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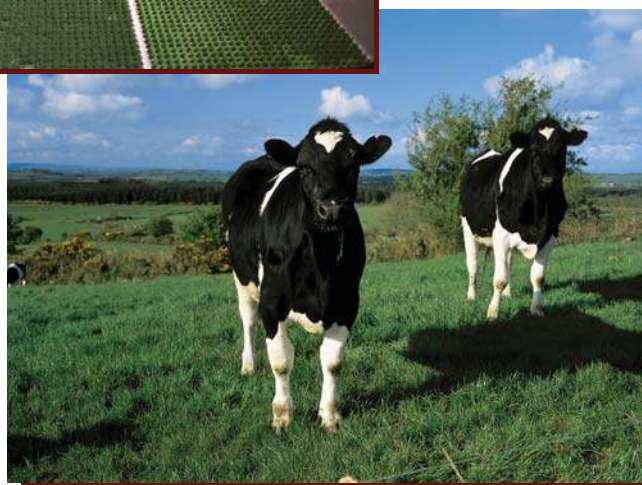
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May 2006

Major Uses of Land in The United States, 2002

Ruben N. Lubowski
Marlow Vesterby
Shawn Bucholtz
Alba Baez
Michael J. Roberts



Electronic
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Ruben N. Lubowski, Marlow Vesterby, Shawn Bucholtz, Alba Baez, and Michael J. Roberts

Abstract

This publication presents the results of the latest (2002) inventory of U.S. major land uses, drawing on data from the Census, public land management and conservation agencies, and other sources. The data are synthesized by State to calculate the use of several broad classes and subclasses of agricultural and nonagricultural land over time. The United States has a total land area of nearly 2.3 billion acres. Major uses in 2002 were forest-use land, 651 million acres (28.8 percent); grassland pasture and range land, 587 million acres (25.9 percent); cropland, 442 million acres (19.5 percent); special uses (primarily parks and wildlife areas), 297 million acres (13.1 percent); miscellaneous other uses, 228 million acres (10.1 percent); and urban land, 60 million acres (2.6 percent). National and regional trends in land use are discussed in comparison with earlier major land-use estimates.

Keywords: Land use, land-use change, agricultural land, nonagricultural land, cropland, forest-use land, forestland, pasture, rangeland, rural residential land, special uses, urban land

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Historical data are available online as part of the ERS Major Land Uses data series at <http://www.ers.usda.gov/data/majorlanduses/>. Included are major land-use estimates by State (1945-2002), and the annual national-level series of cropland used for crops and its components (1910-2005).

Summary tables for 2002 are available online at <http://www.ers.usda.gov/data/majorlanduses/>. These include data by region and State for major uses of land, major uses of cropland, pasture and range, special-use areas by category, forest land by major class, urban area, and irrigated land in farms.

Preface

The U.S. Department of Agriculture's Economic Research Service (ERS) has served as a source of major land-use estimates in the United States for over 50 years. The major land-use series is the only consistent accounting of all major uses of land in the United States, public and private. Francis Marschner made some of the earliest contributions by reporting land use from 1922 through 1940 in the *Atlas of American Agriculture* when he was with ERS's predecessor agency, the Bureau of Agricultural Economics. A consistent series was started in 1945, and has since been published at intervals coinciding with the Census of Agriculture. Marschner was also involved in the 1945 inventory (Reuss et al., 1948). The annual cropland portion of the series has been consistently maintained since 1910.

To ensure comparability with earlier estimates in the series, a standardized set of procedures is used (Barnard and Hexem, 1988). Even so, comparability was sometimes hindered by changes in the characteristics of data available over time. This is inevitable because the estimates are not drawn from a single survey but derived by reconciliation of several data sources.

Economic analyses often require consistent acreage estimates of land use. Prior to 1945, area estimates of major land uses were not consistently available for all States and all major uses of land. Various agencies had data on land use that differed widely in definition, collection criteria, and acreage. No single agency provided all land uses that would sum to the total land in the United States. For example, the Forest Service had data on forestland while the Bureau of Land Management provided public grazing land acreage. The Census of Agriculture collected information on cropland and rangeland, but only if it was included in "land in farms," missing agricultural land not in farms. Various other Federal and State agencies provided data on parks, fish and wildlife areas, roads, railroads, defense installations, and other categories.

Data availability has continued to improve due to new data collection efforts and advances in technology, such as satellite imaging and Geographic Information Systems. The U.S. Geological Survey produced a satellite-based National Land Cover Database (NLCD), which covers the 48 contiguous States for 1992, and is compiling an update for 2001, including all 50 States and Puerto Rico. These data offer comprehensive coverage and unparalleled detail on the distribution and pattern of land uses, as well as aggregate acreage statistics. Satellite data, however, are limited in their ability to provide information on certain land uses as opposed to land covers. For example, NLCD cannot distinguish between grazed or ungrazed forests.

USDA's Natural Resources Conservation Service also publishes the National Resources Inventory (NRI), a successor to the Conservation Needs Inventory. The NRI includes agricultural land not covered by the Census of Agriculture. However, the NRI does not cover Federal land, which accounts for about 28 percent of total U.S. land area. Also, the NRI concentrates on the 48 contiguous States and Hawaii, omitting Alaska's 365 million acres (16 percent of the total U.S. area). ERS remains the only source of consistent major land-use estimates for all 50 States.

Summary

The ERS Major Land Uses (MLU) series is the only accounting of all major uses of land, both public and private, in all 50 States. A consistent series of estimates by State was started in 1945, and has since been published at roughly 5-year intervals coinciding with the Censuses of Agriculture. National-level cropland estimates have been reported annually since 1910.

What Is the Issue?

Land-use changes have important economic and environmental implications for commodity production and trade, open space, soil and water conservation, and other policy issues. A first step in the study of land-use change is developing statistics on land use over time. This publication presents the results of the latest inventory (2002) of U.S. major land uses.

What Did the Study Find?

The most consistent trends in major uses of land (1945-2002) have been a growth in special-use and urban areas and a decline in total grazing lands. Forest-use land has generally declined since the 1940s, but increased 2 percent from 1997 to 2002. Total cropland area dipped about 2 percent from 1945 to 2002, but has cycled upwards and downwards twice over this period. Between 1997 and 2002, total cropland area reached a new 57-year low, continuing a downward trend since 1978.

Land area. The United States' land area totals nearly 2.3 billion acres. Land used for all agricultural purposes accounted for 52 percent of total U.S. land, while total grazing area (grassland pasture and range, cropland pasture, and grazed forests) comprised 35 percent of the total and two-thirds of all agricultural land. Major land uses in 2002 were forest-use land, 651 million acres (28.8 percent of the total); grassland pasture and range, 587 million acres (25.9 percent); cropland, 442 million acres (19.5 percent); special uses, 297 million acres (13.1 percent); miscellaneous other uses, 228 million acres (10.1 percent); and urban land, 60 million (2.6 percent). Within the nonurban land-use categories, about 94 million acres (4.2 percent of total U.S. land) were estimated to be rural residential area.

Cropland. Total cropland includes land planted for crops, cropland used for pasture, and cropland idled, including acreage removed from production under government programs such as the Conservation Reserve Program. Total cropland increased in the late 1940s, declined from 1949 to 1964, increased from 1964 to 1978, and decreased again (about 6 percent) from 1978 to 2002. Between 1997 and 2002, total cropland decreased by 14 million acres (3 percent) to its lowest level since 1945.

Grassland pasture and range. Estimated acreage of grassland pasture and range increased by almost 7 million acres (1 percent) from 1997 to 2002. However, total grazing land acreage (grassland pasture and range, cropland pasture, and grazed forests) decreased from 1997 to 2002, continuing a decline since the 1940s.

Forest-use land. Forest-use land includes 134 million acres of grazed forests, but excludes 98 million forest acres that were estimated to be in parks, wildlife areas, and other special uses in 2002. Forest-use land increased 10 million acres (2 percent) from 1997 to 2002, reversing a downward trend since the 1940s. The 14-percent decline in forest-use land between 1949 and 2002 was largely due to reclassification of forested land from forest-use to special-use areas.

Urban and rural residential areas. Urban land area quadrupled from 1945 to 2002, increasing at about twice the rate of population growth over this period. After adjusting earlier estimates for new criteria used in the 2000 Census, urban area increased by 13 percent between 1990 and 2002. Census estimates based on the previous criteria indicate that urban area increased 9 million acres (18 percent) over the 1980s, 13 million acres (37 percent) over the 1970s, and 9 million acres (36 percent) over the 1960s. Estimated acreage of rural land used for residential purposes increased by 21 million acres (29 percent) from 1997 to 2002, and by 17 million acres (30 percent) from 1980 to 1997.

Special uses. Special-use areas (rural transportation uses, national and State parks, wilderness and wildlife areas, national defense and industrial areas, and farmsteads and farm roads) increased 11 million acres (4 percent) from 1997 to 2002. Special-use land has more than doubled in the 48 contiguous States from 100 million acres in 1945 to 212 million acres in 2002. Some of the estimated rise in special-use areas from 1997 to 2002 was driven by improved data, leading to a reclassification of miscellaneous and other land, which declined by 7 million acres (3 percent) over this period.

Regional patterns. Regional land-use patterns vary with differences in soil, climate, topography, and population. Stable patterns of land use at the national level can obscure larger changes in land use at regional and State levels. While cropland used for crops increased just 5 million acres (1 percent) nationally from 1964 to 2002, cropland used for crops in the Northeast, Southeast, Northern and Southern Plains, Mountain, and Pacific regions declined by 12 million acres (6 percent). It increased 17 million acres (13 percent) in the remaining regions.

Ownership. Over 60 percent (1,378 million acres) of U.S. land is privately owned. The Federal Government owns nearly 28 percent (635 million acres), over a third of which is in Alaska. State and local governments own about 9 percent (195 million acres). Over 2 percent (56 million acres) is in trust by the Bureau of Indian Affairs. There were no major changes in these aggregate ownership patterns from 1997 to 2002.

How Was the Study Conducted?

Data from the U.S. Census Bureau, public land management agencies, and other sources were assembled and synthesized by State to calculate the use of several broad classes and subclasses of agricultural and nonagricultural land in 2002. A standardized set of procedures was used to maintain comparability with earlier estimates.

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How the Land Is Used

The United States has a land area of about 2.3 billion acres, which is allocated among a variety of uses (fig. 1). The largest shares of the Nation's land were allocated to **forest use**, **grassland pasture and range**, and **cropland**. (See Appendix for detailed descriptions of terms in **bold**). About 20 percent of the land area was cropland in 2002, 26 percent was permanent grassland pasture and range, and 29 percent was forest-use land.¹ **Urban areas** constituted just 3 percent of U.S. land, while a variety of **special uses** accounted for 13 percent of the land base and **miscellaneous other** uses comprised the remaining 10 percent. These proportions are significantly affected by the land area of Alaska, which, relative to the contiguous 48 States, has small amounts of cropland and pasture but large areas of forest-use, special-use, and miscellaneous other land. The full set of historical estimates, by region and State, are available online as an ERS data series, Major Land Uses.²

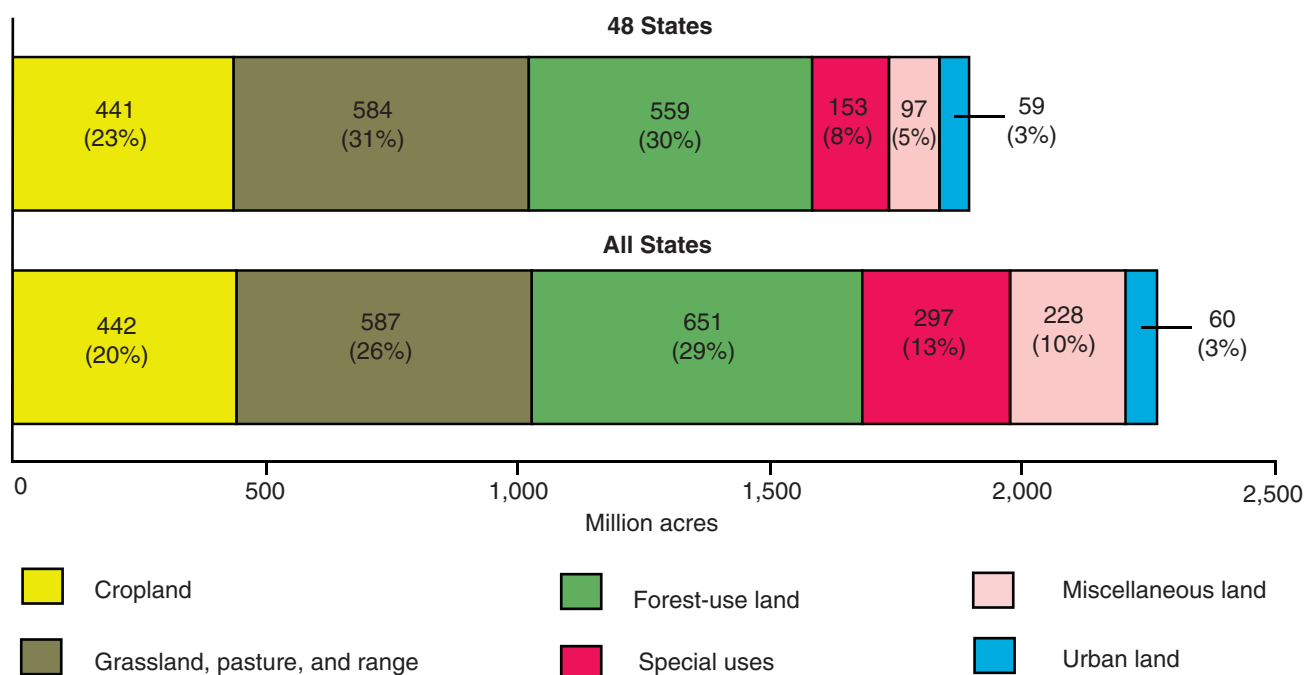
Land classified as cropland totaled about 442 million acres in 2002 (fig. 1). This total represents all land in crop rotation, including **cropland pasture** (fig. 2). **Cropland used for crops—cropland harvested, cropland failure, and cultivated summer fallow**—totaled 340 million acres, or 77 percent of total cropland acreage (table 1). Fourteen percent of total cropland was cropland used only for pasture, while 9 percent of total cropland was classified as **idle cropland**. Acreage enrolled in the Conservation Reserve Program (CRP) is included in this component. The CRP, established by the Food Security Act of 1985, is the largest Federal program idling cropland, offering annual rental payments to farm owners and operators who voluntarily retire environmentally sensitive cropland under 10- to 15-year contracts. In 2002, the CRP paid about \$1.6 billion to retire about 34 million cropland acres (an area almost the size of Iowa).

In 2002, land used for agricultural purposes—cropland; grassland pasture and range; **forest land grazed**; and land in farmsteads, farm roads, and lanes—totaled nearly 1.2 billion acres, just under 52 percent of total U.S. land area (table 1). By comparison, the Census Bureau estimated 938 million acres of "land in farms" in 2002 (USDA/NASS, 2004a). The difference is mostly accounted for by grazing lands (both forested and nonforested) not defined by Census as being in farms, and cropland under-

¹ The forest-use designation excludes about 98 million acres of **forest land in special uses**, such as parks and wildlife areas. **Forest land** used for all purposes in 2002 totaled 749 million acres, nearly a third of the land area of the United States.

² See <http://www.ers.usda.gov/data/majorlanduses/>. Additional summary tables for 2002 are available at <http://www.ers.usda.gov/data/majorlanduses/>.

Figure 1

Major uses of land, 2002

Notes: The area of each major land use is listed in millions of acres with the corresponding share of the total land base in parentheses. Urban uses are listed as a separate category and are not included under the special uses category as was done in previous *Major Land Uses* reports. The land base includes streams and canals less than one-eighth mile wide, and ponds, lakes, and reservoirs covering less than 40 acres. Distributions by major use may not add to totals due to rounding. See Appendix for more complete descriptions of the different land-use categories.

Sources: Estimates are based on reports and records of the Bureau of the Census (HUD/BOC, 1992, 2002, 2003) and Federal, State, and local land management and conservation agencies including DOI/BLM, 2003; DOT/BTS, 2004; DOT/FAA, 2002; DOT/FHWA, 2002; DOT/FRA, 2004; USDA/FS 1989, 1998; DOI/FWS, 2001; GSA, 2001; GDT, 2000; USDA/NASS, 2004a, 2005; DOI/NPS, 2002; USDA/NRCS, 2000, 2004a; and WI, 2002.

