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Farmsteads and Finances in the Finger Lakes: Using Archival Resources in a GIS Database

Patrick J. Heaton

An important component of the Finger Lakes National Forest Archaeology Project was the examination of available archival resources concerning the farmsteads which formerly existed within the national forest. Integrating historic evidence with archaeological data has repeatedly been identified as one of the defining characteristics, and most challenging aspects, of historical archaeology (e.g., Beaudry 1988; Deagan 1982; Leone and Potter 1988; Little 1991, 1994). Because there have not been many studies published concerning GIS applications in historical archaeology, few models exist for integrating historic data into archaeological GIS databases. The types of historic property data available for consideration by this project included title chains, appraisals, and tax assessment records. The information contained in these sources was used to develop an effective method for incorporating archival data into a GIS database.

The Hector Ranger District Office, from which the Finger Lakes National Forest is managed, houses an extensive historical archive of materials relating to the 19th and early-20th-century farmsteads that once existed within the national forest's boundaries. These archives consist of the legal documents produced when the federal government purchased these properties beginning in 1935. The first two sections of this article describe the archival resources housed in the district office, and review the methodology developed to incorporate historic data into the project's GIS database. The purpose of incorporating historic data in the GIS was to include the greatest possible amount of information concerning the Forest's cultural resources in one comprehensive database.

An additional goal of this project was to explore the interpretive potential of historic property ownership data within the GIS. Although the majority of the lands under the National Forest's management were acquired during the 1930s and 1940s, the Forest has con-

tinued to expand throughout the 20th century. This has resulted in a total area of 16,176 acres made up of over 130 former individual properties. Land ownership data, including title chains and tax assessments, were examined from a sample of 51 properties in the Burnt Hill Study Area of the National Forest. This information was transformed into a series of GIS themes which model the changes in property configuration, size, and assessed value within this study area between 1870 and 1930. After describing the sources of information from which these themes were derived and the method of their construction, a discussion of the trends revealed by analyzing the GIS themes is presented.

Considering the GIS data within the historical context of a failing regional economy during the late-19th and early-20th centuries allows for an examination of the role land ownership played in local farmers' economic strategies. A number of trends in property ownership have been identified which exhibit a pattern of land acquisition for many of the farms in the study area. The accumulation of land was a strategy these farmers used in an attempt to alleviate and forestall their own poverty in the face of environmental degradation and regional economic decline. That these farms are now abandoned and demolished, and their remains sit within a National Forest owned by the United States government, indicates that these strategies ultimately failed.

Archival Resources for the Finger Lakes National Forest

The individual properties within the National Forest were recorded by the Soil Conservation Service at the time of purchase with a pair of numerical designations separated by a hyphen. The first number refers to the Military Tract Compartment within the Town of Hector in which the property is located. These Military Tract Compartment

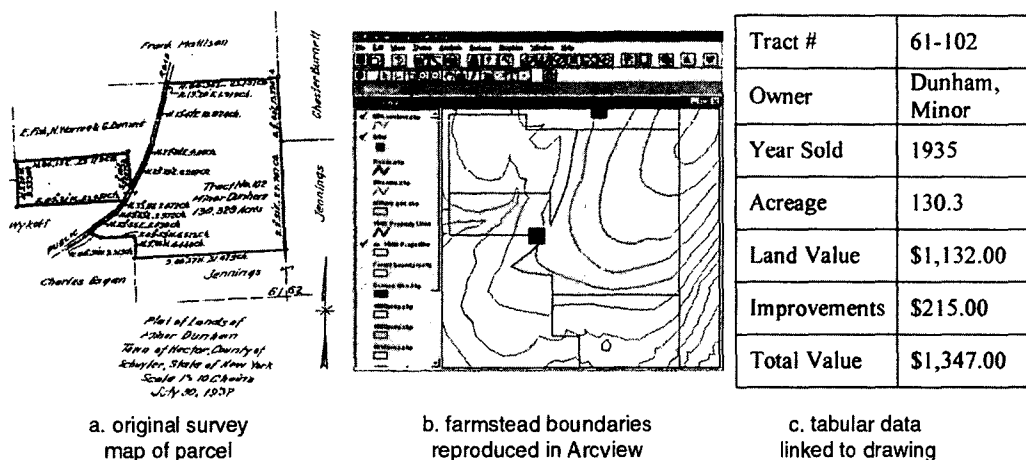


Figure 1. The a) survey maps provided a basis for the reproduction of property boundaries in AutoCAD; b) this drawing was then imported into ArcView; and c) linked to the tabular data set describing the property.

designations refer to the 600-acre parcels laid out during the New Military Tract survey in the 1790s, and were referred to in most of the maps, deeds, mortgages, and tax records which relate to these properties. The second number indicates the Tract Number assigned to the property by the Soil Conservation Service while negotiating the purchase of these farmsteads. For example, property #61-102 refers to Tract number 102, located in Hector Military Tract Compartment 61. This system of designations was continued in the current project for the sake of consistency.

Each of these historic farmsteads has a separate file at the Hector Ranger Station. The files for every property in the National Forest were examined for inclusion in the project. The nature and quantity of information contained in each file was highly variable. The most complete files contained a map of the individual farm depicting the property boundary as of 1935 complete with survey measurements at the scale of 1"=10 chains (66 feet); an appraisal report prepared by the U. S. Department of Agriculture, Sub-Marginal Land Program, which provides information regarding the appraised value, grade, and acreage of each class of land within the property (i.e. cropland, pasture, and timber); an appraisal of permanent improvements on the property including the assessed value, size, and (in some cases) a description of houses, barns, sheds, wells, cisterns, and fencing; and a copy of the abstracted title chain of the property, from the earliest recorded conveyance to the purchase

of the parcel by the U. S. Government. Additionally, these files often contained a series of correspondences between local and federal officials documenting the purchase of the parcel. Each of the files varied according to the completeness of these kinds of data.

Organizing Historic Property Data in a GIS Database

The organizational capabilities of GIS databases, and their emphasis on spatial relationships, have contributed to their recent popularity in archaeology (Kvamme 1999). Incorporating data from the archival sources into the Finger Lakes National Forest Archaeology Project GIS integrates diverse types of information within a single platform. In order to effectively use the archival data in the GIS database, the information contained in historic records had to be linked to some kind of spatial phenomena.

The spatial units selected as a referent for all other kinds of information in this section of the project were property boundaries. The properties chosen for inclusion in this project were those whose files contained a clear survey map of the parcel (FIG. 1a). These survey maps provided the basis for reconstructing the configuration of each farmstead as it existed when purchased by the government. From the dimensions provided in the survey maps, the size and shape of each property were re-drawn in AutoCAD. After

drawing all of the farmstead boundaries, the CAD image was added to the GIS project (FIG. 1b). In order to invest these line drawings (farmstead boundaries) with data (such as ownership, acreage, and assessed value), the GIS must recognize each line drawing as a polygon. The series of lines representing the boundaries of each property are read by the GIS as a set of perimeters which delineate a contained and distinct area.

