overlay

Once the cultural and visual inventories are completed the information can be transferred to a cultural/visual overlay map (Figure 4.7). Although use of this inventory information remains somewhat subjective and influenced to a great extent by local values, it can be useful in further assessing areas of high suitability as related to natural components, in terms of cultural and visual values. In this manner, destruction of important cultural resources and visual degradation of sensitive areas can be avoided. Important considerations concerning cultural elements include:

1. The length of time a specific element has been a part of the landscape.
2. The integrity of the element.(How influential is it?)
3. The number and type of other components upon which a particular element has an impact.

Synthesis of Land Uses

In the synthesis phase, composite suitability maps for individual land uses are combined to create a final composite map. This final composite readily identifies areas of conflicts between land uses. It is at this point in the planning process that additional planning criteria can be utilized and land uses prioritized in order to facilitate land use decisions.

In comparing the two composite suitability maps generated in the Harvey County East Lake study, an interesting characteristic becomes evident. All of the lands possessing a high or moderate suitability for residential development based on natural physical features are also class A-Prime (Appendix IX) or B-Prime agricultural soils (see Figure 4.8). Thus, this study clearly

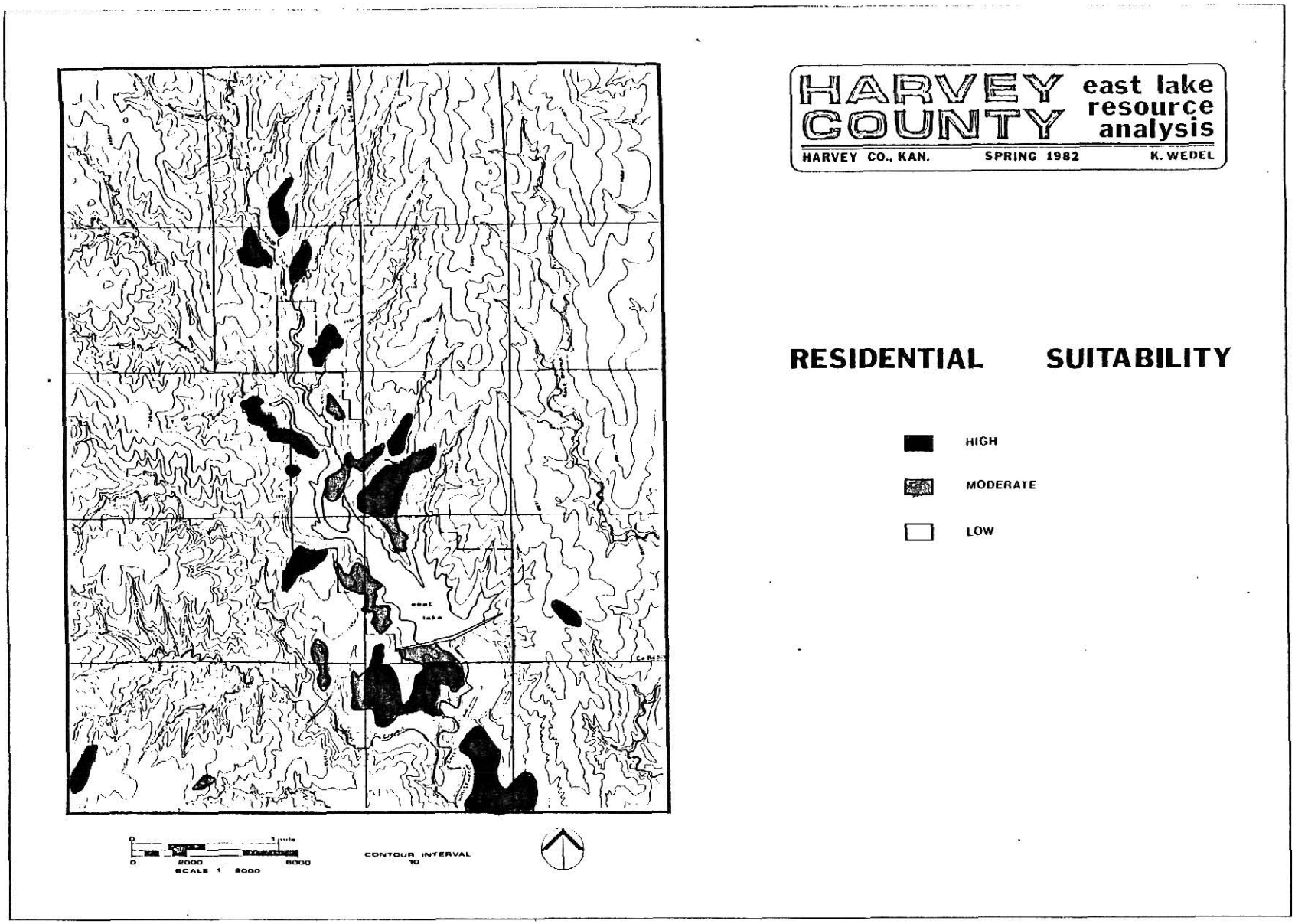
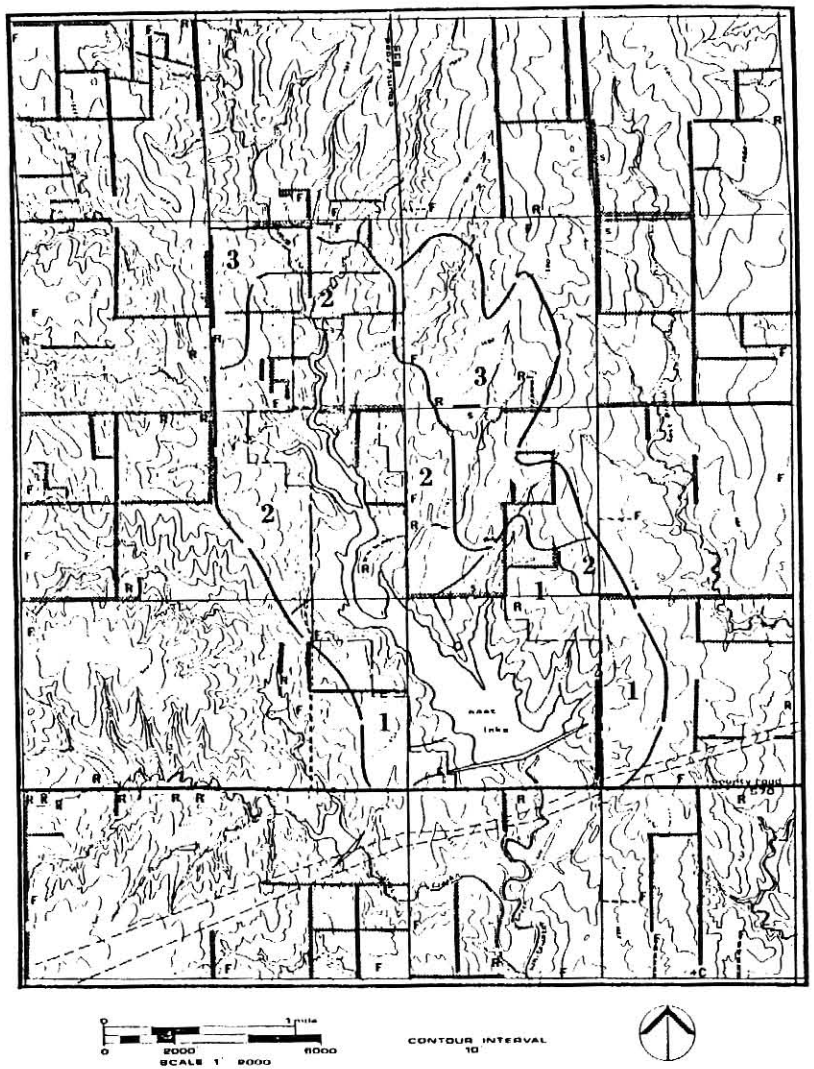


Figure 4.6

Composite Suitability Map for Residential Development



HARVEY COUNTY east lake resource analysis

HARVEY CO., KAN. SPRING 1982 K. WEDEL

CULTURAL/VISUAL MAP

legend

- C church
- F farmstead
- R residence
- S structure
- + cemetery
- planting
- pipeline
- property line

LAND USE
- recreational
- agricultural

ROADS
- paved
- sand/gravel
- dirt

VISUAL MANAGEMENT AREAS

1 [illegible]

2 [illegible]

3 [illegible]

0 2000 6000
SCALE 1" 2000

CONTOUR INTERVAL 10

Figure 4.7

Cultural/Visual Overlay Map

points out the competition for prime soils which often occurs between agricultural and residential uses in rural Kansas communities.

If agricultural suitability is not considered within the process and residential development is permitted on those areas best suited for residential development, in terms of natural physical components, conversion of prime farmland is inevitable. However, if residential developments are only allowed on class B-Prime agricultural soils (see Appendix IX) and the most productive agricultural soils (A-Prime) are preserved for agricultural uses, the areas shown in Figure 4.9 remain open for development.

If all prime farmland is to be preserved, two basic alternatives exist. The first is to simply not permit residential development in the area. This would suggest that residential development be confined to existing urban areas or allowed on other areas suitable for residential development which are not considered as prime farmland. The second alternative is to allow residential development to occur on areas of lower suitability in which case specific performance standards must be implemented to avoid potential ecological problems such as excessive erosion, loss of wildlife habitat, pollution resulting from inefficient sewage disposal systems, or structural damage to foundations and basement walls. In this situation it becomes necessary to re-evaluate the various landscape components in light of the new suitability criteria.

Reaction of the Harvey County Planning Commission

Results of the East Lake Study were presented to the Harvey County Planning Commission at a planning commission meeting. In light of the results of the resource inventory and analysis, most commissioners felt that the study area should be maintained as primarily an agricultural district and residential development restricted in the area. The Harvey