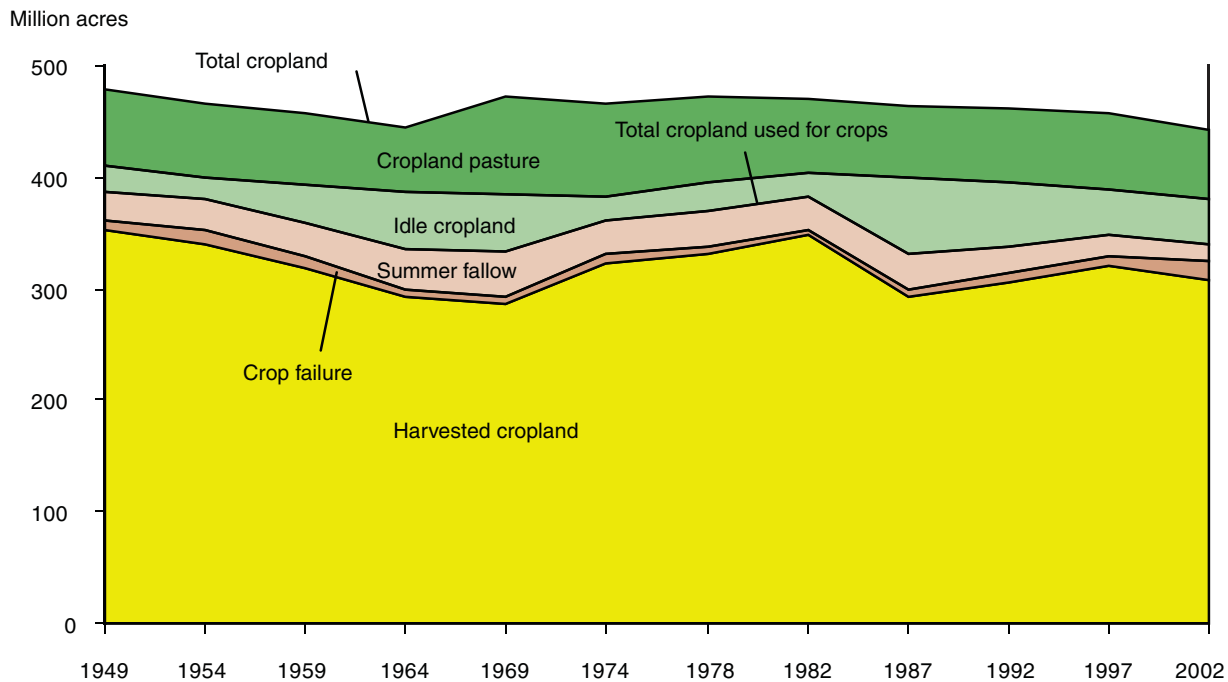
enumerated by the Census of Agriculture (Barnard and Hexem, 1988). In 2002, the Census estimate of total principal crops harvested was about 98 percent of the estimate for the same crops from the National Agricultural Statistics Service (NASS). The Major Land Uses cropland estimate is based on Census data, with an adjustment to reconcile the estimates with the NASS data in each State.

Livestock grazing was the primary use of an estimated 587 million acres of permanent grassland pasture and range, accounting for 26 percent of all U.S. land and half of all agricultural land. When cropland pasture (62 million acres) and forested grazing land (134 million acres) are added to the permanent grassland acreage, total grazing land comprised about 783 million acres, or 35 percent of the total U.S. land area and two-thirds of all agricultural land.

Forest-use land not grazed (total forest land minus land grazed and in special uses, such as national and State parks) amounted to 517 million acres and the largest share of nonagricultural land (table 1). Nonagricultural special-use areas (excluding almost 11 million acres of special-use land in farmsteads and farm roads) were estimated to account for more than 286

Figure 2

Major uses of U.S. cropland



Note: See Appendix for descriptions of the different cropland categories.

Sources: Estimates prior to 2002 are from Daugherty, 1991, 1995; Frey, 1973, 1979, 1982; Frey and Hexem; Frey et al., 1968; Wooten et al., 1962; Vesterby and Krupa; Wooten and Anderson, 1957; and Wooten, 1953a.

million acres, almost 13 percent of the Nation's land area. Federal and State parks, wildlife refuges, and related acres occupied 242 million acres, almost 11 percent of the total land base. **Rural transportation land** accounted for 27 million acres, and defense and other public installations/facilities totaled about 17 million acres.

Sixty million acres were classified as urban areas; all but 400,000 acres were in the contiguous 48 States. Urban acreage accounted for less than 3 percent of the Nation's overall land area, and just over 3 percent of the land area of the contiguous 48 States.³ The remaining 228 million acres (10 percent) of the U.S. land area included various miscellaneous uses not inventoried, including tundra, deserts, bare rock areas, snow and ice fields, swamps, marshes, and other unclassified areas generally of low agricultural value. The land classed under other miscellaneous uses may also include much of the estimated 94 million acres of land used for rural housing lots in 2002. Given the data used to define **rural residential area**, it is not possible to distinguish rural housing lots from land classed under nonurban other uses, such as forests or grassland pasture and range.

³ In previous *Major Land Uses* reports, urban areas were classified as part of special-use areas. Given the growing interest in urban land-use trends, urban areas are treated as a distinct use in this report. For reporting consistency, urban areas are listed separately as well as under special uses in the ERS Major Land Uses data product.

Table 1

Agricultural and nonagricultural uses of land, United States, 2002

Land use	Acreage		Proportion of total	
	48 States	U.S.	48 States	U.S.
	-----Million acres-----		-----Percent-----	
Agricultural				
Cropland:				
Cropland used for crops ¹	340	340	18.0	15.0
Idle cropland	40	40	2.1	1.8
Cropland used only for pasture	62	62	3.3	2.7
Grassland pasture and range	584	587	30.8	25.9
Forest-use land:				
Forest land grazed	134	134	7.1	5.9
Special uses:				
Farmsteads, farm roads	11	11	0.6	0.5
Total agricultural land ²	1,171	1,174	61.8	51.8
Nonagricultural				
Forest-use land:				
Forest-use land not grazed ³	425	517	22.4	22.8
Special uses:				
Transportation uses ⁴	27	27	1.4	1.2
Recreation and wildlife areas ⁵	100	242	5.3	10.7
National defense areas ⁶	15	17	0.8	0.8
Urban land	59	60	3.1	2.6
Miscellaneous other land ⁷	97	228	5.1	10.1
Total nonagricultural land ²	723	1,091	38.2	48.2
Total land area ²	1,894	2,264	100.0	100.0

¹ Cropland harvested, crop failure, and cultivated summer fallow.² Breakdown of land uses may not add to totals due to rounding.³ Excludes 98 million acres of forest land in parks and other special uses.⁴ Rural highways, roads and railroad rights-of-way, and rural airports.⁵ National and State parks and related recreational areas, national and State wildlife refuges, and national wilderness and primitive areas.⁶ Federal land administered by the Department of Defense for military purposes and land administered by the Department of Energy.⁷ Includes miscellaneous uses not inventoried, and areas of little surface use such as marshes, open swamps, bare rock areas, desert, and tundra.

Sources: Estimates are based on reports and records of the Bureau of the Census (HUD/BOC, 1992, 2002, 2003) and Federal, State, and local land management and conservation agencies, including DOI/BLM, 2003; DOT/BTS, 2004; DOT/FAA, 2002; DOT/FHWA, 2002; DOT/FRA, 2004; USDA/FS 1989, 1998; DOI/FWS, 2001; GSA, 2001; GDT, 2000; USDA/NASS, 2004a, 2004b, 2005; DOI/NPS, 2002; USDA/NRCS, 2000, 2004a; and WI, 2002.

Trends in Major Uses of Land

The most consistent trends in major uses of land (1945-2002) have been an upward trend in **special-use** and **urban** areas and a downward trend in total grazing lands (table 2; see Appendix for detailed descriptions of terms in **bold**).⁴ **Forest-use** area generally declined from 1949 to 1997 but increased by about 1 percent in the latest period (1997-2002). Total **cropland** area has declined over this 57-year period, but has not done so consistently. Total cropland area increased in the late 1940s, declined from 1949 to 1964, increased from 1964 to 1978, and then declined again from 1978 to 2002. Total cropland area in 2002 was 442 million acres, its lowest level since the Major Land Uses series began in 1945, but only 2 million acres (less than 1 percent) below the previous low in 1964. From 1997 to 2002, cropland area declined by almost 14 million acres (3 percent), including a 6-million-acre decline in **cropland pasture**. These changes were more than offset by an increase in **grassland pasture and range** and by an increase in forest and special-use areas. Land classed under **miscellaneous other** uses also declined by more than 7 million acres (3 percent) from 1997 to 2002.

⁴ Major land-use estimates for the 48 contiguous States began in 1945, but estimation for the entire United States did not begin until 1949. Estimates for 1945 are indicative of total acreages in cropland, grassland pasture and range, and urban areas, which are concentrated in the contiguous 48 States, but not of forest, special uses, and other miscellaneous uses, which account for 99 percent of Alaska's land area. Estimates for special uses do not include all 50 States until 1959.

Table 2

Major uses of land, United States, 1945-2002

Land use	1945 ¹	1949	1959	1964	1969	1974	1978	1982	1987	1992	1997	2002 ²
	-----Million acres-----											
Cropland	451	478	458	444	472	465	471	469	464	460	455	442
Cropland used for crops	363	383	359	335	333	361	369	383	331	338	349	340
Idle cropland	40	26	34	52	51	21	26	21	68	56	39	40
Cropland pasture	47	69	66	57	88	83	76	65	65	67	68	62
Grassland pasture and range ³	659	632	633	640	604	598	587	597	591	591	580	587
Forest-use land ⁴	602	760	745	732	723	718	703	655	648	648	641	651
Grazed forest-use land	345	320	245	225	198	179	172	158	155	145	141	134
Other forest-use land	257	440	501	507	525	539	531	497	493	503	501	517
Special-use areas ⁵	85	87	115	144	143	147	158	270	279	281	286	297
Urban areas ²	15	18	27	29	31	35	45	50	57	59	66	60
Miscellaneous other land ⁶	93	298	293	277	291	301	301	224	227	224	236	228
Total land area ^{1, 7}	1,905	2,273	2,271	2,266	2,264	2,264	2,264	2,265	2,265	2,263	2,263	2,264

¹ The estimates for 1945, and for special uses until 1959, only account for the 48 contiguous States. The estimates for all other years include all 50 States.

² The 2002 urban acreage estimate is not directly comparable to estimates in prior years due to a change in the definition of urban areas in the 2000 Census of Population and Housing. The change in Major Land Uses "urban" acreage between 1997 and 2002 reflects a definitional change, rather than a decline in acreage. A full description of the new Census definition of urban areas can be found in the *Federal Register* (HUD/BOC, 2002).

³ Other grassland pasture and nonforested range (excludes cropland used only for pasture and grazed forest land).

⁴ Excludes an estimated 98 million forest acres in parks and other special uses of land.

⁵ Includes land specified in table 9. Data for all 50 States are not available until 1959.

⁶ Includes areas in miscellaneous uses not inventoried, marshes, open swamps, bare rock areas, desert, tundra, and other land generally having low value for agricultural purposes.

⁷ Totals differ over time due to remeasurement of the land area. Distribution of land uses may not add to totals due to rounding.

Sources: DOI/BLM, 2003; DOT/BTS, 2004; DOT/FAA, 2002; DOT/FHWA, 2002; DOT/FRA, 2004; USDA/FS 1989, 1998; DOI/FWS, 2001; GSA, 2001; GDT, 2000; USDA/NASS, 2004a, 2004b, 2005; DOI/NPS, 2002; HUD/BOC, 1992, 2002, 2003; USDA/NRCS, 2000, 2004a; and WI, 2002. Estimates prior to 2002 are from Vesterby and Krupa, 2001; Daugherty, 1991, 1995; Frey, 1973, 1979, 1982; Frey and Hexem, 1985; Frey et al., 1968; and Wooten et al., 1962. The estimates are not strictly comparable.

In maintaining the Major Land Uses series, ERS attempts to use a consistent methodology for measuring land use, but tradeoffs are sometimes necessary between consistency and accuracy. As new and improved data become available and are incorporated into the estimates, some of the land-use estimates may change relative to previous years, and it may not be possible to revise all of the historical estimates accordingly. Some of the changes in estimates between 1997 and 2002 reflect differences on paper rather than differences in actual land use. Most strikingly, land in urban areas is estimated at 60 million acres in 2002, compared with an estimated 66 million acres in 1997. This decline is due to a change in the criteria used to define urban areas in the 2000 Census (see “Urban and Rural Residential Uses,” p. 28). After adjusting earlier estimates for the new criteria, the estimated urban area increased by about 13 percent between 1990 and 2002. Similarly, some of the 11-million-acre increase in the estimates for special-use areas from 1997 to 2002 reflects changes in data on transportation lands and farmsteads, rather than actual changes in land use.

Changes in land-use estimates for one category necessarily imply changes in estimates for other land uses, given the fixed amount of total land. Though all land-use categories require reconciliation among sources at the State level, some categories in the Major Land Uses series are adjusted more than others based on the residual amount of land after other uses are tabulated. These categories are miscellaneous and other land and, to some extent, grassland pasture and range. For example, the reclassification of land from urban to rural areas from 1997 to 2002 may account for the estimated 1-percent increase in grassland pasture and range areas, for which less reliable data sources are available relative to cropland and forest-use areas. Similarly, the improved measurement of transportation lands in the special-use category may account for some of the 3-percent decline in the estimated area in miscellaneous other land uses. In general, more confidence should be afforded the broader land-use trends over decades rather than any particular 5-year fluctuations.

The National Resources Inventory (NRI), conducted by USDA’s Natural Resources Conservation Service (NRCS) in cooperation with Iowa State University, is an alternative source of estimated changes in land use for the contiguous 48 States. While the NRI does not account for all land use (Federal land and Alaska are omitted) and does not use the same definitions or data gathering procedures as the Major Land Uses series, it samples individual points on the landscape and collects a range of information on soil types and other physical characteristics.⁵ Between 1982 and 1997, the NRI repeatedly sampled the same points every 5 years, allowing the construction of land-use transition matrixes. Transition matrixes specify where each inventoried change in land use came from and where it went. Since the 1997 survey, the NRI has sampled a smaller number of points on an annual basis. Based on the new annual sample, NRCS provides annual estimates of national land use and summary information on selected land-use transitions.⁶

The NRI indicates a net decline in cultivated and uncultivated cropland area of 8 million acres between 1997 and 2002 (table 3). During this period, there were larger shifts of land both into and out of the cropland category.

⁵ Information on urban land and water bodies is collected for all of the NRI’s primary sampling units, averaging 158 acres in size and covering about 2-6 percent of each county. Information on other land uses is collected on two to three sample points within each of these primary sampling units (Nusser et al., 1998).

⁶ Point-level data are publicly available for the 5-year NRI surveys, enabling the analysis of three land-use transitions for each sample point (1982-87, 1987-92, 1992-97). At the time of this study, point-level data were not publicly available for the annual surveys started in 2001.

Table 3

Land use in the 48 contiguous States: National Resources Inventory estimates

Year	Cropland	Conservation Reserve Program (CRP) ¹	Pasture land	Range land	Forest land grazed	Forest land ungrazed	Other rural land ²	Developed land ³	Water and Federal areas	Total ⁴
-----Million acres-----										
1982	419.6	0	131.0	415.5	64.6	338.4	48.0	72.8	447.7	1,937.7
1987	406.2	13.8	127.2	409.3	62.7	341.7	48.6	79.0	449.3	1,937.7
1992	381.2	34	125.1	406.6	61.7	342.3	49.3	86.5	450.9	1,937.7
1997	376.4	32.7	119.5	404.9	58.2	346.5	50.3	97.6	451.6	1,937.7
2002	368.4	31.6	117.3	405.3	55.1	349.8	50.6	107.3	452.3	1,937.7

¹ Initiated by the Farm Security Act of 1985.

² Includes small and large urban built-up land as well as rural transportation land (see Appendix for complete descriptions of the different land-use categories).

³ A National Resources Inventory (NRI) category including farmsteads and other farm structures, field windbreaks, barren land, and marshland.

⁴ Distributions may not add to totals due to rounding.

Sources: USDA/NRCS, 2003, 2004a.

Lands shifting into cropland from another use over 1997-2001 totaled 16.6 million acres, with half of the new cropland transitioning from pasture uses, 35 percent from CRP acreage, and 15 percent from all other uses. From 1997 to 2001, lands exiting the cropland category totaled 23.3 million, with 43 percent of the land shifting to pasture, 32 percent to CRP, 8 percent to **developed uses**, and the remaining 17 percent to all other use categories. Based on NRI data, the overall change in forest area from 1997 to 2001 was not statistically different than zero. However, this apparent lack of change masks larger flows of land to and from the forest category. Approximately 7.4 million acres of land transitioned to forests from 1997 to 2001, with 53 percent of the land coming from pasture, 16 percent from cropland, and 31 percent from other uses. At the same time, about 7.2 million acres of forest lands transitioned to other uses, with 57 percent of the land shifting to urban development, 17 percent to cropland, and 26 percent to other uses (USDA/NRCS, 2003).

The land-use acreage totals and net changes in land use indicated by NRI differ from the Major Land Uses estimates due to the differences in coverage and definitions (tables 2-3). The NRI estimate for **large urban and built-up areas** was 77.6 million acres in 2001. In addition, the NRI estimates 6.7 million acres of **small built-up areas**. Together, the NRI estimates 84.3 million acres of built-up land. This number is significantly less than the ERS estimate of 154 million acres of urban and **rural residential land**.

The Major Land Uses (MLU) series estimates a decline in total cropland of 20 million acres over 1982-2002, which is equivalent to the NRI estimated change in cropland for this period if CRP and cropland are combined (CRP is classed as idle cropland in MLU but as a distinct land use in NRI). MLU indicates that cropland pasture and grassland pasture and range declined by 13 million acres, compared with a decline of 24 million acres in the NRI. MLU's inclusion of Federal lands, comprising more than a quarter of grassland pasture and range lands (see "Major Uses of Land, by Class of Ownership" p. 35), may account for this difference. For forest land, NRI shows an increase of almost 2 million acres from 1982 to 2002, in contrast to a

decrease of 4 million acres in forest-use land in the MLU series. MLU includes public and Alaskan land in the forest-use category, excludes forested land in parks and other special uses, and employs different estimation procedures than NRI.

