FUTURE LAND USE IN IOWA: A WORKING PAPER

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FUTURE LAND USE IN IOWA: A WORKING PAPER

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Errata Sheet

Updated land use acreage data from Iowa DOT came after final printing of this report. Therefore, TABLE 4, "Land Use Acreage Projections for Iowa: 1960-2020," page 31, does not reflect changes in transportation acreages. However, TABLE 1, "Current Land Use Acreage Estimates for Iowa: 1977," page 23, was reprinted and does reflect the latest changes.

LIST OF TABLES

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INTRODUCTION

Iowa is not generally considered to be a battleground among the developers, agriculturists, and environmentalists. Yet, in the last decade, public concern has increased as conflicts for various uses of land has come to affect more Iowans. Urban expansion into the countryside is a common sight, especially near metropolitan areas. Simultaneously, scarce world food supplies coupled with increasing demands to protect critical environmental areas have led to an increased realization that land is in short supply and requires improved management.

The purpose of this paper is to analyze the present demands on Iowa land and project the impact of past trends and current plans and policies of certain public bodies on future land use. The paper is organized into four sections. Section I summarizes and evaluates the results of the land use projections. Section II describes the need for projecting future land uses. The methodology employed for projecting land uses and the description of each land use category as used in this paper are given in Section III. Finally, Section IV presents the results of both the current estimates and future projections of land use acreages for the state and its regions.

This working paper is partly the outgrowth of a comprehensive study done by James Gibson at Iowa State University concerning land use

acreage projections in Iowa(3). Whereas Gibson projected urban and agricultural acreages under several socio-economic conditions (see appendix), our paper has developed only one set of projections based primarily upon the latest best estimates of human demands for urban-type land uses. Beyond the scope of this paper is projecting the impact of a broad spectrum of agricultural crop yields and world food demands on agricultural land requirements.

We hope that the reader will use this paper as an opportunity on which to build additional theories and research on the subject matter.

In addition to the assistance noted in the methodology section, special thanks goes to Catherine Carpenter, a summer intern at OPP, who did most of the modeling and data compilation for this paper. Cath is a senior at Williams College in Williamstown, Massachusetts, majoring in Political Economics.

I. SUMMARY AND CONCLUSIONS

This paper estimates the current and future uses of land in Iowa through a modeling system that incorporates past urbanization trends and public agencies recent plans and policies. The study period runs from 1960 to 2020 to help establish past trends and project medium- and long-term land use acres.

The results of this land use projection, it should be remembered, are best estimates and should be taken as such. Much of the data for this model is based on the responses of 346 city and county officials to a 1975 survey of incorporated places conducted by the Iowa State University Cooperative Extension Service(4). The degree of accuracy of the survey is uncertain, although most of the jurisdictions went to great lengths to fill out the survey as accurately as possible. The real importance of this paper, however, is that a model has been developed for projecting land use categories on a state-wide basis which considers the impact of population changes and public agencies' plans and policies.

The greatest factor in projecting urban land use requirements is increase in population. According to analysis of the impact of population changes on Iowa, cities over 2,500 population will witness most of the population increase and, therefore, will require the most additional urban land. A decrease in population, however,

does not mean a decrease in urban land acres. On the contrary, even with a decrease in population, there is still some increase in urban land usage. Apparently, the relatively high amount of undeveloped land within cities makes it more attractive for building than rehabilitating older areas. Other factors, such as family income and value of farmland, have only slight impact on urban land use requirements.

Between 1960 and 2020, over 1.2 million acres of farmland is projected to be converted to non-agricultural uses. However, the current land use estimates indicate that 500,600 acres of agriculture land (over 40% of the 1.2 million) have already been converted since 1960. Thus, while the agricultural to non-agricultural land conversion rate was slightly under 30,000 acres per year during the first 17 years of the study period, the conversion rate for the remaining 43 years is predicted to drop to 17,000 acres per year. What this means is that the tremendous demand for agriculture land is predicted to subside significantly during the remainder of the study period.

The three major urban land use categories projected to absorb the most agriculture land between 1960 and 2020 are recreation (696,000 acres), residential (160,800 acres), and transportation (158,300 acres). These three categories constitute 81.8 percent of the total urban needs to the year 2020.

Much conversion of agricultural land into one of these three land use categories has already occurred. In the past seventeen years, we estimate that recreation has consumed 293,500 acres, residential another 51,000 acres, and transportation approximately 86,000 acres. The high recreational land use consumption is due primarily to the three recently completed reservoirs: Lake Rathbun, Red Rock, and Saylorville.

On the regional basis, the future need for urban land varies considerably. The region requiring the most additional urban land is Region 11 (the Des Moines area) (86,000 acres), while Region 6 (the Marshalltown area) will require only 26,000 new urban acres for the remaining 43 years of the study.

Generally speaking, most urban-type land uses (except transportation and recreation) will increase at the rate of 1 percent per year between 1977 and 2020. Transportation land use is projected to increase at the rate of .3 percent, while the corresponding figure for residential land use is 1.4 percent. Obviously, local peculiarities do exist and will cause significant variations in the amount of land used for a particular purpose in a given incorporated place. However, state and regional estimates tend to even out these peculiarities.

According to the 1975 survey, there is plenty of land available within most Iowa cities to meet the state's urban land use needs to

the year 2020. The survey results found that on an average a city in Iowa had 7.5 percent of its land which had been platted, subdivided, but not developed. Medium-sized cities, which are gaining the most population, had nearly one-fifth of all their total land available for development. Another source of land, called vacant land, was not specifically tabulated in the ISU Extension Survey. Persons filling out the survey were asked to include vacant land into the surrounding land uses, so no definite acreage could be made. However, past inventories of cities' land have shown that 10 percent of all city land is considered vacant(1). Combined with undeveloped land, these two categories represent anywhere from 15 to 30 percent of all incorporated land, depending on the size of the city.

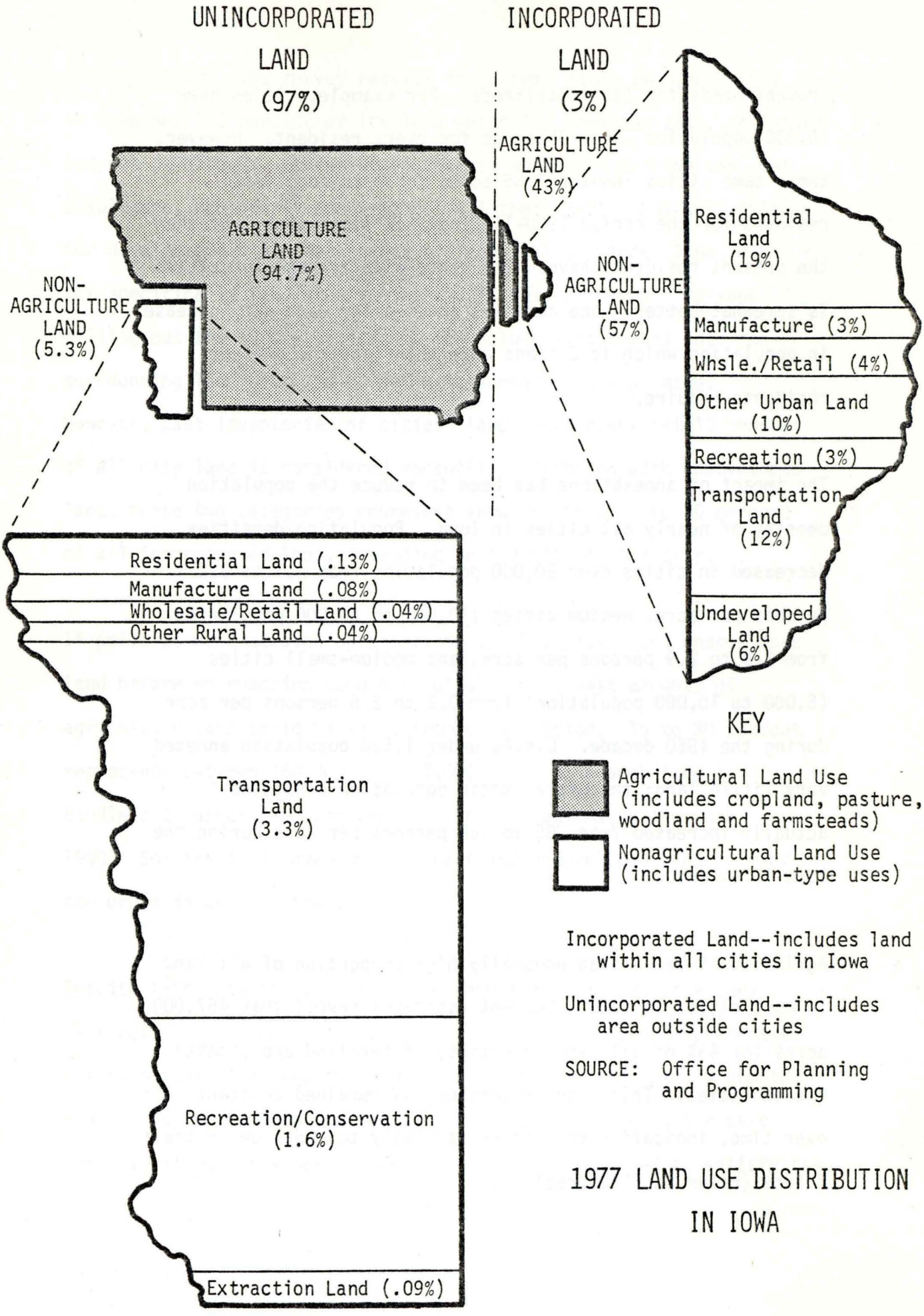
If policies were adopted by cities to develop vacant and undeveloped land before encroaching upon agriculture land, vast amounts of agriculture land could be saved from urbanization. 15 to 30 percent represents between 160,000 and 320,000 acres or enough land to handle city urban land requirements in all regions to the year 1990. Some regions have enough vacant and undeveloped land to meet the urban demands to the year 2020.

Despite this potential, cities have been annexing land at a very high rate - an average of 15,000 acres/year since 1960. Apparently, cities perceived a need to annex land to control and satisfy growth needs. As compared to the increase in population during the same period, cities are annexing far more land than required to satisfy the

present needs for its inhabitants. For example, cities over 50,000 population have .31 acres for every resident. However, these same cities annexed 1.86 acres for each additional resident for the period 1960-1970, or six times more land than the present residents have. The state-wide average for cities is somewhat better - one acre was annexed for each net increase in population which is 2 times more than land the present residents require.

The impact of annexations has been to reduce the population density of nearly all cities in Iowa. Population densities decreased in cities over 50,000 population from 4.1 to 3.2 persons per acre, medium cities (10,000 to 50,000 population) from 3.9 to 2.9 persons per acre, and medium-small cities (5,000 to 10,000 population) from 3.2 to 2.6 persons per acre during the 1960 decade. Cities under 1,500 population annexed very little land; therefore, their population densities actually increased from .85 to .89 persons per acre during the 1960-1970 period.

