3-1-2002

TB182: Agricultural Land Changes in Maine: A Compilation and Brief Analysis of Census of Agriculture Data, 1850-1997

SoEun Ahn

William B. Krohn

Andrew J. Plantinga

Timothy J. Dalton

ISSN 1070–1524

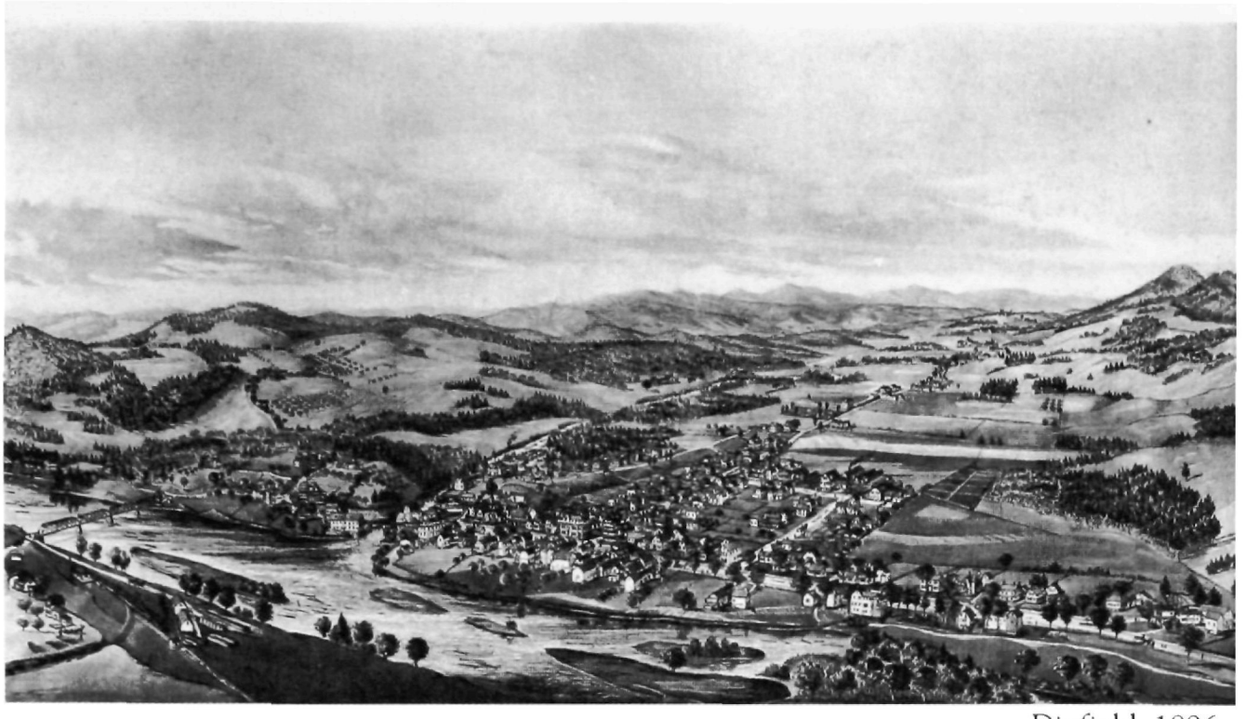
North Berwick, 1877

Agricultural Land Changes in Maine: A Compilation and Brief Analysis of Census of Agriculture Data, 1850–1997

SoEun Ahn
William B. Krohn
Andrew J. Plantinga
Timothy J. Dalton
Jeffrey A. Hepinstall

Technical Bulletin 182 **March 2002**

MAINE AGRICULTURAL AND FOREST EXPERIMENT STATION
The University of Maine



Dixfield, 1896

Agricultural Land Changes in Maine: A Compilation and Brief Analysis of Census of Agriculture Data, 1850–1997

SoEun Ahn
Research Associate
Department of Forestry
North Carolina State University

William B. Krohn
Professor and Leader
Maine Cooperative Fish and Wildlife Research Unit
U.S. Geological Survey, Biological Resources Division

Andrew J. Plantinga
Assistant Professor
Department of Agricultural and Resource Economics
Oregon State University

Timothy J. Dalton
Assistant Professor
Department of Resource Economics and Policy

Jeffrey A. Hepinstall
Scientist
Department of Wildlife Ecology

The University of Maine
Orono, Maine 04469

ABOUT THE COVER ILLUSTRATIONS

In the 1880s and 1890s, at the peak of land cleared for agriculture in Maine, aerial maps of many of the state's cities and towns were carefully drawn. These maps were published and can be found today in many local historical societies across the state of Maine. A number of these maps can also be viewed on a web site created by the United States Library of Congress. Simply go to "Map Collections: 1500-1999" at: *http://memory.loc.gov/ammem/gmdhtml/gmdhome.html* and click on "Cities and Towns." Go to the SEARCH key, enter MAINE, and select the town of interest.

When viewing these "bird's-eye" maps, note the number and sizes of fields, the lack of fencerows, and the amount of cleared land immediately adjacent to waterways. With forests starting to invade the abandoned farmlands at the turn of the century, Manly Hardy (1832-1910), an early Maine naturalist, noted wildlife occuring closer to towns and published the following in the May 23, 1908, issue of *Forest and Stream*:

> Today, while riding, a fox with a 'snowshoe' rabbit in his mouth crossed just in front of the horse. Last week a huge moose came through the fields not over twelve miles east of Bangor, and I know of several deer not over eight miles off.

Today, of course, the situation is much different with deer populations at very high levels in many towns, and moose regularly occurring in Bangor and other Maine cities and towns. These changes in wildlife population have largely been due to increases in forestlands (at the expense of agricultural lands) as well as to improved wildlife protection.

ACKNOWLEDGMENTS

This research would not have been possible without the data collected over decades by the Census of Agriculture, U.S. Department of Commerce. We would also like to acknowledge all the farmers and other citizens who cooperated in this census. The research is supported by The Fund for Rural America Grant No. 97-36201-5282 and the Maine Cooperative Fish and Wildlife Research Unit (U.S. Geological Survey's Biological Resources Division, Maine Department of Inland Fisheries and Wildlife, The University of Maine, and Wildlife Management Institute, cooperating). We thank the U.S. Library of Congress, Washington, D.C., for providing, in digital form, the two bird's-eye maps used for cover illustrations. Finally, the constructive comments by Mark Anderson, Kathleen Bell and MaryEllen Wickett are gratefully acknowledged.

CONTENTS

FIGURES

I. INTRODUCTION

Land use is the result of a culture occupying an area and the environmental conditions of the area being occupied. How humans settle and use a landscape has profound effects on the people living there, as well as all other organisms in the area. There is an increased interest among ecologists, economists, geographers, historians, and others to document patterns of land use change and to understand the effects of these changes on people and the natural biota (e.g., Cronon 1983; Moore and Witham 1996; Sisk 1998b; Plantinga 1999). There is also a growing recognition of the need for interdisciplinary research on land use, and researchers have begun to examine the linkages between land use, ecology, economics, and other disciplines. For instance, Ando et al. (1998) combine data on land values and the incidence of endangered species to estimate costs of species conservation. Plantinga et al. (1999a, 1999b) use econometric models of land use in concert with forest carbon yield date to estimate the costs of addressing climate change through afforestation, (i.e., establishing a forest on land currently unforested) on agricultural land.

To understand current relationships between land use and ecological and economic systems, as well as to develop the capacity to predict future outcomes under an alternative set of conditions, it is important to identify historical land use patterns within a region and to understand the factors influencing past changes in land use. In many instances, the ecological impacts of land use change are "path-dependent," meaning the nature of the impacts in the present period depend not only on current ecological conditions but on past circumstances as well. For example, Harding et al. (1998) found that land use 50 years earlier was a better predictor of stream fish and invertebrate occurrence than current land use; Moore and Witham (1996) found that vegetation on the forest floor was related to land use 100 years earlier.

A first step toward understanding the effect of past land use on present and future outcomes is to develop land use histories. Histories have been recently compiled for the U.S. (Clawson 1979, 1981), a number of regions including the southwest (Allen et al. 1998), the Greater Yellowstone Ecosystem (Hansen et al. 1998), and the Great Lakes Region (Cole et al. 1998). In an economic study of rural New England, Black (1950) analyzed land use trends by state, including Maine. With the exception of Irland (1998) who developed a land use history of Maine forestlands, 1600 to 1995, and Mauldin et al. (1999) who summarized statistics by major land use classes in Maine, 1950 to 1995, there are no recent, comprehensive studies of land use histories in the eastern U.S. Because of how early European settlement occurred in the East relative to the West and Midwest, and because the eastern U.S. has longer written histories of human occupation of the landscape,

the East potentially provides a richer record of landscape changes and impacts (c.f., Cronon documentation of the period of European colonization).

The purpose of this study is to compile the best available long-term historical information on agricultural land use in Maine and to briefly analyze these data to develop a statewide description of Maine's land use history from the mid-1800s to present. Our emphasis is on compiling statistically based information and, in particular, land use data reported in the Census of Agriculture. Objectives were (1) to compile available statewide data on agricultural land and land cover (LULC) in Maine, 1850-1997; (2) to examine temporal and spatial patterns in the LULC of Maine; and (3) to discuss the implications of the major trends in LULC for selected natural resources of current economic and ecological concern. The next section describes the agricultural land data sources and definitions of the LULC categories. We present the methods used to compile the data in Section III, findings are reported in Section IV, and Section V discusses our results in terms of effects on selected agricultural and wildlife resources. Conclusions are given in Section VI.

While this publication emphasizes the quantitative and natural resource aspects of land use change, we must remember that the changes in agricultural lands in documented herein came at great expense to human communities and to individual people. For a discussion of the socioeconomic consequences of the abandonment of agricultural lands in Maine, see Spizuoco and Feurtado (1999).

II. DATA SOURCES AND DEFINITIONS

Data Sources

Our primary data source for agricultural land uses in Maine is the Census of Agriculture. The Census provides the most consistent time-series of agricultural statistics. The first nationwide agricultural census was taken in 1840 as part of the Sixth Decennial Population Census of the U.S. The 1840 Census of Agriculture was limited in the scope of information collected, but the Census in 1850 collected information on the number of farms and farmland acreage. From 1840 to 1950, the agricultural census was conducted on a decadal basis in conjunction with the census of human population.

By the early part of the 20th century, there was an increasing use of machinery and application of new scientific findings in U.S. agriculture, and the decadal census was no longer adequate to capture the rapid changes in agriculture. The U.S. Congress provided for a mid-

decade Census in 1925 and 1935 to meet the demand for more timely and accurate agricultural statistics. Congressional legislation in 1935 stipulated that a mid-decade Census should be taken thereafter. Between 1920 and 1950, the Census was taken every five years. Since 1950, the five-year cycle has continued for the most part, with some small deviations noted below. Between 1954 and 1974, the Census was conducted in years ending in 4 and 9. In 1976, Congress authorized that the Census be taken in 1978 and 1982 so that it coincided with other economic census. After 1982, the five-year cycle resumed; currently the Census is taken in years ending in 2 and 7.

