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Graphically Speaking

Grassland Dynamics

Historically, grasslands occupied approximately one billion acres in the U.S. — about half the land mass of the 48 contiguous states (Figure 1). Grasslands west of the Rocky Mountains (approximately 332 million acres) were largely retained under federal management, while more than 90 percent of those lands east of the Rockies (approximately 565 million acres) were placed under private ownership.

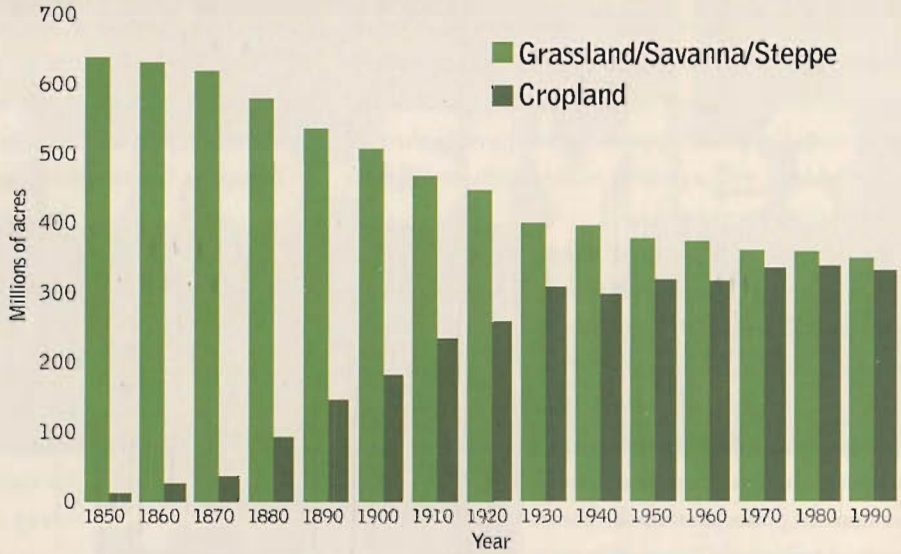

Figure 2. Estimated land coverage by native Grassland/Savanna/Steppe versus Croplands in the U.S. west of the Mississippi River, 1850-1990. Data Source: Ramankutty and Foley (1999).

Why Are Grasslands Important?

Grasslands provide both ecological and economic benefits. The importance of grasslands lies not only in the immense area they cover, but also in the diversity of benefits they produce.

Grasslands provide valuable ecological services such as nutrient cycling and storage of atmospheric carbon. Following cultivation, grassland soils are likely to lose up to 50 percent of their original carbon within the first 40 to 50 years.

Grasslands are key to an efficient hydrologic cycle. The quality and quantity of water runoff and infiltration is dependent upon the quality of ground cover. The biotic diversity of the grasslands has historically supported a diverse assemblage of species.

Native grasslands and rangelands directly support the livestock industry. Grasslands comprise over 95 percent of the acreage it takes to maintain beef cattle in the Great Plains and Western U.S.

Grasslands support recreational based activities such as hunting, fishing, and wildlife viewing. According to the U.S. Fish and Wildlife Service, these activities generated over $37 billion in 1996 for the states west of the Mississippi.

Observers increasingly note the benefits of open space and scenic amenities of grasslands. For example, prices for land bordering open space (including grasslands), have been found to be 7 to 32 percent higher than those not bordering open space.

Trends in Grasslands

The majority of grassland conversions have been to cropland, beginning with the tallgrass prairies and savannas of the mid-western states and continuing to the Central Valley in California. From 1850 to 1990, grasslands west of the Mississippi River declined by almost 290 million acres (Figure 2). From 1950 to 1990, the loss of grasslands outpaced the gains in cropland by over 1.5 to 1 — pointing to an increase in grassland conversion to uses other than cropland.

Between 1982 and 1997, National Resources Inventory data indicate that over 22 million acres of rangelands were converted to other uses (Figure 3). Most of this loss was to cropland (about seven million acres) and development (about 3.3 million acres). Almost three-quarters of a million acres of rangeland were put into the Conservation Reserve Program (CRP) in that time.

However, the actual loss in total rangeland acreage since 1982 was about half of that reported by the NRI due to the conversion of land from other uses back to rangeland (Figure 4). While this reversal in land use softens the total loss in rangeland, the ecological function of re-converted rangeland is less effective than undisturbed native grasslands. This

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"restored" rangeland is also more likely to be in smaller, discontinuous parcels, reducing its value as wildlife habitat relative to native grasslands.

Factors Influencing Grassland Disappearance

Historically, the greatest threat to grassland in the U.S. has been the plow. While the trend of converting grasslands to cropland is still important in some areas, during the past several decades other trends have emerged to threaten the existence and health of grasslands.

Pressure from growth in human population and per capita income, and the resulting demand for property and services, is an ever-increasing threat to the traditional use of grasslands. Between 1990 and 2000, the 22 states west of the Mississippi River gained more than 16.5 million people — a 17.3 percent increase.

