Forest, Field, and Freeway: A Summary of Statistics Describing Landscape, Land Use, and Related Activities in Columbia County, NY. *By C. Vispo, Farmscape Ecology Program, July 2008 draft*

These maps and statistics were put together as a preview of what an atlas might contain. What themes would you like to see expanded? What new themes might interest you? What additional materials, besides maps, would you like to have?

Location & Basic Demographics

Columbia County is located between the Hudson River and the Massachusetts border (Fig. 1). By road, it is approximately two hours north of New York City, three hours west of Boston and about 40 minutes southeast of Albany. It has a current population of around 63,000 and its largest city, located beside the river of the same name, is Hudson with around 7500 residents.

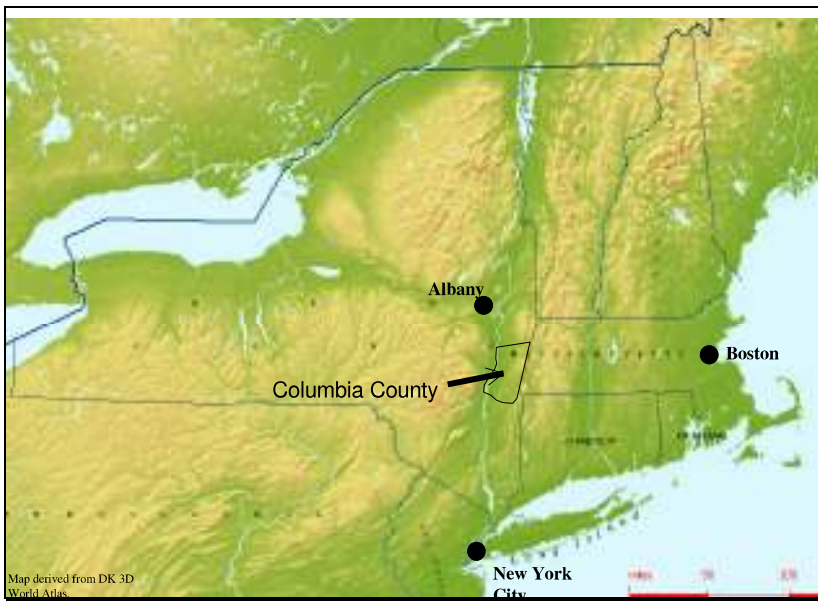


Fig. 1. The general location of Columbia County, NY. Map from DK 3D World Atlas.

Fig. 2. Columbia County townships.

Columbia County is composed of 19 “townships” (Fig. 2), each of which has its own government and planning board. The County population is largely Caucasian, although minority clusters do exist (Fig. 3). The City of Hudson and the surrounding Greenport township have a relatively high minority population, many of whom live in relative poverty. Canaan, in the NE part of the County, may register relatively high minority residence because of the presence of Berkshire Farm for Boys, an educational/correctional facility housing many troubled urban youth. Hispanic populations may work largely with the County’s agricultural and landscaping operations.

Fig. 3. The distribution of the major racial groups in Columbia County. The small, diverse rectangle on the central-western border is the City of Hudson. Data from US 2000 census.

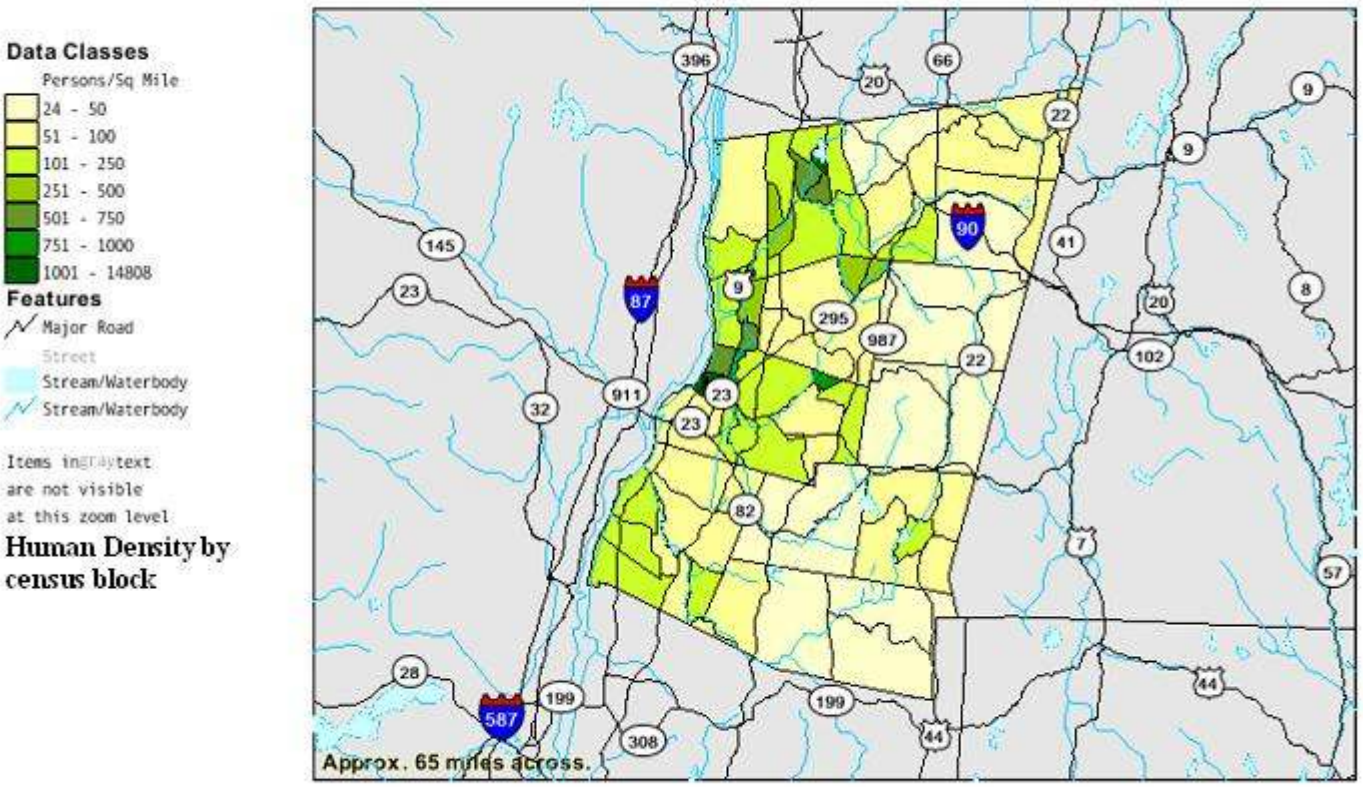


Fig. 4. Human population density in census tracts of Columbia County. Data from US 2000 census.

Overall human density is highest in the western portion of the County, and appears to be focused around the City of Hudson, and sub-division developments north of it (many of which, as shall be explored later, probably house commuters to the Capital District).

Columbia County is linked to adjacent urban regions by road and rail (Fig. 5). Passengers can board Amtrak in Hudson and reach NYC in about 2 hours. Metro North (a NYC commuter rail service) does not quite reach the County, but it is cheaper than Amtrak and some travelers drive to its terminus approximately 15 miles south of the county border. Major north/south routes include the Taconic State Parkway, a four-lane freeway heading due south to the City. Routes 9 and 22 likewise tend due south and are free, however they pass through numerous towns and so tend to be slower than the Parkway; they do, however, permit truck traffic while the Taconic State Parkway does not. Across the Hudson from the County, the I-87 tollway travels south to the City from its junction with I-90 in Albany. The latter is the major east/west route that passes through the County. Boston is a three-hour trip east on this road. Aside from the influence of relative proximity, the strength of the north/south routes probably derives from the historical importance of the Hudson in forging commercial ties and the barrier to east/west travel formerly posed by the Taconic and Berkshire hills.