For more than 150 years, the U.S. Department of Commerce Bureau of the Census conducted the Census of Agriculture. The 1997 Appropriations Act, however, transferred the responsibility for the Agriculture Census to the U. S. Department of Agriculture (USDA), National Agricultural Statistics Service (NASS). The 1997 Census of Agriculture is the first Census conducted by NASS.

Definitions

Although the Census is the most consistent time-series of agricultural statistics available, the definitions of some terms have changed over time. The definition of a farm was first established in 1850 and has since been modified nine times. For all Censuses, however, the "operational unit concept" has been applied in defining a "farm" and "land in farms."

According to this concept, a farm is land farmed by a single operator; neither the ownership of land nor labor sources matter. Thus, when a landowner has one or more tenants, renters, or managers, the land operated by each is considered a separate farm, and the area of land for each operator is a separate component of the land in farms category. Because the operational unit concept has been consistently applied, the Census provides a comparable series of data on farm numbers and farmland area. This data is presented at the county-level scale.

According to the 1997 Census of Agriculture, "land in farms" consists primarily of agricultural land used for crops, pasture, or grazing. Land in farms also includes woodland and wasteland not under cultivation or in use for pasture or grazing provided the land is part of the farm operation. Large areas of woodland or wasteland held for nonagricultural purposes are excluded.[a]

[a] Farms on Native American reservations were either not surveyed or reported in early Censuses and, thus, are not included in land in farms category. Beginning with the 1940 Census, however, reservation lands used for growing crops or grazing livestock are included in land in farms. If farmland in reservations is not reported by individual native or non-Native Americans, it is reported in the name of the cooperative group that farmed the land. In many instances, an entire Native American reservation is reported as a single farm.

For the early years of the Census (1850–1920), land in farms is classified as either improved or unimproved land. Some Censuses (1870, 1880, 1910, and 1920) further disaggregated unimproved land into woodland and other unimproved land. For Censuses between 1850 and 1920, definitions of each category are as follows:

Improved land: All land regularly tilled or mowed, land pastured and cropped in rotation, land lying fallow, land in gardens, orchards, vineyards, and nurseries, and land occupied by farm buildings.

Woodland: All land covered with natural or planted forest trees, which produced, or later may produce, firewood or other forest products.

Other unimproved land: Brush land, rough or stony land, swampland, and any other land which is not improved or in woodland.

Beginning with the mid-decade Censuses in 1925, land in farms is further disaggregated. Definitions of farmland categories reported in this study are as follows:

Cropland: Land from which crops were harvested or hay was cut; land in orchards, citrus groves, vineyards, nurseries, and greenhouses; cropland used only for pasture or grazing; land in cover crops, legumes, and soil-improvement grasses; land in which all crops failed; land in cultivated summer fallow; and idle cropland.

Pastureland: Land, other than cropland pastured and woodland pastured, used only for pasture or grazing.[b]

Woodland: Land in natural or planted wood lots or timber tracts, cut-over and deforested land with young growth, which has or will have value for wood products, and woodland pastured. Land planted for Christmas tree production is reported in cropland harvested, and land in tapped maple trees is reported as woodland not pastured.

---

[b] Note that the Census of Agriculture includes cropland pastured and woodland pastured in the pastureland category. We include these in the cropland and woodland categories, respectively, but exclude them from the pastureland category to avoid double counting.

Other land: Land in house lots, barn lots, pond, roads, ditches, wasteland, etc., and all farmland not classified as cropland, pastureland, or woodland.

Roughly speaking, the improved land category in the pre-1925 Censuses corresponds to the cropland and pastureland categories in the later censuses, and the unimproved land category includes woodland and other land. It is important to reiterate that the woodland category includes only woodlands that are part of farms. Public forests and private forests owned by industrial and non-industrial non-farm owners are not included.

III. METHODS

Data were compiled on the number of farms, total farm land area, and farm acreage in four categories of land use: improved, unimproved, woodland, and "other" (Appendix A). Average farm size was calculated for each region by dividing total area in farms by the number of farms. Data were tabulated by land-type and farmland categories across years. These statistics were plotted to visually assess changes through time. While Black (1950) reported that changes in Census procedures affected results, visual inspection of his graphs shows that differences between trends based on the adjusted versus non-adjusted data were not great enough, in our opinion, to warrant altering the raw data.

To assess spatial trends in agricultural lands through time, Maine was divided into four regions (Figure 1). These regions are not equal size, but do correspond to the sampling units used by the USDA Forest Service (e.g., Powell and Dickson 1984). Ecologically, the two southern regions (Southern and Central) correspond to the northern portion of the New England Coastal Plain, and the Western Region corresponds to the western part of the Interior and Western Mountains. The Northern Region is highly variable ecologically with mountainous to lowland terrain and a variety of climates (Krohn et al. 1999).

IV RESULTS

The number of farms in Maine, 1850–1997, peaked in 1880 at 64,309 (Figure 2). These farms covered more than 6.5 million acres, approximately one-third of the state. Statewide, the number of farms and acres in farm land declined gradually from 1880 through 1944. The decline was more rapid until the early 1970s, with a slower decline through 1997. Regionally, the yearly trend in farmland acres follows the general

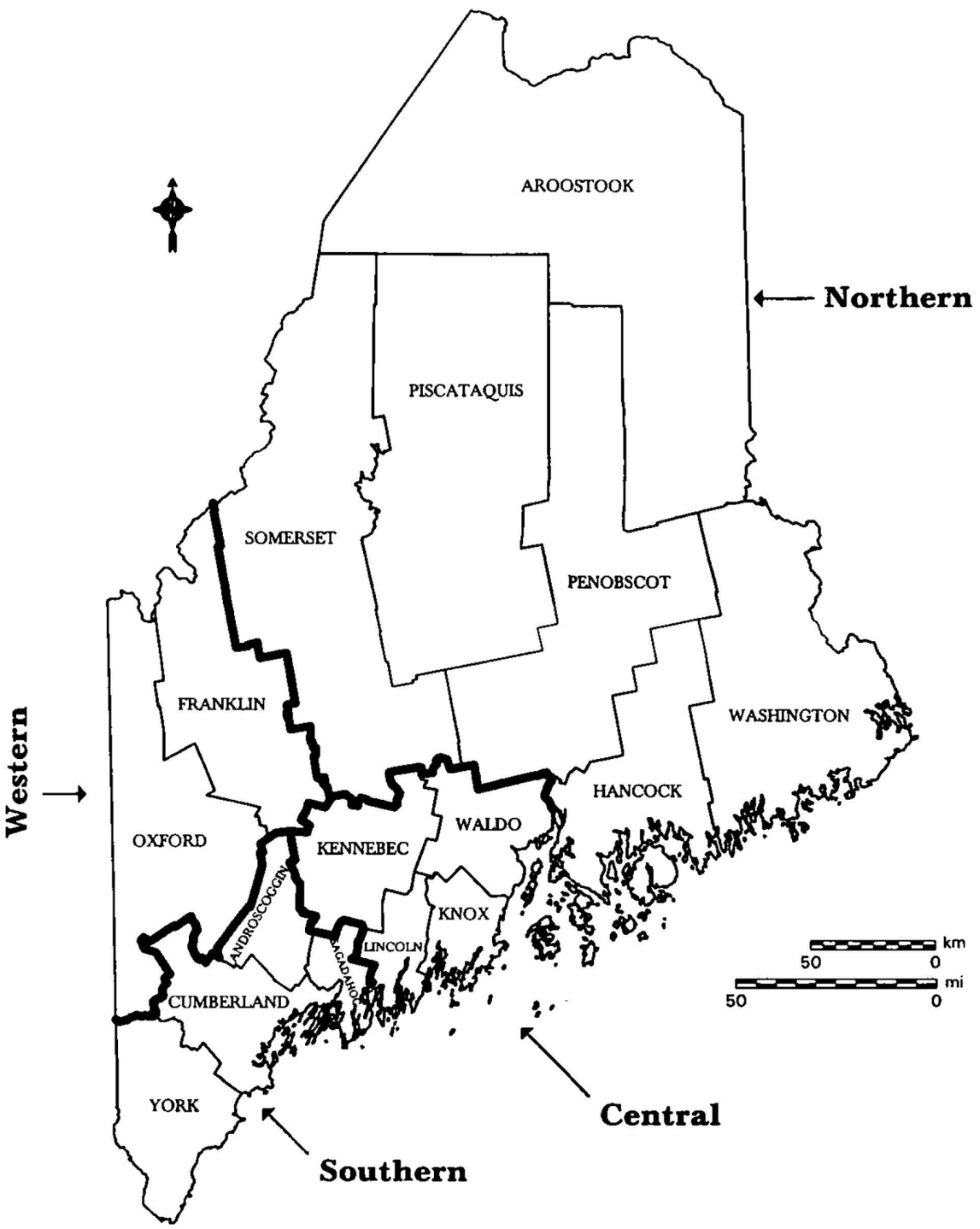


Figure 1. Location of counties in Maine (light lines) and regions used in this study (heavy lines). In Northern Maine, agricultural lands are concentrated in the St. John River Valley, the eastern and northern parts of the region.