Agricultural land is an unusually high proportion of all land in most cities in Iowa. Current estimates reveal that 457,000 acres (or 43% of all land in cities) of farmland are located within cities. This high proportion has remained constant over time, indicating this trend is likely to continue in the future (refer to illustration).



1977 LAND USE DISTRIBUTION IN IOWA

Is all this farmland a help or a hindrance to a city? Is the revenue from the farmland property tax more than enough to compensate for the expense of providing public services? Many cities are finding that large tracts of agricultrual land are no benefit, and the potential future costs of providing services are a threat to balancing the budget.

Owning farmland within cities is a mixed blessing. Property taxes are reduced as the land is annexed, but many farms are being assessed large sums of money to help pay for sewer and water extensions. As the frequency of special assessments has been increasing in recent years, the threat becomes very real to farmers who wish to keep their land in farming.

The total agricultural land is predicted to decrease from 94.5 percent to 89.3 percent of the state total during the 60-year study period. Under average weather conditions and improved farm management practices, this loss of farmland will not affect the overall food supply and should meet most domestic and foreign demand through 2020. According to our research(3), the public policy of preserving farmland will not result in higher public benefits, and the policy of withholding fragile farmland from production will not place undue stress on the general productive capacity for the state as a whole.

The outlook for the future needs of Iowa land is generally bright. Iowa is blessed with plenty of good farmland and undeveloped urban land to meet nearly all of our future needs under normal conditions. Also, we are blessed with a stable population and a steadily improving economy. More socio-economic analyses are needed to assess critically our urban, environmental, and agricultural needs. The economic costs and benefits not only of the land use conversion, but also their resultant social costs and benefits to the people should be considered. If we can accurately predict the consequences of public policies affecting land use, Iowans will be in a better position to decide how they want to use their land in the future.

II. STATEMENT OF NEED

Iowa's first land use inventory was conducted in 1935 for the National Resources Board (16). The purpose of that inventory was to gain an understanding of how land was used on the county, state, and national level. Later, the emphasis was placed upon determining how much land was being used or could be used for agricultural production. With the increased demand for residential, commercial, and industrial land during the 1950's and 1960's, the land use related efforts were directed towards understanding the land conversion process. From these previous efforts several mechanisms were developed to inventory and project urban and rural lands in Iowa. Numerous cities and counties included land use projections in their comprehensive plans. More recent land use planning efforts have begun to deal with environmental issues, such as those associated with water and air pollution and preservation of critical environmental areas.

Currently, all levels of government in Iowa are engaged directly or indirectly in land use planning. Many federal agencies, such as the Environmental Protection Agency (EPA) and the Department of Housing and Urban Development (HUD), base their funding allocations in part on land use planning efforts. State and local levels of government requesting certain federal funds must complete an assessment of their present and projected land use needs to qualify for funds.

The State of Iowa took a major step in 1977 with the passage of House File 210, entitled, "Development of a State Land Preservation Policy (17)." Basically, the new Act requests that the 99 counties and an eighteen-member temporary state commission recommend land preservation policies to the General Assembly after receiving public input and establishing the present and future land use needs. This paper will be of particular interest to individuals and agencies as they establish current trends in land use conversion and establish a model for predicting the impact of proposed public policy alternatives on land use.

III. PROBLEMS OF DEVELOPING FUTURE LAND USE PROJECTIONS

Persons associated with an effort to project future land use are well aware of the problems involved. The problems are compounded when the land use projections are made for a large geographic area, such as a state. In general, the problems involve: 1) absence of predetermined needs, 2) lack of adequate data, 3) lack of proven modeling techniques, and 4) interjurisdictional coordination.

1) Absence of predetermined needs - One overall weakness of projecting land use is a lack of a clearcut planning process. Too often state agencies and local governments estimate present and project future land uses without first clearly defining goals and how the information will be used. The goals are vague and inconsistent (sometimes even nonexistent), making analysis of the results even more vague.

2) Lack of adequate data - For many parts of Iowa, existing land use inventories and their past trends are insufficient or nonexistent, making land use projections difficult.

3) Absence of proven modeling techniques - Projecting future land use is a very complicated task. In addition to population and economic projections, numerous other factors also impact land use. Governmental policies, land capability, and national and

world economic conditions all impact land use but are difficult to predict with any level of accuracy. Land use projections have been done usually in functional areas alone, such as projecting agricultural, industrial, or recreational acres. The interface of the various land use requirements has not been dealt with in a systematic manner.

4) Interjurisdictional Coordination - No comprehensive system of collecting, analyzing, publishing, and distributing land use data has ever been developed in Iowa. Most governmental agencies collect and maintain their own data independent of each other. There is no requirement that state and local governmental units have a uniform land use classification system for estimating land uses. Also, the different land use planning efforts use different projection dates and intervals. Some land use projections are completed only to 1990 while others project to the year 2020. With little agreement and consistency concerning land use research, the accurate projection of land use at the state level is reduced significantly.

IV. LAND USE PROJECTION MODEL

The land use projections given in this paper are primarily based upon a model developed by James A. Gibson as part of his Ph.D dissertation at Iowa State University(3). Titled "Land Use Processes and Projections, Interrelationships of Iowa Nonagricultural and Agricultural Land Uses," Gibson developed a state-wide model for projecting present and future land uses along two main land use categories - agricultural and nonagricultural land.

Gibson based his land use projections on relevant data available from numerous federal and state agencies (such as the U. S. Soil Conservation Service, the U. S. Fish and Wildlife Service, the U. S. Army Corps of Engineers, the U. S. Crop and Livestock Reporting Service, the State Departments of Transportation, Health, Soil Conservation, Environmental Quality, and the State Conservation Commission and the Office for Planning and Programming), the sixteen areawide planning organizations (APOs), the county conservation commissions, the local planning organizations, and other agenices.

To obtain more specific local data, Gibson surveyed a representative cross section of cities (247) and all counties to determine local land use acreages for both 1960 and 1970. Drawing from these specific data, Gibson determined what economic factors (income population, land valves, etc.) had an impact on past and present demands for Iowa urban land use.

We used the same linear regression equation for urban land use as Gibson, but updated the model with the latest population projections from OPP(15).

$$Y = 275.44 + .282X$$

Where Y = change in urban land acres (independent variable)
275.44 = constant
.282 = rate of land absorption
X_n = population projections for the state and each region (X_1=Region 1; X_2= Region 2; ...)(3)

In addition we used the most recent plans from relevant state agencies, such as the Iowa Department of Transportation (Iowa DOT) and the Conservation Commission. Also included were the most recent land conversion and annexation data. Finally, we adjusted Gibson's model to show the latest changes in boundaries for the 16 areawide planning organizations.

A basic assumption in our model is that Iowa land will continue to be used fifty years from now in much the same manner as it is used now. There will be the comparable type of land comsumption in response primarily to population and industrial pressures as was exhibited in previous decades. The model also assumes that there will be no surprise shocks, such as a war, major new environmental restrictions on urban growth, sudden soaring agricultural land prices, or a natural disaster.

The land use categories used in our projections have been defined briefly below. Most cateogry definitions are comparable to those used by the ISU Extension Service in their survey of local land uses (4) because those results are the primary source of data for our calculations. Following each category description is the source of information.

Agricultural land - land in farms which is not being used for non-agricultural purposes. Specifically, this category includes: cropland (harvested and unharvested), pasture, woodland pasture, forests, rangeland, and land in farmsteads, barn lots, ponds (smaller than forty acres), private roads, wasteland, etc. This definition includes farmland located within cities, also. (4, 8, 19, and 20)

Nonagricultural land - consists of urban-type land uses, such as residential, retail/wholesale, manufacturing, recreation, transportation, extraction, other urban, and undeveloped land in both city and rural areas. (5, 6, 7, 9, 10, 11, 12, and 14)

Incorporated land - land that falls within the municipal legal boundaries of cities. According to the Code of Iowa, a "city" is "a municipal corporation, but not including a county, township, school district, or any special-purpose district or authority." (Section 362.2) There are 955 incorporated urban places in the state ranging in size from twenty-some persons to nearly 200,000 persons. (3, 4, 8, 9, 10, and 11)

Unincorporated land - all land that falls outside the city limits. Over 96 percent of Iowa's land lies outside cities and is used mostly for agricultural purposes. However, unincorporated land also includes first home subdivisions, recreation homes, mobile homes, commercial, manufacturing, recreation, transportation, extraction, and other rural land uses. Areas under water are not included. (3, 4, 8, and 19)

Residential land - one of the larger users of nonagricultural land is residential land use. It includes all the forms of housing including single-family detached, duplex, multi-family, recreational, mobile home, and their associated land uses, such as roads and alleys. More than four-fifths of this land is located in incorporated places. While no information indicates what percent of residential land is used for each form of housing, a great majority of the land is in single-family detached. According to the housing information in the 1970 official population census, 81 percent of the state total housing units were single family detached. (3, 4)

Manufacturing - consists of all forms of manufacturing, processing, assembling and associated land uses. As compared to most other states, Iowa has a relatively small percentage of land used for industrial purposes (less than 1 percent). The location of manufacturing sites is fairly evenly spread between city and rural areas. (4, 12)

Wholesale/Retail/Service- includes wholesale, retail, service (including professional, governmental, educational), and associated land use. As was true with manufacturing, less than one percent of the land is used for these commercial uses. However, nearly three-fourths of commercial land is located inside city limits. (3, 4)

Other Urban/Other Rural - all non-classified land use categories which have been developed for some nonagricultural use(s). Junk-yards, cemetaries, solid waste disposal sites, and the like are grouped into the category. Over 80 percent of this land use category is located within cities. (3, 4)

Recreation land - includes all land in parks, forest preserves, recreational land associated with water reservoirs, wildlife conservation areas, golf courses, campgrounds, drive-in theaters, sports assembly complexes, and associated land uses. Recreational land is further divided between public and private land with public holding over 90% of the acreage within the category. Public recreation land is the sum total of city, county, state, and federally owned land. (5, 6, and 7)

Transportation land - the single greatest nonagricultural land use category in the state. Over 3% of the state, mostly in rural areas, is used for transportation purposes. The three main sub-categories are highway and roads, airports (public and private),

and railroads. The acreage totals include the roadway and the right-of-way. (3, 4, 9, 10, and 11)

Undeveloped land - a land use category for lands within cities which have been platted for residential, commercial, or industrial uses, but has not been developed. The land is typically located on the urban fringe or sometimes in small tracts within a developed area. (4)

Extraction land - consists of a very minute portion of Iowa land and includes both surface and underground mining. The mining includes such minerals as stone, sand, gravel, coal, gysum, cement, and clays. Land in this category includes both active and deactivated mines. Potential mining areas are not included in this category. (4)

Water area - defined as interior rivers (at least one-eighth mile wide) and lakes and rivers (greater than 40 acres in size). Despite the recent addition of reservoirs to the Iowa scene, less than one percent of the total land area is water. For purposes of this report, water area was separated from the total land area under consideration. Mississippi and Missouri Rivers are not included in this category. (19)

V. ANALYSIS OF THE RESULTS

After the data collection and modeling was accomplished as described in Section IV, present and future land use acreages were tabulated for the state. The model first calculated state-wide land use acreages which were further disaggregated for each of the 16 areawide planning organizations (see map). This section presents these results and analyzes their impact on the land resources and related public policies.