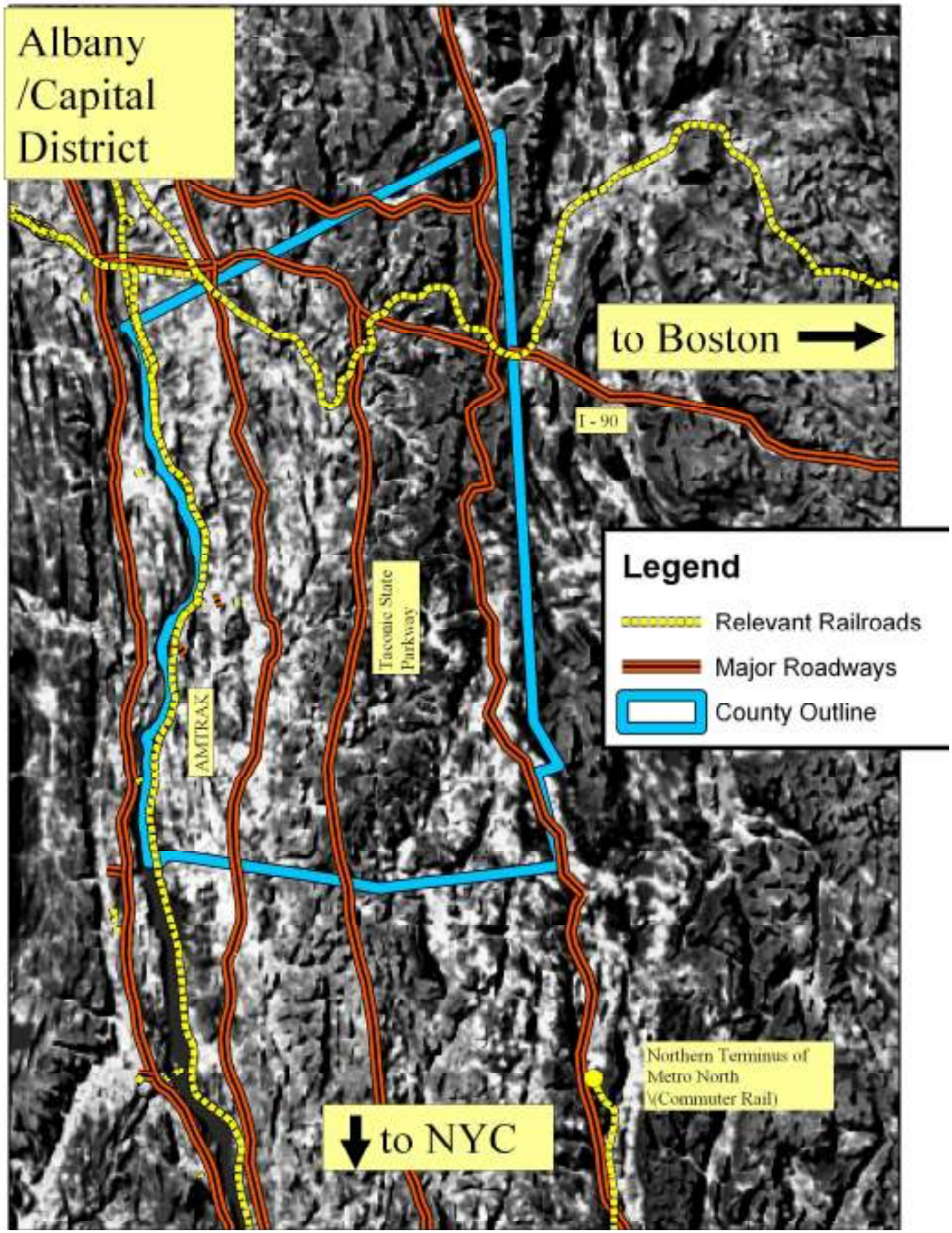


Fig. 5. Major transport routes to the County. Also visible in this image is the rough eastern formed by the Taconic Mountains.

The Bedrock.
While there is minimal use of mineral resources in the County (limestone mining for cement being the most important), geological processes have shaped the modern landscape and that topography continues to exert a large influence over settlement patterns.

As alluded to in our description of transportation routes, Columbia County lies along the western slopes of the Taconics. The County stretches from 2000-foot, thin-soiled peaks of slate and schist along the Massachusetts border west towards deeper soils near the banks of the Hudson River. The Taconics are the toppled remains of higher peaks to the east and, despite frequent popular confusion, are geologically distinct from the neighboring Berkshires. Some 450 million years ago, the Taconics were pushed up and then over by the relentless pressure of drifting land masses which crushed the New England shore in the distant geological past. The map of Columbia County bedrock is thus, essentially, a map of a geological rubble heap (Fig. 6). The entire area was ice-covered during the last glaciation, becoming ice-free by approximately 14,000 year ago. The deeper and generally more tillable soils along the western edge of the County were formed by the remnants of glacial lake Albany which existed for some 5000 years after the glacier's last retreat (for more on Columbia County geology, see Fisher's 2006 Rise and Fall of the Taconic Mountains, Blackdome Press). The uplands tend to be covered with sandy-loamy soils derived from glacial outwash along with gravel banks that continue to be utilized commercially (Fig. 7). The soils of some inland areas do benefit from a calcareous bedrock that enhances soil nutrient availability.

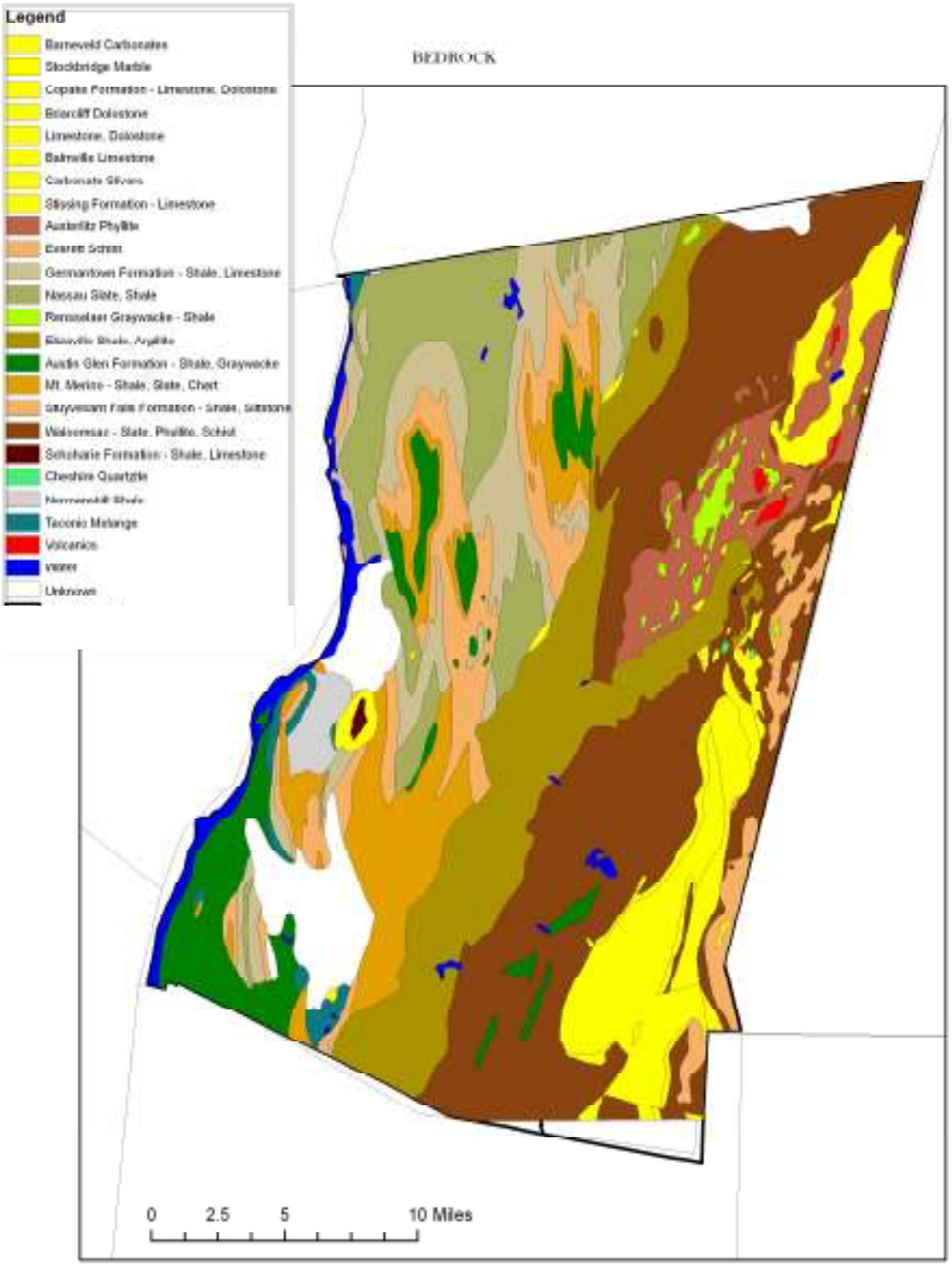


Fig. 6. The bedrock geology of the County. Limestone-bearing formations are emphasized in yellow due to their relative commercial, agricultural, and ecological importance. Data from USGS.