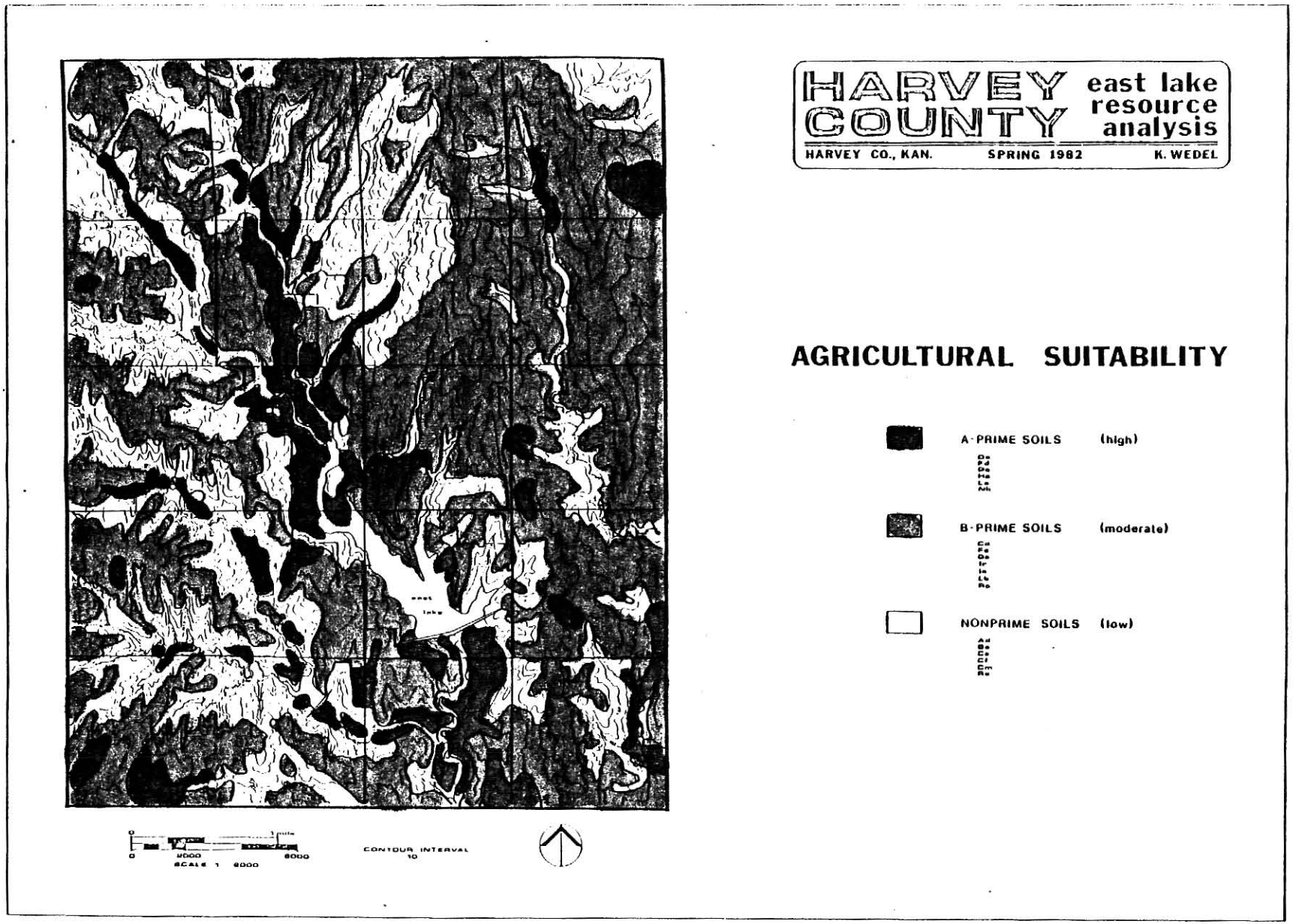


Figure 4.8

Agricultural Suitability Map

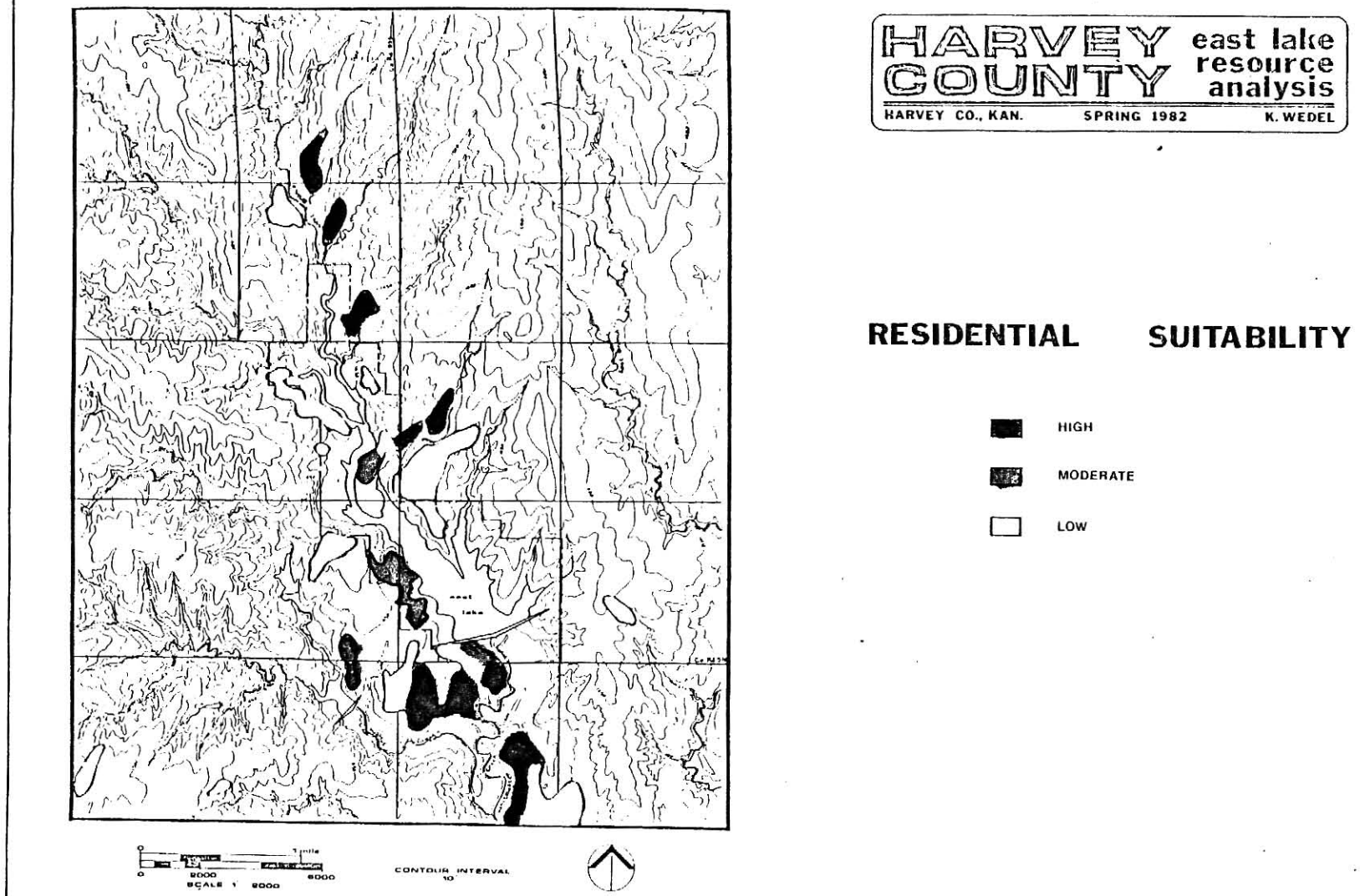


Figure 4.9

Residential Suitability Map Excluding A-Prime Agricultural Areas

County zoning ordinances allow one dwelling unit per 160 acres within an A-1 agricultural district. Although most of the commissioners felt that preservation of prime farmland was a good idea, several commissioners believed that when development occurs, the conversion of prime farmland is unavoidable due to the large amount of prime farmland within the county. As a whole, the Planning Commission showed little concern over the loss of prime farmland at the state or national level and felt they were doing a sufficent job of controlling urban development in Harvey County.

The Planning Commission was presented with a decision making process used in another agricultural community in Black Hawk County, Iowa (Chapter Five). The Planning Commission in Black Hawk County utilizes a less arbitrary process for decision making in which the county's most productive farmlands are preserved for agricultural uses. The need for a similar process in Harvey County would seem apparent in light of the strong competition for prime farmland between agricultural and nonagricultural land uses. In this way, Harvey County could preserve its most productive soils for farming. However, the Harvey County Planning Commission seemed reluctant to acknowledge the need for a less arbitrary decision making process although a few members indicated that additional detailed information, particularly soils information, would be helpful. For the most part, the commissioners appeared content with the existing process which seems to be somewhat arbitrary and allows them considerable flexibility when making land use decisions.

Although the present planning commission may be capable of making wise land use decisions with consideration for important land resource factors, this may not be true in the future. It is apparent that more concrete criteria within the existing decision making process would be helpful in assuring the preservation of the county's best farmland and the best use of available land resources in the future.

Summary

As mentioned in the previous chapter, a resource inventory and analysis should be part of a comprehensive land use planning process. Information gathered from a resource inventory and analysis must be combined with other physical, political, social, and economic information in developing and implementing a comprehensive land use plan. A resource inventory and analysis can provide valuable base information concerning inherent suitabilities of the landscape when planning land uses. Furthermore, it can help control the loss of prime farmland in rural communities by identifying potential conflict areas between agricultural and prospective nonagricultural land uses. The East Lake study showed that, unless agricultural suitability is considered within the land use planning process, conversion of prime farmland is unavoidable and perhaps accelerated. Furthermore, less arbitrary decison making processes for local planning commissions are needed in order to assure the rigid and impartial implementation of land use plans and regulations.

The resource inventory and analysis process utilized in the East Lake study appeared to be very applicable to rural county planning departments. The process is primarily a manual process and utilizes resources and information readily available to most planning departments. If the information gathering and the mapping of information is performed carefully, accurate base information can be developed that could be utilized in numerous planning studies. If computer facilities are available, a careful evaluation of computer versus manual techniques should be performed (Burdett, 1980). The following recommendations should be helpful in developing a useful resource inventory and analysis package.

-- Objectively inventory resource factors utilizing inventory classes that provide considerable flexiblity for analyzing different land uses.

-- Carefully evaluate and identify the resource factors to be inventoried and consider the type of information required. Avoid unnecessary or marginal information in the mapping process.

-- Utilize mapping techniques that are accurate but that provide flexibility to change or update information.

-- A good base map is essential. Carefully evaluate the study area in terms of size and level of detail desired before selecting the scale and type of base map used. (USGS 7.5 minute topographic maps make excellent base maps for many studies.)

-- Contact local agencies, such as the Soil Conservation Service and the Fish and Game office, who can provide valuable assistance and information throughout the resource inventory and analysis process.

CHAPTER FIVE

Protecting Resources for the Future

In light of the magnitude of potential future shortages concerning world food supply, initiatives at all levels of government are needed in order to conserve necessary agricultural land resources for future food production. Loss of prime agricultural land to nonagricultural uses cannot be allowed to continue at current rates if future food shortages are to be avoided. Global, national, state, and local efforts to conserve prime agricultural land are urgently needed and programs at all levels must address the future needs of the international community.

Global Initiatives

The assessment of the situation concerning the loss of prime agricultural land at the global scale, leaves little doubt that the problem is serious. Refusal to address the global situation when developing policies and programs concerning prime farmland at other levels will very likely result in severe shortages in the foreseeable future. The World Conservation Strategy concludes, "In view of the scarcity of high quality arable land and the rising demand for food and other agricultural products, land that is most suitable for crops should be reserved for agriculture (CEQ, 1981:22)."

Programs addressing the global situation will be complex and difficult to implement. Success of these programs will depend largely on the willingness of world societies to absorb short-term costs in return for long-term benefits. In many less-developed countries, where poverty is a reality for large numbers

of the population, the idea of suffering additional immediate hardship in return for distant future benefits will undoubtedly be received with considerable reluctance. However, long-term solutions will require extensive cooperation from developed and underdeveloped countries. The Global 2000 Report (CEQ, 1981:xix) concludes, "To respond adequately to the enormous and urgent challenges before us will require an unprecedented degree of global cooperation and commitment."

In order to achieve the necessary cooperation, wealthy nations such as the United States must be prepared to accept the responsibility of diligently attacking world poverty so as to create a climate favorable for international cooperation. Efforts toward reducing poverty must be long-term in scope and must protect the resource base of the developing country (CEQ, 1981:xxi). The conclusions of the Global 2000 Report (CEQ, 1981:25) led to the following recommendations concerning U.S. actions.

- Establishment of an Interagency Task Force on World Agricultural Lands and Soils which would coordinate U.S. strategy concerning global problems and would consult with other nations and encourage the United Nations Food and Agricultural Organization (FAO) and Environment Programme to consider the development of an international plan of action.

- The United States should seek an appropriate forum, for example through the Organization for Economic Cooperation and Development (OECD), FAO, or UNEP, for a technical conference on possible incentives, land use controls, and other methods to minimize conversion of agricultural land.

National Initiatives

Potential shortages of agricultural resources at the global level should directly influence national initiatives. It is apparent that the United States will be expected to continue to play a major role in meeting world food demands. Therefore, it is essential that the United States seriously and effectively plan for the long-term productivity of our nation's agricultural land. In light of future demands and the limited supply of prime farmland, current

losses at the national level are unnecessary and unacceptable. Federal policies and programs are desperately needed to prevent continued irreversible losses of our nation's most productive agricultural land. Scattered efforts throughout the country cannot sufficiently assure that future demands will be met. Guidance and direction from the federal level for regional, state, and local efforts to preserve prime farmland is essential in obtaining a comprehensive solution to the prime farmland dilema.

Although a substantial amount of controversy has developed concerning specific actions which should be initiated at the federal level, general needs can be identified.

- Adoption of a Federal policy concerning agricultural land preservation by each federal agency whose programs directly or indirectly affect farmland conversion. Agency policies should be consistent with a national statement of policy by the U.S. Congress. Agency actions should be reviewed periodically to assure compliance with established policy.

- Provide assistance and incentives for state and local governments in developing comprehensive preservation programs. These could be in the form of providing guidelines for preservation programs, financial assistance, federal tax incentives, assistance in developing growth management programs, advisory assistance in identifying and evaluating agricultural land and providing other technical assistance.

- Develop comprehensive research and educational programs utilizing existing agency resources to inform the public of potential problems, foster long-term social values, and establish a need for local concern. (USDA, 1981:90)

State Initiatives

In light of projected global and national concerns, Kansas can no longer ignore its current losses of prime farmland. The time has come for Kansans to accept its responsibility to the national and international communities. The state legislature must "bite the bullet" and adopt state level policies and develop programs concerning prime farmland preservation in Kansas. "Passing the buck" entirely to local communities should no longer be considered a viable alternative. Economic growth, in terms of new development, should no longer be

accepted as desirable without serious consideration of the impact on the state's resource base. State level efforts are necessary to adequately assess the future needs and export demands for Kansas and to assure a comprehensive and uniform treatment of prime farmland throughout the state.

The response of local decision makers in the Harvey County case study reflects an attitude that is perhaps typical throughtout local Kansas communities. Little concern appears to exist for state, national, or global needs. Furthermore, because of the vast amount of prime farmland located in the community, particularly surrounding urban areas, the conversion of prime farmland is accepted as an unavoidable phenomenon. The cumulative losses of prime farmland at the state and national levels seem to have little impact on the land use decisions made at the local level. Land use decisions are based primarily on a desire by local officials to maintain homogeneity in land uses rather than to preserve the most productive soils. In other words, once a development proposal is approved the fact that it consumes prime farmland is of relatively little importance to the planning commission. Thus, state level guidelines would be beneficial in assuring that prime farmland conversion is considered in local land use decisions.

Wisconsin's Efforts to Preserve Prime Farmland

Wisconsin's farmland preservation program consists primarily of assisting local governments in preserving prime farmland through local planning and zoning techniques. In addition to this assistance, state tax credits are granted to farmers agreeing to sign a restrictive agreement not to allow development on a parcel of land for a specified period of time. However, before a farmer can quality for tax credits, he must have or request an SCS farm conservation plan. Following 1982, local governments must have an approved planning and zoning plan concerning farmland perservation in order for local farmers to

remain eligible for state tax credits (Steiner, 1980:71). Local efforts for preserving farmland have been based primarily on agricultural zoning techniques requiring large minimum lot sizes in order to preserve the land resource base (Kolb, 1976:318).