The MLU special-uses category increased by 27 million acres over 1982-2002. Much of the MLU special-use land has no similar category in the NRI, but is included in NRI's forest land, other rural land, developed land (which includes rural transportation uses), and Federal areas. These comparisons serve to emphasize that the Major Land Uses estimates include land use for all land in the United States, including Federal land and all 50 States.

Basic Regional Land-Use Patterns

Land-use patterns vary greatly by region, reflecting differences in soils, climate, topography, and patterns of population settlement. For example, **cropland** accounts for 12 percent of the total land in the Northeast and 58 percent in the Corn Belt (table 4; see fig. 3 for a map of the Farm Production Regions used in this report; see Appendix for detailed descriptions of terms in **bold**).⁷ In similar fashion, there is variation among States within a region (fig. 4). Almost two-thirds of North Dakota is cropland, compared with 43 percent in South Dakota.

There are some clear regional patterns in land use. Cropland is roughly concentrated in the central regions of the contiguous United States, with the Northern Plains and Corn Belt having the majority of their land in cropland, and the Southern Plains, Lake States, and Delta States also having cropland shares above the national average. Limited precipitation in semiarid areas means that a large proportion of the land in the West is most suitable for grazing. The Mountain region and Southern Plains have the majority of their land in **grassland pasture and range**. The Northern Plains and Pacific regions also have relatively high shares of grazing acreage, with more than one-third and one-quarter of their land area, respectively, allocated to grassland and pasture and range. Forest-use land is most prevalent in the Eastern regions such as the Northeast, Appalachian, Southeast, and Delta States, which have a majority of their land in forest uses. In addition, forest-use

⁷ ERS constructed a set of Farm Resource Regions (USDA/ERS, 2000) to be used, when possible, in place of the Farm Production Regions. Farm Resource Regions require county-level data, which are not available for most land classes in the State-based Major Land Uses series.

Table 4

Major uses of land by region, 2002

Region ¹	Cropland ²		Grassland pasture and range ³		Forest-use land ⁴		Special uses and misc. other land		Urban area		Total land area ⁵	
	Mil. acres	Pct.	Mil. acres	Pct.	Mil. acres	Pct.	Mil. acres	Pct.	Mil. acres	Pct.	Mil. acres	Pct.
Northeast	13.7	12.3	3.0	2.7	65.5	58.9	16.8	15.1	12.3	11.1	111.4	100
Lake States	42.1	34.5	5.4	4.4	49.0	40.2	21.4	17.5	4.2	3.4	122.1	100
Corn Belt	95.7	58.2	13.1	7.9	31.3	19.0	16.5	10.0	8.0	4.9	164.6	100
Northern Plains	102.0	52.5	71.0	36.6	4.3	2.2	15.9	8.2	1.0	0.5	194.3	100
Appalachian	26.0	21.0	6.3	5.1	71.5	57.8	13.4	10.8	6.5	5.3	123.7	100
Southeast	14.8	12.0	8.3	6.7	73.7	59.7	17.8	14.5	8.7	7.1	123.3	100
Delta States	21.0	23.1	6.2	6.8	50.7	55.5	11.0	12.1	2.3	2.5	91.2	100
Southern Plains	55.7	26.3	115.8	54.7	18.0	8.5	16.7	7.9	5.3	2.5	211.5	100
Mountain	46.3	8.4	302.8	55.3	116.8	21.3	78.3	14.3	3.7	0.7	547.9	100
Pacific	23.9	11.7	52.3	25.7	78.3	38.4	42.1	20.7	7.1	3.5	203.8	100
48 States ⁴	441.3	23.3	584.2	30.8	559.1	29.5	250.0	13.2	59.2	3.1	1,893.8	100
Alaska	0.1	0.0	1.3	0.4	90.5	24.7	274.0	74.9	0.2	0.0	366.0	100
Hawaii	0.2	4.5	1.0	24.4	1.6	37.8	1.1	27.8	0.2	5.5	4.1	100
United States ⁴	441.6	19.5	586.5	25.9	651.2	28.8	525.1	23.3	59.6	2.6	2,264.0	100

¹ See fig. 3 for a map of the Farm Production Regions used in this report.

² Includes cropland used for crops, cropland used only for pasture, and idle cropland.

³ Open permanent pasture and range, both in farms and not in farms, excluding cropland pasture.

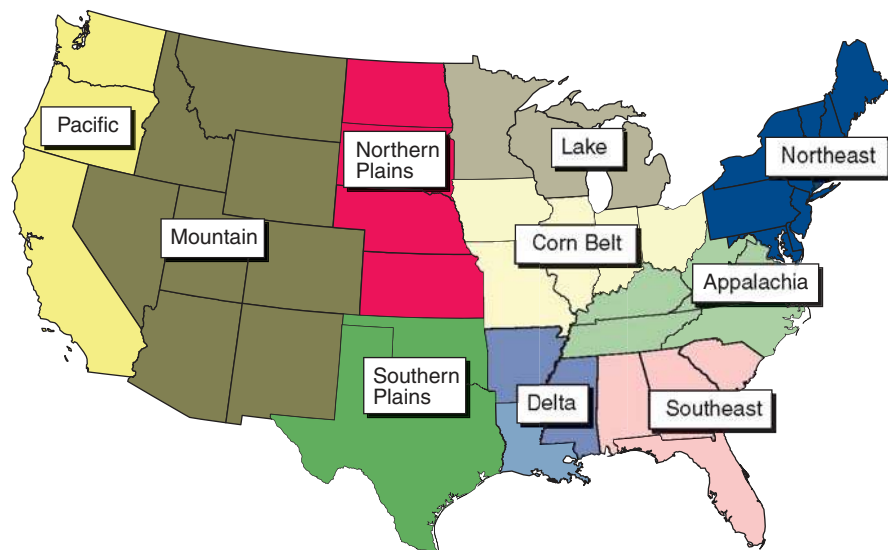
⁴ Includes forests grazed but excludes an estimated 98 million forest acres in parks and other special uses of land.

⁵ Distribution of land uses and percentages may not add to totals due to rounding.

Sources: DOI/BLM, 2003; DOT/BTS, 2004; DOT/FAA, 2002; DOT/FHWA, 2002; DOT/FRA, 2004; USDA/FS 1989, 1998; DOI/FWS, 2001; GSA, 2001; GDT, 2000; HUD/BOC, 1992, 2002, 2003; USDA/NASS, 2004a, 2004b, 2005; DOI/NPS, 2002; USDA/NRCS, 2000, 2004a; and WI, 2002.

Figure 3

USDA farm production regions

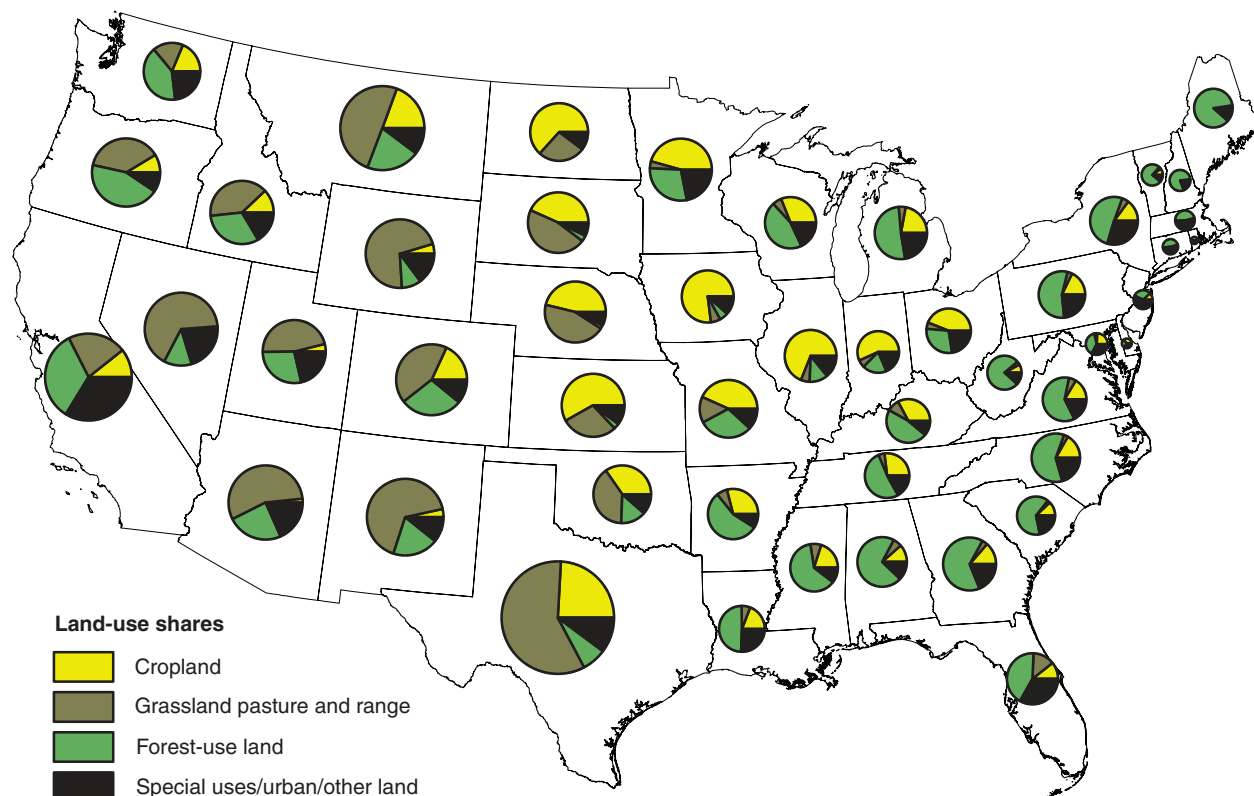


Source: Economic Research Service, USDA.

land constitutes a relatively high share of land in the Lake States and Pacific regions where the topography and precipitation patterns are also conducive to growing trees. The Northeast and Southeast have the highest shares of urban land, while the Lake States, Corn Belt, Appalachian, and Pacific regions also have urban shares above the Nation's average.

Figure 4

Shares of land in major uses, 48 contiguous United States, 2002



Note: The size of the pie charts is proportional to the land area in each State. Shares for Alaska are 25% in forest-use land, 75% in special uses/urban/other land, and less than 0.5% in all other uses. Shares for Hawaii are 5% in cropland, 24% in grassland pasture and range, 38% in forest use, and 33% in special uses/urban/other land.

Source: USDA/ERS Major Land Uses data series, 2005 (<http://www.ers.usda.gov/data/majorlanduses/>).

Cropland

Cropland includes five components: **cropland harvested**, **crop failure**, **cultivated summer fallow**, **cropland pasture**, and **idle cropland** (see Appendix for detailed descriptions of terms in **bold**). Cropland harvested, crop failure, and cultivated summer fallow comprise the total amount of cropland used for crops, or the acreage devoted to crop production in any year. Cropland pastured and idle cropland are not directly involved in crop production in a given year, but may rotate into production in another year.

Cropland Used for Crops

In 2002, the last year in which total cropland was inventoried by the Census of Agriculture, about 340 million acres, or 77 percent of the Nation's cropland base, were used for crops (table 1). Acreage used for crops was largest in the Northern Plains, followed by the Corn Belt, Lake States, Mountain, and Southern Plains regions. As a proportion of total cropland, cropland used for crops was above the national average in the Corn Belt, Lake States, Northern Plains, and Northeast, and below average in the Pacific, Mountain, Southern Plains, Delta States, Southeast, and Appalachia regions. Proportions ranged from a high of 87 percent in the Corn Belt to 56 percent in the Southern Plains region (see Major Land Uses data series for cropland acreage by region and State from 1945 to 2002: <http://www.ers.usda.gov/data/majorlanduses/>).

Cropland harvested, the dominant component of the acreage used for crops, includes row and closely sown crops, tree fruits and nuts, and vegetables. Cropland harvested totaled 307 million acres in 2002, down from 321 million acres in 1997 (table 5). The decrease in cropland harvested, and the

Table 5

Major uses of cropland, selected years, 1949-2002

Year	Cropland used for crops				Idle ³	Cropland pasture ⁴	Total cropland ²
	Harvested	Failed	Fallowed ¹	Total ²			
Million acres							
1949	352	9	22	383	26	69	478
1954	339	13	28	380	19	66	465
1959	318	10	31	359	33	66	458
1964	292	6	37	335	52	57	444
1969	286	6	41	333	51	88	472
1974	322	8	31	361	21	83	465
1978	330	7	32	369	26	76	471
1982	347	5	31	383	21	65	469
1987	293	6	32	331	68	65	464
1992	306	8	24	338	56	67	460
1997	321	7	21	349	39	68	455
2002	307	17	16	340	40	62	442

¹ Cultivated summer fallow.

² Distribution may not add to totals due to rounding.

³ Includes all acreage diverted from crops under the Acreage Reduction Program (ARP), the Conservation Reserve Program (CRP), and other Federal acreage reduction programs shown in figure 5.

⁴ Cropland used only for pasture.

Sources: Estimates from 2002 are from USDA/NASS, 2004a, 2004b, 2005. Estimates prior to 2002 are from Daugherty, 1991, 1995; Frey, 1973, 1979, 1982; Frey and Hexem, 1985; Frey et al., 1968; Vesterby and Krupa, 2001; Wooten et al., 1962; Wooten and Anderson, 1957; and Wooten, 1953.

resulting increase in crop failure, was partly the result of severe drought in some parts of the country in 2002. Crop failure occurred on 17.1 million acres, about 5 percent of the acreage planted for harvest in 2002. This failure rate was well above average for recent years. From 1945 to 2002, the rate of cropland failure averaged less than 3 percent. The rate of cropland failure in 2002 was the highest since 1956, and before that, the Dust Bowl years of the 1930s. Forty-three percent of the failed acreage in 2002 occurred in the Northern Plains. High crop failure rates also occurred in the Southern Plains and Mountain States, which account for 20 and 19 percent, respectively, of all failed acreage in the United States (see Major Land Uses data series for regional and State-level data on cropland failure from 1910 to 2002: <http://www.ers.usda.gov/data/majorlanduses/>).

As with cropland used for crops, harvested acreage was above the national average (70 percent of total cropland) in the Corn Belt, Lake States, and Northeast; about average in the Delta States, Northern Plains, and Pacific regions; and below average in the Southeast, Appalachian, Mountain, and Southern Plains regions. In 2002, the proportion of cropland harvested ranged from 47 percent in the Mountain States to 86 percent in the Corn Belt. The Mountain States and Southern Plains had higher proportions of cropland pasture and idle cropland than other regions, accounting for lower than average rates of harvested cropland.

Cultivated summer fallow refers to cropland in sub-humid regions that is cultivated for a season or more to control weeds and accumulate moisture before small grains are planted. Summer fallow is used extensively in the semiarid West. The use of summer fallow has been decreasing since the late 1960s. In 2002, summer fallow was at 16 million acres, down from a 15-year high of 32 million acres in 1987 and 25 million acres lower than 1969. More than 41 percent of summer fallow acres are in the Northern Plains region, 39 percent in the Mountain region, and the remainder in the Pacific and Southern Plains regions.

Other Cropland

The remainder of total cropland—that portion not used for crops— was used for pasture (62 million acres) or was idle (40 million acres) in 2002. In contrast to permanent grassland pasture and range, cropland pasture is considered to be in a crop rotation. Much of the cropland used for pasture is routinely rotated between crop and pasture use, although the rotation period varies. Part of the acreage, however, is marginal for crop use and may remain in pasture indefinitely.

Cropland used for pasture accounted for nearly 14 percent of all cropland in 2002. The largest acreages were in the Southern and Northern Plains, and the Mountain States, regions that also had the highest rates of crop failure. Some cropland, which would have otherwise failed due to the drought, was probably grazed and counted as cropland pasture.

The reason for pasturing cropland varied between regions. Cropland pasture acreage in the Corn Belt and adjacent areas reflects the high proportion of land classified as cropland. On many farms in this region, the only land

available for pasture may be good quality cropland. In contrast, cropland pasture in the Plains regions and much of the South is associated with higher proportions of marginal cropland.

Idle cropland includes both land completely idled and land seeded to cover or soil improvement crops, such as buckwheat and clover, but not harvested or pastured. Idle cropland totaled 40 million acres in 2002, about 9 percent of U.S. cropland. This amount nearly equals the U.S. historical average of 38 million acres since the major land-use series began in 1945. Regionally, the idle portion of cropland ranged from 6 percent in the Northeast to 17 percent in the Mountain States. Some cropland is idle each year because of adverse weather and soil conditions at planting time or lack of economic incentives. About 85 percent of the land idled in 2002 was under the Conservation Reserve Program (CRP). In 1992, 35 million of the estimated 56 million acres of idle land were in the CRP. Most of the remainder was in annual acreage reduction programs, which were discontinued in 1996. Some CRP land may be planted to trees, but is still classed as idle cropland due to limited data on forest coverage on CRP acreage.⁸ About 1 million acres of land classed as idle in 2002 was enrolled in the Wetland Reserve Program, a Federal program offering landowners financial incentives to remove frequently flooded land from agricultural production (USDA/NRCS, 2004b).

Trends in Cropland Uses

Cropland acreage has remained relatively constant since World War II, but has declined slowly in recent decades. A drop from 478 million acres in 1949 to 444 million acres in 1964 was largely the result of surplus production and subsequent acreage reduction programs. Cropland acreage was at or above 455 million acres in each census year from 1969 to 1997 (table 5). Between 1997 and 2002, total cropland dropped 13 million acres (about 3 percent) to 442 million acres, the lowest since the Major Uses of Land (MLU) series began in 1945 and 2 million acres less than the previous low in 1964.