In addition to the CAD drawing of property lines for the individual parcels, a Microsoft Excel spreadsheet containing information about each of the properties was created (FIG. 1c). This spreadsheet contained the Tract Number for each property (e.g. #61-102), the name of the individual who sold the parcel to the government, the year the parcel was acquired by the USDA, the recorded acreage of the parcel, and the assessed value of both land and permanent improvements on the parcel. Each property drawn in CAD had a corresponding entry in the spreadsheet. This spreadsheet was then linked to the polygon [farmstead boundaries] theme.

The reconstruction of each farmstead property in AutoCAD (FIG. 1b), and the creation of the associated database of tabular data (FIG. 1c), resulted in a comprehensive map and inventory of the historic properties. Figure 2 depicts the historic property boundaries as they existed at the time the government purchased each property. This theme allows for historical data from all the properties in the national forest to be immediately accessible and comparable with other classes of data in the project. The polygons in the farmstead theme (FIG. 2) were linked to two additional tabular data sets. The abstracted title chain for each property was modified into an Excel spreadsheet, as were the descriptions and appraisals of the permanent improvements for each property. These tables were then linked to the corresponding polygon in the GIS database (FIG. 3). As a result, the "hot-link" function in ArcView can be employed to access additional kinds of information concerning each property.

The Property Owners table contains a summarized description of the land transactions for that property (FIG. 3a). The table has an entry for each recorded transaction from the property's title chain, which includes the year

of the transaction, the principal parties involved (e.g. seller and buyer), the type of transaction (e.g. warranty deed transferred, property devised/inherited, or mortgaged), the recorded acreage involved in the transaction, and the consideration involved in the transaction. The information used to construct these tables came from the abstracted title chains, and was included in the project so that the historic ownership information for each property would be readily available for future research efforts.

The Property Improvements table contains a description of the permanent improvements for that property (FIG. 3b). These descriptions

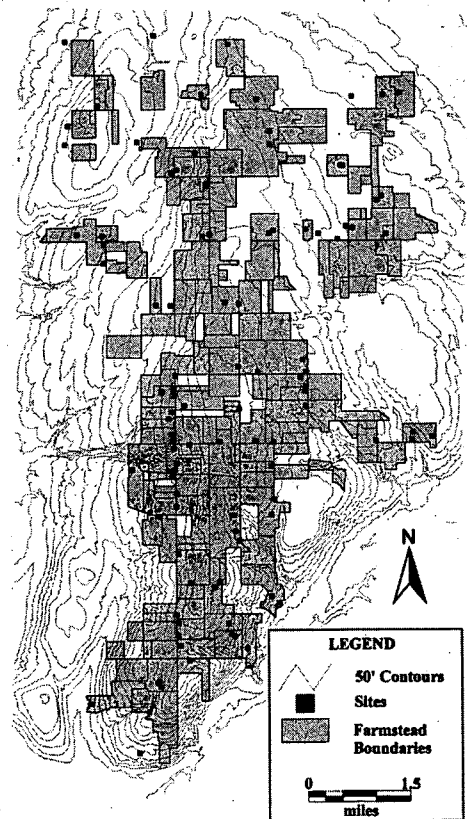
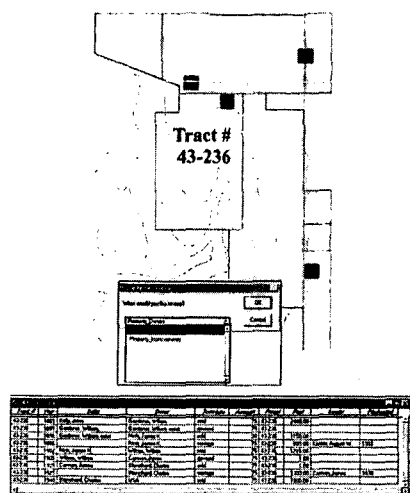
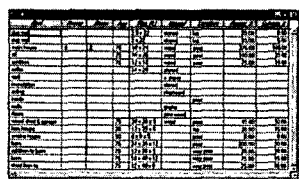


Figure 2. The historic farmstead theme allows for property ownership data and the spatial configuration of individual farmsteads to be directly integrated with other classes of information in the database. Including this information in the database allows for immediate access to a wealth of historical data for future cultural resource management and research efforts in the National Forest.



a. property ownership table



b. property improvements table

Figure 3. Additional data sets were hot-linked to each of the farmstead boundaries in the GIS. A record of the a) ownership history of each farmstead, and b) a description of the appraised improvements on the property, are readily accessible in the database.

were derived from appraisal reports generated by the USDA between 1935 and 1941. The appraisals detail the kinds of improvements on the property (e.g. dug well, house, ell, barns, and sheds), the approximate age of the structures, the dimensions of the structure, the material of construction, the relative condition (e.g. poor, fair, or good), the assessed value at the time of government purchase of the structures, and the salvage value of the materials for each structure after demolition. Additionally, some of the appraisals contain descriptions of the main dwelling, including the number of stories, number of rooms, cellar size and construction material, and details regarding the roofing, siding, foundation, floors, and interior of the structure. These appraisals were included in the database to assist in identifying the types, ages, and func-

tions of architectural features located on archaeological sites within the Forest.

Modeling Changes in Land Ownership and Value

In addition to the management of archival data described above, GIS was used to investigate changes in land ownership and value from a sample of farmsteads within the National Forest (Heaton 1998). The historic records from the 51 properties in the Burnt Hill Study Area were selected to explore the interpretive potential of this kind of data in GIS. As a result of the variability in the archival records for each property, only 41 of these properties had a sufficient amount of data available for inclusion in this analysis.

Information from the abstracted title chains provided the ownership histories of these 41 farmsteads from the time of government purchase (ca. 1935–1941) back to the early- or middle-19th century. These ownership histories established a basis for the examination of tax assessment records for the Town of Hector. The tax assessment records contain information concerning the ownership, acreage, and assessed value of these properties. Data was collected from tax assessments to cover a 60-year period: from the earliest assessment located (Town of Hector 1870), and for each decade year up to 1930 (Town of Hector 1880, 1890, 1900, 1910, 1920, 1930). Additional data were collected for each property for the specific year (between 1935 and 1941) in which it was purchased by the government; these data were listed in a table titled “ca. 1940.” Because 1870 was the earliest year for which this data was available, the analysis presented in this article is limited to the later periods (1870–1940) of occupation for these farms. Although the data does not address the earlier periods of occupation, it has allowed for a rich understanding of land ownership during the economic decline and abandonment of the area.