Local Initiatives

Although statewide initiatives are needed, local communities will probably continue to play the primary role in land use decisions concerning prime farmland in Kansas. It is at the local (county or multi-county) level where land use decisions can be dealt with most effectively (Roberts, 1979:60). However, serious weaknesses are apparent in current local land use decision making processes. Many local decision makers are seemingly apathetic to other than local needs. This is particularly true of prime farmland as a result of the large amount of land designated as prime by the Soil Conservation Service (SCS). This was apparent in Harvey County where nearly all the land in the county was shown as prime on an SCS prime soils map, particularly those areas receiving development pressure. Planning Commission officials noted that in order for any development to occur in these areas, conversion of prime farmland was inevitable.

The large amounts of productive agricultural land in many local Kansas communities, makes it important that a detailed analysis of agricultural soils, in terms of relative productivity, be performed. This information is important in identifying the areas of the best soils for cropland. This type of information was not present in the land use review process for rezoning requests utilized by the Harvey County Planning Commission. An absence of uniform and consistent criteria for evaluating land use proposals in terms of soil productivity was apparent. Restrictions in their agricultural classifications were based primarily on land use type and density. Few, if any, local communities in Kansas utilize soil productivity as primary criteria in making land use decisions concerning prime farmland. In lieu of established criteria, land

use decision -making processes can become very arbitrary when concerned with prime farmland conversion. Local development pressures can significantly influence the process. Local communities must get away from the idea that economic growth and development is inherently good regardless of the impact to the land resource base.

Farmland Preservation in Black Hawk County, Iowa

Black Hawk County is primarily an agricultural community in which considerable development pressure from growing urban centers was occuring (see Figure 5.1). As a result of serious losses of prime farmland to nonagricultural uses, Black Hawk county undertook efforts to identify and preserve their best agricultural soils. Black Hawk County's preservation efforts utilize an agricultural zoning process. The process consists of three basic steps (Johannsen, 1980):

1) Soils are inventoried and given a Crop Suitability Rating (CSR) based on numerous physical characteristics (Appendix XI). CSR's range from 5-100. The principal crop, in this case corn, is utilized in determing the suitability ratings.

2) Soils with a CSR above a specified level are designated as "prime" for farming and preserved for agricultural use (Appendix XII).

3) Rezoning requests are evaluated on the soil's CSR and decisions are based on an established CSR scale. A Technical Review Committee examines the request prior to the Planning Commission and issues a preliminary recommendation. If the parcel of land does not meet the requirements for prime farmland it is evaluated on numerous other physical and socioeconomic criteria. Land not considered as prime farmland is not necessarily prime for development (see Appendix XIII).

Important characteristics of the Black Hawk County process which make a similar process adaptable to many Kansas communities include:

- Prime soils throughout the county are identified in sufficient detail to be used as criteria in the land use decision-making process.

- Information is generated through readily available sources such as the SCS and Agricultural Extension Services. CSR's are found in the Soil Survey of Black Hawk County for each soil series.

- Land use decisions concerning prime farmland are based on established criteria that remains consistent for each rezoning case providing a valuable tool for local decision makers.
- General policies concerning farmland preservation are incorporated into specific zoning ordinances assuring implementation of goals and objectives. This includes crop suitability ratings as well as minimum lot sizes.

The efforts in Black Hawk County have proven to be effective over the past few years. According to Edward Thompson, Jr., of the National Association of Counties Agricultural Lands Project,

> Black Hawk's farmland preservation program is attracting the attention of other counties because of its thoughtful, direct approach that is based upon the soil itself. Soil classification as a policy tool has the potential to work just about everywhere that farmland remains, but is flexible enough to be modified to suit regions where crops other than corn predominate, and where a different mix of agriculture and development is desired by county officials and their constituents (Johannsen, 1980:17).

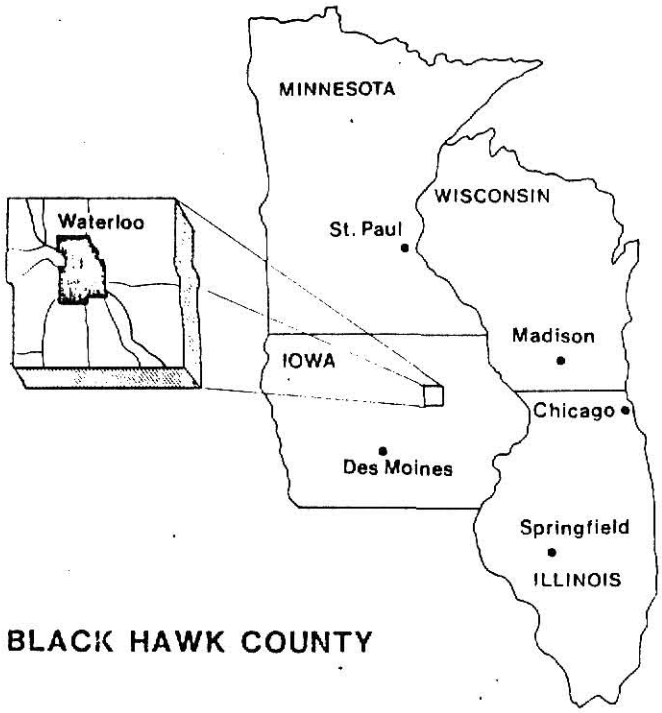


Figure 5.1

Location of Black Hawk County

Accepting Change

The conversion of our nation's prime farmland points out some deep-rooted attitudes within our society concerning social values. Our society has become entrenched in the idea that actions and concerns should be economically justified in order to be valid. Economists seem to have a difficult time when defining value in nonmonetary terms. Oscar Wilde once noted, "An economist is a man who knows the price of everything and the value of nothing (Tribe, 1976: 153)."

Unfortunately, there exists a little economist in each of us. Another observation by Oscar Wilde concludes, "In this world there are only two tradgedies....One is not getting what one wants and the other is getting it. The last is the real tragedy (Moser, 1979:237)."

Leo Moser (1979:237), in The Technology Trap, states, "As a species, we have perhaps been too successful for our own good, our victory over our natural environment too complete. The very successes of recent technology are now putting our species in real danger. Pogo, the philosophical possum of the comic strips, summed up: "We have met the enemy and they are us!"

The apparent affluence of our society may be deceiving if we consider other values besides those easily measured in economic terms. Kenneth Boulding, in Economics of Pollution, describes the situation as follows,

> When we contrast quantity with quality, we are suggesting that the bigger is not necessarily the better. For a baby, growth in weight is evidently desirable; for the adult, it simply means that he is turning into fat. For the poor, growth in income is entirely desirable; for the rich, it may simply mean corruption and luxury... The enormous increase in the Gross National Product in recent years immensely exaggerates the increase in welfare (or affluence). If we were to deduct pollution, education, health, and commuting, as costs, from the Per Capita Disposable Income, the rise in the last forty years might look very modest indeed (Stephenson, 1981:8).

The costs of bigness and the dangers of continued development are brought out in Leopold Kohr's book The Breakdown of Nations. Kohr suggests that we must reconsider our assumption that continued growth and development is necessarily beneficial. As Kohr (1978:xix) puts it, "The problem is not to grow but to stop growing." The concept of "no growth" may soon become a reality in areas where the carrying capacities of natural systems are being approached. It is evident that society must begin to recognize and accept the importance of long-term social values. Regarding agricultural lands, Ian McHarg emphasizes the point that, "Mere market values of farmlands do not reflect the long-term value or the irreplaceable nature of these living soils (McHarg, 1969:60)."

The evolution of new ideas for the future is to a large extent influenced by the actions and choices of the present. Concerning our natural resources, such as prime farmland, decisions to develop may severely limit future options. In this sense, decisions prompting action which would remove or consume prime farmland, as well as other important natural resources, has potentially more serious implications than a decision not to act. Therefore, a decision to consume or destroy a nonrenewable resource should be carefully evaluated in terms of long-term consequences resulting from that action. Decisions to convert agricultural land to nonagricultural uses are in most cases irreversible. Robert Dorfman (1976:164), in When Values Conflict, points out the view of Laurence Tribe that,

> ...our values at any time are largely what past decisions and experiences have made them, and that one of the consequences of our current choices is to mold our future values. We must recognize that our current scale of values is only tentative, but is the only scale we have. We must use it as best we can to make choices that will strengthen our adherence to higher values and to make our value system more like it "ought" to be. I take it that our values "ought" to be those that stand the test of time, and that do not lead to choices that we shall soon regret....

Dorfman continues, "In the environmental field the road to wisdom is a decision process that forces explicit recognition that the environment has values that transcend the economic calculus."

Although the situation is painfully grim, it is not hopeless. The urgency of the situation only emphasizes the need for immediate actions and changes in decision-making policy. According to Leo Moser (1979:24),

> Time is short. There are many exponential trends in our global system that tick on like ever speeding clocks, racing toward a less and less stable state. We must give the highest priority to supplying the needed controls and humanizing this new world of our own creation so that it will be a better home for those who live in it. If we do not, it will become the graveyard of yet another extinct species.

The necessary knowledge and technology to effectively deal with the problems facing our world already exist. However, we must first accept our responsibility to the future as well as the present. Long-term solutions will undoubtedly require a dramatic reorientation of society's values. We must come to grips with the problems before us.

The challenge of the future is perhaps best summarized in the words of C. Northcote Parkinson, noted author, historian and journalist;

> We have to discard our idea of progress. Civilization traces a curve of achievement. When we are on the upward slope we imagine that we shall rise indefinitely. But the curve levels off and then the descent begins. This has happened to western civilization in the twentieth century and all who have been taught to believe in progress feel bewildered, cheated, and lost. We should understand the situation better if we realize that it all has happened before, not once but many times, and that what follows summer must always be autumn. There is much we can do in autumn but not until we have admitted to ourselves that autumn has come and that winter lies ahead (Stephenson, 1981:267).

The future of our world and our children's world is not "set in concrete." Obviously, numerous factors will affect the outcome of emerging problems. Concerning agricultural land resources, projections of future shortages could be altered if steps are taken now to prevent continued careless and unnecessary losses. We must look for viable, sustainable alternatives to current resource-exploiting values and lifestyles. Fortunately, there is hope for the future. Unfortunately, it's up to us.

Conclusions

This study concludes that Kansas communities are currently converting an excessive amount of prime farmland to nonagricultural uses in light of projected future global demands for agricultural products. The primary cause of unnecessary farmland conversion appears to be a lack of consideration of agricultural suitability factors within local land use planning processes. Local decision-makers are seemingly apathetic toward the future needs of the national and international community. Therefore, decisions concerning land use are often based entirely on the needs of the county or multi-county area. Furthermore, state governmental agencies and the state legislature have failed to pass legislation and implement conservation programs that will adequately preserve the state's prime farmland for future generations.

Resource inventory and analysis techniques can be useful as part of a comprehensive land use planning process in identifying and evaluating important resource factors that determine the inherent suitability of a particular area for various land uses. However, if prime farmland is to be preserved, agricultural production must be considered within the planning process in order to identify conflict areas between agricultural and proposed nonagricultural land uses and avoid unnecessary conversion of prime farmland. Rigid policies and ordinances protecting prime farmland should be developed to provide established criteria that can be utilized by local decision-makers in an objective evaluation process concerning land use proposals. Furthermore, state level guidelines and programs are needed to aid

Kansas communities in local preservation efforts and assure consistant treatment of prime farmland throughout the state.

Long-term solutions to the problem of continued conversion of the state's prime farmland to nonagricultural uses will ultimately rest on the shoulders of Kansas citizens to develop a genuine concern for the conservation of agricultural land resources and the future needs of the world community.