Present Land Use Estimates

Agricultural land constitutes 33.3 million acres or nearly 93% of Iowa's total land area (36.0 million acres) (refer to Table 1). According to the 1977 data furnished by the USDA Statistical Reporting Service (20), 70% of all agricultural land is used for harvesting crops. The remaining 30% is used in the following ways: grazing pasture (11%), woodlands (4.5%), other cropland (2%), and unused pasture, woodland pasture, rangeland, farmsteads, and associated land uses (12.5%).

Agriculture land is the dominant form of land use throughout the sixteen regions. There are only minor percentage differences in agricultural acreage among the regions (refer to Table 2). It varies from a high of 95.3% in Region 14 (the Creston area) to a low of 85.9% in Region 9 (the Davenport area).

SIXTEEN AREAWIDE PLANNING ORGANIZATIONS

(As designated by Iowa Office for Planning and Programming)

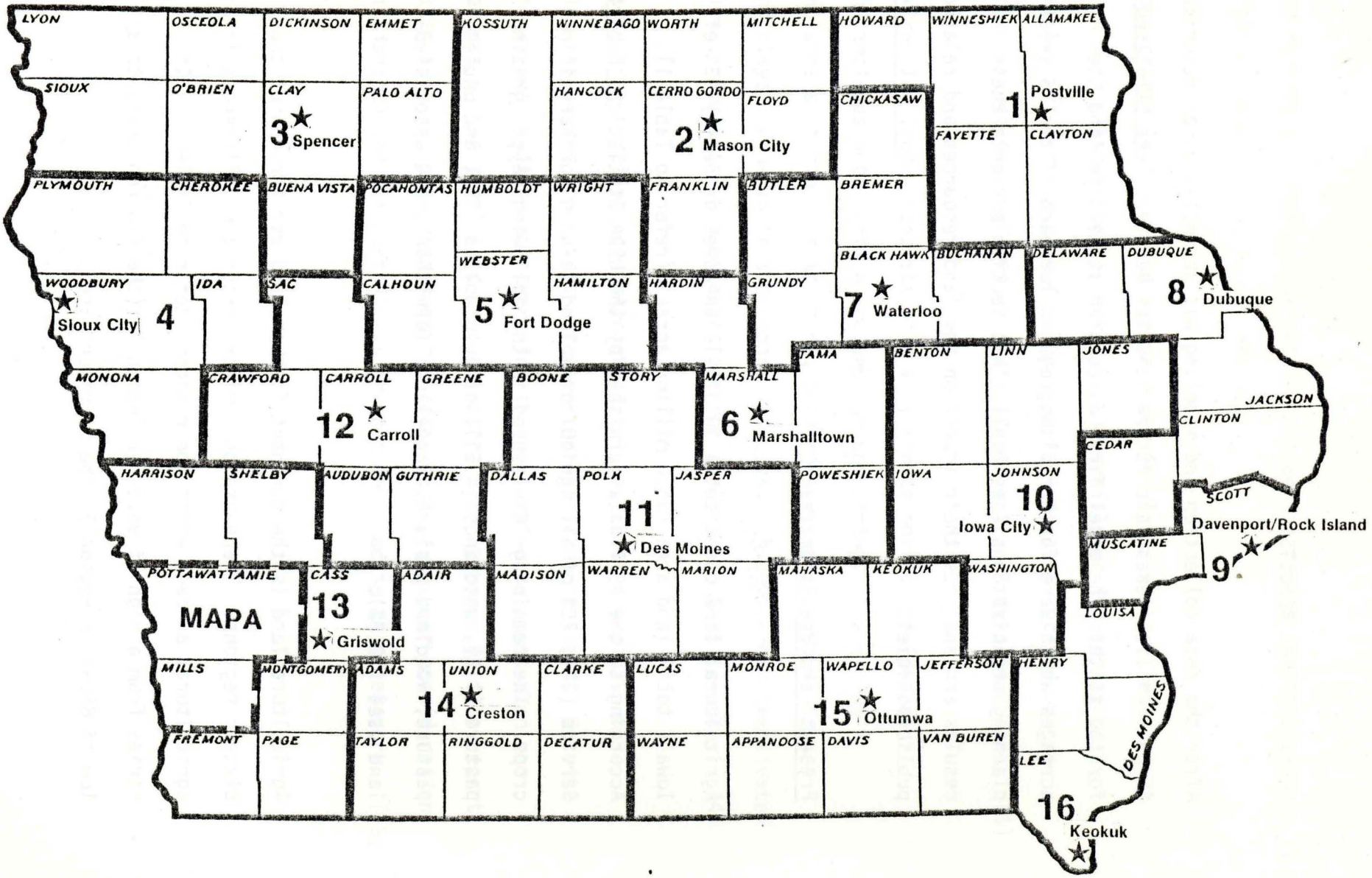


TABLE 1

CURRENT LAND USE ACREAGE ESTIMATES FOR IOWA: 1977

Land Use Category	Individual Acreage Totals	Sub Total Acres	Total Acres
INCORPORATED			1,060,200(3.0%)
NONAGRICULTURE		584,900(55.2%)	
Residential		198,500	
Manufacturing		27,900	
Wholesale/Retail/Service		39,200	
"Other Urban"		105,400	
Recreation/Conservation		35,900	
Transportation		112,300	
Highway	102,800		
Airport	3,200		
Railroad	7,300		
Undeveloped		65,700	
AGRICULTURE		469,300(44.3%)	
UNINCORPORATED			34,744,600(96.4%)
NONAGRICULTURE		1,862,600(5.3%)	
Residential		48,000	
Manufacturing		30,000	
Wholesale/Retail/Service		14,700	
"Other Rural"		16,300	
Recreation/Conservation		574,000	
Transportation		1,146,600	
Highway	1,027,800		
Airport	20,800		
Railroad	98,000		
Extraction		33,000	
AGRICULTURE		32,882,000(94.7%)	
WATER			222,400(.6%)
TOTAL STATE AREA			36,027,200(100.0%)

SOURCE: Office for Planning and Programming

TABLE 2

PERCENT OF AGRICULTURE LAND BY REGION (1970)

Region	% of Region in Ag Acreage	% of Cities within Region in Ag Acreage
1	92.6	58.3
2	94.3	49.7
3	93.3	44.3
4	94.6	43.0
5	94.5	60.0 (highest)
6	94.9	58.0
7	93.7	49.1
8	91.8	44.0
9	85.8 (lowest)	48.0
10	92.1	39.8
11	87.5	33.0
12	94.0	32.7
13	94.3	39.2
14	95.3 (highest)	41.3
15	94.0	40.2
16	87.0	29.7 (lowest)

SOURCE: Office for Planning and Programming

The 1975 ISU Extension Service survey (4) revealed higher amounts of farmland within city limits than previously thought. State-wide, our model estimates approximately 500,000 acres of land within cities is used for agricultural purposes. The average state-wide percentage of agricultrual land within cities is 43 percent, but varies significantly by population size class of cities (refer to Table 3). For example, medium-size cities (5,000-10,000 population) were found to have the lowest percent of agricultural land (33.6%), while the smallest cities (under 1,500 population) had the highest percent (53.7%). The percent of farm land in cities differs substantially from region to region, as well (refer to Table 2). Region 16 cities (the Keokuk area) had the lowest percent of agriculture land within city limits (30%). At the other extreme are Region 5 cities (the Fort Dodge area) which had an average of 60 percent agricultural land within the incorporated boundaries. Clearly, agriculture is a very important component of incorporated land use.

Nonagricultural (or urban-type) uses of land, the other major division of our model, account for only 7 percent of the total land in Iowa. The largest category within urban land is transportation representing 52 percent of all urban land acreage in Iowa. Recreation/conservation represents the second largest category with 25 percent. The remaining urban land is used for residential (10%), manufacturing (2%), wholesale/retail (2%), undeveloped (2%),

extraction (1%), and all other urban uses (5%). (Percentages do not add to 100% due to rounding.)

The allocation of urban-type land uses differ dramatically between cities and areas outside cities. Three-fourths of all non-agricultural land is located in unincorporated areas. The primary reason for this imbalance is transportation and recreational land uses which consume 92 percent of unincorporated nonagricultural land, but only 27 percent of city urban land. Residential land, on the other hand, constitutes one-third of city urban land, but only 3 percent of unincorporated urban land.

The population size has some impact on the proportion of the various land use categories within cities (refer to Table 3). Some general observations are:

-- the larger the city in population, the greater the proportion of the total city land area used for urban-type land uses;

-- size of city has little significance regarding the proportion of residential, commercial, and "other land uses";

-- cities under 1,500 population have the smallest percentages of manufacturing acreage (.8%) and recreational acreage (1.1%);

TABLE 3

1970 IOWA INCORPORATED PLACE LAND USE PROPORTIONS (in %)

Land Use Category[a]	Population Class Size						Total Incorp. State
	50,000+	10,000-50,000	5,000-10,000	2,500-5,000	1,500-2,500	Under 1,500	
Residential	26.4	17.9	23.5	27.0	27.9	21.4	23.2
Manufacturing	3.3	5.0	5.7	7.3	3.5	.8	3.3
Wholesale/Retail	4.4	8.6	3.5	4.7	6.2	2.5	4.6
Recreation/Conserv.	5.9	5.8	6.8	3.5	4.1	1.1	4.2
Undeveloped	5.2	19.0	19.5	6.9	6.4	2.7	7.5
Agriculture	34.2	37.8	33.6	40.0	43.4	53.7	43.0
Other Land Uses[b]	20.2	5.9	7.4	10.6	8.4	17.9	13.3
Total Incorp. Land	100.0	100.0	100.0	100.0	99.9	100.1	99.1

SOURCE: Gibson's thesis (3). Tables 4.1 & 4.6

[a]All land use categories include associated road and highway land use. Vacant land is not a separate category, but assigned to adjacent land uses.

[b]Other land uses include all other urban land uses not grouped in one of the above.

-- cities between 5,000 and 10,000 population have the greatest percentage of land in recreational use (6.8%);

-- cities between 5,000 to 50,000 population have the greatest proportion of land in the undeveloped category (19.25%); cities under 1,500 have only 2.7 percent undeveloped land.

Future Land Use Projections

As mentioned before, the model projects future of land uses based on past trends, current plans and population projections. Land use projections were made for 60 years at ten-year increments from the year 1960 to the year 2020.