Each property within the study area was sought in these tax assessments by identifying the name of the owner (derived from the abstracted title chain), then locating an entry for the appropriate number of acres within the appropriate Military Tract Compartment. When these parcels were successfully located

in the tax records, the assessed value of real and personal estate, the tax paid on that parcel, and all other land holdings of that owner were recorded. The results of these searches were then put into an Excel spreadsheet. A spreadsheet was created for each year that tax assessment data was recorded. These spreadsheets contain the name of the recorded taxpayer for each property, the assessed acreage of the property, and the assessed value of both real and personal estate for each parcel. In many cases, the individuals who owned property in the study area were found to have additional holdings outside the boundaries of the sample area, in which case their total holdings and the assessed value of those holdings were included in the spreadsheet. These additional holdings were included in the analysis to provide a complete picture of how land ownership functioned within the economic strategies of these farmers.

Eight more themes were then constructed for the database. Each theme represents an approximation of the property boundaries of the farmsteads contained within the Burnt Hill Study Area as they were sub-divided, consolidated, and re-shaped from 1870 to 1940. Working backward through time from the original theme based on 1930s survey maps, the CAD drawing for each decade year was modified according to the verbal descriptions of property transfers, divisions, and consolidations found in the abstracted title chains. In cases where the written descriptions of these transfers were vague or obscure, historic maps of the area were consulted to locate the various property owners in the years for which maps were available. This serves to emphasize the integrative nature of GIS, for the historic maps included in the GIS database by other members of the project were integral for the successful completion of this portion of the project. The modified CAD drawings of the properties for each of the eight decades were then added to the GIS as new themes (FIG. 4). The Excel spreadsheets containing the information from tax assessments were incorporated into the GIS and linked to the corresponding themes.

The construction of these eight additional themes resulted in a large and complicated body of data. Each theme displays the approximated configuration of historic property

boundaries within the Burnt Hill Study Area for the years 1870, 1880, 1890, 1900, 1910, 1920, 1930, and ca. 1940. Because information from the property tax records was linked to each of these themes, the individual themes provide a record for both the size and assessed value of each property for a given year. When all eight themes are examined in sequence, they serve as a graphically compelling and data rich history of land ownership, value, and transfer patterns for the Burnt Hill Study Area in the late-19th and early-20th centuries.

Land Ownership on Burnt Hill, 1870-1930

In the second half of the 19th century, farmers in New York State worked to produce a profit-earning surplus from their farms (Ellis et al. 1967: 271; McMurtry 1988; Parkerson 1995). The establishment of transportation networks allowed rural areas access to distant markets, providing the opportunity to sell surplus products and to import commodities from other places. During the mid-19th century rural farmers became more interested in obtaining cheaply manufactured consumer goods, and embraced the possibility for a higher standard of living and a more "comfortable" lifestyle (Parkerson 1995: 7-12). An important result of this new consumer culture was an intensification of agricultural production intended to create a surplus profit with which manufactured commodities could be obtained. The autonomy and self-sufficiency of the former frontier farmsteads were significantly compromised (Chudyk-Carlson 1974: 67), as the production of necessities within the household gave way to the purchase of their manufactured equivalents.

Farming practices were significantly altered to meet the demands of participating in a market economy. The publication and popularity of agricultural journals such as *Cultivator*, *American Agriculturalist*, and *Moore's Rural New Yorker* began in the 1830s and became steadily more widespread after the middle of the century. These journals advocated "rational" and "scientific" farming practices, and their advertisements introduced many rural New Yorkers to the benefits of new and more efficient machines and agricultural

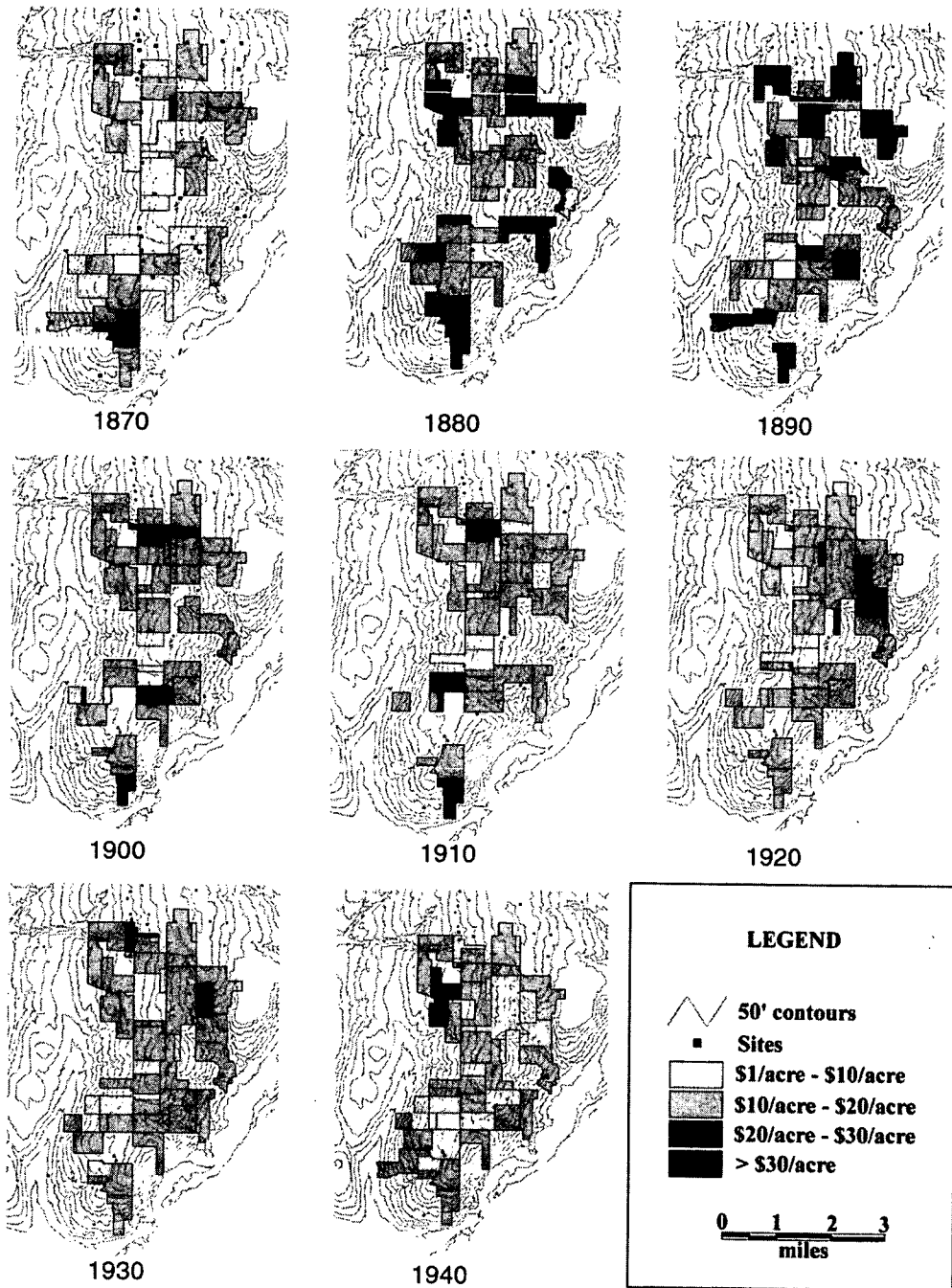


Figure 4. These GIS themes depict the changes in configuration, acreage, and assessed value of farmsteads on Burnt Hill from 1870 until their abandonment. Modeling these changes in GIS allowed for a number of interesting trends in land ownership to be identified.