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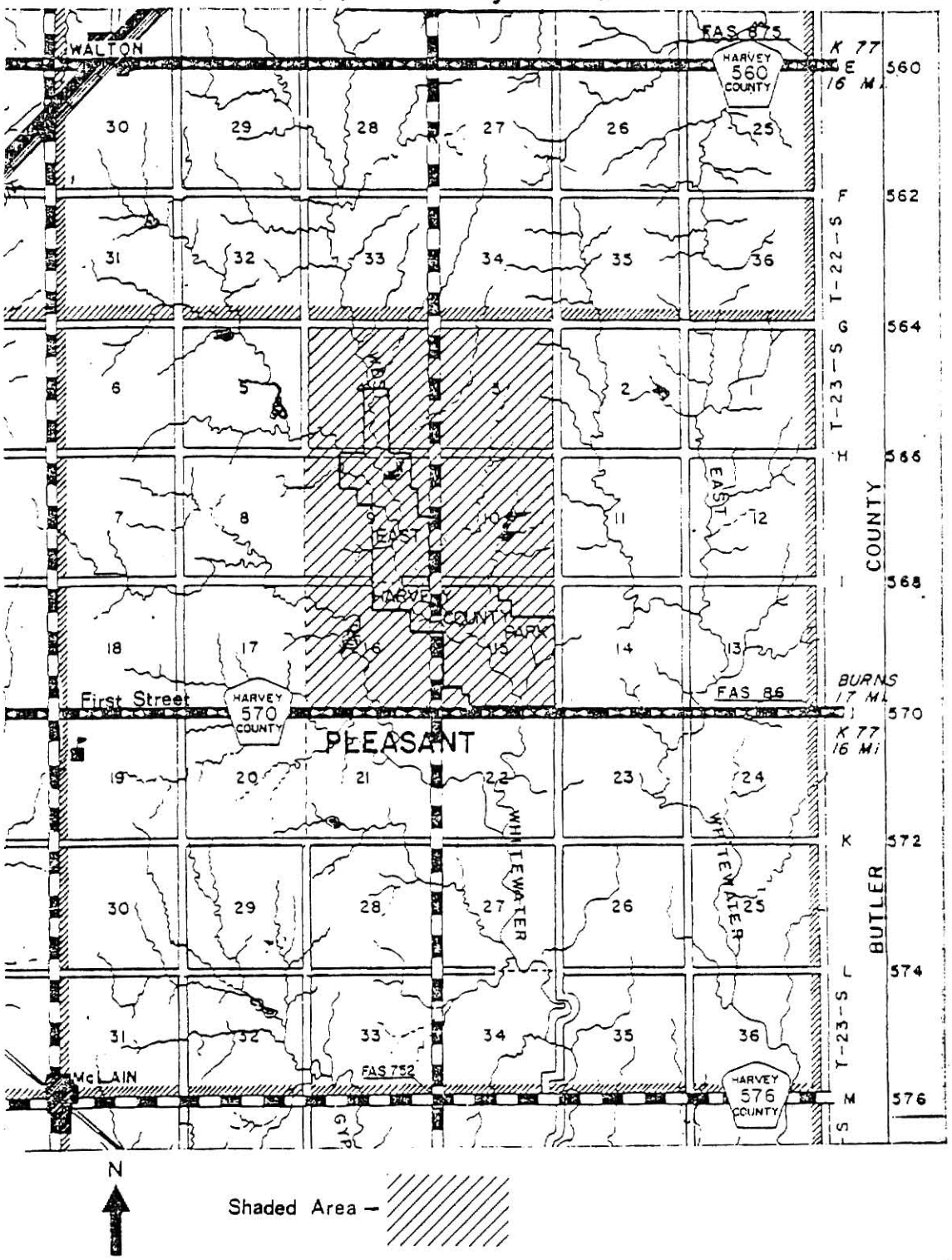
APPENDIXES

APPENDIX I

East Lake User Survey Information

East Lake Plan Study Area



HARVEY COUNTY EAST LAKE PLANNING PROJECT QUESTIONNAIRE

SECTION I - GENERAL QUESTIONS

Circle the appropriate answer.

(1.) 1. Do you live in Harvey County? Residence

1 A. Yes

2 B. No

(2.) 1a. If so do you live in one of the cities, OR Location

1 A. Yes urban

do you live in the rural area of the county?

2 B. Yes rural

(3) 2. What is your main occupation? Occupation

1 A. Farmer
2 B. Blue Collar (non-farm)
3 C. White Collar
4 D. Retired
5 E. Other, please specify_____

SECTION II - EAST LAKE PARK QUESTIONS

Circle the appropriate answer.

(4) 3. During the past year, how many times have you and/or members of your family visited the East Park? Visit 1

1 A. None
2 B. 1-5 visits
3 C. 5-10 visits
4 D. More than 10 visits

(5) 4. When did you and/or members of your family most often visit the East Park? Visit 2

1 A. During the week (Monday through Friday)
2 B. Weekends (Saturday and Sunday)
3 C. During vacation periods

(6) 5. On the average, how long did these visits last? Visit 3

1 A. A few hours
2 B. All day
3 C. Overnight
4 D. A few days

(7) 6. For you or those members of your family who used the East Park, which age groups do they belong? Person Age

1 A. 1-12
2 B. 13-19
3 C. 20-30
4 D. 31-40
5 E. 41-54
6 F. 55-64
7 G. 65-75
8 H. 76 and over

(8) 7. What kinds of outdoor recreational activities do you feel would be appropriate for the East Park and would like to see included/expanded in the future? (May choose more than one)

12. Residential development in the shaded area on the accompanying map, should be permitted.

___ ___ ___ ___ ___

13. Residential development in the unshaded area on the accompanying map, should be permitted.

___ ___ ___ ___ ___

14. Commercial development in the shaded area on the accompanying map, should be permitted.

___ ___ ___ ___ ___

15. Commercial development in the unshaded area on the accompanying map, should be permitted.

___ ___ ___ ___ ___

16. Agricultural land uses in the shaded area on the accompanying map are important and should be preserved.

___ ___ ___ ___ ___

17. Agricultural land uses in the unshaded area on the accompanying map are important and should be preserved.

___ ___ ___ ___ ___

18. Residential development in the shaded area on the accompanying map would be visually distracting to park users and residents of the area.

___ ___ ___ ___ ___

19. Commercial development in the shaded area on the accompanying map would be visually distracting to park users and residents of the area.

___ ___ ___ ___ ___

Circle the appropriate answer.

(11) 20. If residential development were to possibly occur in the shaded area on the accompanying map, which one of the following types would you most favor?

1 A. Low density (1 dwelling per 40 acres)
2 B. Moderate density (1 dwelling per 10 acres)
3 C. High density (1 dwelling per 1 to 2 acres)
4 D. Very high density (multiple dwelling units per acre)
5 E. Not in favor of residential development of any kind in this area.

(12) 21. If residential development were to possibly occur in the unshaded area on the accompanying map, which one of the following types would you most favor?

1 A. Low density (1 dwelling per 40 acres)
2 B. Moderate density (1 dwelling per 10 acres)
3 C. High density (1 dwelling per 1 to 2 acres)
4 D. Very high density (multiple dwelling units per acre)
5 E. Not in favor of residential development of any kind in this area.

22. What other types of activities/land uses, not previously mentioned, would you feel are appropriate in or around the park area? (please specify)_____

_____

_____

(13) 23. Are you aware of the existence of Harvey County's Comprehensive Land Use Plan?

1 A. Yes
2 B. No

(14) 23a. If so, are you familiar with the goals, concepts, principles, and general plan of development outlined in this plan?

1 A. Very familiar
2 B. Familiar
3 C. Relatively familiar
4 D. Not familiar

(1.) yes
(2) no

- A. Fishing
- B. Hunting
- C. Boating
- D. Water Skiing
- E. Picnicking
- F. Swimming
- G. Camping (mobile home and trailer use)
- H. Camping (tent use)
- I. Sailing
- J. Playground activities
- K. Field Sports (soccer, softball, touch football, etc.)
- L. Court Games
- M. Outdoor concerts
- N. Archery
- O. Nature/hiking trails
- P. Horseback riding trails
- Q. Bicycle trails
- R. Park interpretation (e.g. natural history pamphlets, interpretation walks and/or talks)
- S. Sightseeing
- T. Other, please specify_____

(9) 8. Please rate the following facilities and/or services provided at the East Park:

	1 Excellent	2 Good	3 Fair	4 Poor
A. Roads				
B. Parking areas				
C. Picnic areas				
D. Restrooms				
E. Camping sites (vehicle)				
F. Camping sites (tent)				
G. Boat ramps and docks				
H. Utilities				
I. Fishing				
J. Swimming area				
K. Landscaping				

(10.) Select the answer which best represents how you feel.

	1 Strongly Agree	2 Agree	3 Undecided	4 Disagree	5 Strongly Disagree
9. A wildlife refuge/nature area should be included in the park. Refuge					
10. Existing recreational facilities/opportunities within the East Park are adequate and need not be expanded. East Rec					

SECTION III - LAND USE QUESTIONS

Select the answer which best represents how you feel.

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
11. Harvey County should be concerned with the protection of it's prime farm lands from non-farm uses. Protection of Prime Farm lands					

(15) 23b. If you are at least relatively familiar with the goals, concepts, principles, and general plan of development outlined in this plan, do you feel they are good?

1 A. Yes
2 B. No
3 C. Undecided
4 D. Not familiar with Comprehensive Plan

(16) 24. Are you aware of the existence of Harvey County's county-wide zoning and subdivision regulations?

1 A. Yes
2 B. No

(17) 25. Do you feel there is a need for county-wide zoning and subdivision controls (not necessarily in their present form)?

1 A. Definitely
2 B. Possibly
3 C. Undecided
4 D. No, absoultely not

(18) 26. Would you like to know more about Harvey County's Land Use Plan and Zoning and Subdivision Regulations?

1 A. Yes
2 B. No

(19) 26a. If so, would you attend a public meeting to learn more about Harvey County's Land Use Plan and Zoning and Subdivision Regulations?

1 A. Yes
2 B. No

(20) 27. For which of the following land uses do you feel rural water districts should be designed? (Circle as many as you feel appropriate)

1 A. Farm purposes
2 B. Non-farm purposes
3 C. Residential, commercial, industrial developments
4 D. Others, specify_____

(21) 28. Do you feel that public services in your area, such as fire protection, police protection, and road maintenance, would be hampered by increased residential development?

1 A. Definitely
2 B. Possibly
3 C. Undecided
4 D. No, absolutely not

(34) 29. Comments and suggestions: _____

_____

_____

_____

Thank-you very much for completing this questionnaire !

SUMMARY OF RESULTS

EAST LAKE QUESTIONARE

The questionare results indicate that almost 80% of the people surveyed were Harvey County residents with the large majority of these residents being rural dwellers. Slightly more than one-half of the people surveyed were farmers. White collar workers represented the next largest group (18.2%), blue collar and retired persons were slightly lower (15.5% and 12.7% respectively).

Almost one-half of the people visited the East Park from 1-5 times last year staying for only a few hours. Weekends and weekdays were both popular times to visit the Park with weekends slightly favored. The majority of people visiting the Park were between the ages of 20 and 54 (it should be noted that in coding the questionares only one answer could be entered for this question despite the fact that there were numerous multiple answer responses. In these cases the oldest age catagory indicated was used. This should explain for the absence of responses in the lower two catagories. Therefore, there was a large number of visitors in the first catagories which are not represented accurately).

Concerning Park activities the most popular choices were (in order of popularity): (1) fishing (2) picnicking (3)swimming (4) nature-hiking (5) camping (both tent and motor vehicle) (6) playground activities (7) sailing. Boating and water skiing were not as popular as one might expect and there were several comments made concerned about user safety because of the size of the lake itself. Most of the Park facilities /services were rated, for the most part, as being generally good with the exception of the swimming area which received decisively poor ratings. The majority of the respondents felt that a wildlife refuge should be included in the Park with a large number of people indicating that existing park facilities/opportunities were, for the most part, adequate.

A large majority of those surveyed felt that Harvey County should be concerned with the protection of it's prime farmland and were, for the most part, opposed to residential development and strongly opposed to commercial development in both the shaded and unshaded areas. Similarly, a large majority strongly favored preserving agricultural land-uses in these areas. The majority of the people surveyed felt that both residential and commercial developments in the shaded area would be visually distracting to Park users and local residents. As indicated previously, a large number of people were opposed to residential development in both the shaded and unshaded areas but would prefer moderate density development in both areas if development should occur.

About an equal number of people were aware of a Comprehensive Land Use Plan as were not, however, a large majority of respondents were not familiar with the contents of the Land Use Plan. Of those

who were familiar with the Plan, those who felt the Plan was good only slightly outnumbered those who felt it was not with a large number undecided. The majority of respondents were aware of the County's zoning and subdivision regulations with a slim majority confirming the need for these regulations. A large majority of those surveyed were interested in learning more about the zoning and subdivision regulations and most would consider attending a public meeting to do so. A majority of the people surveyed felt that farm purposes should be the primary land use for which rural water districts are designed. A substantial number of respondents indicated that some consideration should be given to residential, commercial and industrial uses as well. Finally, a large number of people felt that public services in the area would definitely be hampered by increased residential development and a substantial number considered it a possibility.

CROSSTABULATION TABLES

RESTP1 by OCCUPA

This crosstabulation table was done in order to show the relationship between the respondents occupation and the response concerning what type of residential development, if any, should be allowed in the immediate vicinity of the East Lake. The results show a somewhat similar conditional distribution among farmers and blue collar workers. Both groups strongly opposed any residential development with moderate density the most acceptable development type. A quite different conditional distribution is observed in the white collar group with the majority of respondents favoring moderate and high density residential development and only 20% favoring no development. Retired persons seemed to fall somewhere in-between with no development and low density development both being the number one choices.

APPENDIX II

East Lake Study Soils Inventory Information

Soils in the study area are characteristic of the Irwin-Rosehill-Clime association. These are gently sloping to sloping, deep and moderately deep soils that have a silty clay loam or silty clay surface horizon and silty clay subsoil. These soils are commonly found on uplands, and are used for crops and range. Wheat and sorghum are the main crops. These soils have severe limitations for sewage lagoons. They have moderate to severe limitations for building sites and roads.