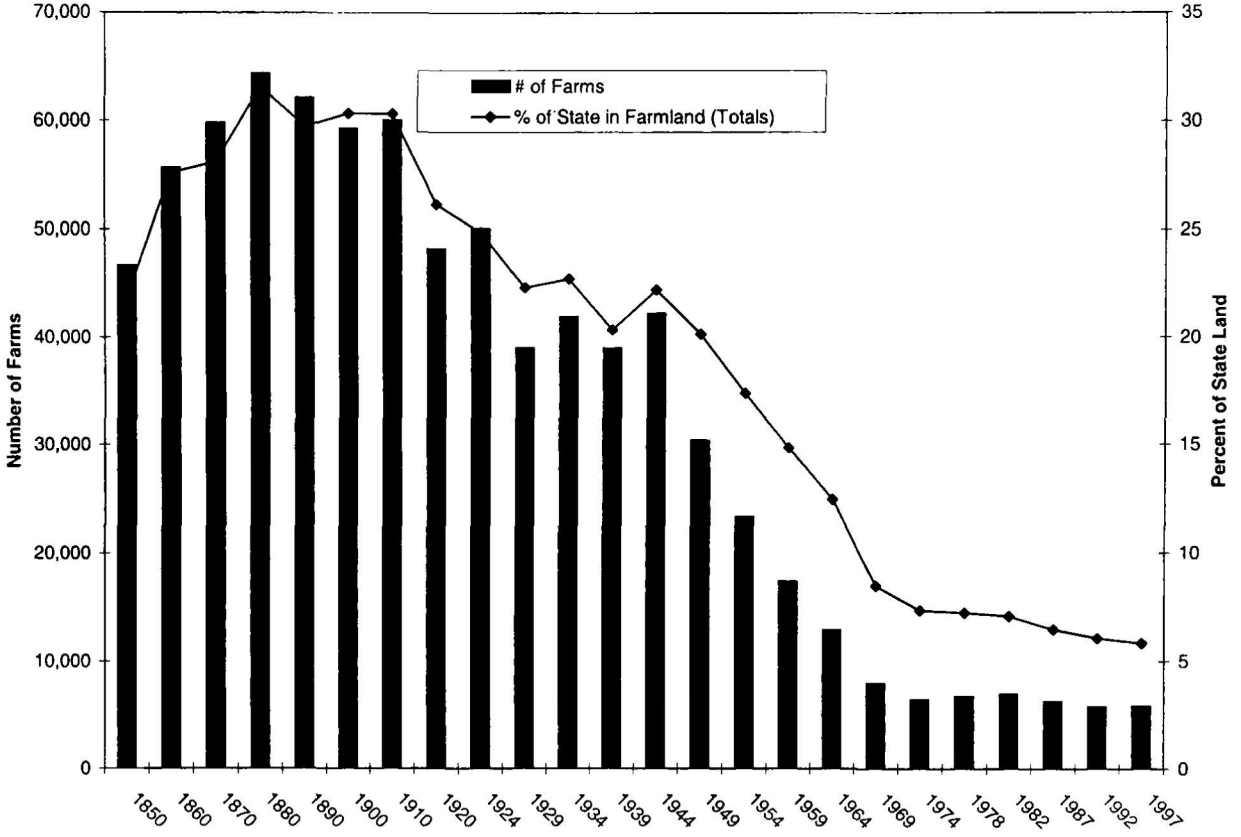


Figure 2. Temporal trend in the number of farms and percentage of state in farmland, 1850–1997. Data from the Census of Agriculture.

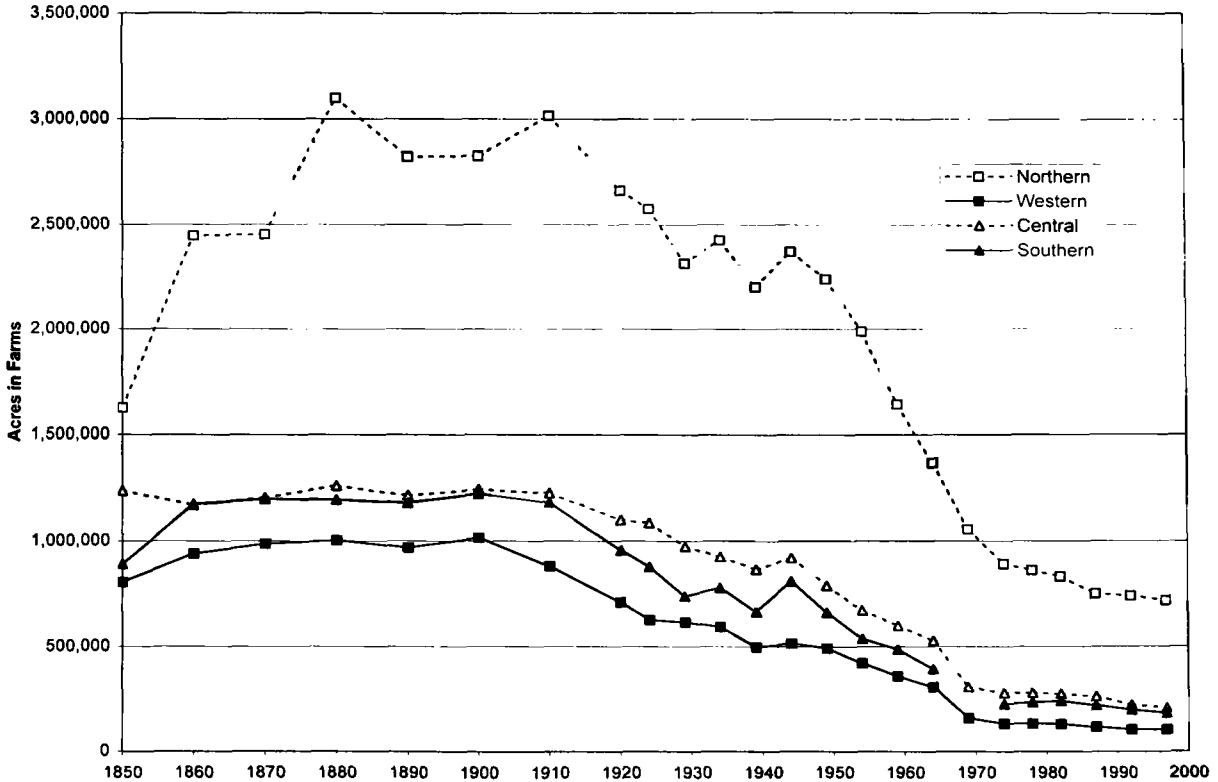


Figure 3. Temporal trends in the acres in farmland by regions (see Figure 1) of Maine, 1850–1997. Data from the Census of Agriculture.

state-level pattern, though with some notable exceptions. In the Western Region, for example, farmland acres also peak around 1880 but nearly 50% of farmland is lost prior to 1944, rather than after (Figure 3). Farmland acres in the Central Region already peaked by 1850 and remained stable until 1910. In the Southern Region, farmland acres increase in 1945, due to food production requirements during World War II, before resuming a downward trend. The trend in farmland acres in the Northern Region most closely matches the statewide pattern, but this aggregate picture largely masks the continued agricultural area expansion related to potato production in Aroostook County (Figures 2 and 3). From 1880 until the 1930s agricultural land expanded in Aroostook County by over 60% through an increase in the number of farms.

Average farm size was relatively stable for the 90-year period, 1860 to 1944 (Figure 4). During these nine decades, the average farm size in northern and western Maine were above the state average; average farm size in southern and central Maine were less than the statewide average. After 1944, however, average farm size increased rapidly. The state average more than doubled, growing from about 109 acres in 1944 to 237 acres by the mid-1970s. During this period, average farm sizes within the four regions held the same relative position. From the mid-1960s to the present, average farm size in the Northern Region remained approximately stable while average farm sizes in the other regions have declined. The stable trend in farm size in the Northern Region occludes the continued expansion of farm size in Aroostook County that began in 1944 (one county in the region) despite declines in other counties in that region (see county-level data presented in Appendix A). The largest change in farm size occurred in the Western Region, where the average farm fell from 262 acres to about 179 acres. By 1997, average farm size was approximately the same in the Western and Central regions, but somewhat smaller, on average, in the Southern Region. The recent declines in farm sizes in the Western, Central, and Southern regions have contributed to the decline the statewide average, which has fallen by 28 acres since the mid-1970s (Figure 4).

During the past 150 years, agricultural land has occupied between approximately 6% and 33% of the land base in Maine (Figure 2). However, there are considerable differences at the regional level (Figure 5). Until 1950, agricultural land accounted for the largest share of the land base in the Central Region. Over 70% of the land in the Central Region was in agricultural use in the late 19th century, whereas today only about 13% remains in agriculture. The pattern is similar in the Southern Region, where the agricultural share of the land base has varied from 73% (1870) to 11% (1997). In 1860, the percentage of total

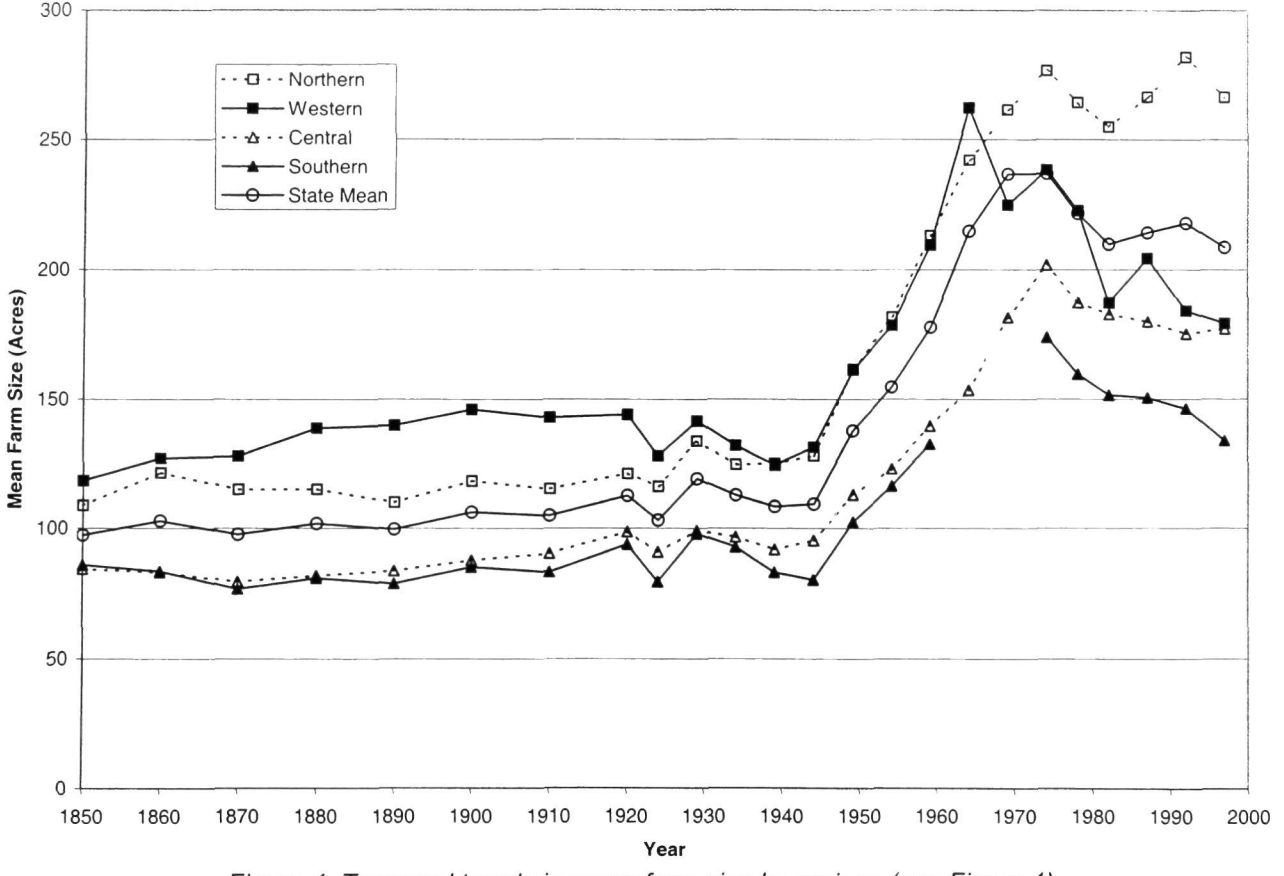


Figure 4. Temporal trends in mean farm size by regions (see Figure 1) of Maine, 1850–1997. Data from the Census of Agriculture.