The sum of cropland used for crops plus idle cropland has followed similar cycles, declining 25 million acres from 1949 to 1969, increasing 20 million acres from 1969 to 1982, and then falling from 404 million acres in 1982 to a 57-year low of 380 million acres in 2002. Idle cropland includes acreage fallowed but not harvested all year as well as acreage diverted from crops under the CRP (initiated in 1985) and other Federal acreage reduction programs (in effect prior to 1996).

Although the total acreage classified as cropland has slowly declined over recent decades, other changes have occurred in component acreages. These changes largely reflect the absence or presence, and extent, of set-aside requirements for Federal crop programs. Federal program enrollments, in turn, reflect the status of supply and demand relationships for agricultural products as well as changes in Federal farm policies.

Cropland acreage used for crops has been subject to greater short-term variations than either total cropland or cropland used for crops plus idle land

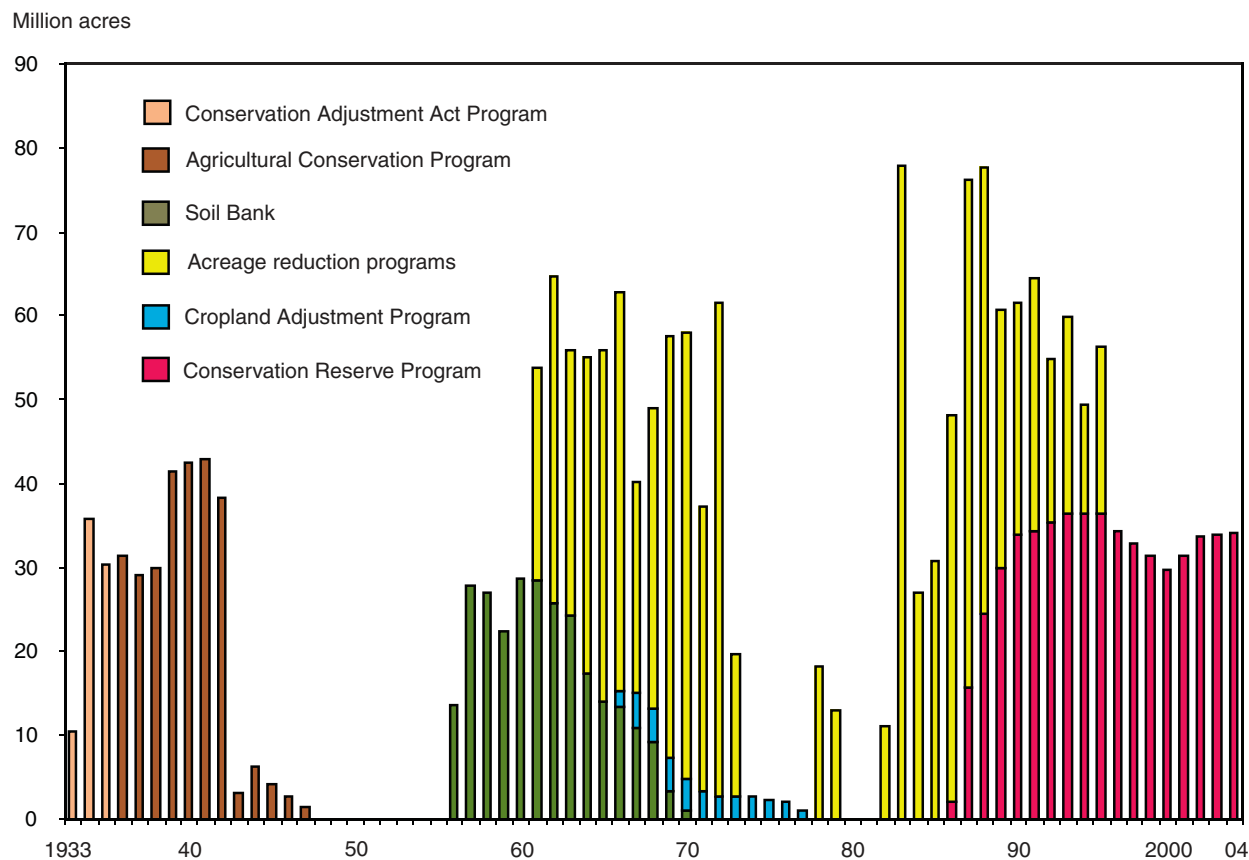
⁸ All CRP land is classified as idle cropland due to the difficulty of assessing the level of forest cover on CRP lands. In 2002, approximately 2.6 million CRP acres nationwide were enrolled under practices requiring tree planting, riparian buffers, and maintenance of existing trees. Additional trees may have existed on other CRP lands, such as 2.3 million acres managed for wildlife cover in 2002 (USDA/FSA, 2003).

(see “Major Land Uses” data product for annual national-level data on cropland used for crops, including cropland harvested, crop failure, and summer fallow, since 1910: <http://www.ers.usda.gov/data/majorlanduses/>). After falling from 383 million acres to 333 million acres from 1949 to 1969, cropland used for crops increased to 383 million acres by 1982 and then fell sharply to a 57-year low of 331 million acres in 1987. Cropland acreage used for crops increased by 18 million acres (5 percent) from 1987 to 1997, before declining 9 million acres (2 percent) during 1997-2002. The area of cropland used for crops in 2002 was 340 million acres, 11 percent below the 1982 and 1949 highs and about 5 percent below the average of 360 million acres for 1910-97. Nevertheless, cropland used for crops in 2002 remained 13 million acres (5 percent) above the 1988 low of 327 million acres.

There is an inverse relationship between two of the components of total cropland: as idled cropland increases, cropland used for crops decreases, and vice versa. Cropland used for crops was at a record high of 383 million acres in 1949 when no acres were idled by Federal programs (table 5, fig. 5). In 1972, cropland used for crops was at a near record low of 334 million acres when Federal programs idled 61 million acres. The area under Federal

Figure 5

Cropland acreage reductions by program type, 1933-2004



Note: For yearly detail of programs, 1974-95, see USDA/ERS, 1997. “Acreage reduction programs” include Acreage Conservation Reserve; 0, 50/85-82 programs; Paid Land Diversion; and Payment-in-Kind programs. Land under these programs is classified as idled cropland in the Major Land Uses estimates.

Source: Crosswhite and Sandretto, 1991; updated by USDA/ERS based on USDA/FSA, 2005.

cropland acreage reduction programs decreased to less than 3 million acres in 1974 (fig. 5). This decline was accompanied by a 27-million acre (8 percent) increase in cropland used for crops. Cropland used for crops climbed to 387 million acres in 1981 when Federal programs did not idle any cropland, and dropped to 333 million acres in 1983 when Federal program set-aside acres reached their historic peak of 78 million acres. Between 1987 and 2002, cropland used for crops increased overall while acreage idled by Federal programs decreased from 76 million acres to just under 34 million acres. Cropland used for crops declined from 349 million acres in 1997 to about 340 million acres in 2004, while acreage idled under Federal programs increased by 200,000 acres, all under CRP.

The general magnitude and trend of the annual changes in cropland used for crops correspond to changes in the land area idled under Federal acreage-reduction programs. Land area under acreage reduction programs has fluctuated inversely with commodity prices, while cropland used for crops has varied together with prices (fig. 6). Declines in real inflation-adjusted prices appear to be followed by increases in idled acreage and corresponding decreases in cropland used for crops, and vice versa. This relationship is consistent with a response by commodity producers to changing market incentives and with government efforts to manage commodity supplies and support farm incomes under adverse market conditions.⁹

Though cropland used for crops has tended to follow trends in prices of major crop commodities, the relative changes in acreage are smaller than the relative changes in prices (fig. 6). Between 1980 and 2002, the prices of major commodities declined by over 60 percent in inflation-adjusted terms, while total cropland used for crops dropped by about 6 percent. Productivity increases might have mitigated some of the effect of real price declines on the real returns to crop production. The variation in cropland used for crops in the 1990s was also smaller than in the 1980s, despite significant variation in real prices. This pattern may reflect the phasing out and elimination in 1996 of Federal acreage-reduction programs other than CRP. The pattern may also reflect the fact that, as the area of cropland used for crops declines, the remaining cropland is generally of higher average quality and less likely to move in and out of production with short-term price fluctuations.

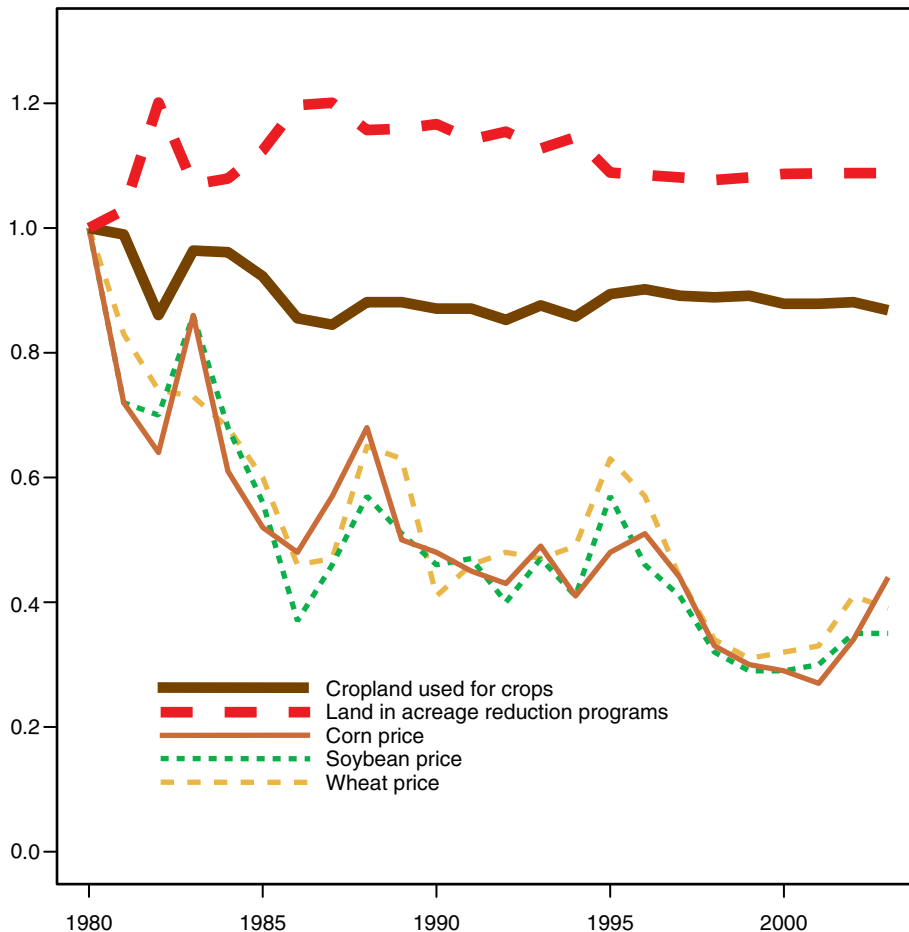
A number of major changes in farm program policy could also have influenced agricultural land-use decisions during this period. Farm legislation in the 1980s and 1990s marked a shift toward greater market orientation, with the addition of income-supporting (rather than price-supporting) commodity loan programs in 1985 and the introduction of planting flexibility on acres qualifying for commodity program payments in 1990. The Federal Agriculture Improvement and Reform (FAIR) Act of 1996 subsequently eliminated acreage set-aside requirements and virtually all cropping restrictions that had been in effect under previous farm programs. The FAIR Act also replaced commodity payments directly tied to current planting decisions with payments tied to historic production choices (Nelson and Schertz, 1996). Meanwhile, the Federal Crop Insurance and Reform Act (FCIRA) of 1994 increased Federal crop insurance premium subsidies, and additional increases were introduced in 2000. Total premium subsidies per insured acre

⁹ See Roberts et al. (2004) for a discussion of the countercyclical nature of Federal farm payments and the role of government farm programs in insuring producer risks.

Figure 6

Cropland used for crops and commodity prices of key crops

Real price and cropland indices



Notes: Real (inflation-adjusted) prices are plotted with a 1-year lag to better track incentives at the time of planting. Prices and land areas are indexed to 1 for 1980 to illustrate relative time trends. To construct the index for land in acreage reduction programs, this acreage is scaled as a share of the acreage in cropland used for crops in 1980, plus a constant that shifts this share up to 1 in the base year. As a result, equal percentage changes in the two cropland indexes indicate equivalent changes in land area.

Source: USDA/ERS, using prices from the National Agricultural Statistics Service deflated with the producer price index for all commodities from the Bureau of Labor Statistics.

almost doubled from 1993 to 2000, while the total level of subsidies paid increased from about \$200 million to \$1.3 billion (Glauber and Collins, 2002). Although these legislative initiatives changed the policy environment for crop production, total cropland acreage has changed little relative to historic trends.

Changes in cropland harvested parallel changes in cropland used for crops, except when the latter is affected by abnormally large changes in crop failure and cultivated summer fallow. Thus, the 1949-2002 totals vary between 286 million and 352 million acres, a range slightly wider than the range in cropland used for crops over the same period, which was 331 million to 387 million acres.

Estimates of cultivated summer fallow peaked at 41 million acres in 1969. In 1997, cultivated summer fallow totaled 21 million acres. Summer fallow occurs mostly in the Plains States where it is used in alternate years with small grains, primarily wheat, to conserve moisture and control weeds. Since 1969, summer fallow has declined and leveled off at about 31 million acres from 1973 through 1987. It has since gradually declined to approximately 15 million acres in 2004. Wetter years (which diminish the need for moisture-retaining summer fallow), better wheat varieties, and improved cultivation practices have contributed to this decrease.

The long-term decline in the area under cultivated summer fallow is partly attributed to the adoption of moisture-conserving soil conservation practices, such as no-till and mulch-till, which have reduced the need for summer fallow. With less summer fallow, farm operators can use more land to grow crops, increasing farm income potential. Some of the decrease in summer fallow may also be attributable to the Conservation Reserve Program (CRP). Much of the CRP acreage is in the Great Plains region, where summer fallow is most commonly practiced. Land taken out of production and placed in the CRP includes some land that might otherwise have been in summer fallow.

Land marked by crop failure has ranged between 5 million and 22 million acres since 1945. The possibility of a large acreage failure is always present. Crop failure was around 10 million acres in 1988, 1993, 1996, 1998, 2000, and 2001 due to severe drought, extensive flooding, or wet weather. The 17 million acres of crop failure in 2002 were the highest since the extensive droughts of 1956. Moderate to extreme drought reached more than half of the contiguous United States during the summer of 2002 (DOC/NOAA).

Total idled acreage in 2002 was almost 1 million acres (2 percent) higher than in 1997, due mainly to an expansion of CRP. Idled cropland increased during the 1950s and 1960s when acreage shifted from crop production, then declined in the early 1970s as acreage returned to production (table 5). Since 1987, idled acreage has ranged from 39 million to 68 million acres—between two and three times the 1974-82 levels—in response to increased enrollments in Federal crop programs and as a result of lands retired under 10- to 15-year CRP contracts.

Cropland used for pasture was 68 million acres in 1997, compared with a high of 88 million acres in 1969 and a low of 57 million acres in 1964 (table 5). These acreage figures may not be strictly comparable, primarily because of inconsistent classifications between cropland pasture and permanent grassland pasture.

Irrigated land reached a record-high of 56 million acres in 1997 and declined about 1 million acres nationally between 1997 and 2002 (see <http://www.ers.usda.gov/data/majorlanduses/> for irrigated land acreage in 2002 by region and State). Irrigated land has increased nearly 9 million acres (19 percent) since 1987, while total cropland decreased over the same period by 22 million acres, or nearly 5 percent (table 2). Irrigated land in 1997 was at record-high levels for every region except the Southern Plains and Mountain States. Between 1997 and 2002, irrigated land decreased in

all regions except for the Delta States, where it reached a high of 6 million acres in 2002.

Regional Changes in Cropland Used for Crops

While the area of cropland used for crops declined between 1997 and 2002, cropland used for crops increased by almost 5 million acres, or 1.4 percent, from 1964 to 2002. At the same time, sharp downward shifts occurred in some regions and larger increases in others. This further concentrated acreage used for crops in major crop-producing regions.

Cropland used for crops in the Northeast, Northern Plains, Southeast, Southern Plains, Mountain, and Pacific regions declined 12 million acres from 1964 to 2002, but increased by 17 million acres in the remaining regions (see Major Land Uses data series for trends by region and State: <http://www.ers.usda.gov/data/majorlanduses/>). Sixty-three percent of the 1964-2002 increase, nationally, occurred in the Corn Belt. The net gains from 1964 to 2002 are attributable to conversion from grassland pasture and range and transfers from cropland pasture acreage in the Corn Belt and Delta States regions.

For some regions, changes in cropland used for crops represent year-to-year fluctuations that tend to balance out over time. For others, the long-term trend has been more dramatic. The Northeast has experienced a long-term decline in cropland used for crops. Cropland used for crops encompassed 11 million acres in the Northeast in 2002, equal to 3 percent of total cropland used for crops in the contiguous 48 States. This compares to 21 million acres in 1945, equal to 6 percent of the 48 States' acreage of cropland used for crops. Urban pressures and a comparative disadvantage in many crops have resulted in the conversion of Northeast cropland to other uses. Between 1997 and 2002, however, cropland used for crops increased almost 1 million acres (about 7 percent) in the Northeast, slightly increasing the region's share of the contiguous 48-State total.