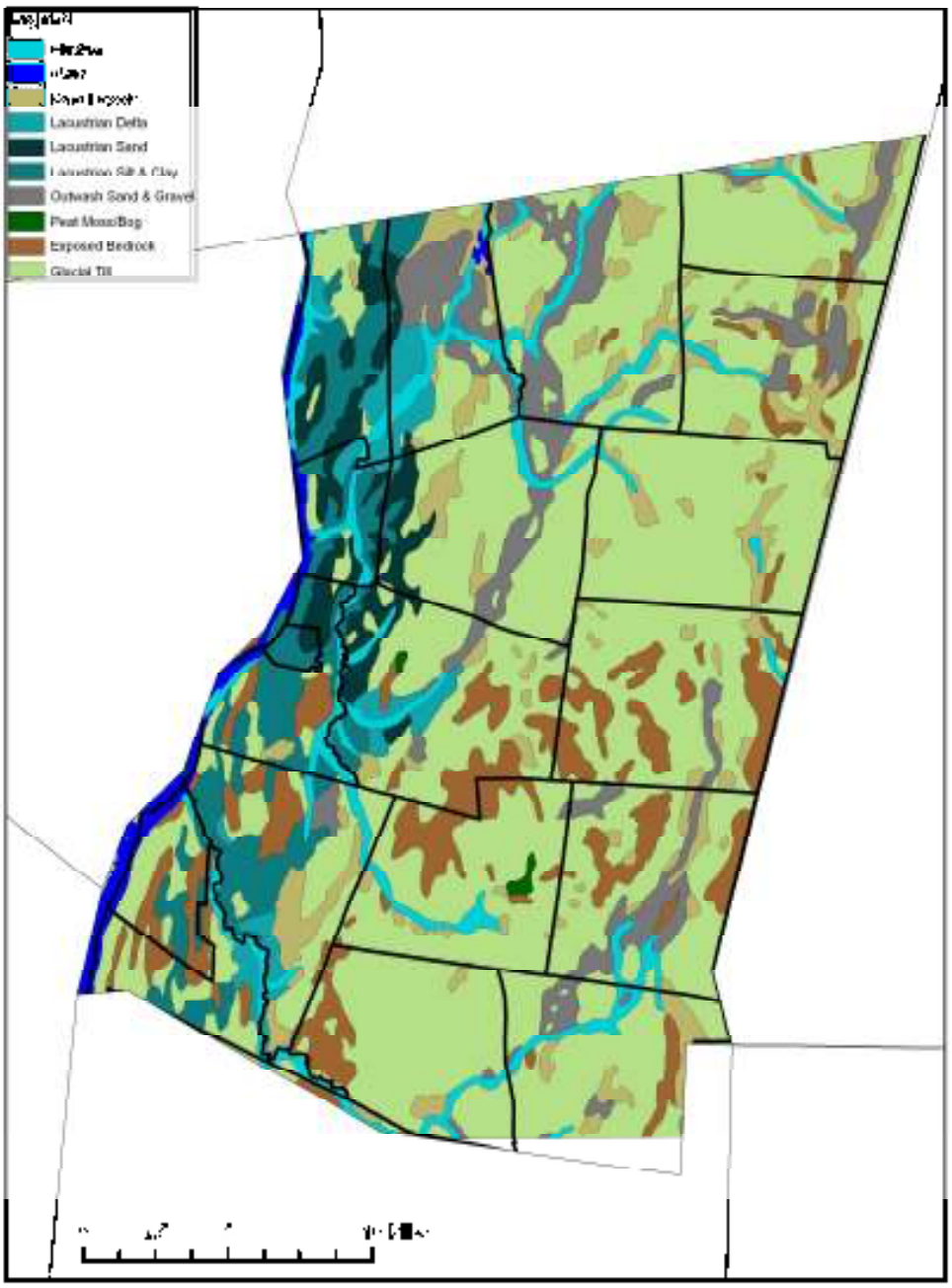


Fig. 7. The surficial geology of Columbia County. The lacustrian soils of the western portion come from the remains of glacial lake Albany. Clays found in this region contributed to historical brick-making. Most of the remainder of the County is covered by glacial deposits. Data from USGS.

The combination of topography and geological history have produced the agricultural landscape of the County. Prime farmland soils (as defined by the USDA) are found mainly on the flatter lands of the Hudson Valley and of the Harlem Valley, which reaches up into the southeastern portion of our area (Fig. 8). The distribution of agriculture has been further patterned by regional climate (fig. 9), with the Hudson Valley, especially in the southern portion of the County, being notably warmer but drier than other areas. Most of the County is within USDA plant hardiness zone 5a, although the SW corner falls within the warmer zone 5b.

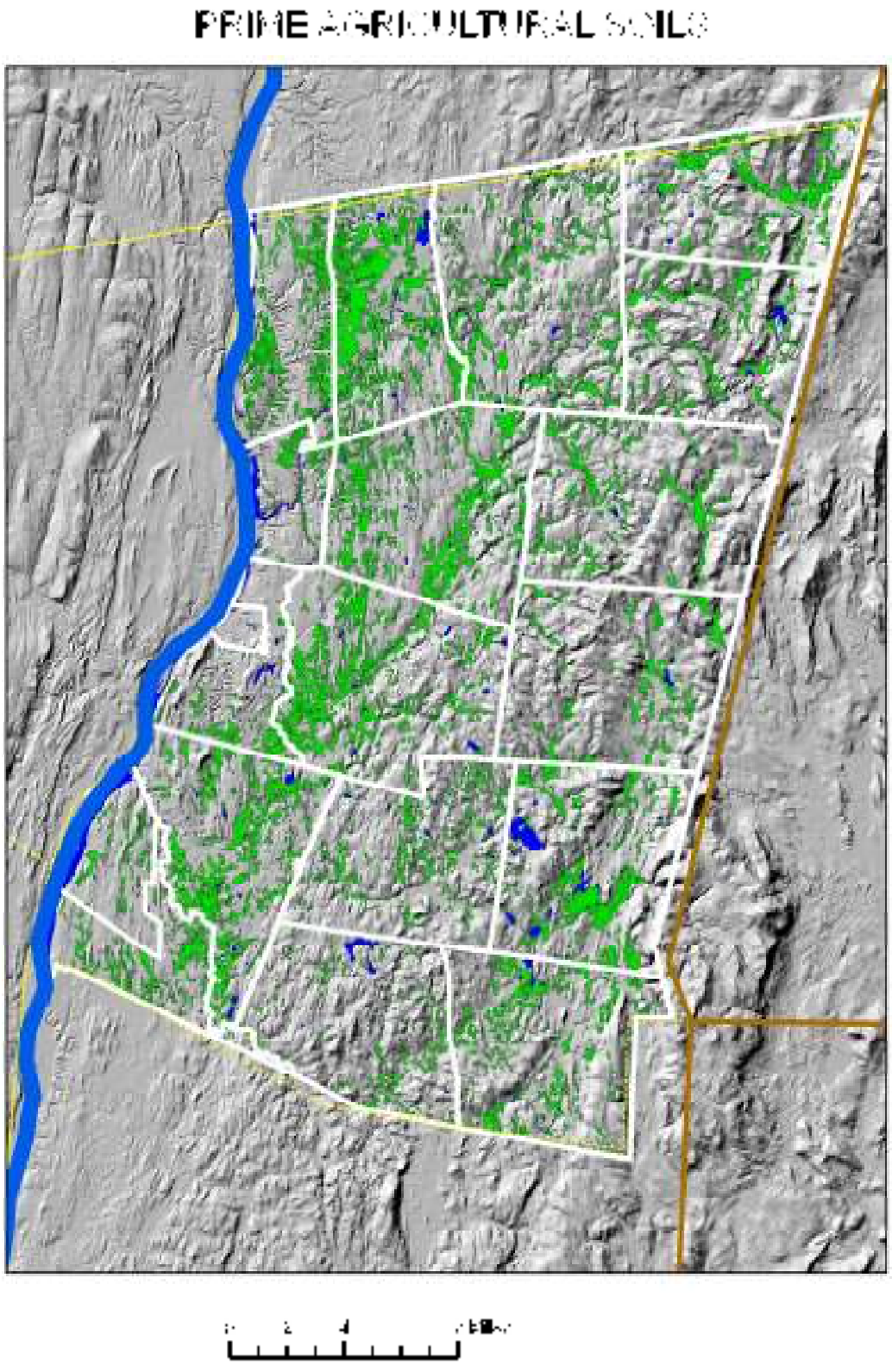


Fig. 8. The location of prime agricultural soils in Columbia County (indicated in green), relative to topography. The best soils are located in the region's valleys. Data from USDA soil surveys.