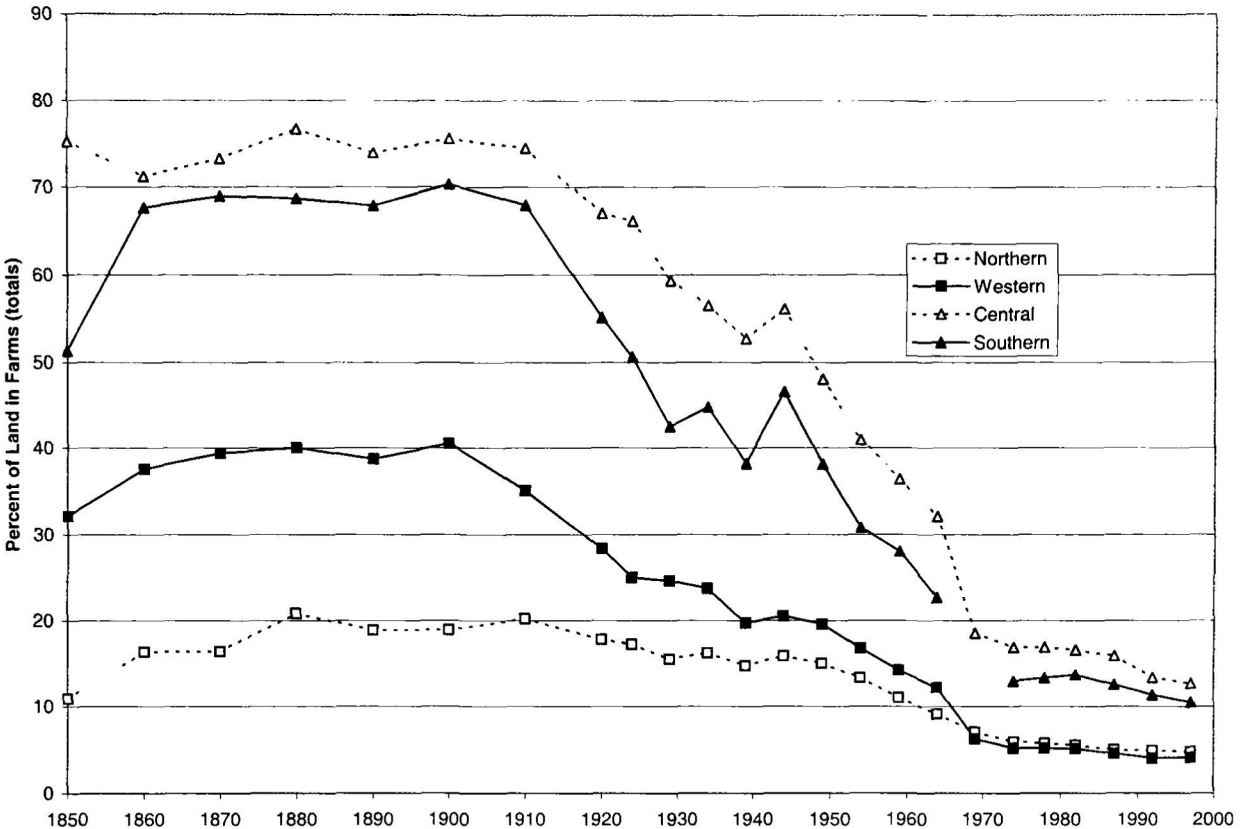


Figure 5. Temporal trends in the percentage of land area in farmlands by regions (see Figure 1) of Maine, 1850–1997. Data from the Census of Agriculture.

land in agriculture was almost two times higher in the Western Region than the Northern, but the gap narrowed steadily through time. In 1969, the agricultural share of the land base in the Northern Region was 8%, nearly equivalent to the 7% share in the Western Region; these values declined slightly from 1969 to 1997 (Figure 5).

Regionally, agricultural land totals are disaggregated primarily into improved and unimproved categories. The improved category includes cropland and pasture and the unimproved category includes woodland and other land. In all regions, acreage of improved land peaked in 1880 and dropped sharply until about 1900. For the next 60 years, total improved acreage remained relatively constant, despite transient fluctuations. Since the mid-1970s, the percentage of farmland in improved acreage has been increasing at a slight rate. Up until the 1920s, a large share of total agricultural land was unimproved (Figure 6). In 1910 and 1920, in particular, over one-half of the agricultural base in each region was made up of unimproved acreage. However, in 1924, unimproved acreage dropped sharply and has since dwindled to a negligible amount today (Figure 6).

V ANALYSIS AND DISCUSSION

Exogenous Factors Driving Agricultural Land Use

Since 1850 agricultural land use has undergone distinct phases of expansion and transformation from an unimproved to an improved state. During the initial phase, from 1850 until 1880, land use was primarily determined by local (household subsistence and local area) demand for food, fiber, and wood products. External trade (both at the local and state scale) was limited (Day 1954). As a result, the number of farms and the percentage of the state in farmland increased to meet local demands of an increasing population (Williams 1927).

The second distinct phase of land use in Maine, 1880–1945, was fundamentally influenced by geographical and economic development of the U.S. In the 19th century, the Ohio and Mississippi valleys were opened to agricultural production as the American frontier pushed westward. It was not until the later part of the century, however, that railroads and the development of the Erie Canal system began to link the East and the Midwest. The development of this transportation infrastructure provided an economically viable manner to ship agricultural commodities to the eastern coast of the U.S.

At the same time, the industrial revolution began to take advantage of inexpensive hydropower sources located throughout Maine (Maine Hydrographic Survey 1869). Factories emerged to produce

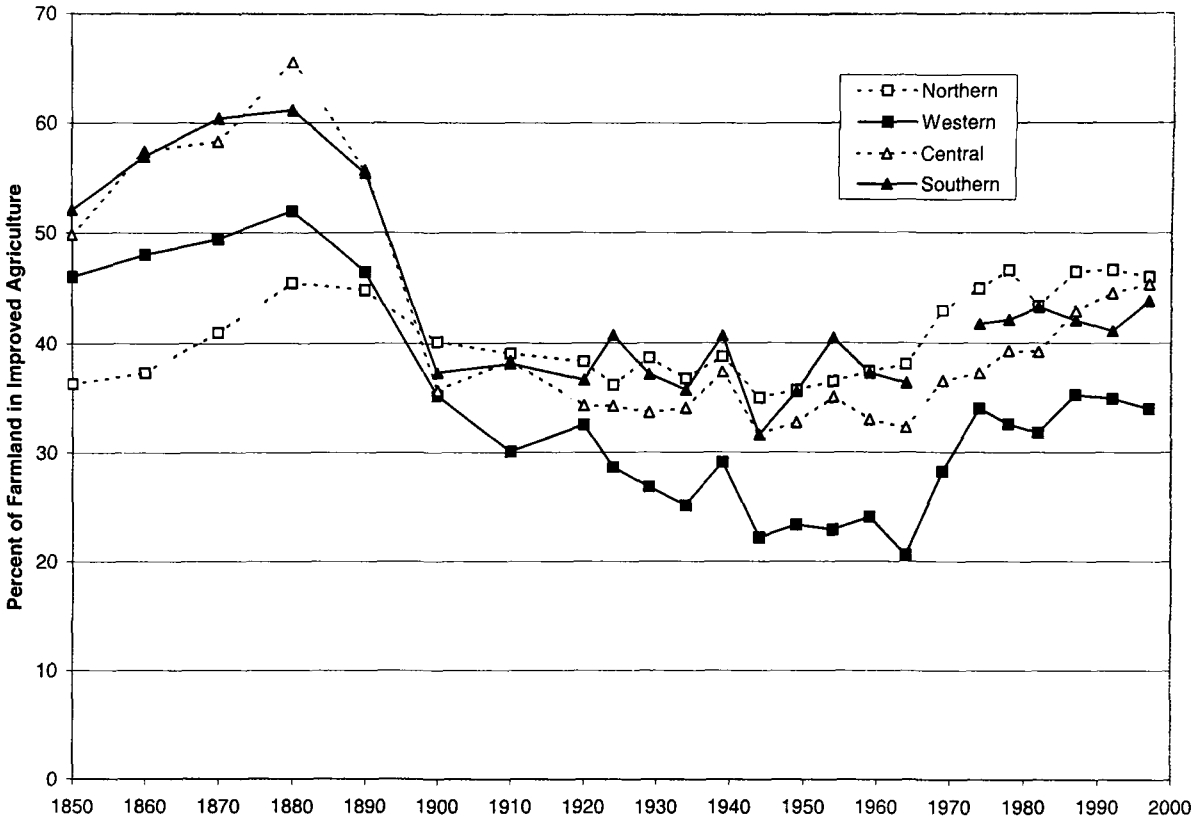


Figure 6. Temporal trends in the percentage of land areas in improved land (as a percentage of farmland) by regions (see Figure 1) of Maine, 1850–1997. Data from the Census of Agriculture.

textiles, tin ware, staves, and other manufactured goods that could be traded for inexpensive food commodities originating in the Midwest. These two factors interacted positively to induce the dramatic abandonment of farming at the end of the 19th century. More fertile land drew farmers from Maine to new farming opportunities in the west while industrialization provided a new, non-farm income source for remaining rural populations that could be exchanged for inexpensive foodstuffs originating out-of-state (Harper 1918). Industrial employment opportunities encouraged emigration within state from rural areas to towns at the same time as new farming opportunities encouraged out-of-state emigration. The primary effect was to reduce the number of farms in Maine but not average farm size. Farms remaining operational allowed crop and pasture land with limited productivity to revert to brush and woodland, thereby fueling the transformation of productive to passive agricultural land use. From 1880 to 1934, the share of improved cropland, as a percentage of all farmland, dropped from 53% to 35%. The first areas to be removed from crop or pasture production were poor, marginal lands with limited productive capacity (Day 1963).

As the number of farms decreased, average farm size tended to increase, albeit at moderate rates until 1940. The gain in average farm size occurred primarily in the unimproved or woodland category. During this era, farms were transformed from a subsistence, diversified base to specialized commercial operations focusing on dairy, potatoes, orchard crops, sweet corn and other canning vegetables (Day 1963).