Changes in Principal Crops Harvested

Trends in crops harvested are closely associated with levels of cropland diverted from production through Federal programs (fig. 5). In 1963, 56 million acres of cropland were diverted through the Soil Bank and acreage reduction programs, but Federal programs diverted no cropland in 1980-81. Strong growth in the export market and rapid expansions through double-cropping of soybeans and small grains marked the 1970s and early 1980s. The harvested acreage of principal crops increased by 68 million acres during 1963-81, then decreased by almost 56 million acres from 1981 to 2002. The CRP diverted almost 34 million acres from production in 2002 (USDA/FSA, 2003). The harvested acreage of principal crops peaked at 354 million acres in 1981, when no cropland was diverted.

Federal programs diverted a record 78 million acres in 1988, which brought harvested acres down to a low of 287 million acres. Since then, Federal program acreages have declined. In 1999, diverted acreage totaled just 30

million in the Conservation Reserve Program, and harvested area reached 316 million acres. It might be expected that cropland harvested would increase in direct proportion to the cropland coming out of Federal programs. However, the increase in harvested acres from 1988 to 2002, 29 million acres, did not match the 47-million-acre decrease in Federal programs, probably due to poor market conditions and weather-related crop failures in the 1990s.

The 1963-81 and 1981-2002 periods also exhibit changes in the mix of crops. Of food crops, only soybeans, some of which were double-cropped, registered substantial increases over time. Soybean acreage more than doubled from about 29 million acres in 1963 to over 72 million acres in 2002, surpassing wheat as the second-leading U.S. crop in acreage terms and almost matching the corn acreage (table 6). Wheat acreage, some of which was double-cropped ahead of soybeans, increased by 35 million acres between 1963 and 1981 but then dropped back to near-1963 levels between 1981 and 2002.

Table 6

Principal crops harvested, 48 contiguous States

Crop	1963	1981	1992	1997	2002	Change	
						1963-81	1981-2002
Million acres							
Food crops							
Wheat	45.5	80.6	62.8	62.8	45.8	35.1	-34.8
Soybeans	28.6	66.2	58.2	69.1	72.2	37.6	6.0
Rice	1.8	3.8	3.1	3.1	3.2	2.0	-0.6
Rye 1.6	0.7	0.4	0.3	0.3	-0.9	-0.4	
Peanuts	1.4	1.5	1.7	1.4	1.3	0.1	-0.2
Sunflowers	NR	3.8	2.0	2.8	2.2	3.8	-1.6
Dry edible beans	1.4	2.2	1.5	1.8	1.7	0.8	-0.5
Dry edible peas	0.3	0.1	0.2	0.3	0.3	-0.2	0.2
Potatoes	1.3	1.2	1.3	1.4	1.3	-0.1	0.1
Sweet potatoes	0.2	0.1	0.1	0.1	0.1	-0.1	0.0
Sugar beets	1.2	1.2	1.4	1.4	1.4	0	0.2
Sugarcane	0.5	0.7	0.9	0.9	1.0	0.2	0.3
Total	83.8	162.1	133.6	145.4	130.8	78.3	-31.3
Feed crops							
Corn, all	68.3	83.2	78.1	78.7	76.8	14.9	-6.4
Sorghum, all	17.0	15.5	12.0	9.6	7.7	-1.5	-7.8
Oats	21.3	9.4	4.5	2.8	2.1	-11.9	-7.3
Barley	11.2	9	7.3	6.2	4.1	-2.2	-4.9
Hay	66.4	59.6	58.9	61.1	64.5	-6.8	4.9
Total	184.2	176.7	154.8	158.4	155.2	-7.5	-21.5
Other crops							
Cotton	14.2	13.8	11.1	13.4	12.4	-0.4	-1.4
Flaxseed	3.2	0.6	0.2	0.1	0.1	-2.6	-0.5
Tobacco	1.2	1.0	0.8	0.8	0.1	-0.2	-0.9
Total	18.6	15.4	12.1	14.3	12.6	-3.2	-2.8
Total ¹	286.6	354.2	300.5	318.1	298.6	67.6	-55.6

NR = Not reported.

¹ Distributions may not add due to rounding.

Sources: Compiled by USDA/ERS, based on principal crops harvested from Daugherty, 1995; USDA/NASS, 1999b, 2005.

Total food crop production increased by 93 percent between 1963 and 1981, from 84 to 162 million acres. Feed crops, on the other hand, declined by nearly 8 million acres (4 percent). Other crops—cotton, flaxseed, and tobacco—declined by more than 3 million acres (17 percent). During 1981-2002, the acreage of food crops declined by 19 percent, almost entirely from wheat. Feed crops declined by 12 percent, with oats declining almost 78 percent. The amount of other crops harvested also continued to drop. Cotton, accounting for 92 percent of other crop acreage, declined by 10 percent from 1981 to 2002, while flaxseed and cotton acreage each declined by over 80 percent.

Market forces and perhaps changes in farm programs have affected the supply and demand for the four agricultural crops (corn, soybeans, wheat, and hay) that comprise 80 percent of total harvested acres in the United States. The harvested acreage of soybeans has increased almost 17 percent since 1996, while wheat acreage decreased by about 21 percent and corn by 2 percent. Harvested hay acreage increased by almost 2 percent. The increase in planting flexibility, introduced with the Food, Agriculture, Conservation, and Trade Act of 1990 and culminating with the FAIR Act of 1996, allowed producers to increase more profitable soybean acreage without losing base acreage of wheat, corn, and other program crops, which could have been costly under previous farm programs. In addition, new varieties of corn and soybeans have allowed expansion of these crops into previously wheat-producing areas of the Plains States (USDA/ERS, 2004).

Grazing Land

Nearly 35 percent of U.S. land area, 782 million acres in 2002, is grazing land—**cropland pasture**, **grassland pasture and range**, and **forest land grazed** (table 1; see Appendix for detailed descriptions of terms in **bold**). While this estimate of total grazing area includes forest land on which grazing occurs as a multiple use, the estimate excludes land grazed before or after crops were harvested. Examples include fall and winter grazing of small grains and after-harvest grazing of hay land. The three types of grazing land measured differed greatly in terms of acreage, distribution, productivity, and other characteristics. (See Daugherty, 1989, for an overview of U.S. grazing lands from 1950 to 1982.)

Cropland Pasture

The smallest but generally most productive component of grazing acreage, cropland pasture, occupied 3 percent of total U.S. land area and accounted for 8 percent of total pasture and range acreage in 2002. While cropland pasture is considered part of the cropland base, it may be marginal for crop use and remain in pasture for extended periods. Two-thirds of the 62 million acres in this category were concentrated in the Southern Plains, Corn Belt, Northern Plains, and Appalachian regions. Cropland pasture comprises a relatively high percentage of total pasture and range in the Appalachian, Corn Belt, Northeast, and Lake States regions. However, the share of land area in grassland pasture and range is much higher in the Plains and Mountain regions than in the East. Cropland pasture is significant in the West, but minor in comparison to the acreages of grassland pasture and range and grazed forest land.

Cropland pasture may shift to cropland used for crops when commodity prices are high. However, these shifts are much more frequent between idled cropland and cropland used for crops because idled cropland is generally more suited to crop production than cropland pasture. Also, these shifts may be more pronounced in regions with higher quality cropland pasture, such as the Corn Belt.

Grassland Pasture and Range

Grazing is the predominant use on 586 million acres of grassland pasture and range, over half of which is in the Mountain region ("grassland pasture" is the name more commonly used in the eastern United States). Another 20 percent is in the Southern Plains. The Northern Plains and Pacific regions together account for 20 percent. These four regions have about 542 million acres (93 percent) of U.S. grassland pasture and range. The rest is distributed among the remaining regions, none of which have more than 2 percent of the total. Of the types of grazing land, grassland pasture and range dominate in all regions except the Appalachian and Delta regions, where cropland pasture and forested grazing predominate, respectively.

Grassland pasture and range account for 55 percent of all land area in both the Southern Plains and Mountain regions. Grazing of this varied cover type accounts for 35 percent of the area in the Northern Plains, where a larger proportion of the land area is used for crops, and 26 percent in the Pacific

region, where forest-use land predominates. In other regions, except Hawaii, the proportion of area in grassland pasture and range varied from 7 percent in the Southeast to less than 1 percent in Alaska. Nearly a third of the land in Hawaii is grazed, but because of the State's small size, grassland pasture there contributes little to the total national acreage.

Grazed Forest Land

The 134 million acres of grazed forest land include acreage in open forest, land reverting to forest, and other forested areas with grass or other forage growth that are grazed to some extent.¹⁰ Grazed forest land ranged from less than 1 million acres in Alaska and Hawaii to 63 million acres in the Mountain region. Acreage of this pasture type is relatively high throughout the West, Southwest, and South, but is the dominant type only in the Delta States. Regional variations in the amount of grazed forest land are a function of the productivity of forested grazing, the demand for grazing, the amount of forest land, and factors such as species composition and stand density.

The value of forest land for grazing varies widely in the different regions, depending on climate, soils, tree canopies, and other factors. Values are relatively high on open stands of pine in the South, for example, where climate permits grazing throughout the year. Upland hardwoods, on the other hand, with a more complete canopy, allow little production of forage, although substantial acreage is grazed because of their availability on farms. Ponderosa pine and other open forest types in the West enable seasonal grazing, but forest land with thick growing trees, such as fir, offers little grazing value.

Trends in Grazing Acreage

Total grazing land in 2002 accounted for 783 million acres, the lowest amount since the Major Land Uses series began in 1945. Total grazing land declined by about 268 million acres (about 25 percent) from 1945 to 2002.¹¹ Total nonforested grazing acreage (the combined acreage of cropland pasture and grassland pasture and range) was just over 648 million acres in 2002. This was near the 1997 level, the lowest level since 1945 when it totaled 706 million acres. Estimated acreage of grassland pasture and range increased by almost 7 million acres from 1997 to 2002. However, acreage of all grazing land declined from 1997 to 2002 (table 7). This continues a downward trend that began in 1945. While cropland pasture and grassland pasture and range have increased in some years, grazed forest land has consistently declined. Cropland pasture and grazed forest land decreased by 6 million acres each from 1997 to 2002, which might reflect a transition of cropland used for crops and pasture to permanent pasture as well as reclassification of urban land under the 2000 Census.

Pasture and range acreage sometimes converts to cropland when demand for crop products is high. However, grazing lands may be less economically suited for crop production than for other uses. Substantial acreages of land used for grazing has shifted to recreational, wildlife, and environmental uses. Under favorable growing conditions, particularly in the South, pasture land may revert to forest. Some acres were converted to urban uses. These forces have combined to cause a long-term net decline in pasture and range

¹⁰ Estimates of total grazed forest acreage are based on acreage estimates of active grazing allotments in national forests, plus grazed acreage on non-federally owned forests from the Census of Agriculture and the National Resources Inventory (NRI). These estimates require reconciliation of various sources and thus depend on more assumptions than estimates derived from a single source, such as total forest acreage obtained from the Forest Service.

¹¹ Statistics for 1945 do not include Alaska and Hawaii. Nevertheless, these States have little influence on total grazing acreage, accounting for just 0.22 percent of the total grazing area in 1949.

Table 7

Total pasture and range, by type, United States, 1949-2002

Year	Cropland pasture ¹	Grassland pasture and range ²	Subtotal ³	Grazed forest land ⁴	Total ³
<i>Million acres</i>					
1949	69	632	702	320	1,022
1954	66	634	700	301	1,001
1959	66	633	699	245	943
1964	57	640	698	225	922
1969	88	604	692	198	890
1974	83	598	681	179	860
1978	76	587	663	172	835
1982	65	597	662	158	820
1987	65	591	656	155	811
1992	67	591	658	145	803
1997	68	580	648	141	788
2002	62	587	648	134	783

¹ Cropland used only for pasture estimate based on USDA/NASS, 2005.

² Grassland and other nonforested pasture and range in farms (USDA/NASS, 1999a) plus estimates of open or nonforested grazing land not in farms.

³ Distribution may not add to totals due to rounding.

⁴ Woodland grazed in farms (USDA/NASS, 2004a) plus an approximation of forested grazing on Federal and non-Federal land not in farms.

Sources: Estimates based on reports and records of the Bureau of the Census and Federal and State land management and conservation agencies. The estimates are not strictly comparable. Estimates for 2002 based on DOI/BLM, 2003; USDA/FS 1989; GSA 2001; USDA/NASS, 2004a, 2004b, 2005; and USDA/NRCS, 2000, 2004a. Estimates for years prior to 2002 are from Daugherty, 1989 and Frey, 1983 plus previous *Major Land Uses* reports: Daugherty, 1991, 1995; Frey, 1973, 1979, 1982; Frey and Hexem, 1985; Frey et al., 1968; Vesterby and Krupa, 2001; Wooten et al., 1962; Wooten and Anderson, 1957; and Wooten, 1953.

acreage, from over 1 billion acres in 1949 to 783 million acres in 2002 (table 7).

The combined acreage of cropland pasture and grassland pasture and range declined from 1949 through 1997 for a net decrease of 54 million acres in the 48 contiguous States. However, not all regions experienced long-term declines in nonforested pasture and range (see Major Land Uses data series for trends by region: <http://www.ers.usda.gov/data/majorlanduses/>). Between 1949 and 2002, pasture and range increased by 31 million acres in the Southern Plains and 2 million acres in the Southeast. These increases offset large declines in the Mountain (42 million acres) and Pacific regions (11 million acres). Increases in the regions east of the Rocky Mountains were associated with declines in acreage used for crops and with clearing and reclassification of forest land. A part of this increased acreage had been classed as forested grazing land. Large decreases in the Western States mainly involved Federal range that was withdrawn for wilderness and similar areas, or that was reclassified as unsuitable for grazing.

Grazed forest land decreased by nearly 186 million acres, or 58 percent, from 1949 to 2002 (table 7), and by 6 million acres during 1997-2002. Among reasons for the long decline in forest grazing activity were fewer farms and less land in farms, increases in forest stand density (restricting grazing possibilities), and improvements in both livestock feeding and forest management practices. All of these factors have been especially important in the South, where woodland grazing acreages have been high.

Forest-Use Land

Forest land used for all purposes totaled 749 million acres in 2002 (table 8), an increase of 2 million acres over 1997 (see Appendix for detailed descriptions of terms in **bold**). In the 48 contiguous States, the increase was 2.5 million acres, while Alaska lost 0.5 million acres from 1997 to 2002. Forest land increased in the Appalachian, Southeast, Mountain, and Pacific regions and either decreased slightly or remained constant in the other regions of the country.

More than two-thirds of the forest land in 2002 was **timberland**—forests capable of commercial timber production not removed from timber use by statute or administrative regulation—and the remainder was a combination of **reserved forest land** and **other forest land**. Of the total, about 67 percent was non-Federal (Smith et al., 2004). Most of the forest area serves multiple purposes. For example, livestock grazing occurs on about 134 million acres or 18 percent of the acreage (see “Grazed Forest Land,” p. 23) and large areas are available for recreational use (see “Special Uses,” p. 31). Forest land provides watershed protection, wildlife habitat, and parks, and serves other special purposes. Excluding **forest land grazed** and an estimated 98 million acres of **forest areas in special uses**, such as parks and wildlife areas, leaves 517 million acres of ungrazed **forest-use land**.

The “forest-use” category is based on the use of the forest land as opposed to the forest cover alone. The forest-use designation includes both grazed and ungrazed forests but excludes forest land in parks, wildlife areas, and other special uses. This reduced area is a closer approximation of the land

Table 8

Total forest land, by major class and region, 2002

Region	Timberland			Reserved and other forest land ² <i>1,000 acres</i>	Total forest land		
	Federal	Non-Federal	Total ¹		Federal	Non-Federal	Total ¹
Northeast	1,588	64,883	66,471	6,455	2,236	70,688	72,924
Lake States	6,131	42,909	49,040	2,885	7,533	44,392	51,924
Corn Belt	2,510	28,794	31,304	1,425	2,857	28,872	32,729
Northern Plains	1,097	3,244	4,341	444	1,323	3,461	4,784
Appalachian	5,960	66279	72,239	2,324	7,842	66,722	74,564
Southeast	4,731	68,930	73,661	2,510	6,167	70,004	76,171
Delta States	5,078	45,588	50,667	496	5,424	45,739	51,163
Southern Plains	1,111	16,896	18,007	6,806	1,293	26,521	24,814
Mountain	46,332	19,955	66,287	73,275	98,783	40,777	139,560
Pacific	30,428	28,532	58,960	32,714	49,533	42,141	91,674
48 States ¹	104,966	386,009	490,975	129,335	182,989	437,316	620,305
Alaska	4,750	7,115	11,865	115,004	63,423	63,446	126,869
Hawaii	0	700	700	1,049	12	1,736	1,748
United States ¹	109,717	393,823	503,540	245,388	246,425	502,497	748,922

¹ Distributions may not add due to rounding.

² Includes 98 million acres of forest land in parks, wildlife areas, and other special land uses.

Source: Smith et al., 2004.

that may be expected to serve commercial forest uses as opposed to having forest cover. While forest-use land generally declined from 1949 to 2002, forest-use land increased by almost 10 million acres (about 2 percent) from 1997 to 2002.

Land area in forests is about equally divided between the eastern half of the country and the western half, including the Plains States and Alaska (Smith et al., 2004). Forest predominates in the Northeast, Appalachian, Southeast, and Delta States regions, comprising 56-65 percent of all land in these regions. Forest land is also a relatively large share of the Lake States and Pacific regions, accounting for 43-45 percent of all land in these regions. Acreages in the Mountain region and Alaska are quite large but make up a smaller proportion of total land area in those regions (25 and 35 percent, respectively).