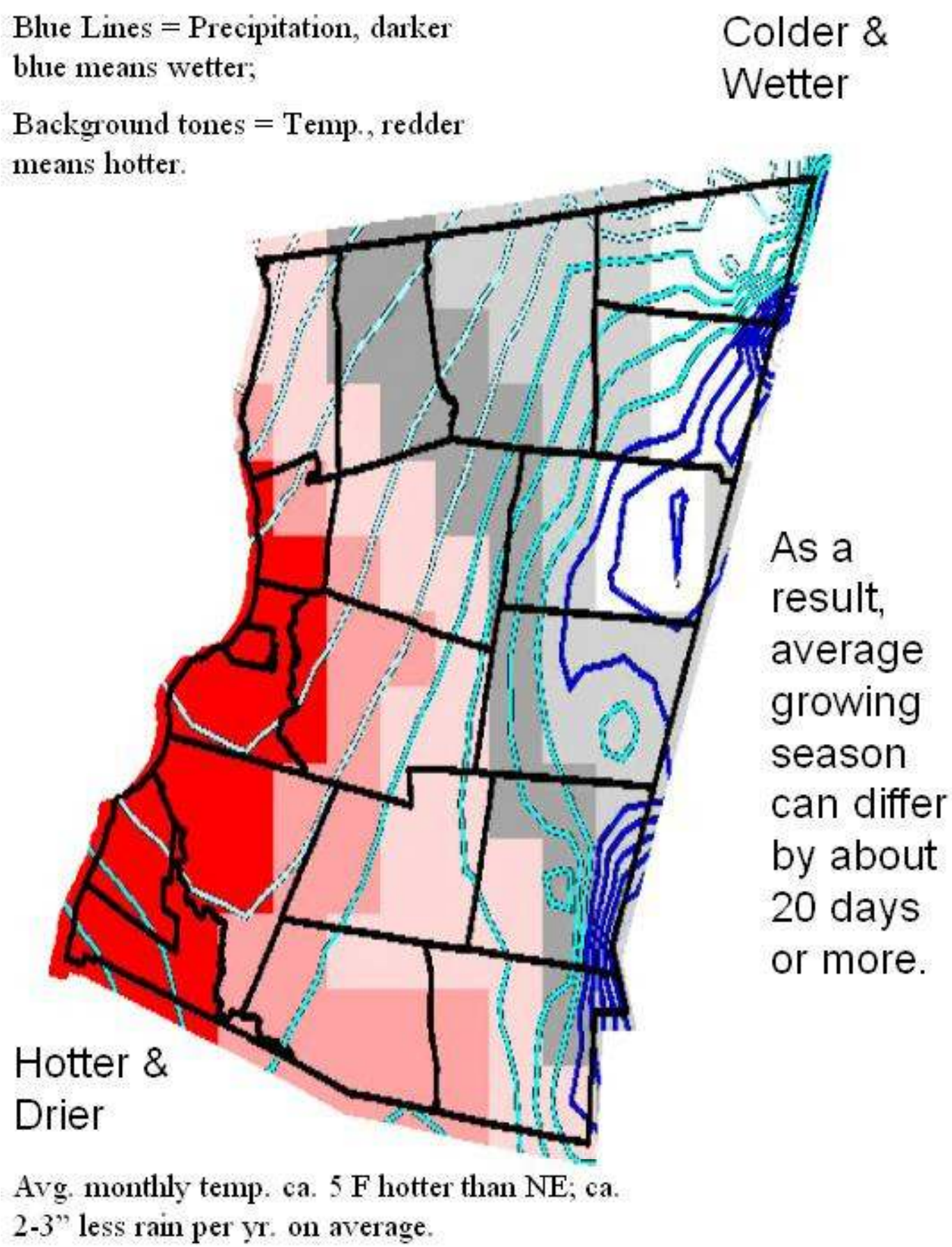
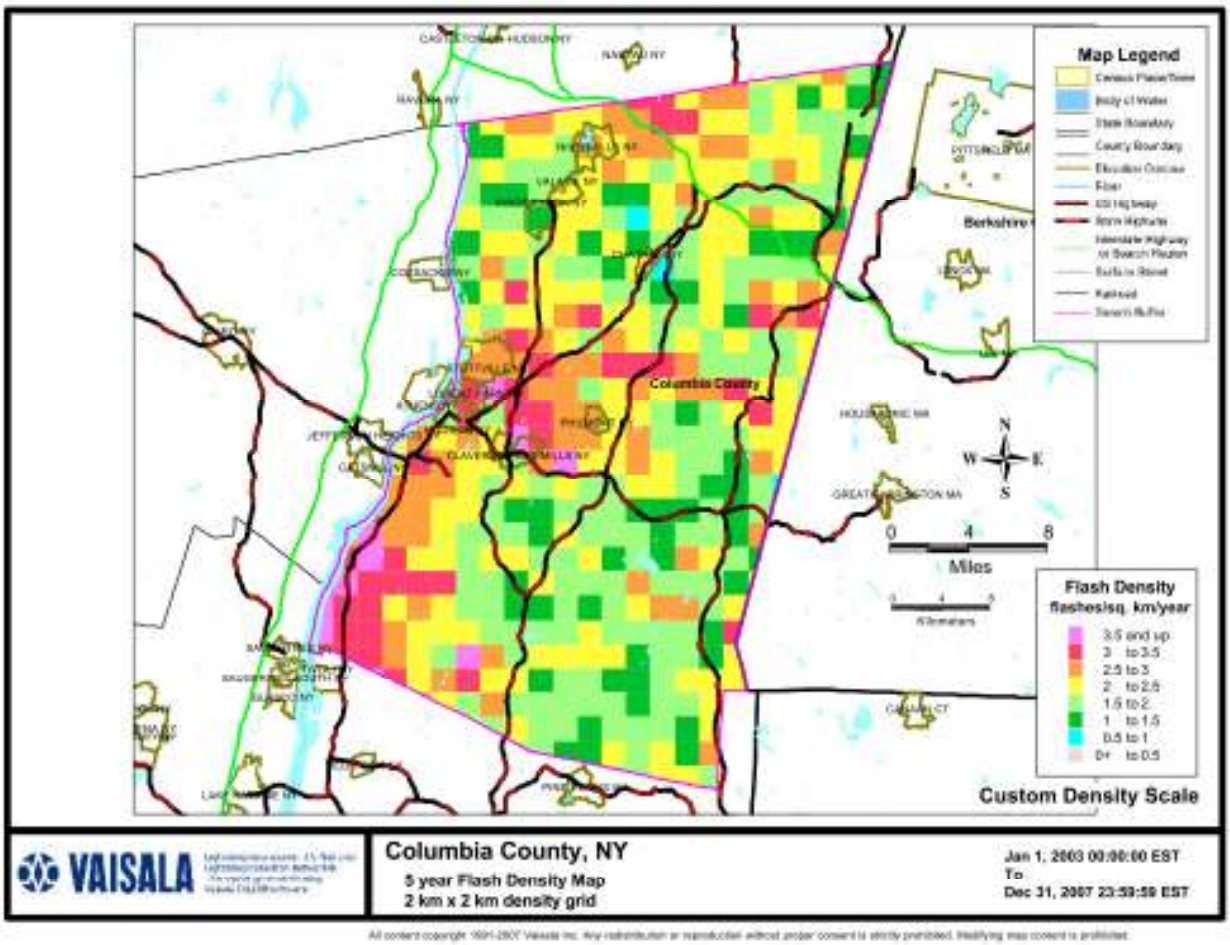


Fig. 9. A summary of climatic variation in Columbia County. The NE corner of the map experiences colder, wetter weather than the SW corner. Differences are large enough to markedly affect growing season.



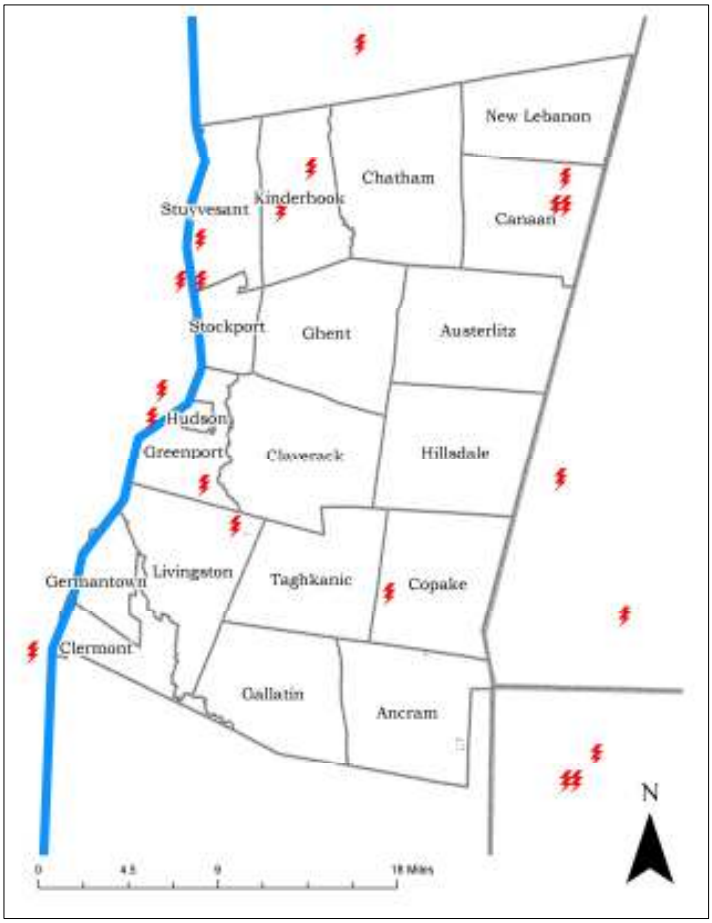


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Fig. 10 (above). A lightning flash density map of Columbia County, courtesy of Vaisala.