The reader should be aware of the impact of population on future land use projections. The analysis by Gibson found that increase in population explained 80 percent of the variation in land use acreages. He also found that other factors, such as family income and value of farmland and buildings, have negligible effect on land use conversions. In simplestic terms, this means that population growth has far greater affect on the conversion of agricultural land than either family income or the price of farmland.

An analysis of where the net change in population occurred (1960-1970) helps to project future land use. First, nearly all population increases occurred within incorporated places between 1960-1970. And secondly, approximately 95 percent of the net increase occurred in cities with populations in excess of 2,500. This trend has been assumed to continue in our land use projections.

While the population of Iowa has been increasing, the rate of increase has been slow but steady. During the 1960s, the Iowa population increased by 2.5 percent. It is projected to increase slightly to 3.7% during the 1970s (15). Changes in the socio-economic factors of the population will impact urban-type land use needs. The average household size is decreasing due mainly to longer life spans, fewer children, and more single-person households. As a result, the projected need for residential land remains strong throughout the study period. Finally, two recent phenomena support an increasing population: 1) the net outmigration, which has been severe in the past, now has been reduced significantly and 2) the number of women of childbearing age has increased substantially in recent years.

The impact of population on land use is not reversible. The ISU Extension Service found out that despite the fact that 48 percent of the cities in Iowa are losing population, there is no accompanied decrease in nonagricultural (urban) land acreages. The survey

results indicate just the opposite: where the population decreased, there was an actual increase in urban land in almost every city surveyed. This phenomenon is reflected in our land use projections.

Incorporated land projections - Table 4 shows that incorporated land area will increase by 85 percent between the years 1960 and 2020. However, on a regional basis, the total incorporated area will increase by as little as 28.5 percent in Region 12 (the Carroll area) to as much as 204 percent in Region 8 (the Dubuque area) (refer to appendix). All of the 686,000 additional incorporated acres will not all be used for urban-type uses, as you might expect. Instead, 46 percent of the projected increase in incorporated land is estimated to be in agricultural use, the remainder in urban-type uses. The proportion of agricultural land of the total incorporated land, however, would continue to remain constant, the trend which was evidenced in recent years by both the Iowa DOT and OPP.

The need for urban-type land uses is responsible for the largest increase in incorporated acres. The projection of land use acres indicates that between 1960 and 2020, city urbanized land will grow from approximately 478,000 acres to 843,000. Incorporated urban land will increase from 1 percent (in 1960) to nearly 2½ percent of the total state land area in the year 2020.

TABLE 4

LAND USE ACREAGE PROJECTIONS FOR IOWA: 1960-2020

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % change
INCORPORATED AREA (% of total state land area)	801,200 (2.2%)	1,001,900 (2.8%)	1,099,100 (3.1%)	1,219,500 (3.4%)	1,315,500 (3.7%)	1,407,800 (3.9%)	1,487,400 (4.1%)	+85.7%
NONAGRICULTURE	477,600	569,600	625,200	693,200	747,800	799,200	843,000	+76.5%
Residential	154,500	185,300	205,400	229,600	249,200	267,600	283,400	+83.5%
Manufacturing	21,700	26,100	28,800	32,200	35,000	37,600	39,800	+83.5%
Wholesale/Retail	30,500	36,600	40,600	45,400	49,200	52,900	56,000	+83.5%
Other Urban	82,000	98,400	109,100	121,900	132,300	142,100	150,500	+83.5%
Recreation	28,000	33,500	37,200	41,500	45,100	48,400	51,300	+83.5%
Transportation	109,800	128,400	136,100	146,600	154,500	162,000	168,200	53.2%
Highway	86,800	106,500	116,500	129,300	139,400	149,200	157,700	+81.7%
Airport	3,200	3,200	3,200	3,200	3,200	3,200	3,200	--
Railroad	19,800	18,700	16,400	14,100	11,900	9,600	7,300	-35.0%
Undeveloped	51,100	61,300	68,000	76,000	82,500	88,600	93,800	+83.5%
AGRICULTURE	323,600	432,300	473,900	526,300	567,700	608,600	644,400	+99.0%
UNINCORPORATED AREAS (% of total state land area)	35,003,600 (97.2%)	34,802,900 (96.6%)	34,705,700 (96.3%)	34,585,300 (96.0%)	34,489,300 (95.7%)	34,397,000 (95.5%)	34,317,400 (95.3%)	- 2.0%
NONAGRICULTURE	1,483,400	1,761,300	1,917,600	2,052,400	2,149,000	2,249,100	2,355,000	+58.7%
Residential	41,100	45,300	49,800	54,800	60,300	66,300	72,900	77.4%
Manufacturing	25,700	28,300	31,100	34,300	37,700	41,500	45,600	77.4%
Wholesale/Retail	12,500	13,800	15,200	16,700	18,400	20,300	22,300	78.4%
Other Rural	13,900	15,400	16,900	18,600	20,400	22,500	24,700	77.7%
Recreation	288,400	511,200	611,500	700,000	787,000	874,100	961,100	233.3%
Transportation	1,076,100	1,116,900	1,158,400	1,189,000	1,181,900	1,176,700	1,176,400	9.3%
Highway	958,700	996,900	1,044,600	1,083,500	1,083,500	1,083,500	1,083,500	13.0%
Airport	13,200	21,900	27,700	31,100	35,100	35,100	35,100	165.9%
Railroad	104,200	98,100	86,100	74,400	63,300	58,100	57,800	-44.5%
Extraction	25,700	30,400	34,700	39,000	43,300	47,700	52,000	+102.3%
AGRICULTURE (% of total state land area)	33,520,200 (93.6%)	33,041,600 (92.3%)	32,788,100 (91.6%)	32,532,900 (90.9%)	32,340,300 (90.3%)	32,147,900 (89.8%)	31,962,400 (89.3%)	- 4.6%
TOTAL AGRICULTURAL (% of total state land area)	33,843,800 (94.5%)	33,473,900 (93.5%)	33,262,000 (92.9%)	33,059,200 (90.9%)	32,908,000 (90.3%)	32,756,500 (89.8%)	32,606,800 (89.3%)	- 3.7%
WATER	222,400	222,400	222,400	222,400	222,400	222,400	222,400	--
TOTAL STATE ACREAGE	36,027,200	36,027,200	36,027,200	36,027,200	36,027,200	36,027,200	36,027,200	--

SOURCE: Office for Planning and Programming

The proportion of residential, manufacturing, and wholesale/retail, recreation, undeveloped, and "other urban" land use category acreages is assumed to remain constant throughout the study period. Referring to the land use inventory of Iowa in 1935 (15), our office underscored the fact that proportions of municipal urban land have remained surprisingly stable over 40 years. Therefore, our model projects the following urban categories will remain a fairly constant proportion of incorporated land: residential (23%), manufacturing (3.3%), wholesale/retail (4.6%), recreation (4.2%), undeveloped (7.5%), and "other urban" (13.3%).

Transportation acreage within cities are estimated to increase within cities, but not as rapidly as other urban land use categories. Using Iowa DOT projections (9, 10 and 11), transportation acreage will increase by 5 percent every 10 years. Highways and roads, a major part of transportation in Iowa, will increase by approximately 6% per decade. Airport acreage is not predicted to increase at all, because Iowa DOT assumes that airport growth will occur largely outside cities. Railroad acreage will continue to decrease significantly within cities. Most of the decrease will occur in the once large railroad switching yards, which are rapidly being converted to other urban uses.

Agriculture land, as mentioned before, will continue to occupy a considerable portion of city land. In fact, there was enough farm

land available within cities in 1970 to absorb all the projected urban growth within incorporated places to the year 2020 in every region but one. (Region 11 would run out of city agricultural land in 2010.) Agriculture land within cities is projected to double in acreage (99%) over the 60-year period, assuming that the proportion of incorporated farmland remains constant. By the year 2020, nearly 2 percent of all agricultural land will be situated within city boundaries (644,500 acres).

Annexation of land is very popular among Iowa cities. Its primary purpose is to assist cities in providing for and controlling urban growth. Our research found that thousands of acres are annexed every year by cities of all sizes. Based on the ISU Extension survey, nearly 200,000 acres were annexed by Iowa cities between 1960-1970. A more recent study by OPP (14) found that larger cities (those over 5,000 population) tend to annex land at least once every eight years, while smaller cities (under 500 population) rarely, if ever, annex land.

The era of large acreage annexation has apparently come to an end. Annexations during the first seven years of this decade show considerably less land taken into the city. Therefore, we project that the total acres annexed each decade will be half of what it was between 1960-1970. Nevertheless, this amount (approximately 100,000 acres per 10 years) is still unusually high, considering the large amounts

of vacant, undeveloped, and agriculture land presently available within cities for urban growth.

Annexation is directly related to population increase and size of city (refer to Table 5). The results show that despite the fact that city populations have increased, the recently annexed land has caused the population density to decrease. For example, cities over 50,000 population annexed 1.86 acres of land for every net population increase between 1960-1970. Medium sized cities annexed approximately one acre for each net increase in population. The cities under 1,500 population, which were not involved in any significant annexation actions between 1960 and 1970, were the only class of cities to show an actual increase in density.

Unincorporated land projections - 96.4% of Iowa land is unincorporated, of which 94.7% is estimated to be in agricultural use in 1977. This percentage, however, has been decreasing as cities continue to annex more land and urban sprawl absorbs more farm land for urban-type uses. During the study period (1960-2020), over 1½ million acres of unincorporated agriculture land is projected to be annexed or converted to urban-type land uses. Of this, approximately 300,000 acres are expected to remain in agricultural production. By 2020, only 89 percent of the state will be unincorporated land in agricultural use.

Unincorporated urban-type land use is only a small portion of total unincorporated land (less than 6%). However, between 1960 and 2020 urban land will show a net increase of 871,000 acres for all unincorporated nonagricultural categories, except one. All but 100,000 acres of that will be absorbed for transportation and recreational uses. As of 1977, we estimate that nearly 40 percent of the land conversion to urban-type uses has already taken place. In short, the rate of conversion is predicted to slow considerably during the remaining 43 years of the study period.

The urban-type unincorporated land uses, such as residential, manufacturing, wholesale/retail, and other rural (cemeteries, junkyards, salvage lots) categories presently constitute only one-third of one percent of state land area. Each is projected to have a net annual increase of 1%. (Some of this land will become annexed, and therefore, part of the incorporated figures.)

Recreation land use is the fastest growing category among unincorporated land use in Iowa. Between 1960 and 1970, recreation acreage increased by 222,779 acres, an increase of 77%. Most of the increase came from three new federal reservoirs: Rathbun, Red Rock, and Saylorville. Considering that the U.S. Army Corps of Engineers has no new reservoir projects scheduled for Iowa, we assume that conversion of farmland to recreational uses will be much slower than was the case in the past. Total unincorporated

recreation is projected to be 961,000 acres by the year 2020 or nearly 3 percent of the non-city land. Not all of the increases in recreational land is expected to come from farmland; for example, Iowa DOT is considering the use of abandoned railroad lines for recreational use such as hiking, cycling, and ski trails (17).