technologies (Ellis et al. 1967: 275–276; McMurry 1988: 5–7; Parkerson 1995: 16–17). The promise of these new technologies further encouraged farmers to generate the capital necessary to acquire them. However, new machines intended to plow, plant, and harvest crops were designed for use on flat, open farms. These inventions were ill suited for use on sloped and uneven ground like the farms of Burnt Hill (Chudyk-Carlson 1974: 72–73).

At the same time that these revolutions in agricultural technology and practice were being promoted, the highland regions of south-central New York State began to experience a serious economic collapse. One result of this instability in the local economy was a massive emigration from the area. The population figures for the whole town of Hector (see Heaton, "Settlement History," this volume, FIG. 3) reveal that many people were leaving their farms in the late-19th century and looking for better opportunities elsewhere. Some of these people went west in search of more profitable farmland, while others went to the cities looking for higher wages and a more dynamic lifestyle (Crane and Perry. 1977: 14; Ellis et al. 1967: 278; Parkerson 1995). The farmers that remained continued attempting to produce a profit from their hillside farms. Many would buy the abandoned lands of their emigrating neighbors (Chudyk-Carlson 1974: 84–85; Ellis et al. 1967: 487), hoping for greater yields from larger farms.

Those farmers in our study area who remained on Burnt Hill in the late-19th and early-20th centuries needed to develop alternative strategies for financial success. Many of the poorer farmers sought part-time employment off their farms and slowly abandoned farming. Because many of the younger generation were moving off their families' farms, the older generation had no heirs whom could continue working their land. Frequently these farmers "sold out to the sons of neighbors or farmers on poorer land" (Ellis et al. 1967: 487). The historic records examined in this project reflect the behavior of individuals who opted for the last of these options. Although some new arrivals appear in the title chain abstracts,

the vast majority of land transfers resulted from the purchase of emigrating farmers' lands by their remaining neighbors.

The acquisition and cultivation of more land may have appeared to be a viable strategy for dealing with the economic and demographic collapse of the region. The financial hardships with which these farmers must have been contending can be seen by examining the value of farmland in the study area between 1870 and 1930. In Figure 5 the average value of farms within the Burnt Hill Study Area are compared to the average value of farms in New York State as a whole for the same years. There are some immediately striking differences apparent between the trends from the study area and the rest of the state. In 1870, the average value of the farms whose records were examined was \$15.38/acre, while the average value of farms for the state as a whole was \$53.69/acre. That the land on Burnt Hill was valued at less than 1/3 that of the average piece of farmland in the state provides the clearest indication that these farmers faced troubled times indeed.

Farm values for the whole state went into a period of decline between 1870 and 1900. This decline may represent the effects of western competition, mechanization, and specialization in farming practices on all the farmers in New York (cf. Ellis et al. 1967: 485–488). However, land values for the whole state recovered, and show a marked and steady increase from 1900 to 1930. The values of farms in the study area show the reverse trend. Farm values show a slight increase from 1870 to 1890 (up to \$26.05/acre), and then enter into a steady decline from 1890 to 1930, when values drop to a low of \$13.84/acre. Not only were farm values well below the state average for the whole period, but after 1890 these farmers were holding onto, buying, or selling parcels of farmland which were steadily declining in value.

The possible effects of these depressed land values can be seen in an examination of the average size of land holdings for each farmer, obtained from the tax assessment rolls from the study area. Figure 6 portrays the average size of farms in the study area compared to the average size of farms in the whole state. In the figures from New York as a whole,

Average Farm Values, 1870-1930

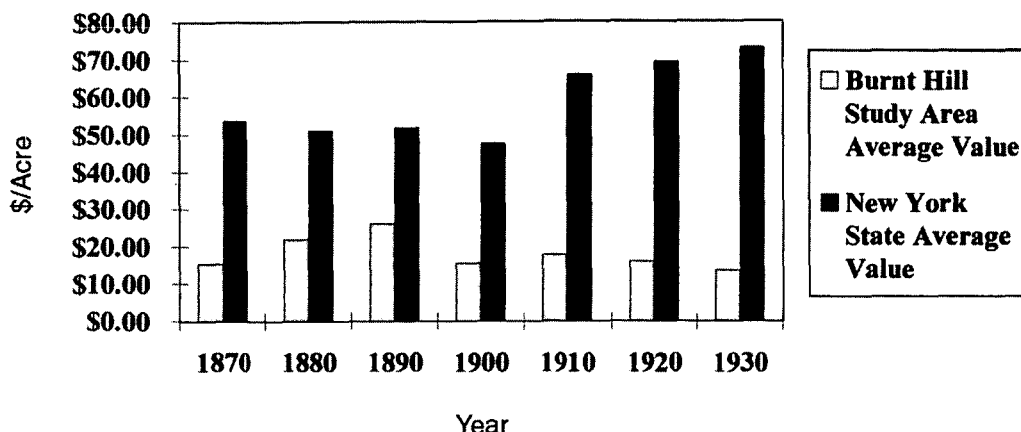


Figure 5. A comparison of land values from farms in the Burnt Hill Study Area and farms in the rest of New York indicates the poor quality of Burnt Hill farmers' land.

the average size of farms decreased slightly between 1870 and 1890, from 103 acres to 97 acres. After 1890, the average size of farms steadily increased from 97 acres to 112 acres in 1930. The average size of land holdings for the Burnt Hill farmers fluctuated much more dramatically and erratically between 1870 and 1930.

Following a slight decrease between 1870 and 1880, the average size of farms in the study area increased to 108 acres in 1890, and then dropped to 86 acres in 1900. After the turn of the century the holdings of farmers steadily increased until 1930, when the average amount of property was 123 acres. A comparison of the trends in average value of farms (FIG. 5) and average size of farms (FIG. 6) on Burnt Hill reveals some interesting trends which illuminate the economic strategies used by these farmers to endure their financial troubles.