Fig. 11. (left) Recorded tornadoes in Columbia County between 1950 and 2004. Tornadoes leave tracks, each symbol represents just one point along what may have been a swath. Data from the National Atlas of the United States.

Another aspect of climate that comes to mind particularly on mid-summer afternoons is thunderstorms and severe weather. Figures 10 and 11 look at two aspects of that – lightning flashes and tornado sightings. Are there patterns here or are these events that are effectively random at the local level? We might centuries of data to know, but then few weather patterns are stable for that long….

Climate and Native Vegetation.
Columbia County experiences a southern New England climate, although some of the ridgetops are more extreme. The forests of this area are variably classified (based upon which botanist you follow) as northern hardwoods, beech-maple forest, eastern hardwood forest or some derivative thereof. The colder, higher regions along the eastern border have vegetation more typical of northern New England. Botanically, we are located on something of a "tension zone", a biogeographical term referring to a region where there is a rapid turnover of species. In our case, the "tension" is between the plants of more northern forests and more southerly ones (Fig. 12). The composition of our fauna, likewise reflects these mixed origins – for example, we are far enough north to retain such species as breeding Juncos and Canada Warblers, but we are also far enough South to get Bog Turtles. In terms of New York State diversity, the County can play an important role supporting populations of southern species because locations south of us tend to be more heavily affected by encroachment from New York City, and hence less ecologically viable.

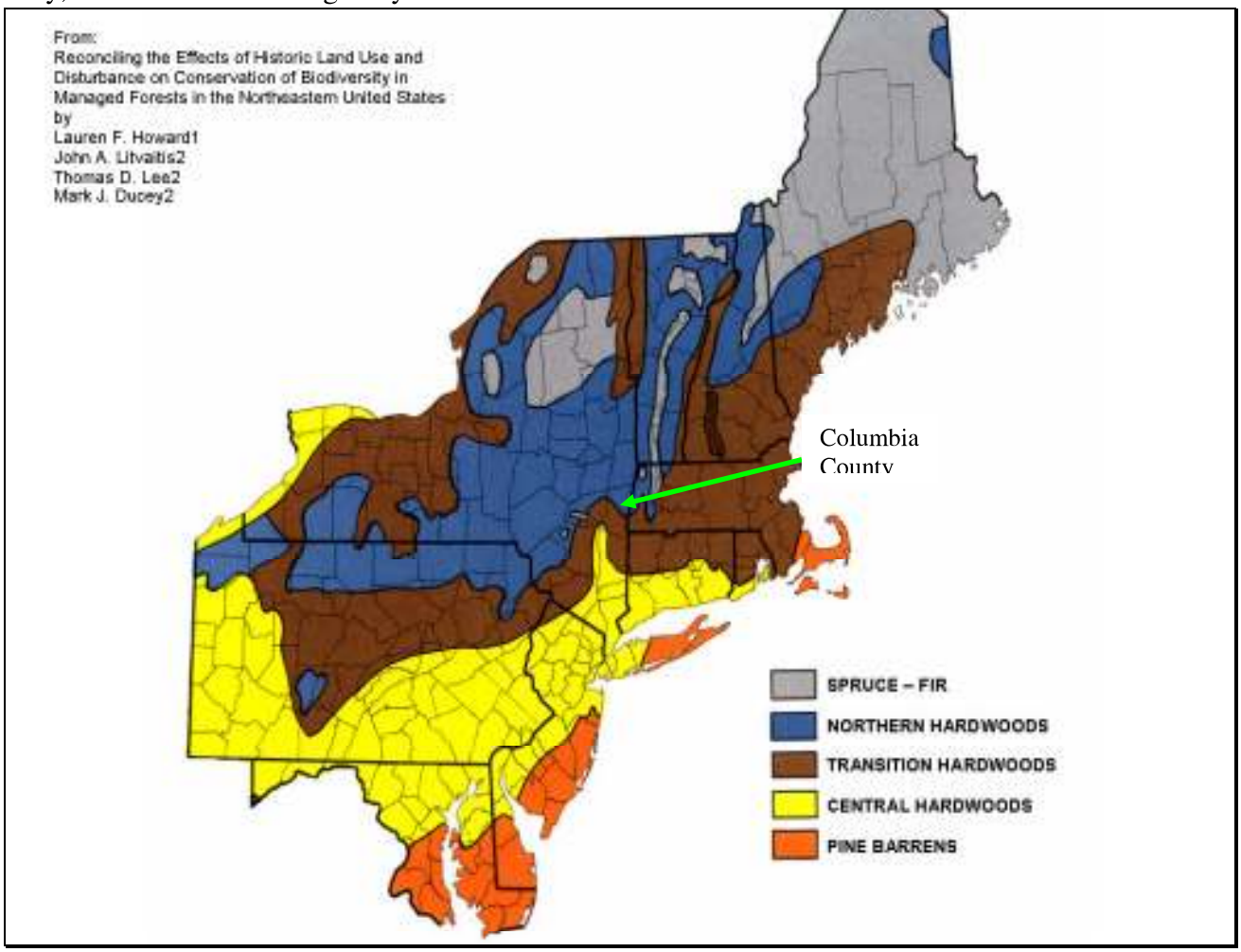


Fig. 12. The forest types of the northeastern US indicating the position of Columbia County along the margin between forest types.

The Landscape & Human Settlement
Our landscape has influenced and continues to influence the distribution of people within the County.

Indigenous activity seemed to be most intense along the banks of the Hudson. However, these villages were likely seasonal with groups retreating to the uplands to hunt during some months. Such hunting, along with fishing and gathering, may have been the main sources of food; corn-based agriculture apparently occurred to at least some extent. At the time of first European contact, the Mohican (or Mahican) tribe of the Algonquin

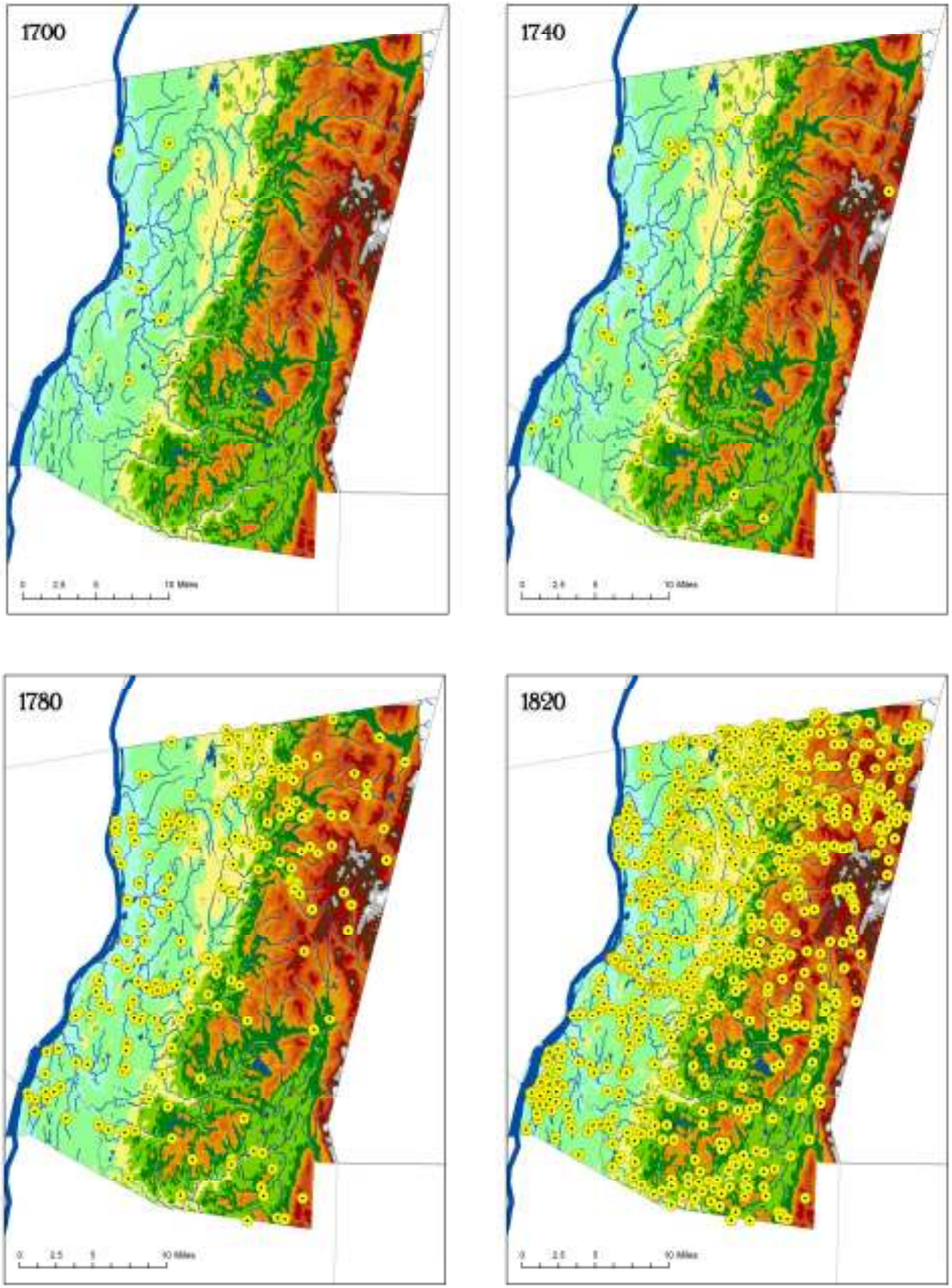


Fig. 13. The spread of European settlement across the County expressed as a sampling of houses existing at various dates (based upon NYS Office of Real Property data on year of house construction). Dutch settlement started along the Hudson and moved up valleys until late in the 18th century when English settlers arrived to the eastern hill towns.

language group lived in the area. An estimated 4000 indigenous people lived in a region outlined by a triangle connecting the southern tip of Lake Champlain, Springfield, MA and Kingston, NY.