In the third phase, between 1940 and 1960, agriculture in Maine became transformed from a labor-intensive production activity to one increasingly reliant upon agricultural machinery. The use of horses for traction had nearly ceased by 1940, replaced by tractors. During the 1940s, agricultural machinery use increased by nearly 83% in the U.S. Mechanization of agricultural production enabled farmers to reclaim woodland acres and to keep them free of brush growth. Secondly, it allowed the addition of new land to existing farms. Farm size across the state nearly doubled during the latter half of the 20th century. At the same time, improved acreage, as a share of total farm acreage, rebounded with most of this growth occurring after 1945. As a result, there is a distinct "U"-shaped pattern of improved cropland as a percentage of total farm acreage. The first peak occurred around 1880, the trough, a result of within state and out-of-state emigration, around 1940, and the second peak, largely influenced by agricultural mechanization, in the late 20th century.

The pattern of agricultural land use over the past 150 years has been dominated by declining farm numbers in response to exogenous

geographic and economic forces. Declining farm numbers have reduced the overall total acres of agricultural land. Within the pattern of declining agricultural land use are two land transformation trends. The first trend is the "U"-shaped transformation of improved land to an unimproved or wooded state during the late 19th and early 20th century, and then its retransformation back to an improved state following 1945. The second trend is the dramatic increase in farm size in the second half of the twentieth century fueled by technological changes in agricultural mechanization. Despite the increase in average farm size and the trend to a greater percentage of farmland in improved cropland and pasture, exit from farming and land transformation to non-agricultural usage still continue to dominate agricultural land use patterns. In terms of agricultural operations, large farms continued to grow larger, and small farms were abandoned and transformed to non-agricultural woodland. Since 1950, large private industrial and non-federal timberland holdings have increased by over 300,000 acres (Mauldin et al. 1999).

Effects on Wildlife Resources

The percentage of farmland in Maine peaked at the end of the 19th century; the majority of these farms were located in the central and southern parts of the state. Today, most of these agricultural lands have reverted to forest, although some acreage has gone to lands dominated by human occupancy. So what does afforestation mean to wildlife?

Wildlife species vary in their habitats needs; some need a mixture of land cover types and forest ages, others are more specialized (e.g., wetland species such as ducks and water birds). The size and shape of land cover types also affect the presence and abundance of wildlife. Some species of forest wildlife need young forests whereas others need a mixture of types. In short, change from agricultural lands to young forests and, more recently, to mature forests, resulted in some species declining while populations of other wildlife species increased.

The New England cottontail (*Sylvilagus transitionalis*) is a rabbit of brushland thickets (Barbour and Litvaitis 1993), whereas the snowshoe hare (*Lepus americanus*) lives in more forested environments, especially stands of early successional conifer forests with high stem densities (Litvaitis et al. 1985). The amount of agricultural land in southern Maine peaked and was fairly constant between 1860 and 1910 (Figure 3). Before the deforestation of the Portland region around the turn of the century, hares were abundant and rabbits apparently absent (Norton 1930). Between 1910 until the mid-1970s, the amount of farmland in this region declined steadily (Figure 3); presumably the

acreage of abandoned farmland increased. In response to these changed environmental conditions, the New England cottontail increased its distribution in southern Maine, 1914–1927 (Norton 1930). By 1930, Norton (1930:81) considered the cottontail in southern Maine "...well established and is common..." Since the mid-1970s farmland acreage in this region has been low but steady (Figure 3), presumably not contributing to any substantial increase in brushland acreage. Today, with the reduction in brushlands and continued fragmentation of the remaining thickets, the New England cottontail continue to decline throughout the Northeast (Litvaitis and Villafuerte 1996).

The fisher (*Martes pennanti*) a medium-sized forest carnivore, rapidly expanded its range throughout southern Maine in the 1950s due to a combination of afforestation and protection from trapping (Coulter 1960). In contrast, woodcock (*Scolopax scolpax*), a species needing early successional habitat ranging from brushy fields (for courting and roosting) to stands of pole-sized trees (for nesting and brood-rearing), initially was "not very numerous" (Fisher 1834:309) and, with the reversion of farm fields and pastures to brushlands in the early 20th century, increased (Williams 1927; Phillips 1932). However, as abandoned farm-fields were used for housing and the forests grew from pole-sized to mature trees, woodcock populations declined (Dwyer et al. 1983).

These examples are relatively short-term population effects of afforestation. We can expect the changes in land use to have many subtle and long-lasting effects, most of which we have yet to study. For several species, however, some of these subtle effects are known. Woodcock have a long bill that enables them to probe deep into soft soils and feed on soil invertebrates, especially earthworms. Land use affects soil characteristics. Farmed land generally contains more organic matter than lands that have never been farmed. High proportions of organic matter in the soil generally increase earthworm populations. In a study of 560 forest sites in Maine, 416 previously farmed and 144 never farmed, earthworms were nearly absent in the never farmed sites, regardless of forest cover type (Owen and Galbraith 1989). Because woodcock use of areas is related to earthworm abundance (Reynolds et al. 1977), these data strongly suggest the long-term effects of land use history on this important game bird. Long-term effects of land use changes also have been documented for aquatic (e.g., Harding et al. 1998) and terrestrial (e.g., Moore and Witham 1996) systems in Appalachian Mountains streams and coastal Maine forests, respectively.

Additional information on the effects of land use changes on selected wildlife in New England are detailed in DeGraaf and Miller (1996), Litvaitis (1993) and Litvaitis et al. (1999).

VI. CONCLUSIONS

Patterns of agricultural land use in Maine have been greatly influenced by geographic and economic development of the U.S. The results of this study highlight distinct phases in agricultural land use in Maine. The first trend originated prior to 1850, the start of our time series. This phase is characterized by highly localized, closed rural economies. Land-use decisions were largely determined by family-level demand for food, fiber, and fuel. During this phase, growth of the human population fueled demand for improved agricultural land, average forest acreage declined, and wildlife populations dependent upon forestland were reduced.

The second phase, occurring after 1880, is marked by an opening of economic trade with the Midwest and industrialization in many small Maine towns. These two forces transformed the economy towards specialization in non-agricultural products that could be traded for inexpensive foodstuffs originating out of state. The industrialization process also encouraged within-state emigration from rural areas to mill towns while new land in the Midwest attracted many Maine farmers. The impact on land use was dramatic with abandonment of farms, especially in central and southern Maine. The remaining crop and pasture lands reverted into an unimproved status and eventually into a woodland state initially dominated by brushlands. During this phase, populations of wildlife species dependent upon early successional forestlands, such as woodcock, increased.

The third phase, since the 1940s, is one dominated by technological change in agricultural mechanization. Agricultural mechanization allowed farmers to reclaim brush and woodland as productive cropland and pasture, thereby fueling an increase in average farm size. Despite the increase in average farm size and the tendency towards a larger proportion of farmland in an improved state, exit from farming and transformation of agricultural land to non-agricultural usage still dominates agricultural land changes in Maine. During this phase, which continues today, the brushlands grew into mature forests with an increase in populations of forest dependent wildlife species, such as fishers, and a decline in species needing early successional forests.

Changes in land use and land cover have long-term effects on humans and ecosystems. Despite a history of major changes in Maine and New England, these areas have received relatively little scholarly attention. By making the preceding land use statistics readily available, it is our hope that more attention will be given to the legacy of Maine's changing landscape. The data used for this analysis (i.e., Appendix A) are available in digital form at: *www.umaine.edu/mafes/*

VII. REFERENCES

Allen, C.D., J.L. Betancourt, and T.W. Swetnam, 1998. Landscape changes in the southwestern United States: techniques, long-term data sets, and trends. *In* Perspectives on the Land-use History of North America: A Context for Understanding Our Changing Environment, ed. T.D. Sisk. U.S. Geological Survey, Biological Resources Division, Biological Science Report USGS/BRD/BSR-1998-0003. Reston, VA. pp. 71–84.

Ando, A., J. Camm, S. Polasky, and A. Solow. 1998. Species distributions, land values, and efficient conservation. *Science* 279: 2126–2128.

Barbour, M. S., and J. A. Litvaitis. 1993. Niche dimensions of New England cottontails in relation to habitat patch size. *Oecologia* 95:321–327.

Black, J.D. 1950. The Rural Economy of New England — A Regional Study. Harvard University Press, Cambridge, MA.

Clawson, M. 1979. America's forests in the long sweep of history. *Science* 204:1168–1174.

Clawson, M. 1981. Competitive land use in American forestry and agriculture. *Journal of Forest History* 25:222–227.

Cole, K.L., M.B. Davis, F. Stearns, G. Guntenspergen, and K. Walker. 1998. Historical landcover changes in the Great Lakes Region. *In* Perspectives on the Land-use History of North America: A Context for Understanding Our Changing Environment, ed. T.D. Sisk. U.S. Geological Survey, Biological Resources Division, Biological Science Report USGS/BRD/BSR-1998-0003. Reston, VA. pp. 43–50.

Coulter, M.W. 1960. The status and distribution of fisher in Maine. *Journal of Mammology* 41:1–9.

Cronon, W. 1983. Changes in the Land: Indians, Colonists, and the Ecology of New England. Hill and Wang, New York.

Day, C.A. 1954. A history of Maine agriculture, 1604–1860. University of Maine Bulletin, Second Series No. 68, University of Maine, Orono.

Day, C.A. 1963. Farming in Maine, 1860–1940. University of Maine Press, Orono.

DeGraaf, R.M., and R.I. Miller. 1996. The importance of disturbance and land use history in New England: implications for forested landscapes and wildlife conservation. *In* Faunal diversity in Forested Landscapes. ed. R.M. Degraaf, and R.I. Miller. Conservation Biology Series 6, Chapman and Hall, London. pp. 3–35.

Dwyer, T. J., D. G. McAuley, and E. L. Derleth. 1983. Woodcock singing-ground counts and habitat changes in the northeastern United States. *Journal of Wildlife Management* 47:772–779.

Fisher, J. 1834. Scripture Animals — A Natural History of the Living Creatures in the Bible. Reprinted 1972. The Payne Press, Princeton, NJ.

Hansen, A., A. Gallant, J. Rotells, and D. Brown. 1998. Natural and human drivers of biodiversity in the Greater Yellowstone ecosystem. *In* Perspectives on the Land-use History of North America: A Context for Understanding Our Changing Environment, ed. T.D. Sisk. U.S. Geological Survey, Biological Resources Division, Biological Science Report USGS/BRD/BSR-1998-0003. Reston, VA. pp. 61–70.

Harding, J.S., E.F. Benfield, P.V. Bolstad, G.S. Helfman, and E.B.D. Jones III. 1998. Stream biodiversity: The ghost of land use past. *Proceedings National Academy Science* 95:14843–14847.

Harper, R.L. 1918. Changes in the forest area of New England in three centuries. *Journal of Forestry* 16:442–452.

Irland, L.C. 1998. Maine's forest area, 1600–1995: review of available estimates. Maine Agricultural and Forest Experiment Station Miscellaneous Publication 736.