The increase in farm values in the study area during the period up to 1890 may explain the sudden increase in farm sizes in 1890. The loss of population from the region in the 1880s and 1890s resulted in the availability of farmland as emigrating individuals sought to sell off their lands to their neighbors. A local increase in the value of farmland may have prompted some optimism on the part of the remaining farmers, who bought up the available land of their emigrating neighbors. This land speculation may be best represented by

Kelly Smith, whose holdings in 1890 were omitted from consideration in Figure 6 because they drastically skewed and misrepresented the average acreage for the study area. The tax assessments for 1880 reveal that Smith owned only a 50-acre plot in Hector, Tract #34-56a in the study area. In 1890 Smith paid taxes on an additional 609 acres outside the study area, while in 1900 he again owned only the 50-acre parcel. Though Smith's land holdings are not representative of the study area as a whole, they suggest that land speculation was both a possible and utilized strategy. It is reasonable to assume that many of these farmers intended to increase their production and profits by cultivating more land and selling the resultant larger yield (Ellis et al. 1967: 487). That these hopes of increased production were in vain is suggested by the beginning of a decline in farm values after 1890.

The falling average size of farms in the 1890s indicates that larger holdings were being split up into smaller parcels. A number of new landowners began buying smaller parcels attempting to establish their own farming base. In fact, the number of small landholders (owning 75 acres or less) increased in the study area from 6 individuals in 1890, to 18 in 1900. Despite falling land values, a significant number of local individuals continued investing in cheap real estate, probably hoping

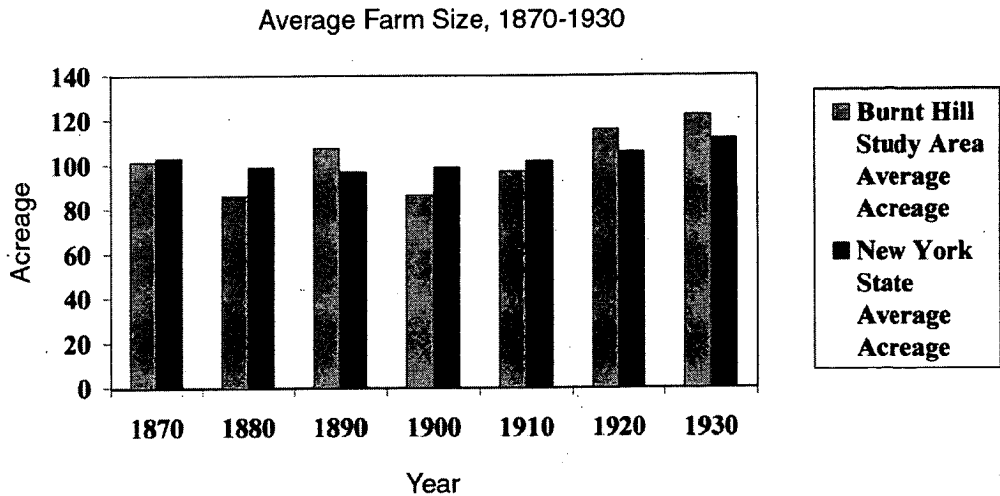


Figure 6. The average acreage of farms on Burnt Hill fluctuated in the late-19th century and steadily increased through the early-20th century.

to turn a quick profit. These new landholders contributed to a renewed cycle of acquisition. After 1900, the average size of farms in the study area steadily increased, even as land values continued to fall. Continued loss of population, an increasingly depressed local economy, and the erosion and progressive depletion of soils on Burnt Hill (Chudyk-Carlson 1974: 73) account for the steady drop in farmland value through the turn of the century.

Just as the average size of farms was fluctuating in the study area between 1870 and 1930, so were the recorded occurrences of property transactions in the abstracted title chains. The relative occurrences of property transactions for these properties are displayed in Figure 7. The Total Transactions reflected in this graph refer to the aggregate of warranty deed transfers, quit claims, and inheritances recorded in the title chains. This bar represents the relative quantity of land exchange activities that occurred during each decade. The town of Hector was not incorporated into Schuyler County until 1854, so the amount of activity displayed in the graph before the 1850s is likely due to loss of records before and during the reorganization of local government.

The dramatic changes in average farm size between 1870 and 1900 are precipitated by the amount of land transfer activity displayed in Figure 7. The high frequency of transactions in

the 1870s and 1880s resulted in the greatly increased size of farms in 1890. Although the number of transactions decreased in the 1890s, there was still sufficient activity to result in the subdivision of properties, increase in small landowners, and drop in average farm size by 1900. After 1900, the average farm size steadily increases. This trend is matched by the total transactions displayed in Figure 7 from 1900-1919. There was a marked increase in activity during these two decades, reflecting the acquisition of more land by Burnt Hill farmers attempting to increase production. There were significantly fewer transactions taking place during the 1920s and 1930s, and more stability in average farm size between 1920 and 1930.

While an examination of the relative frequencies of all transactions between these decades is revealing, looking at a few specific types of recorded land transactions provides additional insight into the local economy. Langhorne and Babits (1988) have demonstrated that recorded land transactions can be used to study the relationship between kinship and land transfer. In the study area the inheritance of land was a significant factor in land transfer and acquisition from 1870 to 1939. It is unclear whether the records up to the 1870s genuinely reflect the frequency of land being devised to relatives in the wills of deceased

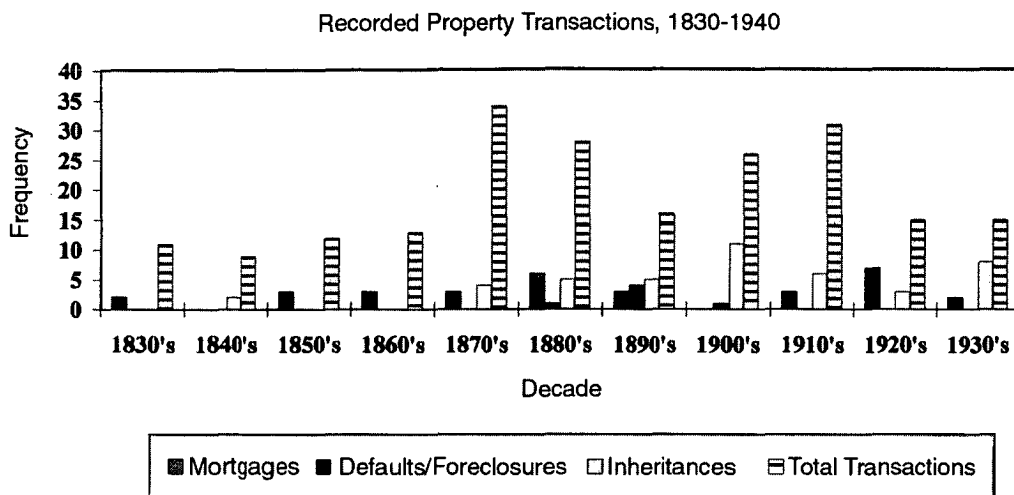


Figure 7. The frequency of recorded land transactions is highly variable between decades; the greater frequency of land transfer around the turn of the century reflects the instability in the local economy and population.

farmers, or whether the records of these actions never existed or have been lost. That inheritances were a significant factor in the total land transactions for all decades between 1870 and 1939 suggests that kinship played an important role in the distribution and acquisition of land in this area. Of the 16 recorded inheritances between 1890 and 1909, only 5—about 1/3 of the sample—were immediately followed (within 5 years) by a re-sale of the land to outside buyers by the inheritors. This suggests that as many as 2/3 of the late-19th-century farmers' families remained on their parents' lands. An additional possibility is that there were few interested potential buyers for the properties in question.