The specific soil series found in the study area are:

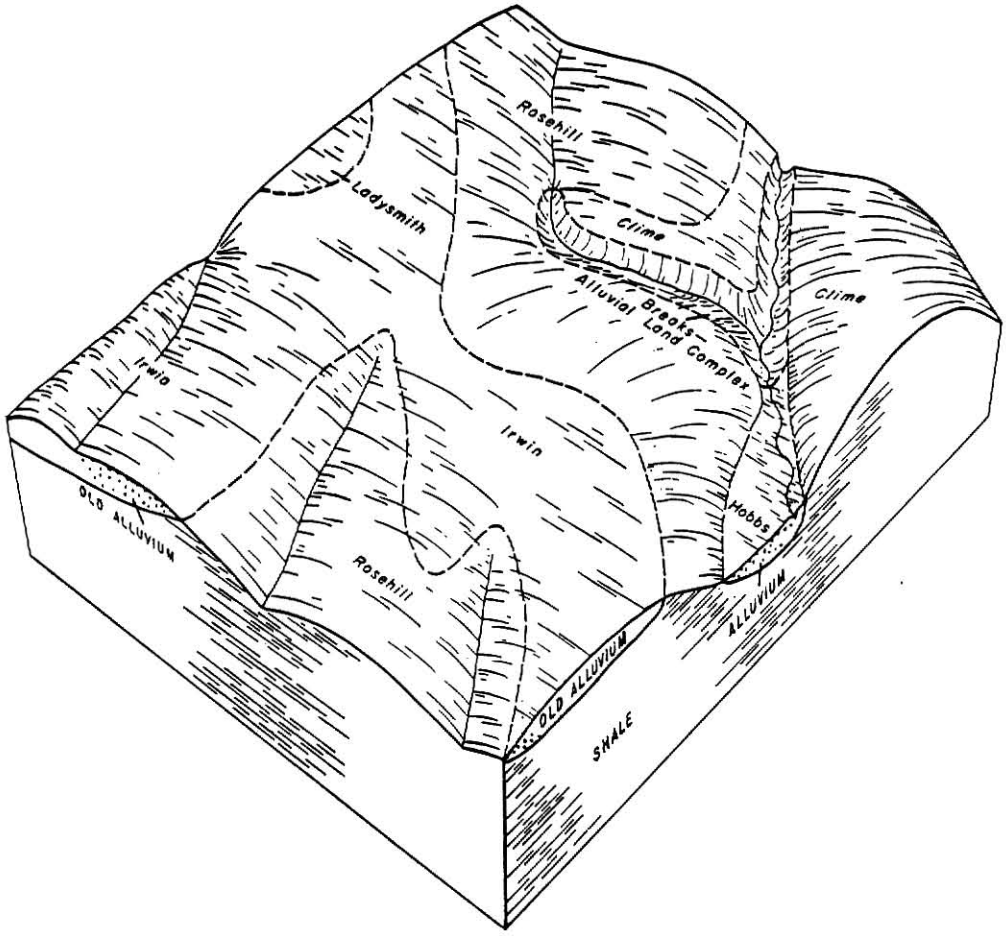
1. Alluvial land, broken (Ad)
   - consists of deeply entrenched stream channels that have steep, broken sides with texture ranging from fine sandy loam to silty clay loam. Slopes range 0 to 20 percent.
2. Breaks-Alluvial land complex (Ba)
   - consists of the sloping to steep sides and the nearly level narrow bottoms of intermittent drainageways. These areas are moderately deep and shallow silty clay underlain by Permain shale. Slopes range from 0 to 20 percent.
3. Clime silty clays (Cd, Ce, Cf, Cm)
   - consists of moderately deep, well-drained, gently sloping to sloping soils on uplands underlain by

calcareous, platy clay shale at a depth of 20 to 40 inches. Runoff is medium or rapid, and permeability is moderately slow. Fertility is medium, and the available water capacity is low. Slope ranges from 1 to 3 percent (Cd), 3 to 6 percent (Ce), 2 to 6 percent, eroded (Cf), and 6 to 12 percent (Cm).

4. Detroit silty clay loam (De)
   - consists of deep moderately well-drained, nearly level soils on flood plains. Runoff and permeability are slow. Fertility and available water capacity are high. Slope ranges from 0 to 1 percent.
5. Farnum loan (Fd, Fe)
   - consists of deep, well-drained, nearly level to moderately sloping soils on uplands. Runoff is slow or medium, and permeability is moderately slow. Fertility and available water capacity are high. Slope ranges from 1 to 3 percent (fd), and 3 to 6 percent (Fe).
6. Goessel silty clay (Go, Gs)
   - consists of deep, moderately well-drained, nearly level to gently sloping soils on uplands. Runoff is slow to medium, and permeability is very slow. Fertility is medium, and the available water capacity is high. Slope ranges from 0 to 1 percent (Go), and 1 to 2 percent (Gs).
7. Hobbs silt loam (Ho)
   - consists of deep, nearly level, well-drained soils on flood plains. These soils are flooded occasionally to frequently. Runoff is slow and permeability is moderate. Fertility and available water capacity are high. Slope ranges from 0 to 1 percent.

8. Irwin silty clay loam (Ir, Is, It)
   - consists of deep, well-drained, gently sloping or moderately sloping soils on uplands. Runoff is medium or rapid, and permeability is very slow. Fertility is medium, and the available water capacity is high. Slopes range from 1 to 3 percent (Ir), 3 to 6 percent (Is), and 2 to 6 percent, eroded (It).
9. Ladysmith silty clay loam (La, Lb)
   - consists of deep, moderately well-drained, nearly level or gently sloping soils on uplands. Runoff is slow or medium, and permeability is very slow. Fertility is medium and the available water capacity is high. Slopes range from 0 to 1 percent (La), and 1 to 2 percent (Lb).
10. Naron fine sandy loam (Nb)
   - consists of deep, well-drained, nearly level or gently sloping soils on uplands. Runoff is slow, and permeability is moderate. Fertility is medium, and the available water capacity is moderate. Slopes range from 1 to 4 percent.
11. Rosehill silty clay (Ro, Rs)
   - consists of moderately deep, well-drained, gently sloping or moderately sloping soils on uplands. Runoff is medium or rapid, and permeability is very slow. Fertility is medium, and the available water capacity is low. Slopes range from 1 to 3 percent (Ro), and 3 to 6 percent (Rs).

The geologic formation found in the study is the Wellington Formation of the Permian System. It is soft, calcareous, gray and bluish gray shale that contains several thin beds of limestone and gypsum. The Rosehill and Clime soils are thought to have formed in material weathered from this shale.



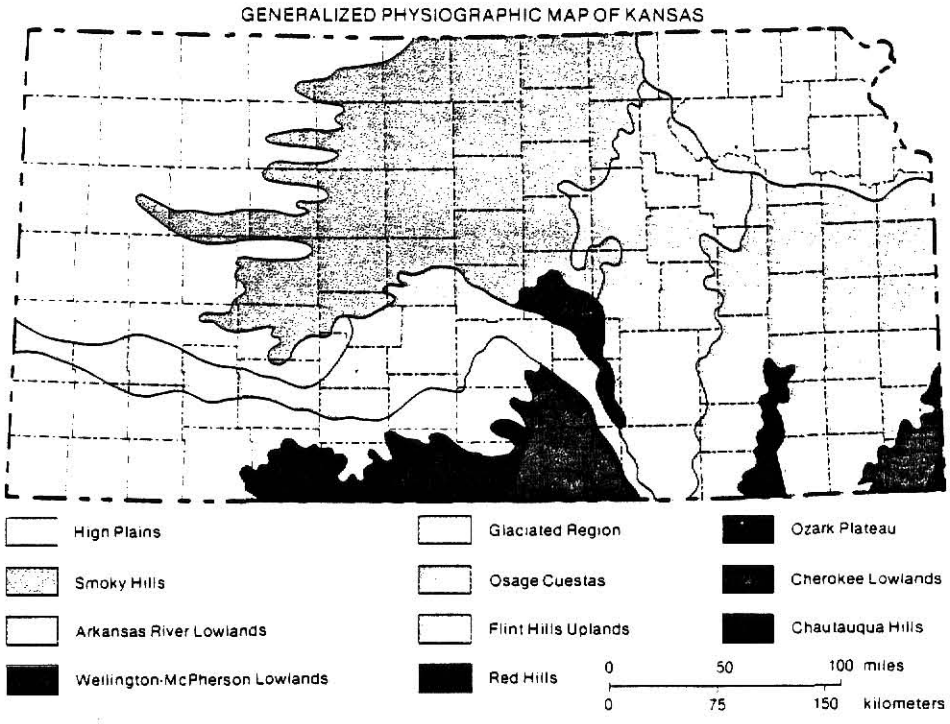
Typical pattern of soils in the Irwin-Rosehill-Clime association.

APPENDIX III

East Lake Study Topographic Inventory Information

Topography of the study area is predominantly gently rolling cropland and rangeland. The study area falls on the western edge of the Flint Hills Uplands physiographic region of Kansas. This area represents a transition zone between the predominantly fertile, more level cropland of central Harvey County to the west and the thin soiled, rolling flint hills of Butler County to the east.

Slopes in the study area range from 1 to 12 percent throughout the majority of the site. A few small, nearly level (0 to 1 percent) areas are present with relatively steep slopes (over 12 percent) directly adjoining some drainageways. Slope-soil relationships are identified in the soils section.



APPENDIX IV

East Lake Study Hydrologic Inventory Information

The study area is drained primarily by the east and west branches of Whitewater Creek and Walnut Creek. The entire study area is within the Arkansas River drainage basin. Two major watershed structures exist within the study area, creating the East Lake Reservoir and another smaller lake. Numerous farm ponds exist throughout the study area. Flooding occurs primarily along the east and west branches of Whitewater Creek, Walnut Creek, and major tributaries.

Ground water in the area is limited and extremely variable. Estimated capacity is between 10-100 gpm. Water quality is generally poor and farm ponds are used to supply water for livestock. The abundant water supplies of the Equus beds are located in the western half of the county and do not extend into the study area. No significant recharge areas exist within the study area.

APPENDIX V

East Lake Study Vegetation Inventory Information

Vegetation in the study area consists primarily of cultivated cropland and native grassland. The principal crops in the area are wheat and grain sorghum. Small areas of riparian woodlands are present along the major drainageways consisting primarily of elm, hackberry, cottonwood, willow and buttonbush. A large number of hedgerows exist within the study area composed primarily of Maclura pomifera species (Osage-Orange).

APPENDIX VI

East Lake Study Wildlife Inventory Information

Wildlife in the more open rangeland and cropland areas consists of numerous bird and small mammal species including quail, pheasant, meadowlarks, field sparrows, red-winged blackbirds, cottontail rabbits, and ground squirrels. Birds and mammals common in the more wooded areas include thrushes, vireos, fox squirrels, red fox, white-tailed deer, mule deer, and racoon. Wetland wildlife commonly found around ponds, lakes, streams or ditches, and marsh areas include wood ducks, rails, herons, shore birds, mink, muskrats, beaver, mallards, and pintails. According to the local office of the Kansas Fish and Game Commission, no known rare or endangered species exist within the study area. Although no critical habits were identified, wildlife habitat for local species was inventoried. Hedgerows, riparian woodlands, wasteland, rangeland, and cropland were inventoried as potential wildlife habitats. Removal of hedgerows was identified as one of the most serious wildlife habitat problems in Harvey County by the local Kansas Fish and Game office.

APPENDIX VII

East Lake Study Climatological Inventory Information

Climate in Harvey County is primarily a continental climate. The weather is often variable and can change quickly. Temperature ranges can be relatively large on both a day to day and yearly basis. Annual precipitation is around 30 inches per year with the bulk of the precipitation coming during the growing season of April-October. Winters on the other hand, are very dry receiving only about 10 percent of the annual precipitation, with snowfall averaging around 16 inches per year. The prevailing winds are southerly with an average hourly velocity of around 13 miles per hour. Relative humidity is low to moderate. The mean percentage of possible sunshine is 65 to 70 percent, ranging from 60 percent during the winter to more than 75 percent in July. The warm temperatures in the spring and summer, providing a long growing season (approximately 190 days), combined with a favorable seasonal distribution of precipitation results in a climate well suited for cultivated cropland.

Temperature and precipitation data

[From records kept at Newton, Harvey County, Kansas]

Month	Temperature				Precipitation				
	Average daily maximum	Average daily minimum	Two years in 10 will have about 4 days with—		Average total	One year in 10 will have—		Days with snow cover of 1.0 inch or more	Average depth of snow on days that have a snow cover
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Totals less than—	Totals greater than—		
	°F.	°F.	°F.	°F.	Inches	Inches	Inches	Number	Inches
January	41.6	20.3	61	3	0.91	0.04	1.64	6	3
February	46.5	23.4	66	8	1.09	0.11	2.07	4	3
March	57.3	32.1	76	15	1.80	0.38	3.33	2	5
April	67.8	43.3	84	30	2.54	0.89	5.79	[1]	2
May	76.0	52.9	90	42	4.41	1.72	8.51	0	
June	86.8	63.2	100	53	4.48	1.26	9.37	0	
July	92.3	67.4	105	61	3.60	0.81	7.57	0	
August	92.2	66.8	105	59	3.33	1.03	6.14	0	
September	84.1	58.5	98	46	3.70	0.92	6.69	0	
October	71.8	46.9	87	34	2.21	0.43	5.25	0	
November	56.5	33.1	71	18	1.38	0.03	3.05	[1]	1
December	44.4	23.4	63	10	1.05	0.09	2.50	5	3
Year	68.1	44.3	[2] 105	[3] −7	30.50	20.90	42.40	18	3

[1] Less than 0.5 day.
[2] Average annual maximum.
[3] Average annual minimum.