Krohn, W.B., R.B. Boone, and S. L. Painton. 1999. Quantitative delineation and characterization of hierarchical biophysical regions of Maine. *Northeastern Naturalist* 6:125–150.

Litvaitis, J.A. 1993. Response of early successional vertebrates to historic changes in land use. *Conservation Biology* 7:866–873.

Litvaitis, J.A., J.A. Sherburne, and J.A. Bissonette. 1985. Influence of understory characteristics on snowshoe hare habitat use and density. *Journal of Wildlife Management* 49:866–873.

Litvaitis, J. A., and R. Villafuerte. 1996. Factors affecting the persistence of New England cottontail metapopulations: the role of habitat management. *Wildlife Society Bulletin* 24:686–693.

Litvaitis, J.A., D.L. Wagner, J.L. Confer, M.D. Tarr, and E.J. Snyder. 1999. Early successional forests and shrub-dominated habitats: land use artifacts or critical community in the northeastern United States? *Northeast Wildlife* 54:101–118.

Maine Hydrographic Survey. 1869. Water-power of Maine. Sprague, Owen & Nash, Augusta (ME).

Mauldin, T.E., A.J. Plantinga, and R.J. Alig. 1999. Determinants of land use in Maine with projections to 2050. *Northern Journal of Applied Forestry* 16(2): 82–88.

Moore, E.H., and J.W. Witham. 1996. From forest to farm and back again—land use history as a dimension of ecological research in coastal Maine. *Environmental History* 3:50–69.

Norton, A.H. 1930. The mammals of Portland, Maine, and vicinity. Proceeding of the Portland Society of Natural History, Portland, ME.

Owen, R.B., Jr., and W.J. Galbraith. 1989. Earthworm biomass in relation to forest types, soil, and land use: implications for woodcock management. *Wildlife Society Bulletin* 17:130–136.

Phillips. J.C. 1932. Northern New England woodcock. *The Auk* 99:466–467.

Plantinga, A.J., T. Mauldin, and D.J. Miller. 1999a. An econometric analysis of the costs of sequestering carbon in forests. *American Journal of Agricultural Economics* 81:812–824.

Plantinga, A.J., T. Mauldin, and R.J. Alig. 1999b. Land use in Maine: determinants of past trends and projections of future changes. U. S. Department of Agriculture Forest Service, Forest Service, Pacific Northwest Research Station. PNW-RP-511.

Plantinga, A.J. 1999. The economics of land use: a bibliography. Maine Agricultural and Forest Experiment Station, Miscellaneous Publication 744.

Powell, D.S., and D.R. Dickson. 1984. Forest statistics for Maine—1971 and 1982. U. S. Department of Agriculture Forest Service, Northeastern Station Resource Bulletin NE-81, Broomall, PA.

Reynolds, J.W., W.B. Krohn, and G.A. Jordon. 1977. Earthworm populations as related to woodcock habitat usage in central Maine. *Proceedings of the 6th Woodcock Symposium* 6:135–146.

Sisk, T.D. (ed.) 1998a. Perspectives on the Land-use History of North America: A Context for Understanding Our Changing Environment. U.S. Geological Survey, Biological Resources Division, Biological Science Report USGS/BRD/BSR-1998-0003. Reston, VA.

Sisk T.D. 1998b. Toward a land use history of North American. *In* Perspectives on the Land-use History of North America: A Context for Understanding Our Changing Environment, ed. T.D. Sisk. U.S. Geological Survey, Biological Resources Division, Biological Science Report USGS/BRD/BSR-1998-0003. Reston, VA. pp. 1–4.

Spizuoco, F., and C. Feurtado. 1999. Dexter, spirit of an age. Vol. II: our neighborly neighbors: 200 years of life in rural Dexter, Maine 1800–2000. Publication Committee, Dexter Historical Society, Dexter, ME.

Williams, B. A. 1927. The return of the forest. *Literary Digest* 94:23–24.

APPENDIX A.
AGRICULTURAL LAND STATISTICS FOR MAINE STATEWIDE, BY COUNTIES AND YEARS FROM 1850–1997, MEASURED IN ACRES. DATA FROM THE CENSUS OF AGRICULTURE, U.S. DEPARTMENT OF COMMERCE.

STATEWIDE

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850	46,760	4,555,393	2,039,596	2,515,797	N/A[b]	N/A
1860	55,675	5,727,671	2,704,133	3,023,538	N/A	N/A
1870	59,804	5,838,058	2,917,793	2,920,265	2,224,740	695,525
1880	64,309	6,552,578	3,484,908	3,067,670	2,682,296	385,374
1890	62,103	6,179,925	3,044,666	3,135,259	N/A	N/A
1900	59,299	6,299,946	2,386,889	3,913,057	N/A	N/A
1910	60,016	6,296,859	2,360,657	3,936,202	2,775,621	1,160,581
1920	48,227	5,425,968	1,977,329	3,448,639	2,447,597	1,001,042
			Cropland[c]	Pasture[c]		
1924	50,033	5,161,428	1,839,283	575,372	2,489,037	257,736
1929	39,006	4,639,938	1,661,030	499,461	2,240,910	238,537
1934	41,907	4,721,842	1,631,928	431,482	2,427,638	230,794
1939	38,980	4,223,297	1,589,362	N/A	1,783,327	850,608
1944	42,184	4,613,175	1,489,789	439,136	2,450,444	233,806
1949	30,358	4,181,613	1,407,022	272,547	2,232,116	269,928
1954	23,368	3,614,242	1,272,350	203,424	1,992,496	145,972
1959	17,360	3,081,987	1,077,670	133,280	1,714,552	156,485
1964	12,875	2,590,022	894,314	98,124	1,458,448	139,136
1969	7,971	1,759,700	706,769	N/A	875,784	177,147
1974	6,436	1,523,696	641,940	N/A	713,897	167,859
1978	6,775	1,500,390	650,356	35,905	716,168	97,961
1982	7,003	1,468,674	610,691	47,131	707,404	103,448
1987	6,269	1,342,588	592,309	35,903	615,780	98,596
1992	5,776	1,258,297	559,424	29,509	594,602	74,762
1997	5,810	1,211,648	539,966	27,952	566,603	77,127

ANDROSCOGGIN

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850[d]	--	--	--	--	--	--
1860	2,777	234,241	145,186	89,055	N/A	N/A
1870	3,023	245,372	161,777	83,595	68,172	15,423
1880	2,981	244,781	159,937	84,844	69,900	14,944
1890	2,862	241,662	147,233	94,429	N/A	N/A
1900	2,924	257,400	125,701	131,699	N/A	N/A
1910	2,979	259,760	103,600	156,160	89,107	67,053
1920	2,235	211,954	90,483	121,471	74,571	46,900
			Cropland[c]	Pasture[c]		
1924	2,722	212,700	89,833	23,507	92,166	7,194
1929	2,322	215,710	83,038	24,837	97,781	10,054

1934	2,062	195,530	74,965	24,383	90,034	6,148
1939	2,111	169,543	71,788	N/A	59,695	38,060
1944	2,231	194,778	66,568	33,677	90,201	4,332
1949	1,543	163,819	62,729	14,739	78,131	8,220
1954	1,009	127,478	54,770	7,631	60,692	4,385
1959	888	130,600	46,552	7,667	71,762	4,619
1964	627	105,925	37,721	5,844	58,633	3,727
1969	412	77,924	32,062	N/A	35,516	10,346
1974	342	68,495	27,550	N/A	32,746	8,199
1978	345	71,637	29,523	2,689	34,185	5,240
1982	355	74,219	33,728	1,718	34,065	4,708
1987	343	69,551	30,821	1,541	32,972	4,217
1992	302	62,242	25,378	1,807	31,436	3,621
1997	288	55,905	23,368	1,733	25,192	5,612

AROOSTOOK

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850	1,228	195,620	55,097	140,523	N/A	N/A
1860	2,938	450,816	124,117	326,699	N/A	N/A
1870	3,209	428,450	133,024	295,426	277,613	17,813
1880	5,802	723,840	270,442	453,398	433,847	19,551
1890	6,180	723,016	316,253	406,763	N/A	N/A
1900	6,938	793,205	389,232	403,973	N/A	N/A
1910	7,289	864,430	443,007	421,423	357,636	3,787
1920	6,741	850,208	450,763	399,445	299,409	100,036
			Cropland[c]	Pasture[c]		
1924	6,337	809,789	411,221	32,303	283,164	83,101
1929	6,459	868,400	450,094	39,515	321,028	57,763
1934	6,714	890,847	449,834	43,389	342,750	54,874
1939	5,706	793,218	410,974	N/A	270,380	111,864
1944	5,411	840,457	398,447	50,558	344,169	4,283
1949	4,614	840,870	409,227	29,708	360,131	41,804
1954	3,940	782,542	381,334	23,953	342,425	34,830
1959	3,057	662,841	328,437	16,481	283,620	34,303
1964	2,292	574,626	292,539	12,194	239,624	30,269
1969	2,153	560,995	294,440	N/A	220,283	46,272
1974	1,561	448,090	240,862	N/A	160,508	46,720
1978	1,368	420,086	232,428	9,362	152,607	25,689
1982	1,253	385,828	203,750	11,463	139,645	30,970
1987	1,012	329,971	187,566	6,871	114,096	21,438
1992	884	334,040	189,850	6,653	114,744	22,793
1997	889	324,887	187,599	7,049	108,490	21,749

CUMBERLAND

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850	5,352	453,283	250,607	202,676	N/A	N/A
1860	4,567	377,699	209,555	168,144	N/A	N/A

1870	5,931	410,302	249,617	160,685	135,917	24,768
1880	5,415	402,753	245,538	157,215	146,146	11,069
1890	5,342	400,764	217,464	183,300	N/A	N/A
1900	5,101	408,946	148,436	260,510	N/A	N/A
1910	5,131	387,734	151,528	236,206	159,025	77,181
1920	3,740	319,776	129,454	190,322	135,358	54,964
			Cropland[c]	Pasture[c]		
1924	3,454	233,130	109,118	14,395	100,928	8,689
1929	2,233	211,867	81,021	24,596	95,561	10,689
1934	3,040	258,055	92,412	19,768	134,855	11,020
1939	2,937	223,457	95,084	N/A	90,730	37,643
1944	3,485	253,339	76,774	23,940	118,365	34,260
1949	2,284	222,393	77,878	13,893	116,879	13,743
1954	1,749	175,450	72,742	8,731	87,022	6,955
1959	1,200	144,900	58,118	4,851	74,964	6,967
1964	879	116,086	45,144	3,615	61,742	5,585
1969	536	67,465	28,998	N/A	29,654	8,813
1974	398	63,753	29,580	N/A	25,337	8,836
1978	491	60,166	29,057	1,549	25,323	4,237
1982	507	62,096	28,948	2,507	26,281	4,360
1987	456	57,745	27,251	1,487	24,202	4,805
1992	440	53,893	23,860	1,219	24,771	4,043
1997	455	49,829	25,543	1,172	19,278	3,836