Mortgages also appear to have been an important factor in land acquisition from as early as the 1850s. The high frequency of mortgages entered into in the 1880s corresponds to the peak of total land transaction activity in that decade. This high frequency of mortgages serves to reinforce two of the possibilities emphasized throughout this article. First, the need to enter into a mortgage in the purchase of property indicates that sufficient excess capital was not available in this area for the regular outright purchase of property. Second, the acquisition of land was sufficiently regarded to be a means of creating a profit that long-term

debt was considered to be a worthwhile risk. Another peak in the mortgage records occurred in the 1920s. Even in this late period, when property values had been steadily decreasing for 30 years, many of these farmers opted to go into debt on their farms rather than abandon farming and seek opportunities elsewhere. Whether this expresses true optimism on the part of these individuals, conservatism for their farming way of life, loyalty to the homes of their families, or a gross error in judgment cannot be determined from the title abstracts and must remain the subject of speculation.

The financial hardships of the turn of the century are further reinforced by the appearance of defaulted mortgages and foreclosures on those mortgages between 1880 and 1909. Although not a widespread phenomenon, the greatest number of defaulted mortgages (a total of four occurrences) took place in the 1890s. This decade seems to have been a critical period in the local economy's decline. In the 1890s we see the value of property enter into a decline from which it never recovered. The average size of farms in the study sample decreased dramatically, even as the average size of farms in the rest of the State began to increase. There were dramatic fluctuations in the occurrences of recorded land transactions,

and a peak in the number of mortgages being foreclosed. All of this suggests increasing instability in the local agricultural economy.

Despite this instability, many farmers on Burnt Hill continued to invest in their agricultural livelihood. Perhaps land ownership was seen as a potential source of stability in a period of an otherwise uncertain economic future. The increasing frequency of property transactions in the early-20th century, and a steady growth in farm sizes, despite a consistent decline in their assessed value, reinforces this notion of the importance of land ownership to these individuals.

Examples of Property Accumulation

The general trends in property ownership identified in the previous section suggest that the accumulation of land was a strategy used by turn of the century farmers on Burnt Hill to cope with times of economic hardship. While an examination of the averaged figures for land value and farm size, and the aggregate of property transactions in a given decade revealed some significant trends, a few specific examples of land transactions and acquisition illustrate how this strategy was executed by certain individuals. The tax assessments indicate that many of these farmers had land holdings outside of the boundaries of the study area, and a portion of the increases in average farm size reflect these "outside" holdings. The following examples were selected because the acquisitions and transfers discussed occurred within the boundaries of the study area, and thus can be illustrated with graphic data from the GIS.

The Auble Farmstead, Tract #44-65

The transaction history of Tract #44-65, a large farmstead located in the northeast corner of Military Tract Compartment 44 and the southeast corner of Military Tract Compartment 34 demonstrates this general process of land acquisition. In the 1920s and 1930s, these lands constituted a single, large farm 296 acres in size. This farm was owned by Arthur C. Auble, who began the process of selling his farm to the federal government under the "Submarginal Land Program" in 1935. Prior to this final transaction, Auble had acquired those 296 acres gradually over a 10-

year period (FIG. 8). As of 1905, this tract of land was made up of three independent holdings.

In 1906 Auble began his real estate accumulation with the purchase of a 96-acre parcel (44-65c FIG. 8) from Stewart Snyder for \$1,250. In 1910 Auble acquired a 114-acre parcel (44-65b) located in Military Tract Compartment #34, separated but up the road from his prior purchase, from Myrtie Smith for \$1,700. Auble added to these considerable holdings again in 1916 with the purchase of the 78-acre parcel (44-65a) which divided his two lots for \$1.00 from John Grant (likely a relative). [Note that the sizes of these three parcels—96, 114, and 78 acres respectively—add up to 288 acres. The discrepancy between this sum of 288 and the 296 acres ascribed to this tract in 1935 by the government reflect differences in the survey measurements from different periods; this problem was frequently encountered in examining the records for these farmsteads]. Significantly, none of these three parcels had been sub-divided or added to during multiple changes in ownership since the first recorded transaction for each parcel in the 1870s. Auble took advantage of the opportunity to purchase these tracts relatively cheaply. These transactions represent Auble's attempts at prosperity through the accumulation and cultivation of larger tracts of land. This claim is further supported by Auble's actions in the mid-1930s.

An agreement with the government for the purchase of Auble's farm was reached in September of 1935. In 1936 the deed to the 73-acre parcel (not shown) immediately south of his farm was transferred to Auble from the

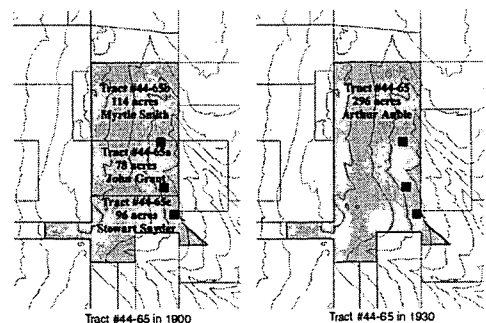


Figure 8. Tract #44-65 was three independent holdings in 1900; by 1930 Arthur Auble had consolidated these holdings into one farm.

County Treasurer for \$47.94. This parcel appears to have been the subject of a defaulted mortgage a few years earlier. Even after agreeing to sell his farm to the federal government, Auble was still intent upon wresting a livelihood from this stubborn landscape. By 1941 the government had successfully obtained all of Auble's holdings, and he was relocated to a "valley farm" nearby (Soil Conservation Service [SCS] 1941).

The Terybery Farmstead, Tract #33-105

The records from Tract #33-105, located in the northwest corner of the study area, also exhibit this pattern of land acquisition. In 1937 this 210-acre farm was sold to the federal government by Mabel Terybery for \$2,174. As with Auble's farm, this 210-acre tract had been gradually accumulated by members of the Terybery family over a 20-year period. In 1879, the first transaction recorded for this parcel, Thomas and Sarah Terybery purchased an irregularly shaped 81 acre plot of land (33-105b in FIG. 9) for \$5,000 from Blaine D. Amos. Seven years later they added to their holdings with the purchase of the 25-acre parcel immediately to the east of their farm (33-105c FIG. 9) from Daniel S. Pangborn for \$550. Two years later Thomas sold off 5 acres of this new acquisition to another neighbor, Daniel Matthews.