Probabilities of last freezing weather in spring and first in fall for central part of Harvey County, Kansas

Probability	Temperature				
	16° F. or lower	20° F. or lower	24° F. or lower	28° F. or lower	32° F. or lower
Spring:					
1 year in 10 later than	March 28	April 5	April 10	April 22	May 5.
2 years in 10 later than	March 22	March 30	April 5	April 17	April 30.
5 years in 10 later than	March 10	March 20	March 27	April 7	April 20.
Fall:					
1 year in 10 earlier than	November 13	November 6	October 30	October 17	October 9.
2 years in 10 earlier than	November 19	November 11	November 3	October 22	October 13.
5 years in 10 earlier than	December 1	November 22	November 13	October 31	October 23.

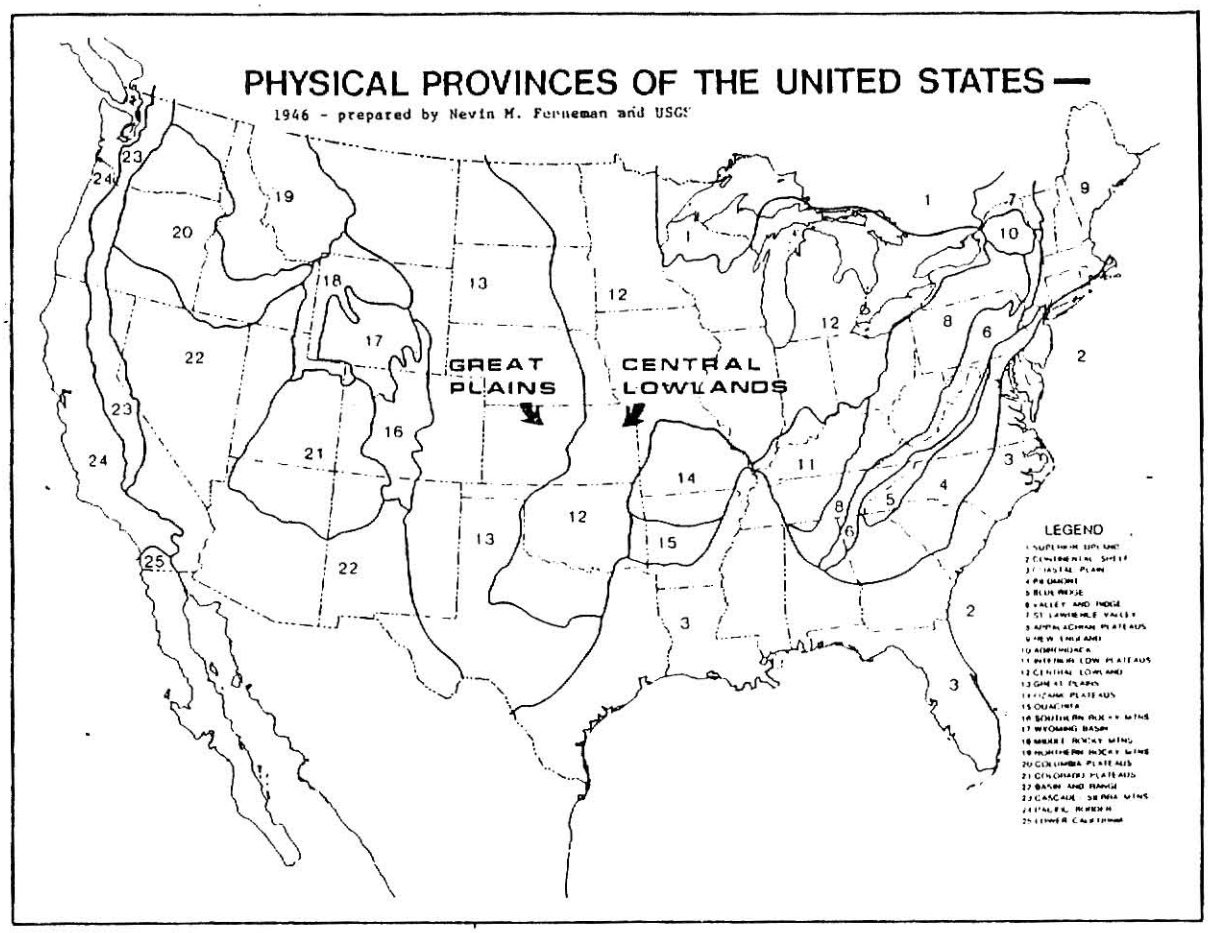
APPENDIX VIII

East Lake Visual Resource Analysis

The visual resource analysis process utilized was primarily an adaption of visual analysis processed developed by the U.S. Forest Service and the Bureau of Land Management.

Visual Resource Identification

The first step in the process is the identification of the physiographic region within which the study area lies. This provides a familiarity with the surrounding landscape and provides an opportunity to identify the visual qualities and characteristics commonly found throughout the region. The study area is located within the central lowlands of the United States (Figure 1) and is located in a transition area between the Wellington-McPherson Lowlands and the Flint Hills Uplands of Kansas (see Appendix III). This area is characterized by gently rolling topography with a combination of cultivated cropland and native rangeland. Slopes vary between 1 to 12 percent in most areas with steeper slopes found along major drainageways. Woody vegetation is found primarily along creeks and streams, on farmsteads, and in hedgerows. To the west, the Flint Hills Upland Region is characterized primarily by native rangeland with limited cropland in the valley bottoms. Upland ridges are characteristically thin soiled and flat-topped while slopes of over 25 percent occur on terraced hillsides of watershed areas. To the east, in the Wellington-McPherson Lowlands, cropland is the dominant vegetation type with large areas of deep fertile soils. Slope gradients are somewhat less in most areas becoming nearly level in some locations.


PHYSICAL PROVINCES OF THE UNITED STATES —
1946 - prepared by Nevin M. Fenneman and USGS
GREAT PLAINS
CENTRAL LOWLANDS
LEGEND

(Figure 1)

The visual study area is roughly six square miles in size and surrounds the East Lake Park (Figure 2). This area is visually dominated by East Lake Reservoir and the west branch of Whitewater Creek. The park is surrounded primarily by cropland occuring on gently rolling hills. The area within the park boundaries is characterized primarily by native grassland around the lake and woody vegetation along the upper creek area. Hedgerows, along with several farmsteads and residences, are seen throughout the study area.

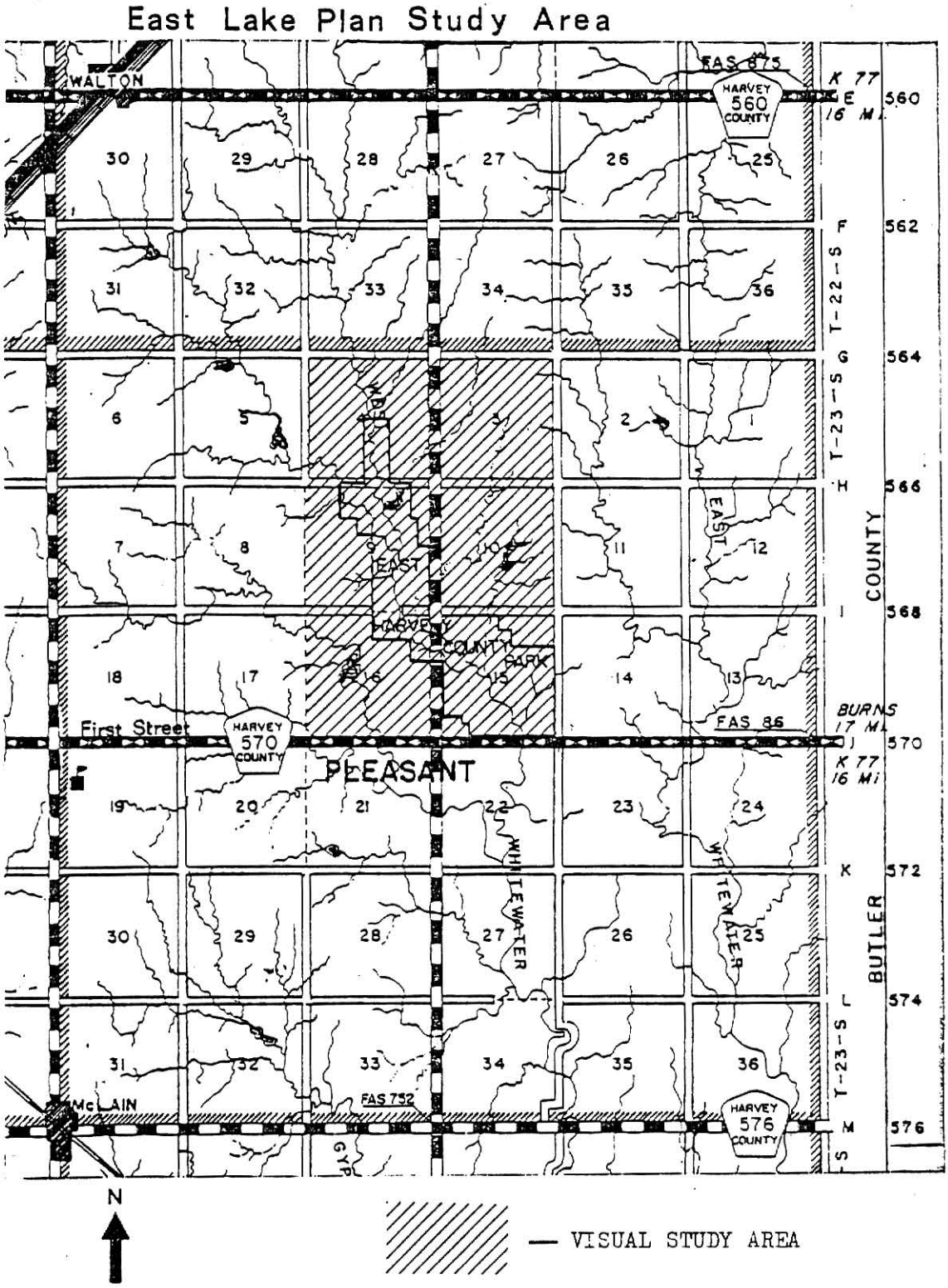
Scenic Quality Rating Units (SQRUs) were delineated based primarily on topographic and visual similarities with the study area (Figure 3).

Inventory Rating

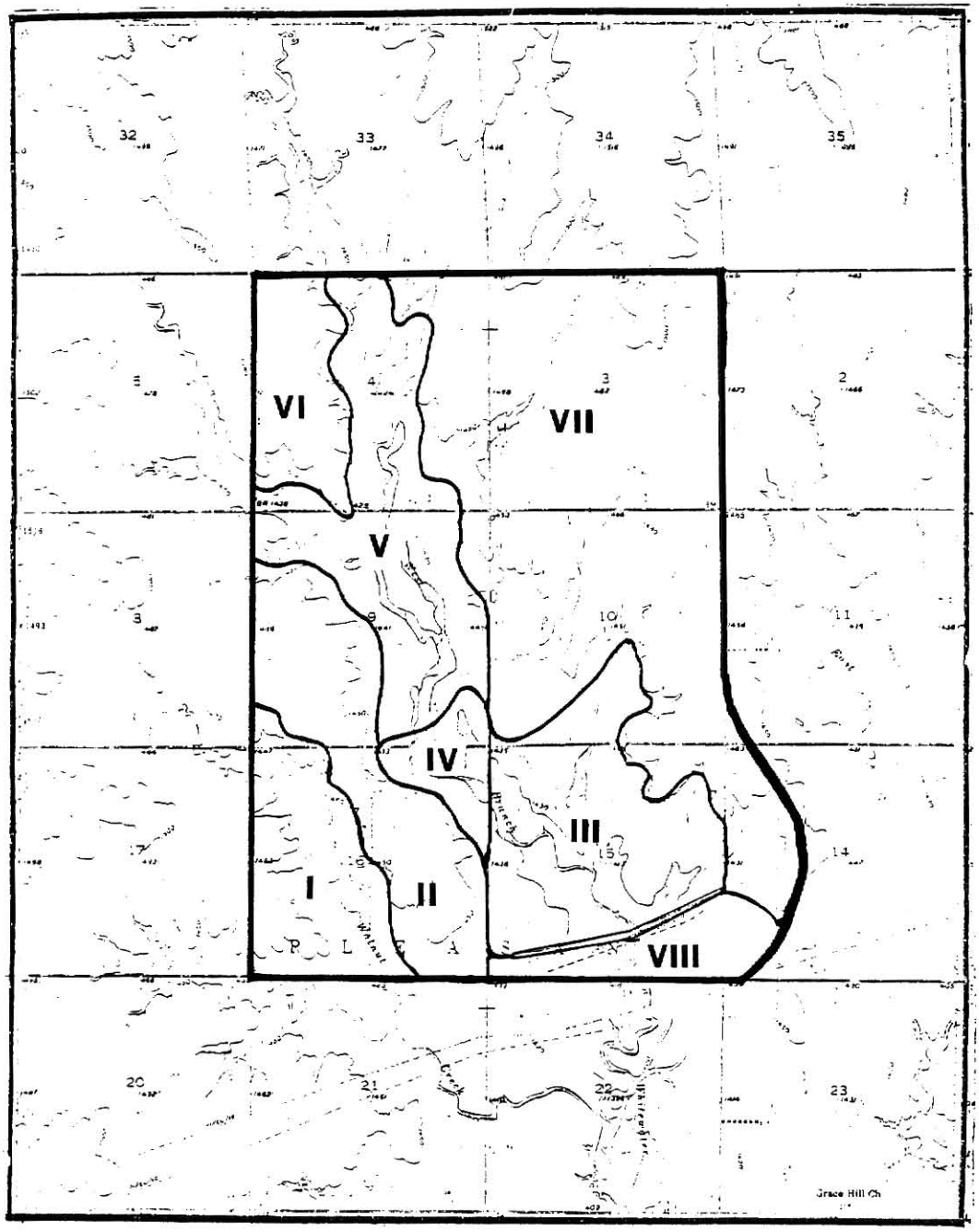
The next step involves rating each SQRU based on three major components; Scenic Quality, Visual Sensitivity, and Distance Zones.