Earliest European settlement in the region was mainly from the West as the Dutch spread out from colonies founded along the Hudson River during the early 1600s (Fig. 13). The Dutch established a semi-feudal system, granting large tracts of land to 'lords of the manor' who oversaw rent-paying tenants. Columbia County itself comprised all or part of two manors: Livingston and Renssellaer. Livingston (a Scot who somehow finagled himself dutch 'lord of the manor' status) brought in Palantine Germans to extract tar from pitch pines. While this venture failed, its legacy lives on in the township of Germantown. By the late 1700's, Dutch settlement from the west was being supplemented by settlement from the English colonies to the east as "squatters" took advantage of the legal confusion surrounding the Massachusetts/NY border. Regional population began to increase rapidly after 1750 as indigenous resistance was quashed. The County's population continued to increase through 1850, apparently supported mainly by the expansion of agriculture (Fig. 14). Population subsided as agriculture began to wane, and 1850 levels were not reached again until about 1970.

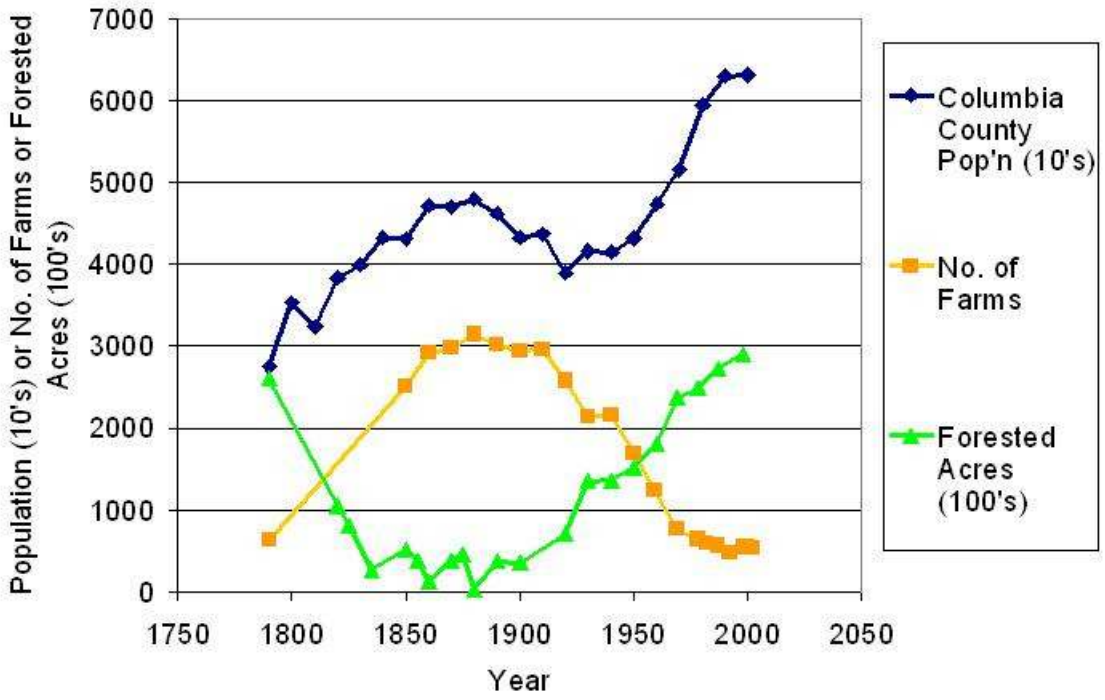


Fig. 14. Population, farm number and estimated forest in Columbia County. Forest has dropped and rebounded dramatically during the past 200 years.

Eighteenth and early 19th century industry (Fig. 15) was powered by the relatively abundant waterways and focused on milling. Although small-scale saw and grist mills abounded, there were also larger paper, cardboard, and linen factories that continued to function well into the 20th century. Iron mining and smelting, stimulated by the presence of limited ore fields, provided some early economic excitement but interest waned in the 1800s. A cement factory near Hudson prospered, and General Electric plants in neighboring counties provided additional employment. As we shall see later, most employment in manufacturing dwindled with the passing of the 20th century. Much of Columbia County's early commerce was (as it continues to be) based upon trade with NYC: the region supplied food, hay, straw and animals for the City's horse power, and, once railroads arrived, also sent fresh dairy products.

Agriculture was initially extensive, with nearly 4000 farms and 90% of the land in farms at its peak in the mid 1800s. Although early settlers tried to raise wheat, conditions seemed ill-suited and rye (largely for straw and paper) became the mainstay of commercial grain production, this joined with a sheep boom prior to 1850 (when there were an estimated 4 sheep for every county inhabitants) and with the budding development of dairy in the latter half of the century. (Figs. 16 & 17). During the 19th century, plowed land was concentrated in the flatlands that were below the Taconics, but above the more clayey soils nearest the Hudson. Hay meadows were more abundant along the riverside, and pasture was most common in the hill towns (Fig. 18).

Corn-based dairy farming coupled with apple orchards planted in the somewhat milder clime along the Hudson became the center point of 20th century agriculture (Fig. 19) and, although their economic importance (and that of all agriculture) has dwindled, they remain the highest grossing agricultural sectors. Modern agriculture has largely deserted the northeastern hill towns, concentrating instead on the same areas favored by 19th century plowed land.