The largest urban-type unincorporated land use is transportation. In 1960, over 3 percent of the total state land area was devoted for roads, highways, airports, and railroads. According to the Iowa DOT's 1977 "Land Use and Transportation in Iowa" (10) and their 1976 summary update of Iowa DOT's State Airport System Plan (SASP)(9), transportation land use in unincorporated areas is expected to increase by 100,000 acres between 1960 and 2020.

Non-city rural interstates, highways, and roads are projected to increase by 125,000 acres during the 1960-2020 period. However, most of this increase has already taken place. As of 1977, over 71,000 acres have been converted to highway use. According to the state highway plan of the Iowa Highway Commission, highway acres added after 1990 will be offset by secondary road acres deactivated. Thus, after 1990 there is no net increase in road acres for unincorporated areas of Iowa.

Airport land use projections are more tentative than highway plans, but the goals are clearly mapped out in the SASP (9). The plan

calls for 21,800 additional airport acres by 1990 (the scheduled completion date) subject to state and federal funding. Our model assumes that the plan will be successfully completed.

Railroad acreage projections are the only nonagricultural land use category likely to decrease in the future. Based on a 50-year trend of rail deactivation and the Iowa DOT "Transplan" (11), unincorporated railroad acreage is projected to decrease from 104,000 acres in 1960 to 58,000 acres in 2020. The present rail deactivation is 1,400 acres/year, but Iowa DOT projects deactivation should nearly cease by the turn of the century. Changes in Iowa's basic transportation needs could reverse the trend used in the projection model, but such changes are not predictable at this time.

Extraction land, land used for mining, is a very small proportion of Iowa's unincorporated land. In 1960, the approximately 25,700 acres of extraction land were the smallest land use category in the state. Mining is projected to increase at its historical trend rate of 480 acres/year to a total of 51,938 acres in 2020. The historical trend method assumes no major changes in consumer demand. Thus, a technical breakthrough in mining and burning of Iowa's coal (presently restricted in use because of its high sulfur content) will render these projections low.

Land under water is projected to remain at its present level of 222,400 acres. The four federal reservoirs - Coralville, Rathbun, Red Rock and Saylorville - are included in this total. According to the Corps and the State Conservation Commission, no definite plans have been made for any artificial lakes of greater than 40 acres in the foreseeable future.

Projection of agricultural needs - For this model, agricultural acreage projections are related to the findings stated earlier: population has more impact on the use of land than family income or the value of farmland. Therefore, we assume urban needs will be satisfied before agricultural needs. Consequently, our model calculated urban needs first and accounted for agricultural land use from the remaining land.

What is the potential impact of converting farm land to urban-type land uses? Our model does not attempt to predict crop yields and foreign and domestic demands as Gibson did (3), but simply looks at the potential loss by today's farming standards. Considering all agriculture land in Iowa, over 1.2 million acres are estimated to be converted to non-agricultural uses between 1960 and 2020. That's 20,500 acres per year that would be irretrievably lost to nonagricultural uses. Such a loss of 1.2 million acres of farm land could mean a substantial loss of potential crop production. By the year 2020, a potential 111 million bushels of corn per year

would be lost (assuming 90 bushels of corn per acre). At the current price of $2/bushel, that's $222.6 million value of production that Iowa farmers would not be receiving. Considering the present farm size is 261 acres, 1.2 million acres means that an equivalent of 4,600 farms would be converted to various urban land uses (13).

On the other hand, the additional urban acres will supply much needed land for residential, commercial, manufacturing, recreational, and transportation uses. The benefits for providing the following are hard to calculate: enough land so everyone can live in their own home, enough land for industry so that Iowa's economy can remain viable, enough land for transportation so that travel can be safer and more convenient, and enough land to provide for our increasing recreational needs while protecting our fragile land from exploitation.

Obviously, the cost/benefit ratio of converting agricultural land is extremely difficult to determine and an ideal subject for additional investigation.

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APPENDIX

Beyond the scope of this report is the projection of the need for agricultural land under varying conditions. However, Gibson's dissertation did extensive modeling in this area and his conclusions are noteworthy. His model projected crop production for varying yields and varying world food demands. Into this model, Gibson injected two basic public policy alternatives: a) remove all prime agricultural land from potential development, and b) remove all fragile agriculture land from potential agriculture production.

The following state-wide conclusions were made by Gibson:

1) The policy of preserving prime agricultural land from non-agricultural land use conversion had a negligible effect on increasing Iowa's cropland resource use capacity in the near-, medium-, and long-term for all projected crop yields and food demands. (Gibson used near-term to mean 1980, medium-term to mean 2000, and long-term to mean 2020.) The differential regional impact of such a policy was also found to be small.

2) While preserving prime farmland will increase crop production, the results may prove to be of small benefit to the

public (i.e., food prices are not likely to be lower). However, Gibson noted that other possible benefits of preserving prime agricultural land are ignored in this conclusion. Theoretically, there would be an increase in environmental quality and potential food supplies to meet any major catastrophy.

3) The public policy of improving the quality of the environment by removing fragile Iowa farmland from production did not place undue stress on the general productive capacity of the state, except under extreme conditions (high crop demand and low-yield production). Gibson added that this policy affected the 16 regions differently. Some regions would be economically hurt much more than others if this policy were implemented. The overall costs and benefits on the regions should be considered before removing fragile farmland from production potential.

LAND USE ACREAGE PROJECTIONS

for the 16

AREAWIDE PLANNING ORGANIZATIONS

TABLE 1A

Land Use Acreage Projections for Region 1[a]

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % change
(Population Projections[b])	(72,329)	(95,672)	(97,203)	(101,563)	(104,832)	(108,325)	(112,209)	(55.1%)
INCORPORATED AREAS[c]	28,406	29,574	33,667	39,874	45,348	50,971	56,857	100.1%
Urban	11,386	12,331	14,140	16,747	19,046	21,408	23,880	109.7%
Agricultural	17,020	17,243	19,527	23,127	26,302	29,563	32,977	93.8%
UNINCORPORATED AREA	2,084,874	2,083,706	2,079,613	2,073,406	2,067,932	2,062,309	2,056,423	-1.4%
Residential	2,210	2,438	2,682	2,950	3,244	3,569	3,925	77.6%
Manufacturing	244	269	295	325	358	393	433	77.5%
Wholesale-Retail	1,489	1,641	1,806	1,986	2,185	2,403	2,644	77.6%
Other Rural	568	627	689	758	834	918	1,009	77.7%
Recreation	29,526	56,138	66,138	71,088	76,038	80,988	85,938	191.1%
Transportation	55,813	57,354	58,670	59,907	59,133	59,133	59,133	5.9%
Highway	50,813	53,024	54,632	56,240	56,240	56,240	56,240	10.7%
Airport	168	447	627	729	835	835	835	397.0%
Railroad	4,125	3,883	3,411	2,938	2,058	2,058	2,058	-50.1%
Extraction	684	810	1,018	1,226	1,434	1,642	1,850	170.5%
Agricultural	1,994,340	1,964,429	1,948,315	1,935,166	1,924,706	1,913,263	1,901,491	-4.7%
Total Agricultural Incorp + Unincorp	2,011,360	1,981,672	1,967,842	1,958,293	1,951,008	1,942,826	1,934,468	-3.8%
Water	27,648	27,648	27,648	27,648	27,648	27,648	27,648	0%
Region Total Acreage	2,140,928	2,140,928	2,140,928	2,140,928	2,140,928	2,140,928	2,140,928	0%

Source: Iowa Office for Planning and Programming

[a]Region 1 (Upper Explorerland Regional Planning Commission) includes the following counties: Allamakee, Clayton, Fayette, Howard and Winneshiek

[b]O.P.P. population projections; includes both rural and urban population for Region 1

[c]Total land within all incorporated cities in Region 1

TABLE 2A

Land Use Acreage Projections for Region 2 [a]

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % change
(Population Projections[b])	(163,787)	(153,863)	(154,357)	(159,161)	(162,101)	(165,238)	(167,936)	(2.5%)
INCORPORATED AREAS [c]	63,478	66,406	71,446	78,562	84,628	90,804	96,732	52.4%
Urban	30,616	33,380	35,723	39,281	42,314	45,402	48,366	57.9%
Agricultural	32,862	33,026	35,723	39,281	42,314	45,402	48,366	47.2%
UNINCORPORATED AREA	2,804,362	2,801,434	2,796,394	2,789,278	2,783,212	2,777,036	2,771,108	-1.2%
Residential	3,107	3,426	3,769	4,146	4,561	5,016	5,518	77.6%
Manufacturing	1,132	1,248	1,372	1,510	1,661	1,827	2,009	77.5%
Wholesale-Retail	604	666	732	806	886	975	1,072	77.5%
Other Rural	1,020	1,125	1,237	1,361	1,497	1,647	1,812	77.6%
Recreation	15,593	21,240	27,313	33,386	39,459	45,532	51,605	230.9%
Transportation	89,623	93,317	95,194	97,408	96,516	95,690	95,690	6.8%
Highway	78,617	82,087	85,115	87,330	87,330	87,330	87,330	11.1%
Airport	692	1,522	1,552	2,732	3,021	3,021	3,021	336.5%
Railroad	10,314	9,708	8,527	7,346	6,165	5,339	5,339	-48.2%
Extraction	3,464	4,096	4,758	5,420	6,082	6,744	7,406	113.8%
Agricultural	2,689,819	2,676,316	2,662,019	2,645,241	2,632,550	2,619,605	2,605,996	-3.1%
Total Agricultural Incorp + Unincorp	2,722,681	2,709,342	2,697,742	2,684,522	2,674,864	2,665,007	2,654,362	-2.5%
Water	6,144	6,144	6,144	6,144	6,144	6,144	6,144	0%
Region Total Acreage	2,873,984	2,873,984	2,873,984	2,873,984	2,873,984	2,873,984	2,873,984	0%

Source: Iowa Office for Planning and Programming

[a]Region 2 (North Iowa Area Council of Governments) includes the following counties: Cerro Gordo, Floyd, Franklin, Hancock, Kossuth, Mitchell, Winnebago and Worth

[b]O.P.P. population projections; includes both rural and urban population for Region 2

[c]Total land within all incorporated cities in Region 2

TABLE 3A

Land Use Acreage Projections for Region 3 [a]