Many of the remaining grasslands are located in areas with high natural amenities. Low returns to ranching industry and an aging population of grassland owners combined with the longest economic boom in U.S. history, advances in telecommunications, and other socio-economic changes, contribute pressure to convert grasslands into large lot, rural residential developments.

A common, unintended result of many agricultural support policies has been to provide incentives to convert grasslands to crop production and/or to thwart the reconversion of cropland back to grass by making land more profitable in cropland rather than in grassland.

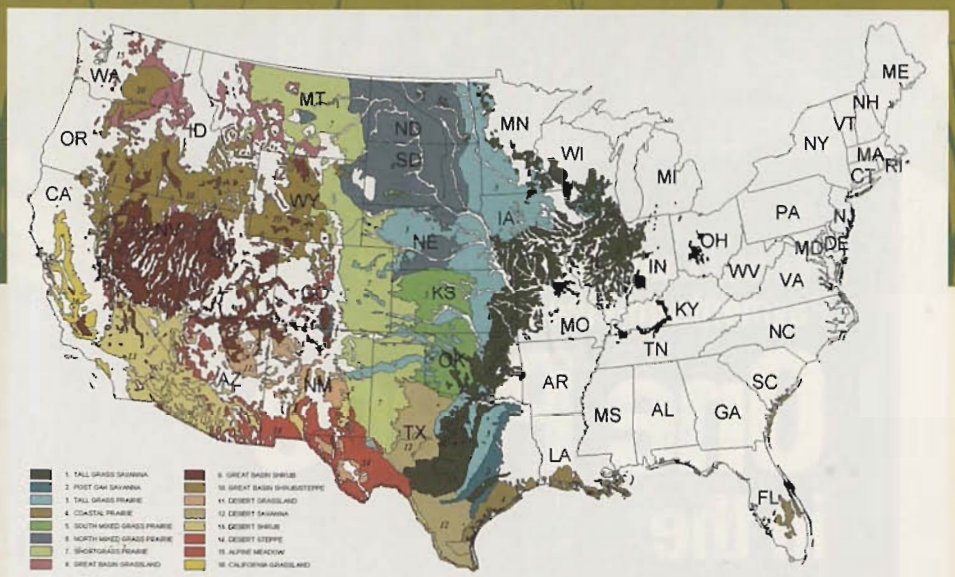


Figure 1. Coverage of pre-settlement grasslands in the contiguous U.S., by type. Adapted from Kuchler (1975).

Figure 3 Rangeland acres (1,000s) lost to other land uses between 1982 and 1997 (22,120,000 total acres lost).

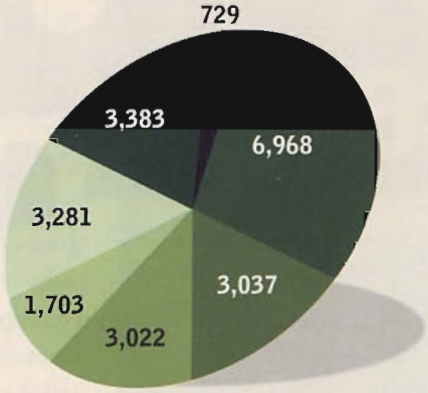
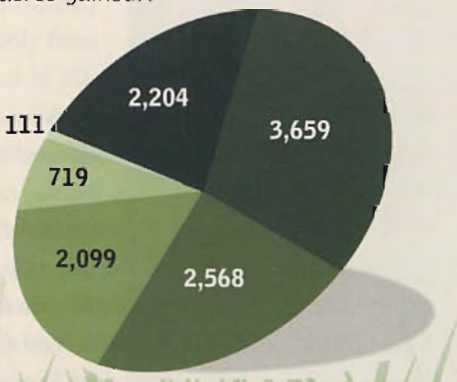


Figure 4 Rangeland acres (1,000s) gained from other land uses between 1982 and 1997 (11,360,000 total acres gained).



- Cropland
- Pastureland
- Forest Land
- Other Rural Land
- Developed Land
- Water & Federal
- CRP

What Can Be Done?

Unless abated, these forces will continue to remove grasslands from their historical uses, and fragment the remaining areas so that they may not be of sufficient size to support their natural biodiversity. Policymakers can slow the pressure for fragmentation by developing government programs that provide incentives to private grassland owners to facilitate grasslands retention and restoration.

Ensuring that government policies do not provide incentives to retain marginal cropland, or convert grassland to cropland, would enhance retention and restoration of grasslands under private ownership. Expanding programs that provide incentives to retain or restore wildlife habitat and encourage wildlife-based land use enterprises could also benefit grasslands restoration (similar to USDA's Environmental Quality Incentives Program, a program that helps farmers defray the cost of implementing Best Management Practices that preserve and enhance surface water and groundwater quality by reducing nutrient-laden runoff and leaching).