FRANKLIN

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850	2,521	298,512	154,568	143,944	N/A	N/A
1860	2,811	366,291	191,762	174,529	N/A	N/A
1870	2,855	390,120	213,913	176,207	159,954	16,253
1880	2,529	370,067	209,188	160,879	152,737	8,142
1890	2,510	378,345	195,807	182,538	N/A	N/A
1900	2,526	393,870	158,051	235,819	N/A	N/A
1910	2,275	341,301	109,323	231,978	168,361	63,617
1920	1,849	274,808	96,294	178,514	138,852	39,662
			Cropland[c]	Pasture[c]		
1924	1,958	247,783	73,991	36,999	126,319	10,474
1929	1,530	220,777	66,187	33,419	114,758	6,413
1934	1,717	234,232	63,267	25,828	138,889	6,248
1939	1,469	185,732	59,506	N/A	94,276	31,950
1944	1,351	180,405	46,139	23,622	106,492	4,152
1949	1,179	193,937	47,503	17,150	120,517	8,767
1954	968	189,721	41,074	10,503	134,204	3,940
1959	720	162,744	40,642	4,984	113,491	3,627
1964	451	121,708	25,963	6,651	86,213	2,881
1969	277	59,031	16,999	N/A	35,585	6,447
1974	216	46,748	16,376	N/A	25,212	5,160
1978	259	50,185	17,000	1,411	29,510	2,264
1982	288	51,046	16,276	2,250	30,360	2,160

1987	229	44,217	16,604	1,141	23,909	2,563
1992	210	38,853	14,876	1,014	21,539	1,424
1997	223	40,091	14,723	1,148	22,782	1,438

HANCOCK

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850	2,271	214,278	74,046	140,232	N/A	N/A
1860	3,020	317,460	102,724	214,736	N/A	N/A
1870	2,891	257,931	103,536	154,395	73,912	80,483
1880	4,078	345,216	138,101	207,115	158,952	48,163
1890	3,888	307,047	119,565	187,482	N/A	N/A
1900	2,784	274,390	51,353	223,037	N/A	N/A
1910	3,382	303,469	65,030	238,439	172,031	66,408
1920	2,442	229,184	44,896	184,288	138,824	45,464
			Cropland[c]	Pasture[c]		
1924	2,679	232,595	45,103	16,123	157,639	13,730
1929	1,300	149,386	35,707	8,481	95,191	10,007
1934	1,864	183,780	39,736	12,324	123,126	8,594
1939	1,804	158,117	34,553	N/A	83,904	39,660
1944	2,140	196,632	44,302	8,981	129,006	14,343
1949	1,348	146,297	35,561	6,862	94,159	9,715
1954	1,252	153,348	37,431	6,443	103,625	5,849
1959	697	125,887	24,498	3,426	88,724	9,239
1964	460	92,733	19,707	5,476	61,506	6,044
1969	200	47,356	9,916	N/A	32,709	4,731
1974	183	42,534	6,980	N/A	31,481	4,073
1978	253	43,042	12,082	525	25,802	4,633
1982	286	51,326	11,684	870	32,570	6,202
1987	290	50,026	14,212	1,581	27,386	6,847
1992	291	50,076	12,226	1,526	31,604	4,720
1997	310	42,607	11,121	1,217	25,959	4,310

KENNEBEC

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850	5,256	450,148	248,637	201,511	N/A	N/A
1860	5,591	450,353	285,393	164,960	N/A	N/A
1870	5,757	462,201	289,994	172,207	134,993	37,214
1880	5,431	479,700	333,354	146,346	135,703	10,643
1890	5,232	464,442	285,498	178,944	N/A	N/A
1900	5,523	479,749	180,994	298,755	N/A	N/A
1910	5,062	467,049	198,385	268,664	154,679	113,985
1920	4,442	430,020	173,835	256,185	155,043	101,142
			Cropland[c]	Pasture[c]		
1924	4,473	419,895	160,540	70,274	174,871	14,210
1929	3,592	365,873	145,398	52,971	149,615	17,889
1934	3,585	349,497	132,426	50,410	152,536	14,125

1939	3,449	314,980	138,639	N/A	105,314	71,027
1944	3,828	365,961	129,503	47,034	173,339	16,085
1949	2,828	320,415	120,901	29,136	152,304	18,074
1954	2,132	276,910	107,614	21,307	137,361	10,628
1959	1,828	249,366	91,035	16,274	124,480	17,577
1964	1,405	224,973	81,190	14,070	115,883	13,830
1969	703	132,640	54,886	N/A	65,036	12,718
1974	559	122,752	49,921	N/A	54,813	18,018
1978	605	119,957	54,236	3,619	53,637	8,465
1982	573	117,547	52,503	4,997	52,036	8,011
1987	576	112,203	52,280	7,146	47,383	5,394
1992	494	95,402	48,273	2,330	40,557	4,242
1997	455	88,134	44,591	2,664	35,908	4,971

KNOX

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850[d]	--	--	--	--	--	--
1860	1,762	142,901	74,537	68,364	N/A	N/A
1870	1,827	132,445	72,987	59,458	39,542	19,916
1880	2,457	162,000	99,888	62,112	47,969	14,143
1890	2,102	150,260	69,061	81,199	N/A	N/A
1900	2,115	156,480	47,091	109,389	N/A	N/A
1910	2,169	157,715	51,719	105,996	63,077	42,919
1920	1,427	124,010	34,048	89,962	56,057	33,905
			Cropland[c]	Pasture[c]		
1924	1,821	131,360	40,221	19,816	63,811	7,512
1929	1,845	144,158	43,842	19,839	71,469	9,008
1934	1,510	118,819	44,446	9,816	57,099	7,458
1939	1,544	116,939	39,775	N/A	47,934	29,230
1944	1,672	122,412	41,486	12,312	61,174	7,440
1949	1,101	102,071	34,056	8,662	48,522	10,831
1954	806	77,139	30,376	5,529	36,841	4,393
1959	657	71,192	24,294	2,840	33,464	10,594
1964	669	84,006	28,589	2,643	45,756	7,018
1969	263	40,069	13,500	N/A	21,084	5,485
1974	213	32,675	11,282	N/A	17,650	3,743
1978	198	32,509	11,129	172	18,441	2,767
1982	211	31,703	11,535	634	16,896	2,638
1987	221	34,390	14,485	1,181	14,458	4,266
1992	217	27,622	10,214	1,578	13,876	1,954
1997	194	25,183	10,306	750	12,323	1,804

LINCOLN

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850	4,975	413,178	188,466	224,712	N/A	N/A
1860	2,812	221,572	119,034	102,538	N/A	N/A
1870	3,197	218,819	109,738	109,081	66,057	43,024

1880	3,213	232,982	146,480	86,502	68,474	18,028
1890	3,046	219,822	110,876	108,946	N/A	N/A
1900	2,808	223,069	58,430	164,639	N/A	N/A
1910	2,679	222,024	75,023	147,001	93,389	53,612
1920	2,024	184,998	51,524	133,474	90,150	43,324
			Cropland[c]	Pasture[c]		
1924	2,416	197,888	57,082	35,502	99,750	5,554
1929	1,870	169,977	48,504	17,610	95,417	8,446
1934	1,875	157,044	47,627	17,695	86,353	5,369
1939	1,810	147,032	56,026	N/A	63,577	27,429
1944	1,684	155,099	40,024	7,929	96,424	10,722
1949	1,099	116,505	34,168	7,152	69,163	6,022
1954	975	102,526	34,879	7,289	56,617	3,741
1959	661	85,879	28,962	3,677	49,064	4,176
1964	416	55,870	17,359	3,013	32,042	3,456
1969	195	32,447	11,816	N/A	16,344	4,287
1974	156	29,210	10,595	N/A	15,303	3,312
1978	209	30,488	11,210	721	16,932	1,625
1982	240	32,318	11,748	1,109	17,718	1,743
1987	228	29,230	12,017	1,034	12,962	3,217
1992	202	24,350	10,187	730	11,487	1,946
1997	210	25,920	11,010	1,625	11,949	1,336

OXFORD

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850	4,288	506,539	216,081	290,458	N/A	N/A
1860	4,594	573,856	259,640	314,216	N/A	N/A
1870	4,864	595,974	273,389	322,585	271,264	51,321
1880	4,689	631,729	311,716	320,013	300,324	19,689
1890	4,416	590,554	254,333	336,221	N/A	N/A
1900	4,420	620,704	198,474	422,230	N/A	N/A
1910	3,874	538,225	155,349	382,876	290,408	92,468
1920	3,078	434,989	134,722	300,267	238,612	61,655
			Cropland[c]	Pasture[c]		
1924	2,921	376,126	104,655	41,133	219,906	10,432
1929	2,806	393,107	98,262	42,606	241,913	10,326
1934	2,774	358,349	85,242	21,828	240,845	10,434
1939	2,509	308,485	84,210	N/A	169,288	54,987
1944	2,560	333,234	67,731	33,150	219,444	12,909
1949	1,861	296,672	66,830	16,560	201,492	11,790
1954	1,392	231,277	55,202	10,385	159,957	5,733
1959	983	193,962	45,020	9,132	132,432	7,378
1964	716	184,309	37,121	6,544	136,824	3,820
1969	422	98,078	27,343	N/A	61,405	9,330
1974	335	84,502	28,260	N/A	49,185	7,057
1978	327	80,242	25,502	1,970	49,670	3,100
1982	403	78,270	24,866	3,182	46,878	3,344

1987	334	70,813	23,943	1,584	41,021	4,265
1992	346	63,473	20,834	2,861	36,235	3,543
1997	358	63,959	20,673	1,232	39,601	2,453

PENOBSCOT

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850	3,983	409,186	158,611	250,575	N/A	N/A
1860	5,554	607,225	243,386	363,839	N/A	N/A
1870	6,336	654,267	297,263	357,004	243,661	113,343
1880	7,256	732,807	384,686	348,121	303,969	44,152
1890	6,691	658,881	337,505	321,376	N/A	N/A
1900	6,076	663,671	293,240	370,431	N/A	N/A
1910	6,514	679,633	277,217	402,416	283,499	118,917
1920	5,188	591,275	219,485	371,790	253,910	117,880
			Cropland[c]	Pasture[c]		
1924	5,255	588,126	199,790	92,364	270,779	25,193
1929	4,060	504,380	177,337	71,954	232,587	22,502
1934	4,566	523,579	170,259	53,662	274,707	24,951
1939	3,932	445,185	162,659	N/A	186,308	96,218
1944	4,438	510,215	162,986	49,879	286,348	11,002
1949	3,288	489,812	152,406	39,686	275,682	22,038
1954	2,219	397,020	124,175	29,739	230,637	12,469
1959	1,552	336,092	100,625	16,875	207,847	10,745
1964	1,173	263,501	85,459	10,849	156,430	10,763
1969	653	174,890	59,204	N/A	97,130	18,556
1974	591	152,210	57,694	N/A	80,001	14,515
1978	633	155,019	63,154	3,836	78,892	9,137
1982	654	145,949	56,662	4,079	76,910	8,298
1987	572	132,717	54,397	3,282	67,280	7,758
1992	524	118,152	53,916	3,353	56,801	4,082
1997	525	116,593	49,019	3,113	58,686	5,775