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % change
(Population Projections[b])	(110,778)	(146,433)	(152,586)	(161,635)	(166,747)	(171,271)	(175,722)	(58.6%)
INCORPORATED AREAS [c]	44,674	51,266	58,550	67,534	74,536	81,241	87,909	96.8%
Urban	24,113	28,574	32,788	37,819	41,740	45,495	49,229	104.2%
Agricultural	20,561	22,692	25,762	29,715	32,796	35,746	38,680	88.1%
UNINCORPORATED AREA	3,029,886	3,023,294	3,016,010	3,007,026	3,000,024	2,993,319	2,986,651	-1.4%
Residential	580	639	703	774	851	936	1,029	77.4%
Manufacturing	95	105	116	127	140	154	169	77.9%
Wholesale-Retail	220	243	267	294	323	356	391	77.7%
Other Rural	1,090	1,202	1,322	1,454	1,600	1,760	1,935	77.5%
Recreation	38,351	42,204	49,092	55,980	62,868	69,756	76,644	99.8%
Transportation	96,728	100,565	101,491	102,304	101,398	100,572	100,572	4.0%
Highway	85,328	89,046	90,941	92,836	92,836	92,836	92,836	8.8%
Airport	1,086	1,811	2,023	2,122	2,397	2,397	2,397	20.7%
Railroad	10,314	9,708	8,527	7,346	6,165	5,339	5,339	-48.2%
Extraction	3,418	4,041	4,282	4,523	4,764	5,005	5,246	53.5%
Agricultural	2,889,404	2,874,295	2,858,731	2,841,570	2,828,080	2,814,780	2,800,665	-3.1%
Total Agricultural Incorp + Unincorp	2,909,965	2,896,987	2,884,499	2,871,285	2,860,876	2,850,526	2,839,345	-2.4%
Water	30,464	30,464	30,464	30,464	30,464	30,464	30,464	0%
Region Total Acreage	3,105,024	3,105,024	3,105,024	3,105,024	3,105,024	3,105,024	3,105,024	0%

Source: Iowa Office for Planning and Programming

[a]Region 3 (Northwest Iowa Regional Council of Governments) includes the following counties: Buena Vista, Clay, Dickinson, Emmet, Lyon, O'Brien, Osceola, Palo Alto and Sioux

[b]O.P.P. population projections; includes both rural and urban population for Region 3

[c]Total land within all incorporated cities in Region 3

TABLE 4A

Land Use Acreage Projections for Region 4 [a]

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % change
(Population Projections[b])	(215,381)	(165,995)	(169,814)	(177,192)	(183,761)	(190,089)	(195,158)	(-9.4%)
INCORPORATED AREAS [c]	55,884	58,400	62,733	68,800	74,467	80,014	84,939	52.0%
Urban	32,054	33,304	35,758	39,216	42,446	45,608	48,415	51.0%
Agricultural	23,830	25,100	26,975	29,584	32,021	34,406	36,524	53.3%
UNINCORPORATED AREA	2,143,796	2,141,280	2,136,947	2,130,880	2,125,213	2,119,666	2,114,741	-1.4%
Residential	1,127	1,243	1,367	1,503	1,654	1,819	2,001	77.6%
Manufacturing	624	688	757	833	916	1,008	1,108	77.6%
Wholesale-Retail	309	341	375	412	454	499	549	77.7%
Other Rural	829	914	1,006	1,106	1,217	1,339	1,473	77.7%
Recreation	3,957	10,713	17,549	19,385	26,221	33,057	39,893	908.2%
Transportation	65,523	68,553	71,542	73,173	72,931	72,931	72,931	11.3%
Highway	59,442	61,736	64,377	66,392	66,392	66,392	66,392	11.7%
Airport	1,956	2,934	3,754	3,843	3,860	3,860	3,860	97.3%
Railroad	4,125	3,883	3,411	2,938	2,679	2,679	2,679	-35.1%
Extraction	473	560	871	1,182	1,493	1,804	2,115	347.1%
Agricultural	2,070,954	2,058,268	2,043,480	2,033,286	2,020,327	2,007,209	1,994,671	-3.7%
Total Agricultural Incorp + Unincorp	2,094,784	2,083,368	2,070,455	2,062,870	2,052,348	2,041,615	2,031,195	-3.0%
Water	3,584	3,584	3,584	3,584	3,584	3,584	3,584	0%
Region Total Acreage	2,203,264	2,203,264	2,203,264	2,203,264	2,203,264	2,203,264	2,203,264	0%

Source: Iowa Office for Planning and Programming

[a]Region 4 (Siouxland Interstate Metropolitan Planning Council) includes the following counties: Cherokee, Ida, Monona, Plymouth and Woodbury

[b]O.P.P. population projections; includes both rural and urban population for Region 4

[c]Total land within all incorporated cities in Region 4

TABLE 5A

Land Use Acreage Projections for Region 5 [a]

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % chance
(Population Projections[b])	(130,602)	(123,672)	(118,668)	(118,810)	(119,138)	(119,682)	(119,721)	-8.3%
INCORPORATED AREAS [c]	54,411	63,999	64,693	68,925	68,288	72,803	76,963	41.4%
Urban	22,346	25,635	25,877	27,570	27,315	29,121	30,785	37.7%
Agricultural	32,065	38,364	38,816	41,355	40,973	43,682	46,178	44.0%
UNINCORPORATED AREA	2,159,349	2,149,761	2,149,067	2,144,835	2,145,472	2,140,957	2,136,797	-1.0%
Residential	1,174	1,294	1,424	1,566	1,723	1,895	2,084	77.5%
Manufacturing	621	685	753	829	912	1,003	1,103	77.6%
Wholesale-Retail	2,156	2,377	2,615	2,876	3,164	3,481	3,828	77.6%
Other Rural	617	680	748	823	905	995	1,095	77.5%
Recreation	6,643	12,083	17,712	23,341	28,970	34,599	40,228	505.6%
Transportation	70,507	72,776	73,995	74,748	73,806	73,062	73,062	3.6%
Highway	60,401	62,666	64,799	66,557	66,557	66,557	66,557	10.2%
Airport	824	1,373	1,522	1,580	1,700	1,700	1,700	106.3%
Railroad	9,282	8,737	7,674	6,611	5,549	4,805	4,805	-48.2%
Extraction	1,674	1,980	2,409	2,838	3,267	3,696	4,125	146.4%
Agricultural	2,075,957	2,057,886	2,049,411	2,037,814	2,032,725	2,022,226	2,011,272	-3.1%
Total Agricultural Incorp + Unincorp	2,108,022	2,096,250	2,088,227	2,079,169	2,073,698	2,065,908	2,057,450	-2.4%
Water	3,968	3,968	3,968	3,968	3,968	3,968	3,968	0%
Region Total Acreage	2,217,728	2,217,728	2,217,728	2,217,728	2,217,728	2,217,728	2,217,728	0%

Source: Iowa Office for Planning and Programming

[a]Region 5 (Midas Council of Governments) includes the following counties: Calhoun, Hamilton, Humboldt, Pochahontas, and Webster

[b]O.P.P. population projections; includes both rural and urban population for Region 5

[c]Total land within all incorporated cities in Region 5

TABLE 6A

Land Use Acreage Projections for Region 6[a]

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % change
(Population Projections[b])	(101,230)	(102,274)	(108,455)	(115,154)	(118,593)	(120,681)	(121,747)	(20.3%)
INCORPORATED AREAS[c]	27,533	34,005	40,693	47,814	52,748	56,774	60,112	118.3%
Urban	11,495	14,246	17,091	20,082	22,154	23,845	25,247	119.6%
Agricultural	16,038	19,759	23,602	27,732	30,594	32,929	34,865	117.4%
UNINCORPORATED AREA	1,544,947	1,538,475	1,531,787	1,524,666	1,519,732	1,515,706	1,512,368	-2.1%
Residential	3,061	3,375	3,714	4,085	4,493	4,942	5,436	77.6%
Manufacturing	186	205	226	249	274	301	331	78.0%
Wholesale-Retail	652	719	791	870	957	1,053	1,158	77.6%
Other Rural	537	592	651	716	788	867	953	77.5%
Recreation	1,699	7,476	10,580	13,684	16,788	19,892	22,996	1253.5%
Transportation	49,470	51,327	52,172	52,797	52,243	51,690	51,690	4.5%
Highway	43,143	45,014	46,516	47,768	47,768	47,768	47,768	10.7%
Airport	139	488	540	621	776	776	776	458.3%
Railroad	6,188	5,825	5,116	4,408	3,699	3,146	3,146	-49.2%
Extraction	1,139	1,348	1,730	2,112	2,494	2,876	3,258	186.0%
Agricultural	1,488,203	1,473,433	1,461,923	1,450,153	1,441,695	1,434,085	1,426,546	-4.1%
Total Agricultural Incorp + Unincorp	1,504,241	1,493,192	1,485,525	1,477,885	1,472,289	1,467,014	1,461,411	-2.8%
Water	192	192	192	192	192	192	192	0%
Region Total Acreage	1,572,672	1,572,672	1,572,672	1,572,672	1,572,672	1,572,672	1,572,672	0%

Source: Office for Planning and Programming

[a]Region 6 (Region Six Planning Commission) includes the following counties: Hardin, Marshall, Poweshiek and Tama

[b]O.P.P. population projections; includes both urban and rural population for Region 6

[c]Total land within all incorporated cities in Region 6

TABLE 7A Land Use Acreage Projections for Region 7[a]

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % change
(Population Projections[b])	(241,097)	(223,456)	(233,831)	(246,351)	(255,299)	(261,662)	(265,118)	(10.0%)
INCORPORATED AREAS[c]	50,059	83,931	88,994	95,039	99,937	106,320	111,471	122.7%
Urban	30,797	42,689	45,387	48,470	50,986	54,223	56,850	84.6%
Agricultural	19,262	41,242	43,607	46,569	48,969	52,097	54,621	183.6%
UNINCORPORATED AREA	1,974,261	1,940,389	1,935,326	1,929,281	1,924,383	1,918,000	1,912,849	-3.1%
Residential	3,387	3,735	4,108	4,519	4,971	5,468	6,015	77.6%
Manufacturing	416	458	504	555	610	671	738	77.4%
Wholesale-Retail	502	554	609	670	737	810	891	77.5%
Other Rural	766	844	929	1,022	1,124	1,236	1,360	77.5%
Recreation	7,931	12,841	17,942	23,043	28,144	33,245	38,346	383.5%
Transportation	61,026	63,379	68,134	71,953	72,158	72,055	72,055	18.1%
Highway	52,731	54,791	59,249	63,707	63,707	63,707	63,707	20.8%
Airport	1,075	1,793	2,916	3,104	4,135	4,135	4,135	284.7%
Railroad	7,220	6,795	5,969	5,142	4,316	4,213	4,213	-41.6%
Extraction	1,065	1,260	1,343	1,426	1,509	1,592	1,675	57.3%
Agricultural	1,899,168	1,857,318	1,841,757	1,826,093	1,815,130	1,802,743	1,791,769	-5.7%
Total Agricultural Incorp + Unincorp	1,918,430	1,898,560	1,885,364	1,872,662	1,864,099	1,854,840	1,846,390	-3.8%
Water	960	960	960	960	960	960	960	0%
Region Total Acreage	2,025,280	2,025,280	2,025,280	2,025,280	2,025,280	2,025,280	2,025,280	0%