About 46 percent of the reserved and other forest land—parks, wilderness, and wildlife refuges, for example—is in the Southern Plains, Mountain, and Pacific regions, where it accounts for over 44 percent of all the forest land in those regions. Much of the remainder (47 percent) is in Alaska, where it accounts for 91 percent of all forest land in that State. In contrast, acreages of reserved and other forest land in the Eastern States are relatively small, accounting for no more than 10 percent of all forest land in any region east of the Mississippi River (Smith et al., 2004).

Trends in Forest-Use Acreage

Forest-use land, which does not include the forest area counted under special uses, increased by 10 million acres (roughly 2 percent) from 1997 to 2002. This marked a reversal of a downward trend since 1949. The 651 million acres of forest-use land differs from the 749 million total forest acres estimated by the Forest Service because the latter includes multiple-use areas in special uses such as parks and wildlife refuges. Much of the 14-percent decline in forest-use land from 1949 to 2002 entailed reclassification of land from forest-use to **special-use areas** (see “Special Uses,” p. 31). Total forest land decreased less than 1 percent between 1953 and 2002 (Smith et al., 2004).

Total forest land, including multiple-use areas, declined from colonial times until about 1920, increased from 1920 to 1960, then trended downward until 1987 (USDA/FS, 1982; 1989). Total forest area has increased since 1987, rising by about 5 million acres between 1987 and 1992, by 10 million acres between 1992 and 1997, and by 2 million acres between 1997 and 2002. Forest land classed as timberland has followed a similar upward trend since 1987, when it was at a 35-year low of 485 million acres. Timberland area increased by 5 million acres over 1987-92, increased by 14 million acres over 1992-97, and stabilized over 1997-2002 at about 504 million acres (Smith et al., 2004).

Recent increases in timberland area are partially the result of a reclassification of some national forest lands due to standardization with protocols in use on other land ownerships. Some of the increases in total timberland since 1987 may also indicate a response to rising real prices for forest prod-

ucts. Based on a national analysis of National Resources Inventory data, Lubowski et al. (2003) estimate that the increase in net returns from timber production, combined with a decline in crop profits, were the major determinant of forest area change from 1982 to 1997. While timberland acreage increased nationally, changes were not uniform across the country. Some timber-producing States, such as California, Washington, and Michigan, experienced small decreases in timberland acreage from 1997 to 2002 (of 1, 0.4, and 0.3 percent, respectively).

Although grazed forest land constituted 14 percent of the total U.S. land area in 1949 (and 42 percent of the forest-use land), this share had dropped to less than 6 percent of the total land area (and 21 percent of the forest-use land) by 2002. Most of the forested land that had been grazed likely remained forested. However, forest-use land that was not grazed increased by just 77 million acres from 1949 to 2002, for an overall decline in forest-use land of 109 million acres (14 percent) during this period.

Forests under non-Federal ownership declined by 0.7 million acres (less than 0.5 percent) from 1997 to 2002. Acreage classified under all nonindustrial private ownerships remained at 291 million acres, while woodlands on farms declined by about 1 million acres (1 percent) from 1997 to 2002 (USDA/NASS, 1999a; 2004a). Federal timberland increased by about 0.6 million acres (1 percent) from 1997 to 2002, compared with a 13-million-acre increase from 1992 to 1997. Earlier declines in Federal timberland area from 1952 to 1992 were primarily the result of transferring timberland into reserved areas.

Urban and Rural Residential Uses

The Census Bureau reported an **urban area** total of 56 million acres in 1990 and, based on a revised definition, 59.2 million acres in 2000 and 59.6 million acres in 2002 (see Appendix for detailed descriptions of terms in **bold**). This estimate of urban land area for 2002 is below the 66 million urban acres previously reported by Major Land Uses (MLU) for 1997 (table 2). This difference does not indicate an actual decline in urban acreage. Instead, it reflects a change in the definition of urban and rural areas used for the 2000 Census. The Census Bureau calculates that 1990 urban area would have been 51.8 million acres under the new definition, compared with 55.9 million acres under the previous definition. Estimates based on the new definition imply that urban area increased about 7.8 million acres (13 percent) from 1990 to 2000.

Most significantly, the Census Bureau created a new set of geographic entities termed “urban clusters,” in order to more precisely delimit areas of high population density outside major “urbanized areas.” These urban clusters replaced the previous criteria, which classified whole Census-designated places as urban based on average population density. The new geographic units included high-population-density areas previously defined as rural and excluded low-density areas previously defined as urban. Other changes in the criteria include the removal of a grandfathering requirement to retain areas as urban if they fell within previously designated urbanized areas. On net, these and other changes in the Census criteria led to the downward revision of urban area estimates.¹²

In 2002, urban land in the United States was less than 3 percent of total land area, but housed 79 percent of the U.S. population. Rural **residential area** is an estimate of the acres of land and associated lots in rural areas used for housing. Data on rural residential acreage at the national level are available from several periodic American Housing Surveys (AHS) published by the U.S. Department of Housing and Urban Development (HUD) and the Census Bureau. AHS data are not available by State. In deriving the MLU estimates, housing units for which AHS assigns an acreage weight but no lot size (apartment houses, condominiums) were assigned the smallest lot size in the sample to account for all housing area. Area associated with farm housing units was subtracted to account for land in productive farms (with more than \$1,000 in annual agricultural income).

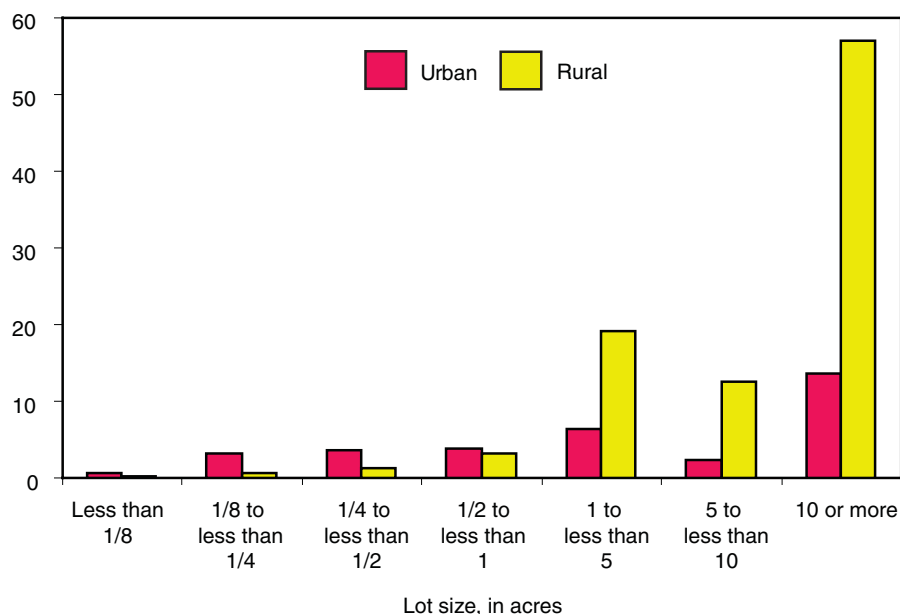
The MLU estimate for the nonfarm, rural residential area is 94 million acres in 2002, up from the 1997 estimate of 73 million acres and the 1980 estimate of 56 million acres. Urban land plus rural residential areas together comprise 154 million acres, or almost 7 percent of total U.S. land area. Given the information provided by AHS, it is not possible to clearly distinguish land used for residential purposes from land in other uses. Land in the rural residential category could be classified under the “miscellaneous other” land category in the MLU series (see “Major Uses of Land, by Class of Ownership,” p. 35). However, land classed under rural housing lots could also be classed as forests or grassland pasture and range, particularly given the prevalence of large lots that could serve multiple uses (fig. 7).

¹² The new Census definition of urban area, and updates, can be found in the *Federal Register* (DOC/BOC, 2002).

Figure 7

U.S. urban and rural residential area, by lot size, 2002

Million acres



Notes: Estimates are an average of 2001 and 2003 American Housing Survey micro-data, weighted according to 2000 Census geography. Farm housing units and housing units with unreported lot sizes (e.g., apartments) are not included in these estimates.

Sources: HUD/BOC, 2002; 2004.

Large lot sizes occur more frequently in rural areas than in urban areas (fig. 7). Rural residential area encompassed 57.1 million acres of lots 10 acres and more, versus 13.5 million acres in urban areas. However, in the smaller lot sizes, urban land occurred in greater frequency. Urban land occupied 711,000 acres of lots less than an eighth of an acre, while rural land encompassed only 189,000 such acres. These small-size lot numbers do not reflect residential units, such as apartments, which are not assigned lot sizes by the AHS. Land in rural areas is generally less expensive, which may account for larger lot sizes in rural areas.

The National Resources Inventory (NRI) is an alternative source for estimates of urban and rural residential areas. The NRI uses a consistent definition for **urban and built-up areas**, although it differs from the definition used by the Census Bureau. According to the NRI, **developed land** totaled 106 million acres in 2001, including 22 million acres in rural transportation uses and 84.3 million acres in small and large urban and built-up areas. The MLU estimates for 2002 are 60 million urban acres, with 27 million acres in transportation areas (highways/roads, railroads, and airports) and 94 million acres in rural residential uses.

NRI's estimate of built-up areas exceeds the Census urban area estimate, as NRI's classification includes some rural housing tracts (typically over 10 acres) and some developed land used for nonhousing purposes in rural areas (not included in MLU's rural residential category). On net, NRI's built-up classification excludes more land than it includes relative to the sum of the Census urban plus rural residential categories.

Trends in Urban and Rural Residential Uses

Urban land area has quadrupled from roughly 15 million acres in 1945 to an estimated 60 million acres in 2002. The Census Bureau reports that the U.S. population nearly doubled over this same period. Thus, urban land area has increased at about twice the rate of population growth. Rural residential land, as estimated by MLU, increased by 17 million acres (30 percent) from 1980 to 1997, and by 21 million acres (29 percent) from 1997 to 2002. However, even with large percentage increases in urban and rural residential areas, percentage decreases in the remaining rural area are small given the available land base.

Although the definition changes may have improved the precision of the Census' urban area estimates, the estimated 7.8-million-acre (13 percent) change in urban area during the 1990s cannot be directly compared with changes in previous periods. Based on the previous definitions, the Census estimates that urban area increased 8.6 million acres (18 percent) over the 1980s, 12.8 million acres (37 percent) over the 1970s, and 9.1 million acres (36 percent) over the 1960s.

The NRI's use of a consistent definition across survey years makes it useful for calculating the rate of urbanization or development of land. Between 1982 and 2001, the average rate of increase in large and small built-up areas was 1.7 million acres per year. Between 1997 and 2001, the average rate of increase was 2.1 million acres per year. According to the NRI, built-up land increased by 13 million acres (26 percent) over 1982-92 and by 19 million acres (33 percent) over 1992-2001.

The average annual rate of increase in rural residential land has been 1.7 million acres per year since 1980. Combining the total urban annual rate of 230,000 acres and the rural residential rate of 1.72 million acres, the average rate of increase in these categories is about 2 million acres per year. Evidence suggests that the yearly rate of increase of residential land use may have been higher over shorter periods of time. For example, land used for all single-family housing, urban and rural, increased by about 2.3 million acres per year from 1994 to 1997 (HUD, 2000).

Special Uses

Land for all **special uses**—including rural highways, roads, railroads, airport rights-of-way, parks, and related recreational areas—comprised 297 million acres in 2002, an 11-million-acre (3.8 percent) increase since 1997 (table 9; see Appendix for detailed descriptions of terms in **bold**). **Rural transportation land** accounted for more than 27 million acres, about 9 percent of the total. National and State parks and related wilderness and primitive areas totaled almost 141 million acres. An additional 102 million acres were administered by Federal and State fish and wildlife agencies, and nearly 17 million acres served defense and industrial purposes. Land in farmsteads, farm roads, and farm lanes accounted for 11 million acres in 2002.

Of the 242 million acres used for parks, recreation, and wildlife purposes in 2002, 28 percent were in the Mountain and Pacific regions, combined, and 58 percent were in Alaska. Much of this land is federally owned. An additional 7.5 percent spans rural parks, recreation, and fish and wildlife refuges

Table 9

Trends in special uses of land, 1959-2002

Special-use areas	1959	1964	1969	1974	1978	1982	1987	1992	1997	2002
<i>Million acres</i>										
Nonagricultural										
Intensive uses ¹	25.0	26.0	26.0	26.3	26.7	26.8	25.7	25.2	25.4	27.3
Rural highways/roads	20.2	21.2	21.0	21.2	21.5	21.5	21.2	21.0	21.0	21.8
Railroads	3.4	3.3	3.2	3.1	3.0	3.0	2.3	2.0	1.9	3.1
Airports	1.4	1.5	1.8	2.0	2.2	2.3	2.2	2.2	2.5	2.4
Extensive uses	87.7	107.4	107.0	112.5	122.8	234.9	245.8	249.3	253.6	258.8
National/State parks ²	29.7	31.9	35.0	36.8	38.5	89.7	96.0	94.3	98.1	99.2
Wilderness areas ³	14.5	14.6	14.3	14.8	18.1	26.0	32.5	35.7	40.0	41.4
Wildlife areas ⁴	17.2	29.0	32.1	35.9	41.3	95.2	96.4	98.8	99.0	101.6
Defense/industrial ⁵	26.3	31.9	25.6	25.0	24.9	24.0	20.9	20.5	16.4	16.7
Agricultural										
Farmsteads/farm roads ⁶	10.1	9.2	8.4	8.1	8.4	8.0	7.1	6.2	6.6	10.8
Total ⁷	122.8	142.6	141.4	146.9	157.9	269.7	278.6	280.8	285.5	296.8

¹ To derive rural highway and road estimates for 2002, average right-of-way widths were applied to mileage reported by FHWA (2002). 2002 railroad area is from FRA (2004) and airport area is from DOT/BTS (2004), DOT/FAA, (2002), and GDT (2000).

² For 2002, includes areas in national and State park systems plus about 2.5 million acres in New York classified as State forest preserves. Estimates exclude large water bodies and parks in urban places. Sources: DOI/NPS, 2002; WI, 2002; and HUD/BOC, 2003.

³ Estimates for 2002 include national forest wilderness and primitive areas administered by the U.S. Forest Service and Bureau of Land Management. Source: WI, 2002.

⁴ Areas administered by the U.S. Fish and Wildlife Service (DOI/FWS 2001) and State wildlife agencies. Estimates exclude Federal areas under the jurisdiction of other agencies or areas leased for wildlife purposes. State estimates for 2002 are from State Fish and Wildlife websites, when available. Otherwise, they are mainly from a compilation by the Council on Environmental Quality updated through 2001.

⁵ Estimates for 2002 include areas administered by the U.S. Department of Defense (13 million acres) and U.S. Department of Energy (2 million acres), plus other defense-related public land (1.7 million acres), as of FY 2000 from the U.S. General Services Administration (GSA). GSA has subsequently restricted access to these data.

⁶ Estimated on the basis of State-by-State number of farms and acreage of unclassified land in farms. For 2002, a new method was used to compute farmstead acreage. The average farmstead size in 1997 was derived from National Resources Inventory data (USDA/NRCS, 2000) and then multiplied by the number of farms in 2002 (USDA/NASS 2004a).

⁷ Distributions may not add to totals due to rounding.

Sources: Estimates prior to 2002 are from Daugherty, 1991, 1995; Frey, 1973, 1979, 1982; Frey and Hexem, 1985; Frey et al., 1968; Vesterby and Krupa, 2001; Wooten et al., 1962; Wooten and Anderson, 1957; and Wooten, 1953.

east of the Rocky Mountains, including areas in New York, Pennsylvania, Michigan, Minnesota, North Carolina, Tennessee, Florida, and Texas—all with a million or more acres. Alaska alone accounted for over three-fourths of the Federal and State fish and wildlife areas in the United States. Many areas, particularly the national parks and wilderness systems, were selected because of specific or unique site characteristics.

National defense areas are concentrated in the Western States and Alaska, where large areas are federally owned, and in less agriculturally productive areas of the East. Nearly 65 percent of the national defense lands are in the Mountain and Pacific regions.

Trends in Special Uses

Land used for rural transportation, recreation, wildlife, defense, and other special uses in the 48 contiguous States has more than doubled from 100 million acres in 1945 to 212 million acres in 2002. Over all 50 States, special use areas have increased about 2.5 times over a 43-year period, increasing from 142 million acres in 1959 to 356 million acres in 2002.¹³ This was largely due to a nearly fourfold increase in rural parks and fish and wildlife areas. Of the 181-million-acre increase in parks and wildlife areas from 1959 to 2002, 126 million acres (70 percent) occurred in Alaska.

The 71-percent increase in special uses between 1978 (158 million acres) and 1982 (270 million acres) came from establishing national parks, wilderness areas, and wildlife refuges in Alaska in what was once inventoried as forest or other unclassified land use. Alaska now has about 48 percent of the special-use acreage. Since 1978, acreage in special uses in Alaska has more than quadrupled from 35 million to over 143 million acres.

Special-use areas increased 11 million acres (almost 4 percent) over 1997-2002, continuing a steady upward trend since the 1940s. This apparent change, however, should be interpreted with caution, as it reflects in part an upward adjustment due to new data and methods. The rise in special-use areas from 1997 to 2002 may have been driven by a reclassification of miscellaneous and other land, which declined by 7 million acres from 1997 to 2002 (see “Miscellaneous and Other Land Uses,” p. 34).