PISCATAQUIS

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850	1,779	202,063	75,191	126,872	N/A	N/A
1860	1,858	235,721	97,674	138,047	N/A	N/A
1870	1,952	269,980	110,726	159,254	130,105	29,149
1880	2,114	330,368	148,182	182,186	177,968	4,218
1890	2,074	276,276	116,977	159,299	N/A	N/A
1900	1,935	265,180	104,223	160,957	N/A	N/A
1910	1,913	255,541	81,218	174,323	133,586	40,737
1920	1,424	218,668	67,880	150,788	117,001	33,787
			Cropland[c]	Pasture[c]		
1924	1,529	206,301	58,722	29,812	110,845	6,922
1929	918	152,450	42,382	17,934	85,501	6,633

1934	1,240	179,812	53,912	19,049	99,921	6,930
1939	977	138,208	40,402	N/A	70,156	27,650
1944	1,104	148,506	39,703	16,145	88,945	3,713
1949	829	143,759	38,498	7,214	93,174	4,873
1954	530	120,818	32,054	6,620	79,486	2,658
1959	339	86,948	22,565	2,672	59,678	2,033
1964	302	79,954	20,982	1,204	55,383	2,385
1969	151	49,865	13,975	N/A	34,039	1,851
1974	129	39,412	13,076	N/A	20,855	5,481
1978	144	37,164	13,072	785	20,589	2,718
1982	158	36,248	12,358	1,227	21,442	1,221
1987	138	38,391	13,054	757	22,027	2,553
1992	140	35,988	12,952	212	21,672	1,152
1997	141	34,171	10,434	1,211	20,799	1,727

SAGADAHOC

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850[d]	--	--	--	--	--	--
1860	1,316	116,566	70,838	45,728	N/A	N/A
1870	1,321	117,037	63,587	53,450	31,570	21,880
1880	1,336	115,760	73,488	42,272	35,569	6,703
1890	1,221	111,029	56,633	54,396	N/A	N/A
1900	1,238	115,043	39,279	75,764	N/A	N/A
1910	1,238	118,024	53,610	64,414	39,500	24,914
1920	852	95,866	33,868	61,998	35,166	26,832
			Cropland[c]	Pasture[c]		
1924	1,074	111,298	38,579	17,455	51,373	3,891
1929	815	91,213	31,991	7,432	43,908	7,882
1934	727	81,599	29,423	7,128	39,745	5,303
1939	669	73,797	27,391	N/A	27,373	19,033
1944	892	89,031	26,822	6,870	49,732	5,607
1949	501	62,095	23,821	3,498	31,090	3,686
1954	368	51,828	22,260	2,885	22,981	3,702
1959	297	43,509	16,152	3,541	21,454	2,362
1964	253	37,100	12,983	2,879	18,176	3,062
1969	113	17,542	7,413	N/A	7,594	2,535
1974	94	14,381	6,116	N/A	6,363	1,902
1978	109	17,655	7,907	324	8,076	1,348
1982	120	17,827	7,795	312	8,352	1,368
1987	124	18,319	7,072	754	9,243	1,250
1992	120	18,793	6,777	821	10,304	891
1997	118	17,853	7,074	769	8,721	1,289

SOMERSET

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850	3,813	399,192	163,438	235,754	N/A	N/A
1860	4,409	532,338	261,245	271,093	N/A	N/A

1870	4,703	582,092	302,615	279,477	241,046	38,431
1880	4,664	597,553	322,141	275,412	253,252	22,160
1890	4,347	582,339	280,082	302,257	N/A	N/A
1900	4,122	579,301	240,474	338,827	N/A	N/A
1910	4,184	595,757	244,329	351,428	285,723	65,705
1920	3,646	500,383	180,315	320,068	229,243	90,825
			Cropland[c]	Pasture[c]		
1924	3,548	469,613	155,545	66,589	234,707	12,772
1929	2,996	407,853	139,307	65,208	191,318	12,020
1934	2,916	391,814	126,523	58,131	196,726	10,434
1939	2,863	376,936	134,603	N/A	174,419	67,914
1944	2,868	396,103	109,411	48,265	219,585	18,842
1949	2,141	355,858	109,671	33,405	200,909	11,873
1954	1,878	334,368	96,534	25,473	198,467	13,894
1959	1,215	258,734	84,212	14,378	151,386	8,758
1964	822	193,366	62,465	8,721	112,531	9,649
1969	556	138,579	46,801	N/A	76,876	14,902
1974	477	123,774	51,006	N/A	61,360	11,408
1978	510	125,236	49,505	2,687	68,008	5,036
1982	523	122,973	47,351	3,438	67,070	5,114
1987	462	112,332	47,154	2,091	58,381	4,706
1992	413	106,971	42,580	2,225	59,462	2,704
1997	431	101,270	35,971	1,171	59,769	4,359

WALDO

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850	4,415	371,952	178,264	193,688	N/A	N/A
1860	3,893	353,097	192,237	160,860	N/A	N/A
1870	4,341	388,794	228,842	159,952	122,874	37,078
1880	4,277	384,093	245,333	138,760	119,700	19,060
1890	4,116	378,805	211,168	167,637	N/A	N/A
1900	3,674	381,531	155,789	225,742	N/A	N/A
1910	3,607	375,813	143,837	231,976	143,891	88,085
1920	3,234	359,983	117,424	242,559	154,443	88,116
			Cropland[c]	Pasture[c]		
1924	3,202	335,494	113,584	37,626	170,329	13,955
1929	2,511	293,256	89,930	38,163	144,658	20,505
1934	2,599	300,293	90,702	44,538	142,718	22,335
1939	2,593	285,108	88,344	N/A	113,334	83,430
1944	2,452	275,585	79,519	37,096	151,323	7,647
1949	1,959	249,407	68,900	19,286	145,789	15,432
1954	1,553	214,679	62,347	12,461	129,949	9,922
1959	1,136	191,162	52,871	10,192	119,694	8,405
1964	942	161,969	42,782	5,883	106,920	6,384
1969	517	99,235	30,980	N/A	59,296	8,959
1974	446	92,650	31,396	N/A	49,415	11,839
1978	470	94,514	32,455	2,958	53,561	5,540
1982	465	90,463	30,824	4,331	50,647	4,661

1987	426	85,137	33,301	2,371	41,083	8,382
1992	339	71,890	29,036	1,254	37,670	3,930
1997	315	68,569	28,338	1,203	34,878	4,150

WASHINGTON

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850	1,875	204,957	63,590	141,367	N/A	N/A
1860	2,393	303,121	83,728	219,393	N/A	N/A
1870	2,266	261,161	59,220	201,941	89,717	112,224
1880	3,062	370,933	147,008	223,925	140,513	83,412
1890	2,467	272,948	94,319	178,629	N/A	N/A
1900	2,051	248,782	54,919	193,863	N/A	N/A
1910	2,918	317,146	67,114	250,032	161,753	88,279
1920	2,561	272,153	56,347	215,806	163,720	52,086
			Cropland[c]	Pasture[c]		
1924	2,844	268,756	61,072	21,594	158,749	27,341
1929	1,591	233,191	50,389	14,650	149,312	18,840
1934	2,188	256,765	50,656	7,953	171,519	26,637
1939	2,358	291,163	70,303	N/A	139,165	81,695
1944	2,589	279,809	74,823	23,021	161,378	20,587
1949	1,656	264,841	54,317	12,715	134,319	63,490
1954	1,120	199,372	53,005	14,744	118,619	13,004
1959	847	171,285	53,672	7,593	92,352	17,668
1964	591	160,899	37,802	4,311	94,000	24,786
1969	320	82,956	28,958	N/A	41,837	12,161
1974	277	84,517	30,680	N/A	43,934	9,903
1978	350	80,556	31,069	1,496	37,937	10,054
1982	381	87,438	28,256	2,887	43,995	12,300
1987	337	85,734	31,795	1,528	40,080	12,331
1992	372	94,755	33,585	825	49,969	10,376
1997	399	98,336	36,313	1,119	53,007	7,897

YORK

Year	Number of Farms	Land in Farms	Improved Land	Unimproved Land	Woodland	Other Land[a]
1850	5,004	436,485	213,000	223,485	N/A	N/A
1860	5,380	444,414	243,077	201,337	N/A	N/A
1870	5,331	423,113	247,565	175,548	138,343	37,205
1880	5,005	427,996	249,426	178,570	137,273	41,297
1890	5,519	423,735	231,892	191,843	N/A	N/A
1900	5,064	438,625	141,203	297,422	N/A	N/A
1910	4,802	413,238	140,368	272,870	179,956	92,914
1920	3,344	327,693	95,991	231,702	167,238	64,464
			Cropland[c]	Pasture[c]		
1924	3,800	320,574	120,227	19,880	173,701	6,766
1929	2,158	218,340	77,641	20,246	110,893	9,560
1934	2,530	241,827	80,498	15,580	135,815	9,934

1939	2,249	195,397	75,105	N/A	87,474	32,818
1944	3,479	271,609	85,551	16,657	154,519	14,882
1949	2,127	212,862	70,556	12,881	109,855	19,570
1954	1,477	179,766	66,553	9,731	93,613	9,869
1959	1,283	166,886	60,015	8,697	90,140	8,034
1964	877	132,997	46,508	4,227	76,785	5,477
1969	500	80,628	29,478	N/A	41,396	9,754
1974	459	77,993	30,566	N/A	39,734	7,693
1978	504	81,934	31,027	1,801	42,998	6,108
1982	586	83,423	32,407	2,127	42,539	6,350
1987	521	71,812	26,357	1,554	39,297	4,604
1992	482	61,797	24,880	1,101	32,475	3,341
1997	499	58,341	23,883	776	29,261	4,421

[a] Other Land in 1939, 1969, and 1974 includes Pasture.

[b] N/A : not available.

[c] Prior to 1924, Improved Land incuded both Cropland and Pasture. Data for these sub-categories did not exist prior to 1924. See the text for further elaboration.

[d] Androscoggin, Knox, and Sagadahoc counties did not exist in 1850.