Source: Iowa Office for Planning and Programming

[a]Region 7 (Iowa Northland Regional Council of governments) includes the following counties: Black Hawk, Bremer, Buchanan, Butler, Chickasaw and Grundy

[b]O.P.P. population projections; includes both rural and urban population for Region 7

[c]Total land within all incorporated cities in Region 7

TABLE 8A

Land Use Acreage Projections for Region 8[a]

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % change
(Population Projections[b])	(119,285)	(204,622)	(216,155)	(233,764)	(249,609)	(263,203)	(276,042)	(131.4%)
INCORPORATED AREAS[c]	37,278	65,240	73,461	84,788	95,225	104,530	113,455	204.3%
Urban	30,082	36,508	41,138	47,481	53,326	58,537	63,535	111.2%
Agricultural	7,196	28,732	32,323	37,307	41,899	45,993	49,920	593.7%
UNINCORPORATED AREA	1,950,562	1,922,600	1,914,379	1,903,052	1,892,615	1,883,310	1,874,385	-3.9%
Residential	3,223	3,554	3,910	4,301	4,731	5,204	5,724	77.5%
Manufacturing	763	842	926	1,018	1,120	1,232	1,355	77.5%
Wholesale-Retail	1,697	1,871	2,059	2,265	2,491	2,740	3,014	77.6%
Other Rural	421	465	511	562	618	680	748	77.6%
Recreation	32,265	37,944	43,623	49,557	55,491	61,425	67,359	108.7%
Transportation	54,607	56,918	60,487	64,048	64,154	64,154	64,154	17.4%
Highway	48,512	50,499	54,660	58,696	58,696	58,696	58,696	20.9%
Airport	938	1,564	1,564	1,679	2,012	2,012	2,012	114.4%
Railroad	5,157	4,854	4,263	3,673	3,446	3,446	3,446	-33.1%
Extraction	1,453	1,720	1,836	1,952	2,068	2,184	2,300	58.2%
Agricultural	1,856,454	1,819,287	1,801,027	1,779,349	1,761,942	1,745,691	1,729,731	-6.8%
Total Agricultural Incorp + Unincorp	1,863,650	1,848,019	1,833,350	1,816,656	1,803,841	1,791,684	1,779,651	-4.5%
Water	24,320	24,320	24,320	24,320	24,320	24,320	24,320	0%
Region Total Acreage	2,012,160	2,012,160	2,012,160	2,012,160	2,012,160	2,012,160	2,012,160	0%

Source: Iowa Office for Planning and Programming

[a]Region 8 (East Central Intergovernmental Association) includes the following counties: Cedar, Clinton, Delaware, Dubuque and Jackson

[b]O.P.P. population projections; includes both rural and urban population for Region 8

[c]Total land within incorporated cities in Region 8

TABLE 9A

Land Use Acreage Projections for Region 9[a]

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % change
(Population Projections[b])	(207,967)	(179,868)	(198,090)	(218,524)	(234,832)	(246,793)	(255,413)	(22.8%)
INCORPORATED AREAS [c]	54,450	71,020	81,980	94,121	104,025	111,571	117,306	115.4%
Urban	33,058	36,941	42,630	48,943	54,093	58,017	60,999	84.5%
Agricultural	21,932	34,079	39,350	45,178	49,932	53,554	56,307	163.2%
UNINCORPORATED AREA	519,630	503,060	492,100	479,959	470,055	462,509	456,774	-12.1%
Residential	1,508	1,663	1,829	2,013	2,214	2,435	2,678	77.6%
Manufacturing	543	599	659	725	798	877	965	77.7%
Wholesale-Retail	278	307	337	371	408	449	494	77.7%
Other Rural	270	298	328	361	397	437	480	77.8%
Recreation	7,304	13,114	15,124	17,134	19,144	21,154	23,164	217.1%
Transportation	17,370	17,768	18,401	18,712	18,712	18,712	18,712	7.7%
Highway	14,381	14,900	15,695	15,989	15,989	15,989	15,989	11.2%
Airport	926	926	1,001	1,053	1,053	1,053	1,053	13.7%
Railroad	2,063	1,942	1,705	1,670	1,670	1,670	1,670	-19.0%
Extraction	941	1,114	1,278	1,442	1,606	1,770	1,934	105.5%
Agricultural	491,416	468,197	454,144	439,201	426,776	416,675	408,347	-16.9%
Total Agricultural Incorp + Unincorp	512,808	502,279	493,494	484,379	476,708	470,229	464,654	-9.4%
Water	10,816	10,816	10,816	10,816	10,816	10,816	10,816	0%
Region Total Acreage	584,896	584,896	584,896	584,896	584,896	584,896	584,896	0%

Source: Iowa Office for Planning and Programming

[a]Region 9 (Bi-State Metropolitan Planning Commission) includes the following counties: Muscatine and Scott

[b]O.P.P. population projections; includes both rural and urban population for Region 9

[c]Total land within all incorporated cities in Region 9

TABLE 10A Land Use Acreage Projections for Region 10[a]

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-202 % change
(Population Projections[b])	(288,270)	(312,479)	(323,779)	(339,284)	(354,647)	(365,867)	(371,776)	(29.0%)
INCORPORATED AREAS[c]	57,092	86,793	95,122	105,163	115,138	123,167	128,698	125.4%
Urban	36,663	52,234	57,073	63,098	69,083	73,900	77,219	110.6%
Agricultural	20,429	34,559	38,049	41,965	46,055	49,267	51,479	152.0%
UNINCORPORATED AREA	2,369,148	2,339,447	2,331,118	2,321,077	2,311,102	2,303,073	2,297,542	-3.0%
Residential	4,846	5,344	5,878	6,466	7,113	7,824	8,605	77.6%
Manufacturing	954	1,052	1,157	1,273	1,400	1,540	1,694	77.6%
Wholesale-Retail	1,347	1,486	1,634	1,798	1,977	2,175	2,392	77.6%
Other Rural	1,222	1,347	1,482	1,630	1,793	1,972	2,169	77.5%
Recreation	42,736	48,831	54,926	61,021	67,116	73,211	79,306	85.6%
Transportation	74,365	77,503	81,925	84,216	83,578	82,751	82,456	10.9%
Highway	66,153	68,972	72,371	75,395	75,395	75,395	75,395	14.0%
Airport	992	1,736	3,585	3,679	3,867	3,867	3,867	289.8%
Railroad	7,220	6,795	5,969	5,142	4,316	3,489	3,194	-55.8%
Extraction	1,643	1,944	2,346	2,748	3,150	3,552	3,954	140.7%
Agricultural	2,242,035	2,201,940	2,181,770	2,161,925	2,144,975	2,130,048	2,116,966	-5.6%
Total Agricultural Incorp + Unincorp	2,262,464	2,236,499	2,219,819	2,203,890	2,191,030	2,179,315	2,168,445	-4.2%
Water	1,024	1,024	1,024	1,024	1,024	1,024	1,024	0%
Region Total Acreage	2,427,264	2,427,264	2,427,264	2,427,264	2,427,264	2,427,264	2,427,264	0%

Source: Iowa Office for Planning and Programming

[a]Region 19 (East Central Iowa Association of Regional Planning Commissions) includes the following counties: Benton, Iowa, Johnson, Jones, Linn and Washington

[b]O.P.P. population projections; includes both rural and urban population for Region 10

[c]Total land within all incorporated cities in Region 10

TABLE 11A

Land Use Acreage Projections for Region 11[a]

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % change
(Population Projections[b])	(462,094)	(502,235)	(557,482)	(606,348)	(635,316)	(653,932)	(661,637)	(43.2%)
INCORPORATED AREAS[c]	120,501	149,133	175,725	199,582	215,063	226,187	232,718	93.1%
Urban	78,952	99,953	117,736	133,720	144,092	151,545	155,921	97.5%
Agricultural	41,549	49,180	57,989	65,862	70,971	74,642	76,797	84.8%
UNINCORPORATED AREA	2,866,379	2,837,747	2,811,155	2,787,298	2,771,817	2,760,693	2,754,162	-3.9%
Residential	9,503	10,479	11,527	12,679	13,947	15,343	16,875	77.6%
Manufacturing	905	998	1,097	1,207	1,328	1,461	1,607	77.5%
Wholesale-Retail	1,211	1,335	1,469	1,616	1,777	1,955	2,150	77.5%
Other Rural	1,690	1,863	2,050	2,255	2,480	2,729	3,001	77.6%
Recreation	12,557	94,353	104,977	113,570	122,163	130,756	139,349	1009.7%
Transportation	99,630	103,267	108,057	110,491	109,996	109,996	109,996	10.4%
Highway	88,204	91,557	96,992	99,801	99,801	99,801	99,801	13.1%
Airport	1,112	2,002	2,538	3,344	3,661	3,661	3,661	229.2%
Railroad	10,314	9,708	8,527	7,346	6,504	6,504	6,504	-36.9%
Extraction	2,260	2,672	2,905	3,138	3,371	3,604	3,837	70.0%
Agricultural	2,738,623	2,622,780	2,579,073	2,542,342	2,516,755	2,494,849	2,477,347	-9.5%
Total Agricultural Incorp + Unincorp	2,780,172	2,671,960	2,637,062	2,608,204	2,587,726	2,569,491	2,554,144	-8.1%
Water	68,480	68,480	68,480	68,480	68,480	68,480	68,480	0%
Region Total Acreage	3,055,360	3,055,360	3,055,360	3,055,360	3,055,360	3,055,360	3,055,360	0%

Source: Iowa Office for Planning and Programming

[a]Region 11 (Central Iowa Regional Association of Local Governments) includes the following counties: Boone, Dallas, Jasper, Madison, Marion, Polk, Story, and Warren

[b]O.P.P. population projections; includes both urban and rural population for Region 11

[c]Total land within all incorporated cities in Region 11

TABLE 12A

Land Use Acreage Projections for Region 12[a]