About half of the estimated increase in special-use land over 1997-2002 resulted from a 5-million-acre (2 percent) increase in rural parks and wildlife areas, plus a 0.3-million-acre (2 percent) increase in defense areas. The remaining change was the result of a 4-million-acre (64 percent) increase in farmsteads/farm roads and a 2-million-acre (7 percent) increase in rural transportation areas. The dramatic change in farmsteads and farm roads reflects, perhaps in large part, newer data used to compute farmstead acreage rather than actual changes in land use. The average farmstead size in 1997 was derived from National Resources Inventory data (USDA/NRCS, 2000), then multiplied by the number of farms in 2002 (USDA/NASS, 2004a). The 1997 NRI data replaced older estimates of farmstead acreage used for previous reports.

The change in estimated areas under roads, airports, and railroads also reflects the use of improved data and coverage of uses previously omitted.

¹³ Data on special-use areas in Alaska and Hawaii only became available in 1959, when they represented about 12 percent of the Nation's total area in special uses.

Estimated land in rural transportation uses increased by nearly 2 million acres from 1997 to 2002. Slightly less than half of the increase in rural transportation was due to increases in the estimated area of rural roads based on 2002 mileage data from the Federal Highway Administration, with the remainder due to an increase in the estimated acreage of rural railroads. In past reports, railroads other than class 1 were excluded due to insufficient data. For this report, the availability of data and use of Geographic Information Systems techniques made it possible to include other classes of rural railroads.

National defense and industrial acres—including energy and research areas—differ from other special uses mainly in that location is paramount and higher values and intensive uses characterize much of the land. This land category consisted of 16.7 million acres in 2002, an increase of 300,000 acres from 1997, but a decrease of nearly 4 million acres since 1992. The modest increase may be attributed to more complete reporting of statistics. The decrease over the past 10 years is largely attributable to consolidation and closing of military installations.

Miscellaneous Other Land Uses

The remaining 228 million acres (10 percent) of the Nation's land is **miscellaneous other** land (see Appendix for detailed descriptions of terms in **bold**). These uses consist of **rural residential area** (see “Urban and Rural Residential Uses,” p. 28), as well as marshes, open swamps, desert, tundra, and other land not inventoried and generally of low value for agricultural purposes. Acreage of this unclassified land is relatively large in arid portions of the West and several Atlantic and Gulf coastal areas. With extensive areas of tundra, Alaska has 131 million acres of miscellaneous other land, over 57 percent of the U.S. total. Land classed under miscellaneous and other uses declined by 7 million acres (3 percent) from 1997 to 2002. This decline is partially a result of new data on rural roads and railroads, which raised the estimate of transportation uses by 2 million acres, and other increases in **special uses** (see “Special Uses,” p. 31).

While some of the 94 million acres of rural residential land may be included under miscellaneous other uses, total miscellaneous other land in the contiguous United States equals just 97 million acres. According to the National Resources Inventory (NRI), non-Federal “barren” land and marshlands totaled 32 million acres in the 48 contiguous States in 1997. Since these lands are likely included under miscellaneous other uses in the Major Land Uses (MLU) estimates, this suggests that at least 30 percent, and possibly much more, of rural residential land overlaps with some of the other land uses, perhaps forest-use land or grassland pasture and range.

Some of the miscellaneous land may constitute wetland acreage, although wetlands can occur on land in a variety of other MLU categories, including cropland, grassland pasture and range, forest uses, special uses, and urban land. “Wetland” is thus a designation related to land cover, as opposed to land use. According to the NRI, non-Federal acreage of wetlands in the contiguous 48 States, excluding deepwater habitats, totaled almost 111 million acres in 2002, about 6 percent of the total U.S. land area. Sixteen million (14 percent) of these wetland acres were classed as “other rural land,” a residual category similar to miscellaneous other land in MLU. Of the remaining wetland acres inventoried by NRI in 2003, 66 million occurred on forest land; 17 million were on cropland, pasture, or Conservation Reserve Program land; 8 million were rangeland; 2 million were developed land; and 3 million were classified as water areas (USDA/NRCS, 2005).

The NRI estimates a 22,000-acre net loss in total wetland acreage from 1992 to 1997, followed by an overall net gain of almost 100,000 acres from 1997 to 2003 (USDA/NRCS, 2005). Using a different sampling technique and including both Federal and non-Federal land, the U.S. Fish and Wildlife Service (FWS) estimates total wetland acreage in the contiguous 48 States at 106 million acres in 1997, and reports a total net loss of 644,000 acres from 1987 to 1997. This net loss was 80 percent lower than the FWS-estimated decline from 1977 to 1987 (Dahl, 2000).

Major Uses of Land, by Class of Ownership

Over 60 percent of the land in the United States is privately owned (table 10). The Federal Government is the next largest landowner with more than 28 percent, mostly in the West. State and local governments own nearly 9 percent and Indian trust land accounts for over 2 percent. These proportions change only gradually over time, except in Alaska, where large areas of Federal land have been transferred to State and native (private) ownership.

Federal land, at 635 million acres in 2002, includes the original public domain and land acquired by purchase and other means. Total federally owned land decreased by about 12 million acres between 1997 and 2002. About 37 percent of all Federal land is in Alaska, 41 percent in the Mountain region, and 14 percent in the Pacific region. The remaining 9 percent is distributed among the other eight farm production regions and Hawaii, with the largest portion—nearly 2 percent of all Federal land—in the Lake States.

About 152 million acres of Federal grassland and a portion of Federal forestland are used for grazing. Livestock can also graze some of the special-use and miscellaneous land. Federal land also includes **forest land in special uses** and **miscellaneous other land**, such as marshes, open swamps, bare rock areas, desert, and other uses not inventoried (see Appendix for detailed descriptions of terms in **bold**).

State and local governments have accumulated landholdings of various sizes through grants from the Federal Government, tax reversions, purchases, gifts, and escheats. These publicly administered areas are distributed throughout the Nation more evenly than Federal land, but are still highly concentrated in the Western States. State and local governments hold land

Table 10

Ownership and use of land, by major categories, 2002

Ownership	Cropland	Grassland pasture and range	Forest land ¹	Special uses, urban uses, and miscellaneous land ²	Total land area ⁴
<i>Million acres</i>					
Federal	--	152	246	237	635
State and other public	3	40	70	82	195
American Indian ³	2	36	11	7	56
Private	436	358	422	162	1,378
Total ⁴	442	587	749	487	2,264

-- = Less than 500,000 acres.

¹ Includes reserved forest land in parks and other special uses.

² Excludes an estimated 98 million acres in special uses that have forest cover and, therefore, are included with forest land in this table.

³ Managed in trust by the Bureau of Indian Affairs for American Indian and Alaskan Native tribes and individuals.

⁴ Distributions may not add to totals due to rounding.

Sources: Federal, State, and local government and Indian land acreage are approximations based on public records and reports (DOI; FS; GSA). Private land is the remainder of the land in each use category. Land use data are from DOI/BLM, 2003; DOT/BTS, 2004; DOT/FAA, 2002; DOT/FHWA, 2002; DOT/FRA, 2004; DOI/FWS, 2001; GSA, 2001; GDT, 2000; HUD/BOC, 1992, 2002, 2003; USDA/FS 1989, 1998; USDA/NASS, 2004a, 2004b, 2005; DOI/NPS, 2002; USDA/NRCS, 2000, 2004a; and WI, 2002.

for forests, parks, wildlife refuges, highways and roads, institutional uses, and other specific purposes. Most Western States also own relatively large acreages to earn income, provide financial support to schools, and meet other objectives. About 40 million acres in this category are used for grazing.

The Bureau of Indian Affairs (BIA) manages 56 million acres in trust for American Indian and Alaskan Native tribes and individuals. Like Federal and State land, most land managed by BIA is concentrated in the Western States. About 36 million acres is grazing land, and a small acreage is used for crop production.

Private land, except that under American Indian and Alaska Native ownership, totaled nearly 1.4 billion acres in 2002. Between 1997 and 2002, private ownership increased in **forest-use** land by 2 million acres and in **special uses, urban**, and miscellaneous by a total of 17 million acres. Privately owned land includes 99 percent of the Nation's **cropland**, 61 percent of the **grassland pasture and range**, 56 percent of the forest-use land, and 30 percent of the special-use, urban, and miscellaneous land.

Land use is closely interlinked with land ownership, and these proportions reflect historic land management priorities. During the 19th century, Federal agencies actively encouraged westward settlement and economic development through the selective transfer of the more productive agricultural lands from Federal ownership to private companies and individuals (Wiebe et al., 1997). At the beginning of the 20th century, the emphasis of land-use policies has evolved to balance private economic interests with the provision of recreation, wilderness and wildlife, and environmental and resource conservation.

References

- Barnard, Charles, and Roger Hexem. 1988. *Major Statistical Series of the U.S. Department of Agriculture: Land Values and Land Use*. Agriculture Handbook No. 671, Vol. 6. U.S. Department of Agriculture, Economic Research Service. Washington, DC.
- Birch, Thomas W. 1996. *Private Forest-Land Owners of the United States, 1994*. Resource Bulletin NE-134. U.S. Department of Agriculture, Forest Service, Northeast Forest Experiment Station, Radnor, PA.
- Crosswhite, William M., and Carmen L. Sandretto. 1991. "Trends in Resource Protection Policies in Agriculture," in *Agricultural Resources: Cropland, Water, and Conservation Situation and Outlook Report*. No. AR-23. U.S. Department of Agriculture, Economic Research Service. Washington, DC.
- Dahl, Thomas E. 2000. *Status and Trends of Wetlands in the Conterminous United States, 1986 to 1997*. U.S. Department of the Interior, Fish and Wildlife Service. Washington, DC.
- Daugherty, Arthur B. 1995. *Major Uses of Land in the United States: 1992*. Agricultural Economic Report No. 723. U.S. Department of Agriculture, Economic Research Service. Washington, DC.
- Daugherty, Arthur B. 1991. *Major Uses of Land in the United States: 1987*. Agricultural Economic Report No. 643. U.S. Department of Agriculture, Economic Research Service. Washington, DC.
- Daugherty, Arthur B. 1989. *U.S. Grazing Lands: 1950-82*. Statistical Bulletin No. 771. U.S. Department of Agriculture, Economic Research Service. Washington, DC.
- Frey, H. Thomas. 1983. "Expansion of Urban Area in the United States: 1960-80." ERS Staff Report AGES830615. U.S. Department of Agriculture, Economic Research Service. Washington, DC.
- Frey, H. Thomas. 1982. *Major Uses of Land in the United States: 1978*. Agricultural Economic Report No. 487. U.S. Department of Agriculture, Economic Research Service. Washington, DC.
- Frey, H. Thomas. 1979. *Major Uses of Land in the United States: 1974*. Agricultural Economic Report No. 440. U.S. Department of Agriculture, Economics, Statistics, and Cooperatives Service. Washington, DC.
- Frey, H. Thomas. 1973. *Major Uses of Land in the United States: Summary for 1969*. Agricultural Economic Report No. 247. U.S. Department of Agriculture, Economic Research Service. Washington, DC.
- Frey, H. Thomas, and Roger Hexem. 1985. *Major Uses of Land in the United States: 1982*. Agricultural Economic Report No. 535. U.S. Department of Agriculture, Economic Research Service. Washington, DC.

Frey, H. Thomas, Orville E. Krause, and Clifford Dickason. 1968. *Major Uses of Land and Water in the United States, Summary for 1964*. Agricultural Economic Report, No. 149. U.S. Department of Agriculture, Economic Research Service. Washington, DC.

Glauber, Joseph W., and Keith J. Collins. 2002. "Risk Management and the Role of the Federal Government." In *A Comprehensive Assessment of the Role of Risk in Agriculture*, Richard E. Just and Rulon E. Pope, eds. Kluwer Academic Publishers. Boston, MA.

Lubowski, Ruben N., Andrew J. Plantinga, and Robert N. Stavins. 2003. "Determinants of Land-Use Transitions in the United States: 1982-1997." Discussion Paper 03-47. Resources for the Future. Washington, DC. <http://www.rff.org/Documents/RFF-DP-03-47.pdf>.

Nusser, S.M., F.J. Breidt, and W.A. Fuller. 1988. "Design and Estimation for Investigating the Dynamics of Natural Resources," *Ecological Applications*, 8(2): 234-245.

Nelson, Fredrick J., and Lyle P. Schertz, eds. 1996. *Provisions of the Federal Agriculture Improvement and Reform Act of 1996*. Agricultural Information Bulletin, No. 729. U.S. Department of Agriculture, Economic Research Service. Washington, DC. <http://www.ers.usda.gov/publications/aib729/aib729fm.pdf>.

Reuss, Lawrence A., Hugh H. Wooten, and Frances J. Marschner. 1948. *Inventory of Major Land Uses, United States, Major Uses of Land, 1945*. Miscellaneous Publication No. 663. U.S. Department of Agriculture, Bureau of Agricultural Economics. Washington, DC.

Roberts, Michael J., Craig Osteen, and Meredith Soule. 2004. *Risk, Government Programs, and the Environment*. Technical Bulletin No. 1908. U.S. Department of Agriculture, Economic Research Service. Washington, DC. <http://www.ers.usda.gov/publications/tb1908/>.

Smith, Brad W., Patrick D. Miles, John S. Vissage, and Scott A. Pugh. 2004. *Forest Resources of the United States, 2002: A Technical Document Supporting the USDA Forest Service 2005 Update of the RPA Assessment*. General Technical Report NC-241. U.S. Department of Agriculture, Forest Service, North Central Research Station, St. Paul, MN. http://ncrs.fs.fed.us/pubs/gtr/gtr_nc241.pdf.

Smith, Brad W., John S. Vissage, David R. Darr and Raymond M. Sheffield. 2001. *Forest Resources of the United States, 1997*. General Technical Report NC-219. U.S. Department of Agriculture, Forest Service, North Central Research Station, St. Paul, MN. http://www.ncrs.fs.fed.us/pubs/gtr/gtr_nc219.pdf.

U.S. Department of Agriculture, Economic Research Service. (ERS). 2004. *Wheat: Background*. Nov. Washington, DC. <http://www.ers.usda.gov/Briefing/Wheat/background.htm>.

U.S. Department of Agriculture, Economic Research Service. (ERS). 2000. *Farm Resource Regions*. Agricultural Information Bulletin No. 760. Washington, DC. <http://www.ers.usda.gov/publications/aib760/>.

U.S. Department of Agriculture, Economic Research Service. (ERS). 1997. *Agricultural Resources and Environmental Indicators, 1996-97*. Agriculture Handbook No. 712. Washington, DC. <http://www.ers.usda.gov/publications/ah712/>.

U.S. Department of Agriculture, Economic Research Service. (ERS). 1992. *Economic Indicators of the Farm Sector: Production and Efficiency Statistics, 1990*. Economic Indicators of the Farm Sector No.10-3. Washington, DC.

U.S. Department of Agriculture, Farm Service Agency (FSA). 2005. *Conservation Reserve Program Fiscal Year Summary: FY 2004*. Washington, DC. http://www.fsa.usda.gov/dafp/cepd/crp_statistics.htm.

U.S. Department of Agriculture, Farm Service Agency (FSA). 2003. *Conservation Reserve Program Fiscal Year Summary: FY 2002*. Washington, DC. http://www.fsa.usda.gov/dafp/cepd/crp_statistics.htm.

U.S. Department of Agriculture, Forest Service (FS). 2000. *The United States Forest Resource Current Situation*. Forest Inventory and Analysis, 1997 Resources Planning Act (RPA). Washington, DC.

U.S. Department of Agriculture, Forest Service (FS). 1998. *Report of the Forest Service: Fiscal Year 1997*. Washington, DC. <http://www.fs.fed.us/pl/pdb/97report/>.

U.S. Department of Agriculture, Forest Service (FS). 1989. *An Analysis of the Land Base Situation in the United States, 1989-2040: A Technical Document Supporting the 1989 USDA Forest Service RPA Assessment*. General Technical Report RM-181. Rocky Mountain Forest and Range Experiment Station. Fort Collins, CO.

U.S. Department of Agriculture, Forest Service (FS). 1982. *An Analysis of the Timber Situation in the United States, 1952-2030*. Forest Resource Report No. 23. Washington, DC.

U.S. Department of Agriculture, National Agricultural Statistics Service (NASS). 2005. *Crop Production, 2004 Summary*. Crop Production (Cr Pr) No. 2-1 (05). Jan. Washington, DC. <http://jan.mannlib.cornell.edu/reports/nassr/field/pcp-bban/cropan05.pdf>.

U.S. Department of Agriculture, National Agricultural Statistics Service (NASS). 2004a. *2002 Census of Agriculture*. Vol. 1: Part 51, Chapter 2, AC-02-A-51, United States Summary and State Data. June. Washington, DC. <http://www.nass.usda.gov/census/census02/volume1/us/USVolume104.pdf>.

U.S. Department of Agriculture, National Agricultural Statistics Service (NASS). 2004b. *Acreage*. Crop Production (Cr Pr) No. 2-5 (04). June. Washington, DC.
<http://usda.mannlib.cornell.edu/reports/nassr/field/pcp-bba/>.

U.S. Department of Agriculture, National Agricultural Statistics Service (NASS). 1999a. *1997 Census of Agriculture*. Vol. 1: Part 51, Chapter 2, AC97-A-51, United States Summary and State Data. Feb. Washington, DC.
<http://www.nass.usda.gov/census>.