In 1907, Peter Terybery (the son of Thomas and Sarah) purchased the 80 acres immediately to the south of his parents' farm (33-105a in FIG. 9) for \$2000 from Herman Slaight. Slaight's farm had remained the same size throughout a series of transactions beginning in 1859. Following Thomas' death, Peter Terybery inherited his father's 130-acre estate resulting in a farm totaling 210 acres. By 1932 Peter had died, and all of his properties were devised to Mabel Terybery. Five years later, Mabel sold this farm to the federal government.

This example differs in some significant ways from that of Arthur Auble. Although property acquisition seems to have been an important goal for both Thomas and Peter Terybery, the final size of the property resulted from an inheritance. Peter's purchase of Tract 33-105a illustrates Ellis et al.'s (1967) contention that the sons of local farmers often purchased the lands of neighbors who had

opted to either emigrate or change professions. Additionally, the Terybery property's history emphasizes the importance of kinship in the redistribution of land.

The Dunham Farmsteads, Tracts #61-102 and #61-265

Two farms located in the southern extent of our study area further illustrate the degree to which kinship was an important factor in the decisions of landowners. These farms, identified as 61-102 and 61-265 in Figure 10, were owned by various members of the Dunham family for 58 and 95 years, respectively. As early as 1818, Thomas Dunham owned property in Hector and sold 350 acres from Military Lot 62 (adjacent to the properties shown) to John Dunham. While the Dunham family does not appear in the records of properties within the Burnt Hill sample until 1846, this earlier transaction was included to establish that the Dunham family has a long history in the area. This history may have contributed to the decision of later descendants to remain in the area and continue attempting to make a livelihood on Burnt Hill.

In 1846 Thomas Dunham's grandson, Sylvester Dunham, purchased the southernmost (61-265b) of the parcels depicted in Figure 10. The prior owner of this property was Alexander Graham, who sold Sylvester

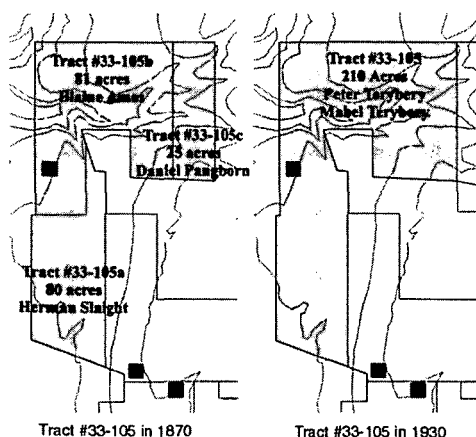


Figure 9. In 1870 Tract #33-105 consisted of three separate parcels; these parcels were consolidated by members of the Terybery family between 1879 and 1907.

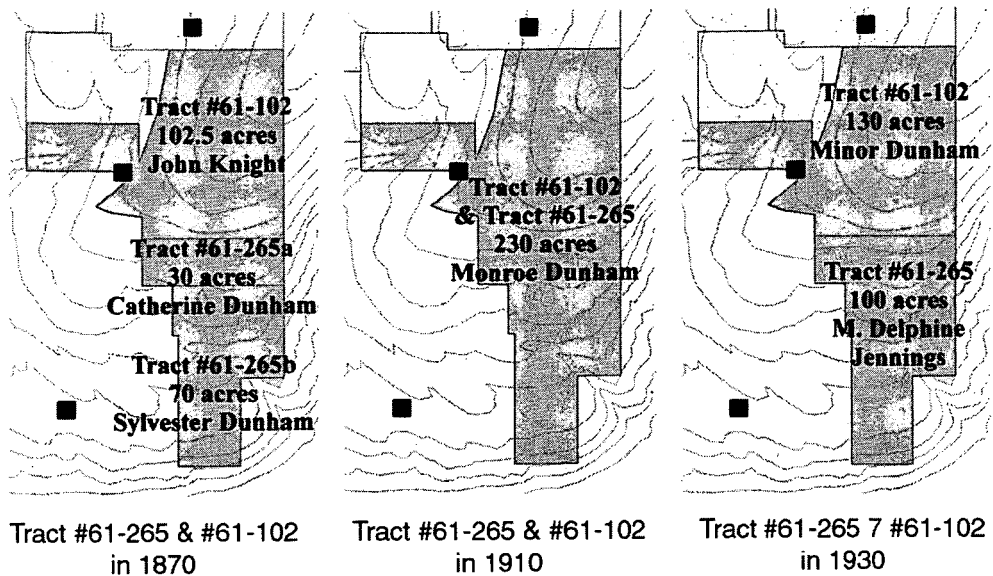


Figure 10. The Dunham family farmstead, Tracts #61-102 and #61-265, between 1870 and 1930.

the 90 acre piece of land for \$900. In 1852 Sylvester sold 20 acres out of this 90-acre plot to William Baldwin. Fifteen years later Sylvester's wife, Catherine Dunham, purchased the 30-acre plot immediately north of her husband's holdings (61-265a) from Jesse McNish for \$1,125. The combined 100-acre farm would retain its shape and size until being purchased by the federal government in 1941.

Sylvester Dunham continued to expand his holdings. In 1879 he purchased the property immediately to the north of his farm (61-102 in FIG. 10), consisting of 102.5 acres (later assessed as 130 acres) from John Knight for \$4,000. Sylvester's second eldest son, Monroe Dunham, and daughter Adelia Dunham then purchased the 130 acres from their father in 1887 for the same price of \$4,000. In 1895 Sylvester Dunham died, leaving Catherine in possession of the original 100 acres (61-265). Three years later, Adelia Dunham Velie (now married) sold her 1/3 interest in the northern property (61-102) to Monroe for \$1.00.

Catherine Dunham died in 1909 leaving Tract 61-265 to her son Monroe, grandson Fred Dunham, and daughter Adelia Velie. Later that year Fred and Adelia sold their interest in the property to Monroe for a combined \$2,100. From 1909 to 1920, Monroe Dunham owned

both of these properties for a combined farm size of 230 acres. In 1916 the Town of Hector executed a mortgage for \$500 to Monroe for the southern property. This may be an indication that larger tracts of land did not guarantee financial success. In 1920 the title to the northern 130-acre property was transferred to Minor M. Dunham and his wife Elsie for the consideration of \$1.00. That same year Minor took out a mortgage on this newly acquired property for \$1,500.