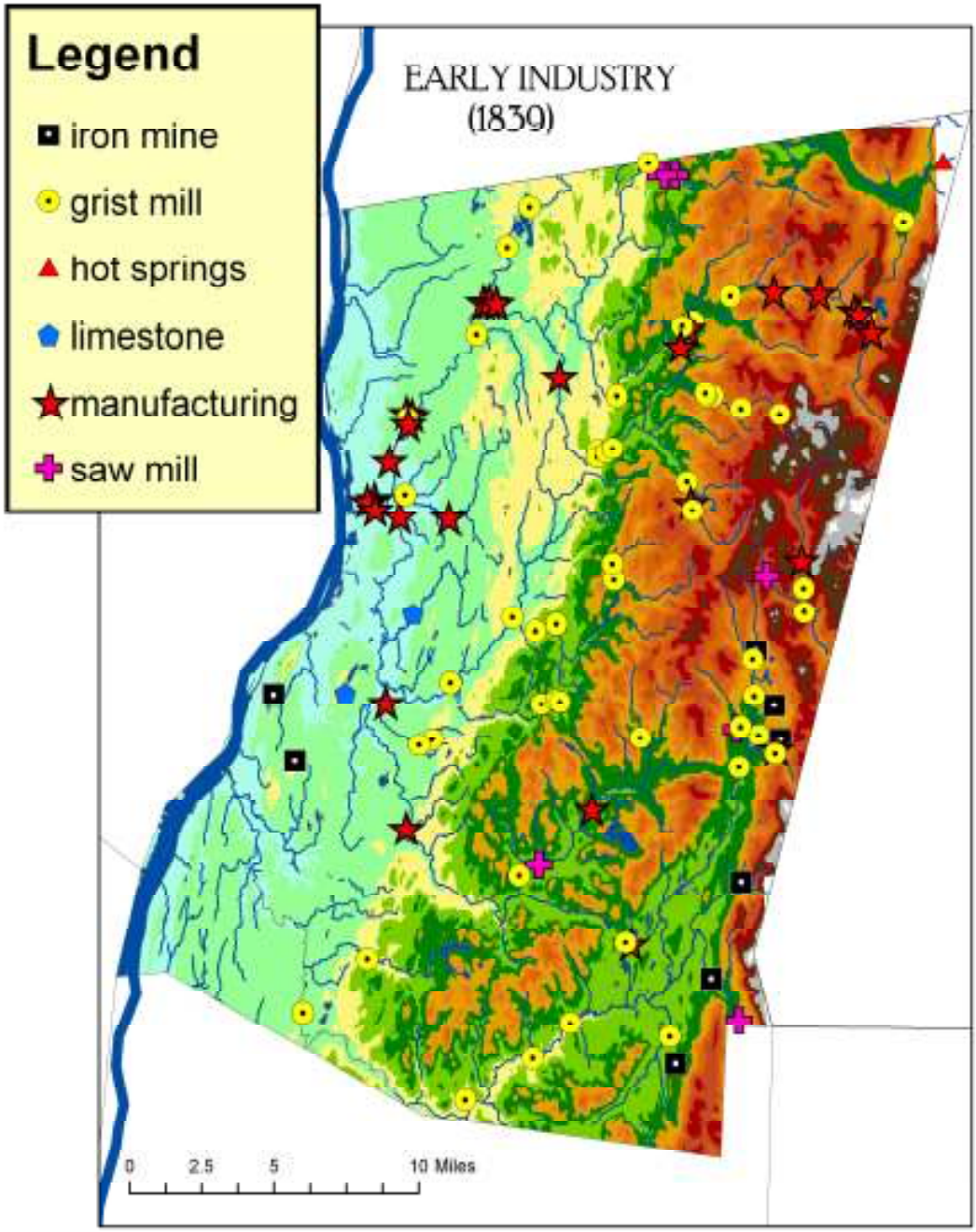
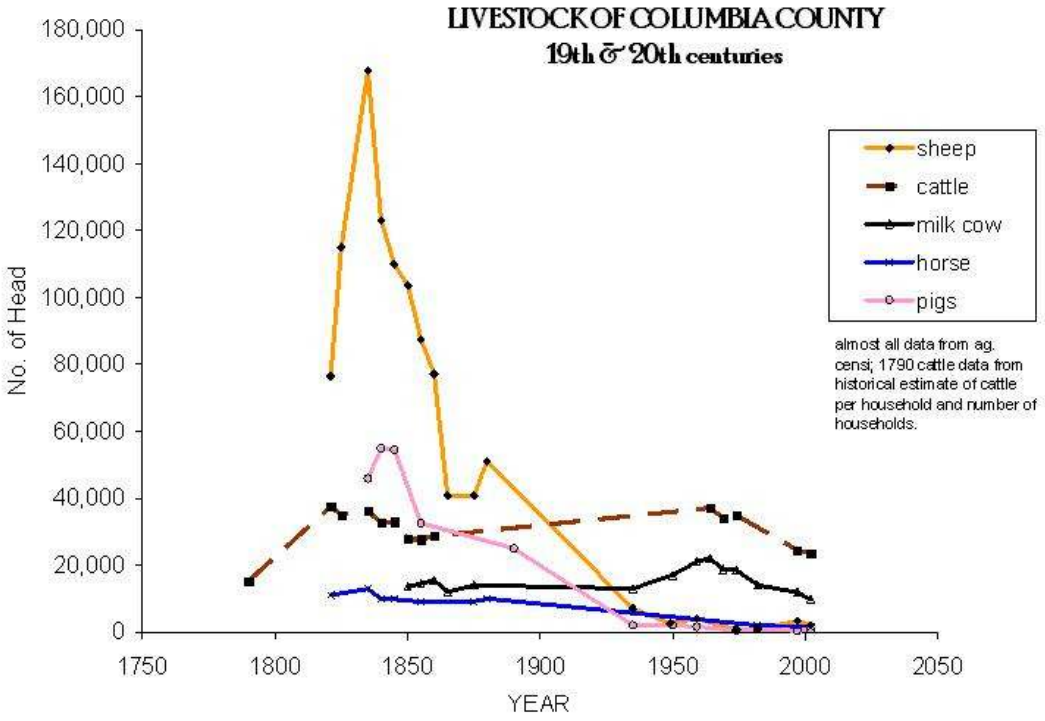
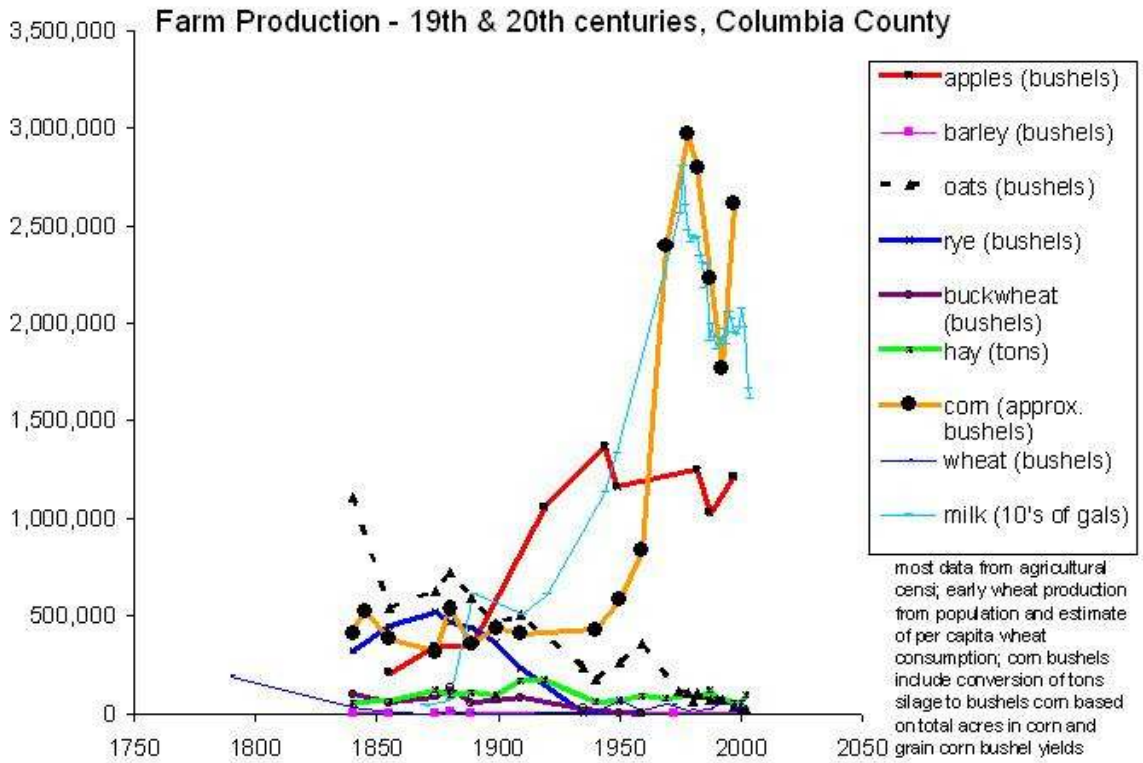


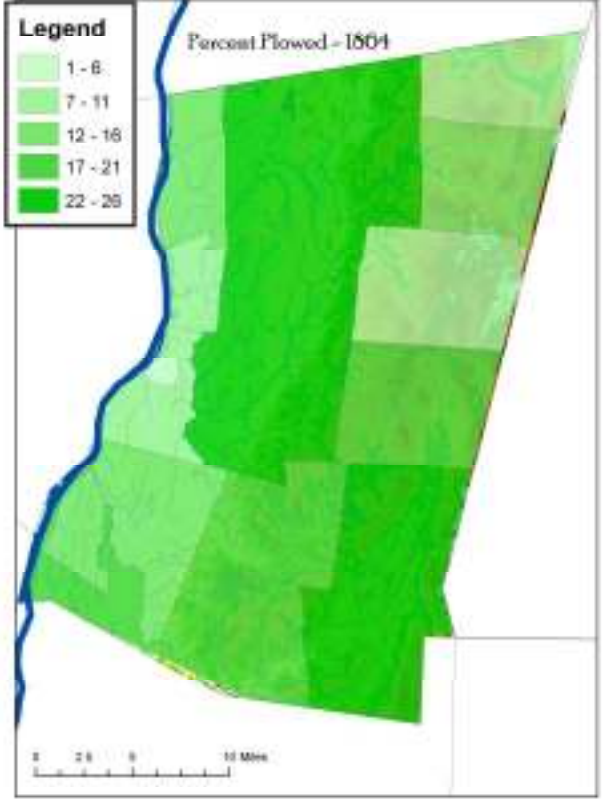
Fig. 15. The distribution of early industry in the County based upon an 1839 map of the region. At this point, most mills and other mechanized industries were directly hydro-powered.