U.S. Department of Agriculture, National Agricultural Statistics Service (NASS). 1999b. *Crop Production, 1998 Summary*. Crop Production (Cr Pr) No .2-1 (99). Jan. Washington, DC.
<http://jan.mannlib.cornell.edu/reports/nassr/field/pcp-bban/cropan05.pdf>.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) and Iowa State University Statistical Laboratory. 2005. *National Resources Inventory: 2003 Annual NRI*. Washington, DC.
<http://www.nrcs.usda.gov/technical/land/nri03/nri03wetlands.html>.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) and Iowa State University Statistical Laboratory. 2004a. *National Resources Inventory: 2002 Annual NRI*. Washington, DC.
<http://www.nrcs.usda.gov/technical/land/nri02/landuse.pdf>.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2004b. *Fact Sheet: Wetlands Reserve Program*. Washington, DC.
<http://www.nrcs.usda.gov/programs/farmbill/2002/pdf/WRPFct.pdf>.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) and Iowa State University Statistical Laboratory. 2003. *National Resources Inventory: 2001 Annual NRI*. Washington, DC.
<http://www.nrcs.usda.gov/technical/land/nri01/nri01lu.html>.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) and Iowa State University Statistical Laboratory. 2000. *Summary Report, 1997 National Resources Inventory* (revised December 2000), including associated database files. Washington, DC.
http://www.nrcs.usda.gov/technical/NRI/1997/summary_report/.

U.S. Department of Commerce, Bureau of the Census (BOC). 2003. *Statistical Abstract of the United States: 2002*. Washington, DC.
<http://www.census.gov/prod/2004pubs/03statab/arts.pdf>.

U.S. Department of Commerce, Bureau of the Census (BOC). 2002. 2000 *Census of Population and Housing, Summary Population and Housing Characteristics, United States*. Population and Housing Characteristics (PHC) No. 1-1. Washington, DC.
<http://www.census.gov/census2000/pubs/phc-1.html>.

U.S. Department of Commerce, Bureau of the Census (BOC). 1992. 1990 *Census of Population and Housing, Summary Population and Housing*

Characteristics, United States. Census of Population and Housing (CPH) No. 1-1. Washington, DC.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA). 2003. *Climate of 2002—Annual Review: U.S. Drought*. National Climatic Data Center. January.
<http://lwf.ncdc.noaa.gov/oa/climate/research/2002/ann/drought-summary.html>.

U.S. Department of Housing and Urban Development (HUD). 2000. *The State of the Cities 2000*. Washington, DC.
<http://usinfo.state.gov/usa/infousa/facts/states/socrpt.pdf>.

U.S. Department of Housing and Urban Development and U.S. Department of Commerce, Bureau of the Census (HUD/BOC). 2004. *American Housing Survey for the United States, 2003, National Microdata*. CD-AHS03-NMICRO. Washington, DC. <http://www.huduser.org/datasets/ahs.html>.

U.S. Department of Housing and Urban Development and U.S. Department of Commerce, Bureau of the Census (HUD/BOC). 2002. *American Housing Survey for the United States, 2001, National Microdata*. CD-AHS01-NMICRO. Washington, DC. <http://www.huduser.org/datasets/ahs.html>.

U.S. Department of Housing and Urban Development and U.S. Department of Commerce, Bureau of the Census (HUD/BOC). 1996. *American Housing Survey, Components of Inventory Change: 1980-1993*. H151/93-2. Washington, DC. <http://www.huduser.org/datasets/ahs.html>.

U.S. Department of the Interior, Fish and Wildlife Service (FWS). 2001. *Report of Lands Under Control of the U.S. Fish and Wildlife Service as of September 30, 2000*. Washington, DC. <http://www.fws.gov/realty/nwrs.htm>.

U.S. Department of the Interior, Bureau of Land Management (BLM). 2003. *Public Land Statistics: 2002*. Vol. 187. BLM/BC/ST-03/001+1165. Washington, DC. <http://www.blm.gov/natacq/pls02/>.

U.S. Department of the Interior, National Park Service (NPS). 2002. *Acreage Reports, 2002*. Land Resources Division. Washington, DC. <http://science.nature.nps.gov/nrdata/datastore.cfm?ID=19137>.

U.S. Department of Transportation, Bureau of Transportation Statistics (BTS), 2004. National Transportation Atlas Databases, GIS Coverage. Washington, DC. <http://transtats.bts.gov/mappingcenter.asp>.

U.S. Department of Transportation, Federal Aviation Administration (FAA), Aeronautical Information Services (ATA-100). 2002. National Airspace System Resource Aeronautical Data. Washington, DC.

U.S. Department of Transportation, Federal Highway Administration (FHWA). 2002. *Highway Statistics 2002*. Washington, DC.
<http://www.fhwa.dot.gov/policy/ohim/hs02/re.htm>.

U.S. Department of Transportation, Federal Railroad Administration (FRA) and the Bureau of Transportation Statistics. 2004. "1:100000 Railroads." National Transportation Atlas Database. Washington, DC.

U.S. General Services Administration (GSA), Office of Administration. 2001. *Summary Report of Real Property Owned by the United States Throughout the World as of September 30, 2000*. Washington, DC. http://www.gsa.gov/gsa/cm_attachments/GSA_DOCUMENT/owned_inv_00_R2M-n11_0Z5RDZ-i34K-pR.pdf.

U.S. Geographic Data Technology, Inc. (GDT). 2000. "Airports GIS Boundary Files." ESRI, Inc. Redlands, CA.

Vesterby, Marlow, and Kenneth S. Krupa. 2001. *Major Uses of Land in the United States, 1997*. SB-973. U.S. Department of Agriculture, Economic Research Service. Washington, DC. <http://www.ers.usda.gov/Publications/sb973/>.

Wiebe, K., A. Tegene, and B. Kuhn. 1996. *Partial Interests in Land: Policy Tools for Resource Use and Conservation*. Agricultural Economic Report No. 744. U.S. Department of Agriculture, Economic Research Service. Washington, DC. <http://www.ers.usda.gov/publications/AER744/>

Wilderness Institute, 2005. "The National Wilderness Preservation System." Wilderness.net Partnership Project, University of Montana, College of Forestry and Conservation, Arthur Carhart National Wilderness Training Center, and Aldo Leopold Wilderness Research Institute. <http://www.wilderness.net>.

Wooten, Hugh H. 1953a. *Major Uses of Land in the United States*. Technical Bulletin No. 1082. U.S. Department of Agriculture, Bureau of Agricultural Economics. Washington, DC.

Wooten, Hugh H. 1953b. *Supplement to Major Uses of Land in the United States, Basic Land Use Statistics, 1950*. Technical Bulletin, No. 1082, Supplement. U.S. Department of Agriculture, Bureau of Agricultural Economics. Washington, DC.

Wooten, Hugh H., and James R. Anderson. 1957. *Major Uses of Land in the United States: Summary for 1954*. Agricultural Information Bulletin No. 168. U.S. Department of Agriculture, Agricultural Research Service. Washington, DC.

Wooten, Hugh H., Karl Gertel, and William C. Pendleton. 1962. *Major Uses of Land and Water in the United States: Summary of 1959*. Agricultural Economic Report No. 13. U.S. Department of Agriculture, Economic Research Service. Washington, DC.

Appendix: Definitions and Explanation of the Data

Major land uses presented in this report are the latest from a series of land-use inventories, based on available land use data from a wide variety of sources, conducted by the Economic Research Service and predecessor agencies. The estimates were constructed from available data, rather than used exactly as developed by source agencies. This process is necessary because land-use data, regardless of origin or utility for specific purposes, have limitations for comprehensive inventory purposes.

Data are typically obtained from surveys differing greatly in scope, methods, definitions, and other characteristics. Individual sources account for only one or a few uses and for only a limited part of the total land area. The available data contain conflicts and overlaps that must be reconciled. Definitions and explanations of the various land-use categories are:

Cropland—Total cropland includes five components: cropland harvested, crop failure, cultivated summer fallow, cropland used only for pasture, and idle cropland. The estimate of total cropland in 2002 includes total cropland as reported by the 2002 Census of Agriculture (USDA/NASS, 2004a) plus an upward adjustment to conform to data on principal crops harvested in each State as reported by the National Agricultural Statistics Service for 2002 (USDA/NASS, 2005). In 2002, the Census estimate of total principal crops harvested was about 98 percent of the estimate for the same crops from NASS.

Cropland used for crops—Three of the cropland acreage components—cropland harvested, crop failure, and cultivated summer fallow—are collectively termed cropland used for crops, or the land input to crop production. Annual estimates of cropland harvested are based on both Census data and the series on principal crops harvested as maintained by NASS. Annual estimates of crop failure are based on differences in planted and harvested acreage of principal crops from the NASS series. Annual estimates of cultivated summer fallow historically have been based on fragmentary data from a variety of sources. Since the late 1970s, they have been based on data from the Census of Agriculture and unpublished NASS data.

Cropland harvested—Includes row crops and closely sown crops; hay and silage crops; tree fruits, small fruits, berries, and tree nuts; vegetables and melons; and miscellaneous other minor crops. In recent years, farmers have double-cropped about 4 percent of this acreage.

Crop failure—Consists mainly of the acreage on which crops failed because of weather, insects, and diseases, but includes some land not harvested due to lack of labor, low market prices, or other factors. Crop failure is calculated using the difference between cropland planted and cropland harvested. However, some cropland planted is not intended to be harvested. Thus, the acreage planted to cover and soil improvement crops not intended

for harvest is excluded from crop failure and is considered idle. In recent years, crops have failed on about 2-3 percent of the acreage planted for harvest.

Cultivated summer fallow—Refers to cropland in subhumid regions of the West cultivated for one or more seasons to control weeds and accumulate moisture before small grains are planted. This practice is optional in some areas, but it is a requirement for crop production in the drier cropland areas of the West. Other types of fallow, such as cropland planted to soil improvement crops but not harvested and cropland left idle all year, are not included in cultivated summer fallow but are included as idle cropland.

Cropland pasture—Generally is considered to be in long-term crop rotation. However, some cropland pasture is marginal for crop uses and may remain in pasture indefinitely. This category also includes land that is used for pasture before crops reach maturity and some land used for pasture that could have been cropped without additional improvement. Cropland pasture and permanent grassland pasture have not always been clearly distinguished in agricultural surveys.

Idle cropland—Includes land in cover and soil-improvement crops and cropland on which no crops were planted. Some cropland is idle each year for various physical and economic reasons. Acreage diverted from crops to soil-conserving uses (if not eligible for and used as cropland pasture) under Federal farm programs is included in this component. Cropland enrolled in the Federal Conservation Reserve Program (CRP) and Wetland Reserve Program (WRP) is included in idle cropland.

Grassland pasture and range—Grassland pasture and range comprise all open land used primarily for pasture and grazing, including shrub and brushland types of pasture, grazing land with sagebrush and scattered mesquite, and all tame and native grasses, legumes, and other forage used for pasture or grazing. Because of the diversity in vegetative composition, grassland pasture and range are not always clearly distinguishable from other types of pasture and range. At one extreme, permanent grassland may merge with cropland pasture, or grassland may often be found in transitional areas with forested grazing land. The estimates in this report are composites of data from the Census of Agriculture, Bureau of Land Management, Forest Service, and several other Federal agencies. The 587 million acres classed as grassland pasture and range in 2002 included 395 million acres in farms (USDA/NASS, 2004a). Also included are estimates of private grazing land not in farms and public, nonforested grazing land.

Forest land—As defined by the Forest Service, the 749 million acres of forest land in 2002 consists of “land at least 10 percent stocked by trees of any size, including land that formerly had such tree cover and that will be naturally or artificially regenerated. Forest land includes transition zones, such as areas between heavily forested and nonforested lands that are at least 10 percent stocked with forest trees and forest areas adjacent to urban

and built up lands. Also included are pinyon-juniper and chaparral areas in the West and afforested areas” (Smith et al., 2004). There are a number of components to total forest land, which are described below.

Timberland—Forest land that is producing or is capable of producing crops (in excess of 20 cubic feet per acre per year) of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. Currently inaccessible and inoperable areas are included (Smith et al., 2004).

Reserved forest land—Forest land withdrawn from timber utilization through statute, administrative regulation, or designation without regard to productive status (Smith et al., 2004). Wilderness areas and parks are included in this category. The definition changed slightly in 1997. Prior to 1997, the reserved forest land definition depended on the timberland designation. Reserved timberland was classed as “productive reserved” forest while non-timberland reserved forests were classed as “unproductive reserved” and included under the “other forest” land category (see below).

Other forest land—Forest land other than timberland and reserved forest land. This includes available and reserved unproductive forest land, which is incapable of producing 20 cubic feet per acre per year of industrial wood under natural conditions because of adverse site conditions such as sterile soils, dry climate, poor drainage, high elevation, steep slopes, or rockiness. Urban forest land is also included (Smith et al., 2004). This definition changed slightly starting in 1997. “For 1997, Other Forest no longer includes land classified as unproductive reserved. This area, amounting to about 12 million acres in 1997, is now included in the Reserved Forest category” (Smith et al., 2001).

Forest-use land—A Major Land Uses category based on the use of the forest land as opposed to the forest cover alone. The forest-use category includes both grazed and ungrazed forests but excludes an estimate of forest land in parks, wildlife areas, and similar special-purpose uses from the Forest Service’s inventory of total forest land. While it is impossible to eliminate overlap with other uses, this reduced area is a closer approximation of the land that may be expected to serve commercial forest uses as opposed to having forest cover. Nevertheless, forest-use land may still be economically unsuited for timber harvests. In addition, private landowners may have objectives other than timber harvest. For example, Birch (1996) found that only 29 percent of private forest owners reported managing their land primarily for timber production.

Forest land grazed—Forested grazing land consists mainly of forest, brush-grown pasture, arid woodlands, and other areas within forested areas that have grass or other forage growth. The total acreage of forested grazing land includes woodland pasture in farms plus estimates of forested grazing land not in farms. For many States, the estimates include significant areas grazed only

lightly or sporadically. The Census of Agriculture, the National Resources Inventory, and the Forest Inventory and Analysis are the principal sources of data (USDA/NASS, 2004a; USDA/NRCS, 2000; Smith et al., 2004). Historical data from these and other sources were used in developing the 134-million-acre approximation.

Forest-use land not grazed—Forest-use land not used for grazing.

Forest land in special uses—Forest land in special uses such as in parks, wildlife areas, and similar special-purpose uses, estimated at 98 million acres for 2002.

Special-use areas—Special uses include areas in highway, road, and railroad rights-of-way and airports; Federal and State parks, wilderness areas, and wildlife refuges; and national defense and industrial areas. The sources and procedures used in developing these estimates are outlined in the footnotes to table 9.

Miscellaneous other land—Includes miscellaneous other uses such as industrial and commercial sites in rural areas; cemeteries; golf courses; mining areas; quarry sites; marshes; swamps; sand dunes; bare rocks; deserts; tundra; rural residential; and other unclassified land. In this report, urban land is reported as a separate category. In the ERS “Major Land Uses” data product, urban area is included as part of the special uses category.

Urban area—Nationally, there are two sources of data on urban area. First, the Census Bureau compiles urban area every 10 years, coincident with the Census of Population. Second, the Natural Resources Conservation Service publishes developed land—including urban components—in 5-year intervals prior to 1997 and 1-year intervals subsequently, as part of the National Resources Inventory (NRI).

Census Bureau—Census urban areas include densely-populated areas with at least 50,000 people (“urbanized areas”) and densely-populated areas with 2,500 to 50,000 people (“urban clusters”). Densely-populated areas include census blocks with a population density of at least 1,000 people per square mile, surrounding blocks with a density of at least 500 people per square mile, and “less densely settled blocks that form enclaves or indentations, or are used to disconnect discontinuous areas with qualifying densities” (DOC/BOC, 2002). In the 2000 Census, urban clusters (UCs) replaced previous designations that were based on the boundaries of Census-designated places. Included in the Census urban area definition are residential areas and concentrations of nonresidential urban area such as commercial, industrial, and institutional land; office areas; urban streets and roads; major airports; urban parks and recreational areas; and other land within urban defined areas. The definition allows for exceptions and special cases. Portions of extended cities that are essentially rural in character are excluded.

National Resources Inventory—Developed land in the National Resources Inventory consists of urban and built-up areas and land devoted to rural transportation (USDA/NRCS, 2000).

Urban and built-up areas—Consist of residential, industrial, commercial, and institutional land; construction and public administrative sites; railroad yards, cemeteries, airports, golf courses, sanitary landfills, sewage plants, water control structures, small parks, and transportation facilities within urban areas.

Large urban and built-up areas—Include developed tracts of 10 acres or more.

Small built-up areas—Include developed tracts of 0.25 to 10 acres, which do not meet the definition of urban area but are completely surrounded by urban and built-up land.

Rural transportation land—Includes highways, roads, railroads, and rights-of-way outside of urban and built-up areas.

Residential area—Residential area is the sum of acres in lots used for housing units. This series was introduced in 1997 to the Major Land Uses report. Due to the limits of available data, it is not possible to distinguish rural housing lots from land classified under other uses. Much of this land may be included with “miscellaneous other” land, but some overlap could also exist with forest use, grassland pasture and range, and other categories. Data for this series are from the American Housing Surveys (AHS) (HUD/BOC, 1996, 1999a, 1999b, 2002, 2004). The AHS started the current series in 1980 and collects sample-based data every 2 years.