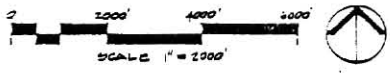
Scenic Quality is essentially the total effect of the various physical features of the landscape which combine to produce a given level of aesthic appeal when viewed together. Each SQRU is evaluated on a standard rating sheet which identifies the various individual landscape features in reaching a cumulative total. A rating scale is established discerning the relative variation in scenic quality among the various SQRUs. Three general classes (A, B, C) are established (Figure 4).

Visual sensitivity is used to assess the relative degree of user concern for changes in the visual quality of the existing landscape. The criteria for assessing visual sensitivity are: 1) User volume (number of users viewing the area), 2) Visual impact of existing cultural modifications, 3) Visual absorption capability and user attitudes. User volumes were assessed in terms of very high, high, medium, and low depending on the various activities and the location of facilities within the park. Cultural modifications within the study


East Lake Plan Study Area
WALTON
FAS 875
HARVEY 560 COUNTY
K 77
16 Mi.
560
562
564
566
568
570
572
574
576
T-22-S
T-23-S
T-23-S
EAST
HARVEY COUNTY PARK
EAST
COUNTY
BUTLER
First Street
HARVEY 570 COUNTY
PLEASANT
FAS 86
BURNS
17 Mi.
K 77
16 Mi
WHITEWATER
WHITEWATER
McLAIN
FAS 752
HARVEY 576 COUNTY
GYP
N
— VISUAL STUDY AREA

(Figure 2)





HARVEY COUNTY east lake resource analysis

HARVEY CO., KAN. SPRING 1982 K. WEDEL

SCENIC QUALITY RATING UNITS (SQRUs)

(Figure 3)

SCENIC QUALITY EVALUATION CHART

KEY FACTORS	RATING CRITERIA		
LANDFORM	5 Pronounced vertical relief typified by limestome outcroppings, moderate to deep ravines, dramatic changes in elevation, and/or dominant slopes over 15%.	3 Moderate relief, typified by gently rolling hills with moderate to shallow draws. Dominant slopes from 5-15%.	1 Slight relief, generally flat to rolling. Dominant slopes less than 5%.
VEGETATION	5 Indigenous plant materials occurring in a distinct juxtaposition of perennial grassed hilltops with heavily wooded ravines, or heavily wooded lowlands. Must have marked abscence of invader species.	3 Predominately woody plant cover or predominantely grass cover with minimal variety. Must have relative abscence of invader species. And/or cultivated land.	1 Marked presence of invader species resulting in an atypical mix of plant species.
influence of ADJACENT SCENERY	5 Greatly enhances visual quality.	3 Moderately enhances visual quality.	0 Little or no influence on over-all visual quality.
SCARCITY	6 One of a kind, or unusually memorable, or very rare within the physiographic region.	2 Distinctive, though similar to others within the physiographic region.	0 Common within the physiographic region.
WATER	5 Flowing and readily visible or still and dominant in the landscape.	3 Flowing or still-visible but not dominant.	0 Abscent or not visible.

A = 15+

B = 6-14

C = 0-5

(Figure 4)

area were not considered as significantly detracting or enhancing the existing visual quality of the area. Visual absorption capability and user attitude was subjectively evaluated on the relative ability of the landscape to visually absorb residential development and the relative sensitivity of park users to such development. Based on these three criteria the SQRUs were assessed into three visual sensitivity classes:

High - areas highly sensitive to visual modification.

Medium - areas moderately sensitive to visual modification.

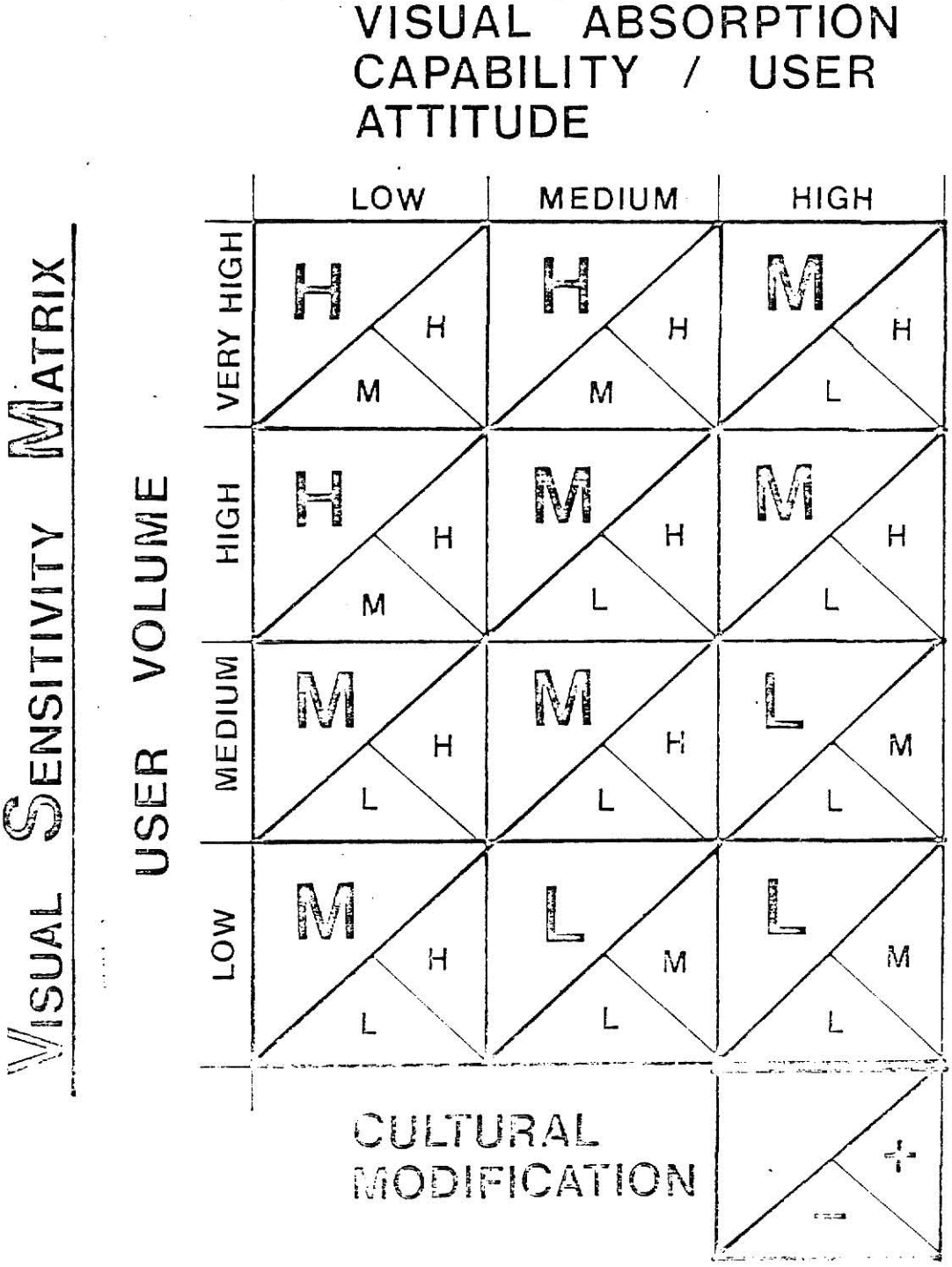
Low - areas least sensitive to visual modification.

The final determination of visual sensitivity classes was made by using a visual senstivity matrix (Figure 5).

The last component, distance zones, assesses the impact of visual change in terms of distance from the viewer. Because of the small size of the East Lake Park, distance zones were established from the park boundaries assuming an observation point anywhere within the park. Therefore, all areas within the park were considerd as foreground. Foreground outside the park was delineated as a zone extending one-fourth mile from the park boundaries. Middleground was considered as areas further than one mile. Seldom seen areas were designated as areas visually obstructed by some type of physical barrier, such as ridge lines, probibiting visual access by park usess. Consequently, seldom seen areas were not rated.

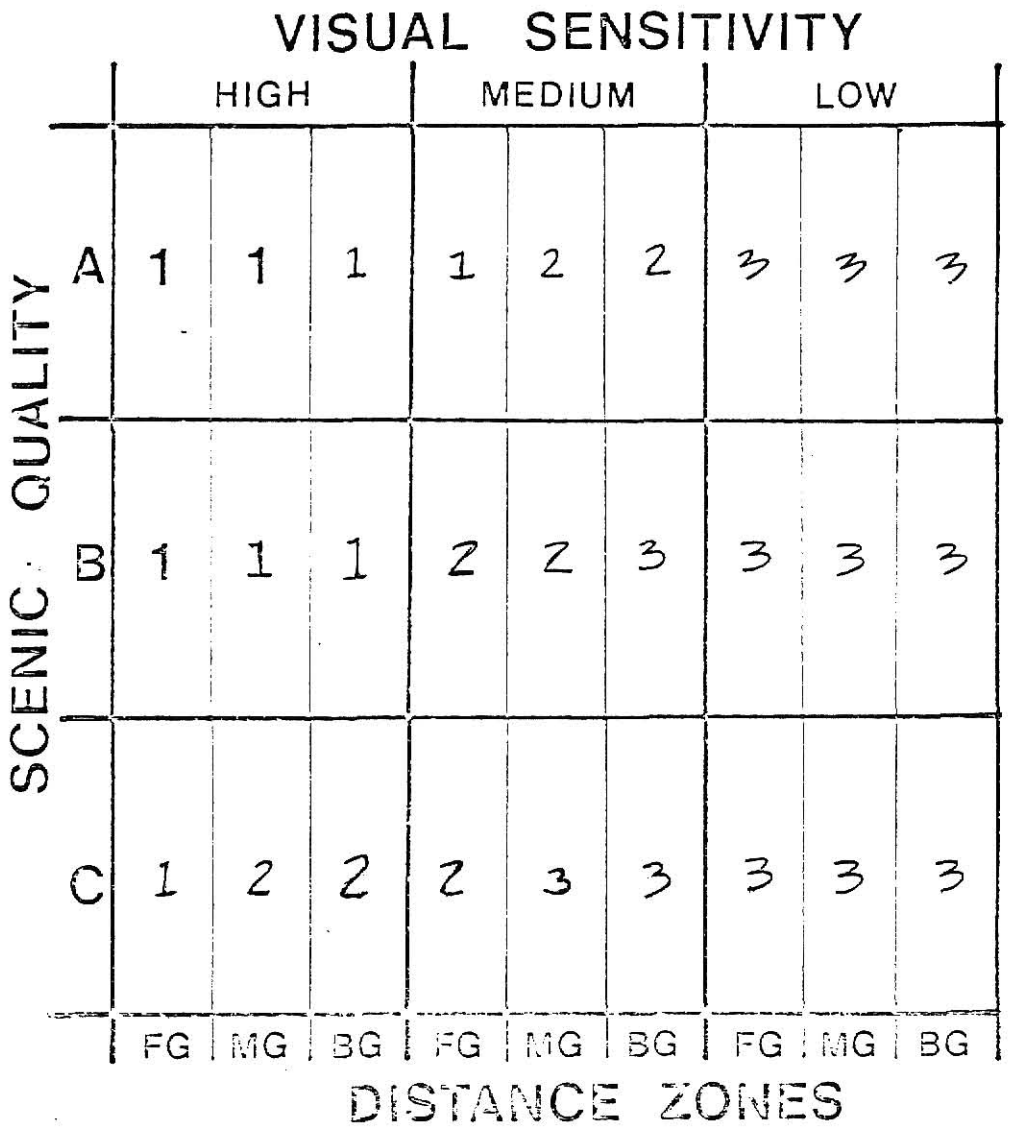
Inventory Analysis and Visual Management Classes

In these final steps, Scenic Quality, Visual Sensitivity and Distance Zones are analyzed together through an overlay process. Visual Management classes, allowing varying degrees of modification, are determined using a Visual Management Class Matrix (Figure 6).