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % change
(Population Projections[b])	(97,912)	(92,155)	(91,541)	(95,136)	(97,984)	(101,306)	(105,016)	(7.2%)
INCORPORATED AREAS [c]	70,945	73,118	75,688	79,667	83,333	87,197	91,225	28.5%
Urban	47,432	49,232	50,711	53,377	55,833	58,422	61,121	28.8%
Agricultural	23,513	23,886	24,977	26,290	27,500	28,775	30,104	28.0%
UNINCORPORATED AREA	2,156,895	2,154,722	2,152,152	2,148,173	2,144,507	2,140,643	2,136,615	-.9%
Residential	1,681	1,854	2,039	2,243	2,467	2,714	2,984	77.5%
Manufacturing	132	146	160	176	194	213	234	77.2%
Wholesale-Retail	276	305	335	368	405	446	490	77.5%
Other Rural	912	1,006	1,107	1,218	1,339	1,473	1,620	77.6%
Recreation	5,950	10,208	15,889	21,570	27,251	32,932	38,613	548.9%
Transportation	66,456	68,972	71,159	73,129	72,723	72,519	72,519	9.1%
Highway	59,442	62,203	64,881	67,559	67,559	67,559	67,559	13.6%
Airport	826	944	1,162	1,162	1,465	1,465	1,465	77.3%
Railroad	6,188	5,825	5,116	4,408	3,699	3,495	3,495	43.5%
Extraction	1,941	2,298	2,478	2,658	2,838	3,018	3,198	64.7%
Agricultural	2,079,547	2,069,933	2,058,985	2,046,811	2,037,290	2,027,328	2,016,957	-3.0%
Total Agricultural Incorp + Unincorp	2,103,060	2,093,819	2,083,962	2,073,101	2,064,790	2,056,103	2,047,061	-2.6%
Water	704	704	704	704	704	704	704	0%
Region Total Acreage	2,228,544	2,228,544	2,228,544	2,228,544	2,228,544	2,228,544	2,228,544	0%

Source: Iowa Office for Planning and Programming

[a]Region 12 (Region XII Council of Governments) includes the following counties: Audubon, Carroll, Crawford, Greene, Guthrie and Sac

[b]O.P.P. population projections; include both rural and urban population for Region 12

[c]Total land within all incorporated cities in Region 12

TABLE 13A

Land Use Acreage Projections for Region 13[a]

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % change
(Population Projections[b])	(193,268)	(188,198)	(190,778)	(198,428)	(204,140)	(209,502)	(213,815)	(10.6%)
INCORPORATED AREAS [c]	39,433	60,997	65,520	70,900	74,997	79,095	83,092	110.7%
Urban	27,294	37,058	39,967	43,249	45,748	48,248	50,686	85.7%
Agricultural	12,139	23,939	25,553	27,651	29,249	30,847	32,406	167.0%
UNINCORPORATED AREA	2,989,687	2,968,123	2,963,600	2,958,220	2,954,123	2,950,025	2,946,028	-1.5%
Residential	1,944	2,144	2,358	2,594	2,854	3,140	3,454	77.7%
Manufacturing	263	290	319	351	386	425	467	77.6%
Wholesale-Retail	1,048	1,155	1,271	1,398	1,538	1,691	1,860	77.5%
Other Rural	1,442	1,590	1,749	1,924	2,116	2,328	2,561	77.6%
Recreation	17,074	23,679	30,284	36,889	43,494	50,099	56,704	232.1%
Transportation	94,481	97,648	101,383	102,837	102,129	101,779	101,779	7.7%
Highway	85,328	88,528	93,129	95,416	95,416	95,416	95,416	11.8%
Airport	902	1,354	1,433	1,544	1,781	1,781	1,781	97.5%
Railroad	8,251	7,766	6,821	5,877	4,932	4,582	4,582	-44.5%
Extraction	1,245	1,472	1,812	2,152	2,492	2,832	3,172	154.8%
Agricultural	2,872,190	2,840,145	2,824,424	2,810,075	2,799,114	2,787,731	2,776,031	-3.3%
Total Agricultural Incorp + Unincorp	2,884,329	2,864,084	2,849,977	2,837,726	2,828,363	2,818,578	2,808,437	-2.6%
Water	8,128	8,128	8,128	8,128	8,128	8,128	8,128	0%
Region Total Acreage	3,037,248	3,037,248	3,037,248	3,037,248	3,037,248	3,037,248	3,037,248	0%

Source: Iowa Office for Planning and Programming

[a]Region 13 (Southwest Iowa Planning Council) includes the counties: Cass, Fremont, Harrison, Montgomery, Page, Pottawattamie and Shelby

[b]O.P.P. population projections; includes both rural and urban population for Region 13

[c]Total land within all incorporated cities in Region 13

TABLE 14A Land Use Acreage Projections for Region 14[a]

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % change
(Population Projections[b])	(69,032)	(61,847)	(59,917)	(60,028)	(59,609)	(59,493)	(59,428)	(-13.9%)
INCORPORATED AREAS[c]	26,014	27,629	29,802	33,122	36,190	39,402	42,639	63.9%
Urban	15,927	16,199	17,583	19,542	21,352	23,247	25,157	58.0%
Agricultural	10,087	11,430	12,219	13,580	14,838	16,155	17,482	73.3%
UNINCORPORATED AREA	2,178,786	2,177,171	2,174,998	2,171,678	2,168,610	2,165,398	2,162,161	-.8%
Residential	553	609	670	737	811	892	981	77.4%
Manufacturing	516	570	627	689	758	834	917	77.7%
Wholesale-Retail	331	365	401	441	486	534	587	77.3%
Other Rural	734	810	891	980	1,078	1,185	1,304	77.7%
Recreation	12,963	17,423	21,883	26,343	30,803	35,263	39,723	206.4%
Transportation	62,709	64,757	66,401	67,244	67,154	67,051	67,051	6.9%
Highway	59,442	61,499	63,322	64,519	64,519	64,519	64,519	8.5%
Airport	173	346	521	521	785	785	785	353.7%
Railroad	3,094	2,912	2,558	2,204	1,850	1,747	1,747	-43.5
Extraction	892	1,057	1,220	1,383	1,546	1,709	1,872	109.9%
Agricultural	2,100,088	2,091,580	2,082,905	2,073,861	2,065,974	2,057,924	2,049,726	-2.4%
Total Agricultural Incorp + Unincorp	2,110,175	2,103,010	2,095,124	2,087,441	2,080,812	2,074,079	2,067,208	-2.0%
Water	1,152	1,152	1,152	1,152	1,152	1,152	1,152	0%
Region Total Acreage	2,205,952	2,205,952	2,205,952	2,205,952	2,205,952	2,205,952	2,205,952	0%

Source: Iowa Office for Planning and Programming

[a]Region 14 (Southern Iowa Council of Governments) includes the following counties: Adair, Adams, Clarke, Decatur, Ringgold, Taylor and Union

[b]O.P.P. population projections; includes both rural and urban population for Region 14

[c]Total land within all incorporated cities in Region 14

TABLE 15A

Land Use Acreage Projections for Region 15[a]

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % change
(Population Projections[b])	(167,216)	(153.825)	(146,789)	(144,498)	(142,990)	(142,481)	(141,765)	(-15.2%)
INCORPORATED AREAS[c]	46,287	49,700	50,792	54,305	58,187	62,538	66,792	44.3%
Urban	26,596	29,705	30,475	32,583	34,912	37,523	40,075	50.7%
Agricultural	19,691	19,995	20,317	21,722	23,275	25,015	26,717	35.7%
UNINCORPORATED AREA	3,117,873	3,114,460	3,113,368	3,109,855	3,105,973	3,101,622	3,097,368	-.7%
Residential	1,439	1,587	1,746	1,921	2,113	2,324	2,556	77.6%
Manufacturing	322	355	391	430	473	520	572	77.6%
Wholesale-Retail	242	266	293	322	355	390	429	77.3%
Other Rural	1,352	1,491	1,640	1,804	1,985	2,183	2,401	77.6%
Recreation	12,386	58,576	65,005	71,434	77,863	84,292	90,721	632.4%
Transportation	86,432	89,810	93,788	97,804	97,116	96,537	96,537	11.7%
Highway	78,617	81,428	85,954	90,480	90,480	90,480	90,480	15.1%
Airport	595	1,587	1,865	2,182	2,320	2,320	2,320	289.0%
Railroad	7,220	6,795	5,969	5,142	4,316	3,737	3,737	-48.2%
Extraction	3,070	3,630	3,929	4,228	4,527	4,826	5,125	66.9%
Agricultural	3,012,630	2,958,745	2,946,576	2,931,912	2,921,541	2,910,550	2,899,027	-3.8%
Total Agricultural Incorp + Unincorp	3,032,321	2,978,740	2,966,893	2,953,634	2,944,816	2,935,565	2,925,744	-3.5%
Water	4,544	4,544	4,544	4,544	4,544	4,544	4,544	0%
Region Total Acreage	3,168,704	3,168,704	3,168,704	3,168,704	3,168,704	3,168,704	3,168,704	0%

Source: Iowa Office for Planning and Programming

[a]Region 15 (Area XV Regional Planning Commission) includes the following counties: Appanoose, Davis, Jefferson, Keokuk, Lucas, Mahaska, Monroe, Van Buren, Wapello and Wayne

[b]O.P.P. population projections; includes both rural and urban population for Region 15

[c]Total land within all incorporated cities in Region 15

Land Use Category	1960	1970	1980	1990	2000	2010	2020	1960-2020 % change
(Population Projections[b])	(117,289)	(118,774)	(113,251)	(112,321)	(113,417)	(113,977)	(113,260)	(-3.4%)
INCORPORATED AREAS [c]	24,731	30,732	30,199	31,399	33,414	35,214	36,500	47.5%
Urban	18,760	21,595	21,139	21,979	23,390	24,650	25,550	36.1%
Agricultural	5,971	9,137	9,060	9,420	10,024	10,564	10,950	83.4%
UNINCORPORATED AREA	1,113,189	1,107,188	1,107,721	1,106,521	1,104,506	1,102,706	1,101,420	-1.0%
Residential	1,726	1,904	2,094	2,303	2,534	2,787	3,065	77.5%
Manufacturing	17,954	19,798	21,778	23,956	26,351	28,986	31,881	77.1%
Wholesale-Retail	183	202	222	244	268	296	325	77.5%
Other Rural	447	493	542	596	656	721	793	77.4%
Recreation	41,470	44,361	53,456	62,551	65,214	67,877	70,540	70.0%
Transportation	31,718	32,963	35,554	38,208	38,097	38,052	38,052	19.9%
Highway	27,803	28,956	31,901	34,846	34,846	34,846	34,846	25.3%
Airport	821	1,095	1,095	1,158	1,401	1,401	1,401	70.6%
Railroad	3,094	2,912	2,558	2,204	1,850	1,805	1,805	-41.6%
Extraction	334	396	491	586	681	776	871	160.7%
Agricultural	1,019,357	1,007,071	993,584	978,077	970,705	963,212	955,893	-6.2%
Total Agricultural Incorp + Unincorp	1,025,328	1,016,208	1,002,644	987,497	980,729	973,776	966,843	-5.7%
Water	30,272	30,272	30,272	30,272	30,272	30,272	30,272	0%
Region Total Acreage	1,168,192	1,168,192	1,168,192	1,168,192	1,168,192	1,168,192	1,168,192	0%

Source: Iowa Office for Planning and Programming

[a]Region 16 (Southeast Iowa Regional Planning Commission) includes the following counties: Des Moines, Henry, Lee and Louisa

[b]O.P.P. population projections; includes both rural and urban population for Region 16

[c]Total land within all incorporated cities in Region 16