Monroe Dunham sold the southern property (61-265) in 1925 to M. Delphine Jennings, a widow, for \$1.00. Jennings was the maiden name of Minor Dunham's wife Elsie, although the exact relationship between Elsie and M. Delphine Jennings is unclear. This indicates that this set of transactions was being conducted within a group of local and at least loosely related individuals. This extended family's commitment to Burnt Hill could not endure the economic troubles of this region indefinitely. In 1937 Tract 61-102 was sold to the government for \$1,347. By this time, the house on the property was abandoned and the Dunhams had moved to Ohio (SCS 1941). M. Delphine Jennings sold the other property shortly thereafter, and in 1941 was paid \$1,600 for her 100 acres by the government.

These examples are provided to illustrate that the trends discussed in the previous section are only abstracted generalizations of individual choices regarding land ownership. Because the information used to construct these generalizations was primarily concerned with financial matters, an economic perspective was adopted to see trends and interpret meaning from the data. The examples illustrated above suggest that factors which are not strictly economic in nature, such as kinship and the importance of "home," were also significant considerations in these people's decisions.

Land Acquisition as a Coping Strategy

The dramatic loss of population in this region in the late-19th and early-20th century was a sign of the underlying economic problems faced by local residents. The great disparity in land values between farms from the Burnt Hill Study Area and those of New York State (FIG. 5) present a clear picture of how serious these economic problems were. Although the population dropped dramatically in this period, a number of individuals did choose to remain on Burnt Hill until as late as the 1930s. The emigration of neighbors provided an opportunity for the remaining farmers to expand their land holdings. The increasing size of farms after 1900 in the study area (FIG. 6) indicates that many individuals took advantage of this opportunity. The expansion of land holdings seems to have been a common strategy employed by these farmers to bring more land under cultivation, hoping to increase the productivity and profitability of their farming enterprises.

The strategies used and actions taken by these farmers in their attempt to sustain themselves in a failing landscape can be analytically considered as examples of the intensification of production. Morrison offers a general definition of intensification as "an increase in the productive output per unit of land or labor" (1994: 115). The farmers of Burnt Hill faced the demands of participating in a market economy. The extremely low land values assessed for their properties generally indicate that these farms were relatively impoverished and may not have been able to support more intensive agricultural techniques. Land acquisition was a common strategy which these farmers used to increase their productivity. However, this strategy must be seen as one possibility among a host of options. Judging

by the great number of individuals who left the Town of Hector around the turn of the century, a commonly selected option was to abandon their farms and seek opportunity elsewhere.

For those individuals who remained, a number of potential options existed. The application of more efficient technologies is an obvious example. Innovations in farming technology were proving to be quite effective in other parts of New York, and in the nation as a whole (Ellis et al. 1967: 276). The new plows, planters, and reapers were not, however, ideally suited to the steep slopes of Burnt Hill. These farmers apparently opted to invest what little capital they had in land instead of technological improvements.

Another possible form of intensification is an increase in labor. Parkerson (1995) has argued that labor provided by migrant kin and hired help was crucial to successful surplus production for many farmers during the middle of the 19th century in New York. The widespread availability of labor during that period was, however, unavailable to the farmers in our study area in the later-19th and early-20th centuries. The specific examples of real estate transactions within families provided earlier demonstrate that some farmers had a potential labor pool of offspring and relatives locally available. In addition to the transfer of land, it can be assumed that some exchange of labor characterized these individuals' relationships. The depressed economy which serves as the backdrop of this whole analysis suggests that these farmers would not have been able to employ many outside laborers.

The high costs associated with accessing technological improvements and paying for additional labor may have been the critical factors in why increased land acquisition failed as a coping strategy. Cultivating more land requires more efficient practices and technology, or increased amounts of labor, or a combination of both. If these additional investments were not made by these farmers, then it is not surprising that their efforts at intensification failed.

In the rest of New York, farmers after the turn of the century were becoming increasingly specialized (Ellis et al. 1967: 489). The farmers on Burnt Hill instead opted for diver-

sification, which Morrison views as a strategy of "protection against uncertainty" (1994: 137). In the "Appraisal Reports" prepared by the government when purchasing these farms in the 1930s, descriptions of these farms suggest that they were attempting to exploit a variety of resources. The property assessments often indicate the number of acres used for crops, pasture, and timber. Raising livestock and cultivating lumber created alternate sources of income for these farmers, whose crop yields were well below the state averages (Chudyk-Carlson 1974: 84). In addition, the descriptions of permanent improvements in the Appraisal Reports for a few of these farms identify certain structures as hen houses, hog houses, or goat houses. However, the frequency and quality of these descriptions in the appraisal reports is quite varied, so it is difficult to ascertain how widespread these diversification practices were. It is not possible to tell from these records when these diversifying practices began, but they were opted for by some individuals in at least the latter years of their occupation of Burnt Hill.

Ultimately all of these strategies of intensification were in vain. Emigration from places like Hector had begun as early as 1875, but this emigration accelerated around the turn of the century. The loss of population contributed to the stagnation of local economies, a process which was further intensified by the national agricultural depressions of the 1920s and 1930s (Crane and Perry 1976: 15). The Burnt Hill farmers' economic crisis proved intolerable following a torrential rainstorm in July of 1935 (Bonsteel and Patton 1943). This ecological disaster literally washed away the clearcut fields of these farmers, ending any possibility of a continued livelihood on these lands. All of these farms were sold to the Soil Conservation Service between 1935 and 1941. By the time the lands were sold, most of the farms were already abandoned. These transactions finished the pattern of land transfer and accumulation described in this article.

Conclusion

This article has described methods for incorporating data from archival records into a GIS database. The resulting database has pro-

vided the Finger Lakes National Forest with a comprehensive reference of historical data for use in future cultural resources management projects. The GIS project was also used to organize a large body of historic financial data in order to examine economic behavior and responses to poverty in a sample of farmsteads from the National Forest.

The incorporation of title abstracts, tax assessments, property boundaries, and land values from farmsteads on Burnt Hill into a GIS allowed for explicitly cultural variables (e.g., measurements of space, financial and legal transactions, assessments of value) to be the subject of analysis. The process of organizing the data within a GIS format proved to be the essential element in recognizing, exploring, and interpreting patterns which were contained—but not explicit or obvious—in the archival data. While re-drawing the changing property boundaries for the construction of GIS themes, a pattern of farmstead expansion in the late-19th century became apparent. Analysis of the historic data revealed trends in property size, property value, and recorded transactions discussed previously. Illustrative examples from the GIS demonstrate how these general trends were evident in the records from individual properties.

These trends were interpreted according to the relevant context in which they occurred. Property transactions and appraisals of land value are inherently cultural activities. Moreover, they are explicitly financial—or economic—in nature. For the farmers on Burnt Hill, the depopulation of the surrounding region and associated economic collapse allows for their land transactions to be interpreted as reactions to an economic crisis. In this context, the accumulation of land can be seen as a strategy of intensification these individuals used in an attempt to overcome the marginality of their land and consequent poverty.

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