VISUAL SENSITIVITY MATRIX
USER VOLUME
VISUAL ABSORPTION CAPABILITY / USER ATTITUDE
LOW
MEDIUM
HIGH
VERY HIGH
HIGH
MEDIUM
LOW
H H M
H H M
M H L
H H M
M H L
M H L
M H L
M H L
L M L
M H L
L M L
L M L
CULTURAL MODIFICATION
+
-

(Figure 5)

VISUAL MANAGEMENT CLASS MATRIX



See Cultural/Visual Map (Figure 4.7 in Chapter Four) for a description of individual Management Classes.

(Figure 6)

APPENDIX IX

East Lake Study Agricultural Suitability

Agricultural suitability was determined as follows:

Suitability	Group	SCS Capability Class
High	A-Prime Soils	I and II
Moderate	B-Prime Soils	III and IV with a predicted wheat crop yield of 30 bushels per acre or more
Low	Nonprime Soils	IV (wheat yields less than 30 bushels per acre) through VIII.

—Predicted average yields per acre of wheat and grain sorghum under high level management

Soil	Wheat	Grain sorghum
	Bu.	*Bu.*
Carwile fine sandy loam	26	50
Clark clay loam, 1 to 3 percent slopes	30	46
Clime silty clay, 1 to 3 percent slopes	32	44
Clime silty clay, 3 to 6 percent slopes	28	40
Crete silt loam, 0 to 1 percent slopes	42	68
Crete silt loam, 1 to 3 percent slopes	40	64
Detroit silty clay loam	42	70
Farnum fine sandy loam, 0 to 1 percent slopes	38	68
Farnum loam, 0 to 1 percent slopes	40	70
Farnum loam, 1 to 3 percent slopes	38	66
Farnum loam, 3 to 6 percent slopes	36	62
Farnum-Slickspots complex	28	40
Geary silt loam, 0 to 1 percent slopes	42	72
Geary silt loam, 1 to 3 percent slopes	40	70
Geary silt loam, 3 to 6 percent slopes	38	66
Goessel silty clay, 0 to 1 percent slopes	36	56
Goessel silty clay, 1 to 2 percent slopes	34	52
Hobbs silt loam	40	68
Irwin silty clay loam, 1 to 3 percent slopes	36	52
Irwin silty clay loam, 3 to 6 percent slopes	34	48
Irwin silty clay loam, 2 to 6 percent slopes, eroded	26	42
Kaski loam	42	68
Ladysmith silty clay loam, 0 to 1 percent slopes	36	56
Ladysmith silty clay loam, 1 to 2 percent slopes	34	54
Ladysmith-Slickspots complex	24	36
Lesho loam	30	52
Naron fine sandy loam, 0 to 1 percent slopes	36	66
Naron fine sandy loam, 1 to 4 percent slopes	34	62
Pratt loamy fine sand, 1 to 5 percent slopes	28	50
Pratt-Carwile complex	28	50
Rosehill silty clay, 1 to 3 percent slopes	32	46
Rosehill silty clay, 3 to 6 percent slopes	28	40
Smolan silty clay loam, 1 to 3 percent slopes	38	60

APPENDIX X

East Lake Study Residential Suitability

Soils

Soil suitability for residential development was determined through a matrix using the soil survey ratings of slight, moderate and severe limitations in terms of engineering properties. The three principal factors were 1) Shrink-swell potential, 2) Septic tank limitations, 3) Sewage lagoon limitations. Other factors considered included erosion potential and the American Association of State Highway Officials (AASHO) ratings.

Suitability Rating	Soil Type (Appendix II)
High	Nb
Moderate	Fd, Fe
Low	Ad, Ba, Cd, Ce, Cf, Cm, De, Go, Gs, Ho, La, Lb, Ro, Rs

Slope

Slope suitability for residential development was evaluated on the following criteria:

Suitability Rating	Slope Class
High	1 to 5 percent
Moderate	6 to 12 percent
Low	Over 12 percent, less than 1 percent

Hydrology

Although ground water in the study area is extremely variable, good wells do exist which can supply the necessary capacity for small scale residential developments.

Actual drainageways and the 100 year flood plain of Walnut and Whitewater Creeks were considered as low suitability. No significant recharge areas were identified. The remainder of the study area was considered as high suitability realizing that a sufficient water source must be verified before development could occur.

Vegetation/Wildlife Habitat

Suitability of the various plant cover types was determined on a number of factors including habit value as evaluated by the Kansas Fish and Game Commission, scarcity within the region relative to other types, dominance as a landscape element, and the relative growth period (number of years) reflected by the representative species. Suitability ratings were as follows:

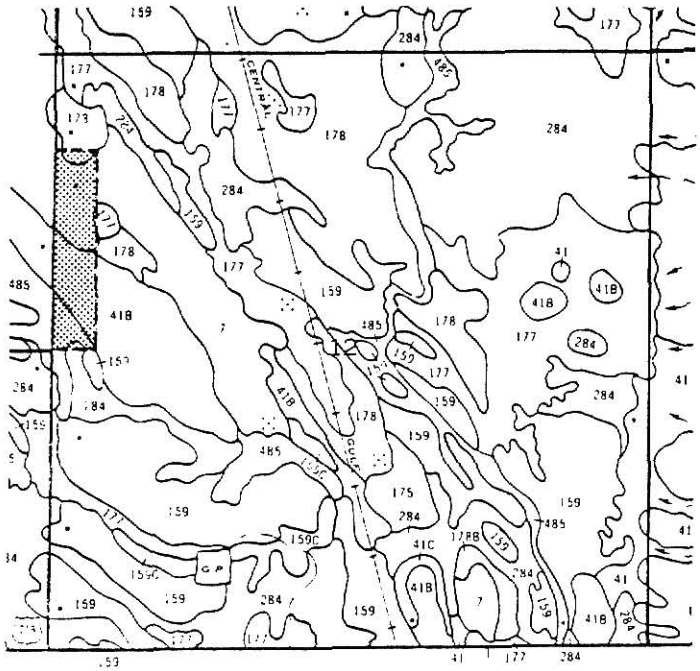
Suitability Rating	Vegetation Type
High	Crops
Moderate	Native grassland
Low	Overstory

APPENDIX XI

Black Hawk County, Iowa

Crop Suitability Ratings (CSR)

SOIL INFORMATION
BELFIELD REQUEST
NW¼ of Section 12, T 90N, R 14W



Map Symbol	Soil	CSR	Sanitary Facilities Suitability	Building Site Development	Percent of Area
7	Wiota	95	Moderate: Wetness	Severe: Wetness	42.7
41B	Sparta	40	Slight	Slight	39.0
178	Waukee	79	Slight	Slight	2.4
284	Flagler	50	Slight	Slight	1.2
485	Spillville	92	Severe: Wetness	Severe: Wetness	14.7

APPENDIX XII

Black Hawk County, Iowa

Farmland Protection Ordinance

Section VIII.
Natural Resource Protection and Preservation

A. Agricultural Lands of Highly Productive Soils Shall Be Preserved.

It shall be known that Black Hawk County, Iowa, rich in fertile productive soils desires to maintain this nonrenewable resource for future generations to employ in the production of food and fiber. Therefore, a parcel of land where more than twenty-five (25) percent of its area consists of agricultural lands of productive soils having a corn suitability rating that has been rated at sixty (60) or above shall be considered "prime" and shall be preserved as "A-1" Agricultural District, unless there are extenuating circumstances. Determination regarding corn suitability ratings and other soil characteristics shall be referenced from the official Soil Survey of Black Hawk County, Iowa, published by the United States Department of Agriculture Soil Conservation Service, December 1978. Soils boundaries shall be determined from the soil maps found in the official Soil Survey of Black Hawk County, Iowa, or from a soil map upon an aerial photograph compiled and attested by a certified soil scientist or technician.

APPENDIX XIII

Black Hawk County, Iowa

Technical Review Criteria

BLACK HAWK COUNTY PLANNING AND ZONING
COMMISSION TECHNICAL COMMITTEE REVIEW

Name of Request: Belfield Date: November 4, 1980

Location: Part of the NW¼ of Section 12, Township 90 North, Range 14 West.

Reason for Rezoning: Development of an eight lot subdivision.

I. PHYSICAL FEATURES:

A. Eco-System: Row crops, road ditch grasses, and scattered trees along fence line.

B. Soils: 7(95) Wiota Silt Loam - 42.7% of area.
41B(40) Sparta Loamy Fine Sand - 39.0% of area.
178(79) Waukee Loam - 2.4% of area.
284(50) Flagler Sandy Loam - 1.2% of area.
485(92) Spillville Loam - 14.7% of area.

C. Slope: Moderately level - 61% of area.
Moderately sloping (2 to 5%) - 39% of area.

D. Drainage Basin: Site drains west approximately one mile to the Cedar River.

E. Landscape: Terrace.

F. Surface Geology/Bedrock: Stratified Loamy and sandy alluvial sediment/ either Devonian Wapsipinicon or Silurian Niagaran.

G. Aquifer/Aquifer Recharge Zone: The bedrock formation or alluvial aquifers available. Area may be considered a minor aquifer recharge zone.

H. Flood Prone: Not in the identified flood plain.

I. Vegetation: Row crops, grasses, and scattered trees along fence line.

J. Unique Features: None.

II. SITE CHARACTERISTICS:

A. Agricultural Suitability: High.

B. Urban Suitability: Moderate.

C. Surface Drainage: Adequate on majority of parcel, some ponding may occur on southern most area of the parcel.

D. Soil Erosion: Silting of road ditch, some sheet erosion evident in open field.

E. Soil Drainage: Majority of the parcel is classified as good to excessive. The Spillville soil is poorly drained.

F. Energy Potential: No existing windbreak, level topography does not lend itself to passive earth sheltered dwellings.

G. Sewer and Water Systems: Required engineering analysis of proposed subdivision sewer and water systems per Black Hawk County Health Department criteria for subdivision developments. Recommend shared water system. Possible septic field problems associated with the Wiota and Spillville soils. Sparta soils excessive permeability may pollute the groundwater.

III. WILDLIFE HABITAT:

A. Open Land: Road ditch, minimal due to proximity of U.S. Highway 218.

B. Woodland: NA

C. Wetland: NA

IV. PUBLIC SERVICES:

A. Sewer: Individual.

B. Water: Individual.

C. School: Janesville Community School District.

D. Utilities: Iowa Public Service. Janesville Telephone Exchange District.

E. Fire Protection: Janesville Fire Department.

F. Police: County Sheriff.

G. Transportation: Access onto U.S. Highway 218 (Waverly Road). Eight separate driveways would probably not be approved by the Iowa Department of Transportation. Access road would be recommended, but would need additional land rezoned to meet "R-S" district requirements. Moderate increase in traffic.

V. SOCIOECONOMIC:

A. Economic Activities: Agricultural; trapshooting range, seed plant, and engineering firm one-half mile south.

B. Land-Value: Not available.

C. Population Distribution: Moderately sparse.

D. Historical Significance: None.

E. Cost/Revenue Flow: No available data to project flow.

AGRICULTURAL SUITABILITY CONSIDERATIONS INFLUENCING LAND USE PLANNING IN KANSAS

by

KERRY LEE WEDEL

B. S., Kansas State University, 1980

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture

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Manhattan, Kansas

1982

Abstract

AGRICULTURAL SUITABILITY CONSIDERATIONS INFLUENCING LAND USE PLANNING IN KANSAS

Agricultural land resources represent an important part of the world's land resource base. These valuable resources are essential in order to meet the future food and fiber demands of a growing population. Prime farmland is one of our most valuable natural resources. The supply of this resource is finite and nonrenewable. Unfortunately, vast amounts of prime farmland are continually being irreversibly converted to nonagricultural uses. Chapters I and II of this study assess the current global, national, and regional situation concerning prime farmland.

Kansas represents one of the most agriculturally productive areas in the world. An important reason for this is the fact that Kansas has an abundance of prime farmland. Like the rest of the nation, Kansas is currently losing a sizable amount of prime farmland each year to nonagricultural uses. This trend is expected to continue as the numbers of people increase. Although numerous state and local governments throughout the United States have seriously begun to address the situation concerning the loss of prime farmland, Kansas has made relatively little effort to preserve this invaluable resource. Chapter III examines the current situation concerning prime farmland in Kansas. The traditional land use planning process is explored and ecological planning concepts are discussed. A case study involving a resource inventory and analysis in Harvey County, Kansas is utilized in Chapter IV to evaluate and identify areas in terms of relative suitability for specific land uses, including agricultural suitability, based on inherent physical characteristics of the landscape. Through this process, the competition between agriculture and urban development for prime farmland is examined and important factors identified.

The conclusions of this study clearly indicate that efforts to preserve prime farmland in Kansas are desperately needed in light of future global and national demands. The solution to our agricultural land dilemma will ultimately rest on the

willingness of society to accept short term economic costs in order to avoid long term social costs. Chapter V discusses various recommendations and programs for preserving agricultural land.