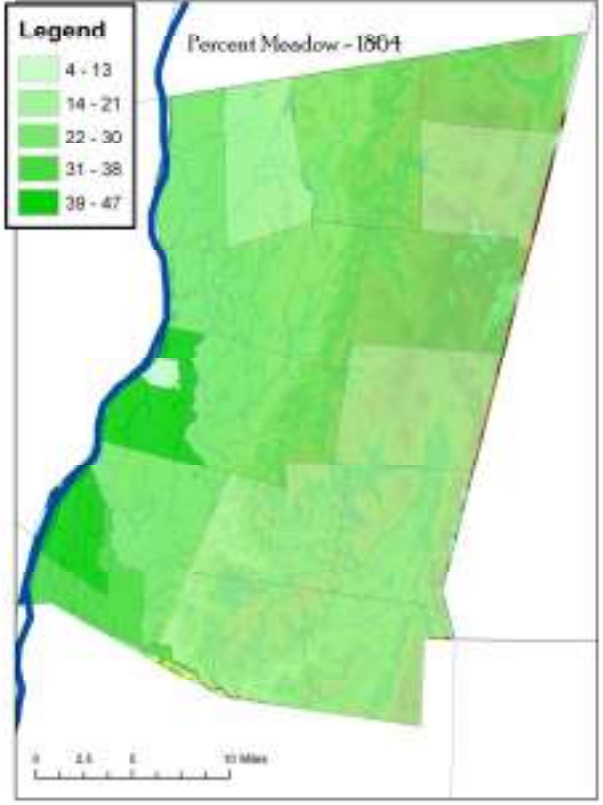
The County's landscape has gone through a dramatic historical metamorphosis: prior to European settlement was likely at least 95% forested; by the 1850 peak of farming, forest covered only about 15% of the terrain; finally, with the decline in agriculture, woodlands now cover nearly 80% of the County (Fig. 14).





Figs. 16 (top) and 17 (bottom). Livestock have generally declined since the late 19th century although there was a brief upsurge in milk cows (which are also included in "cattle"). Agricultural production surged dramatically in the 20th century as first apple and then dairy (and associated feed corn) rose. Although agricultural land began to decrease early in the 20th century, loss of land base was largely offset by increased yield until the last quarter of the 20th century.





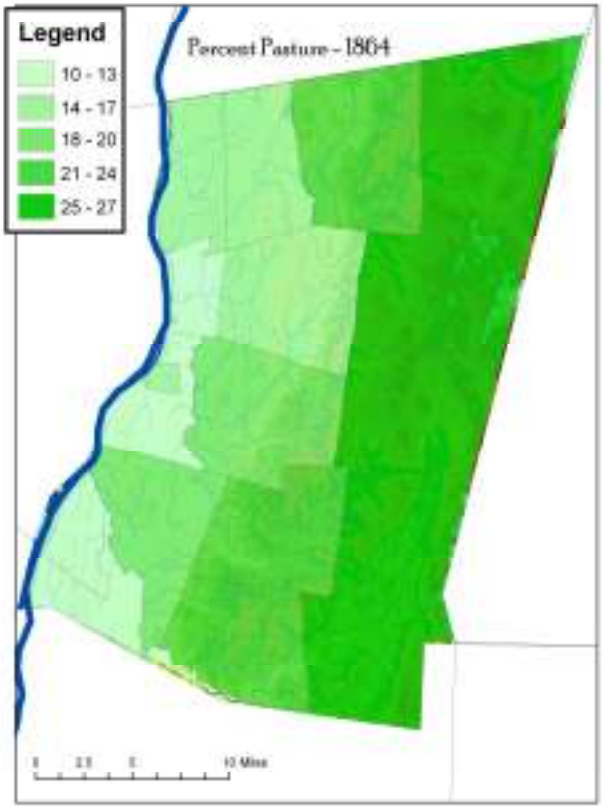


Fig. 18 The influence of topography on 19th century agriculture. Pasture was concentrated in the hill towns, while plowed land extended across the Hudson Valley flatlands and up into the Harlem Valley (SE corner).Based upon NYS census data.

Fig. 19. The modern distribution of agriculture in Columbia County. Current agriculture occurs mainly in the Hudson and Harlem Valleys. Based upon NYS Office of Real Property data on the designations of existing land parcels. Units do not necessarily reflect distinct business enterprises.

The most healthy sector of present-day agriculture appears to be niche farming, i.e., farming which provides specialized foods (e.g., organic, local, pasture-raised, etc.) to affluent markets and concerned consumers willing to pay extra for these items. Farmers markets and C.S.A.'s (community supported agriculture) have blossomed. Much of the best agricultural land also appears to be a prime target for current development (Fig. 20). Maintaining the County's agricultural landscape is of growing interest to residents, and various programs have arisen to support it

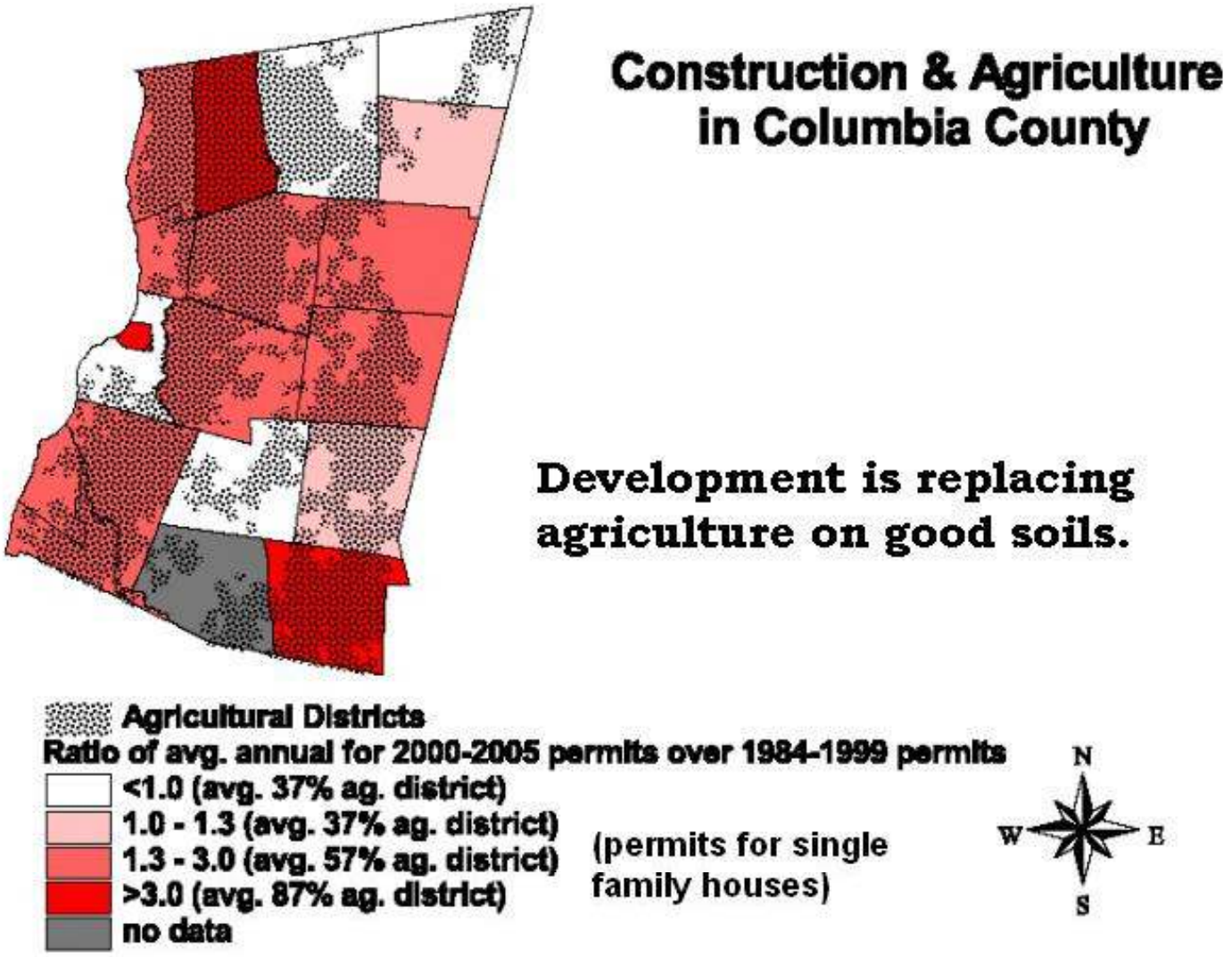


Fig. 20. The relation ship between agriculture (as reflected by the distribution of NYS agricultural districts) and development intensity (indexed as the ratio of the average annual number of single-family housing permits during the period 2000 – 2005 over the same statistic for 1984 – 1999. Townships in the lowest intensity class also have the lowest extent of land in agricultural districts (37%), while the most intensely developing townships average 87% agricultural district. Permit data from U.S. Dept. of Housing and Urban Development (socds.huduser.org).

Evolution of the Work Force

Despite the previously-noted 20th century boom in agricultural production (Fig. 17), individuals making a living from farming began a steady decline by 1900 (Fig. 14). By 1964 (Fig. 21), the work force was engaged mainly in manufacturing, government employment, services, and retail in roughly equal measure. Agriculture had declined to relative unimportance in terms of employment (8% of the work force). That decline would only continue (Fig. 22), joined by a drop in the importance of manufacturing and a jump in the role of services and construction. By 2004, services far exceeded the remaining sectors, employing 40% of the workers.; meanwhile agriculture claimed only 4% of the total and had declined in real as well as relative terms (Fig. 23). Service industries continue to grow (Fig. 24) led by expansion in educational services, administration and real estate.

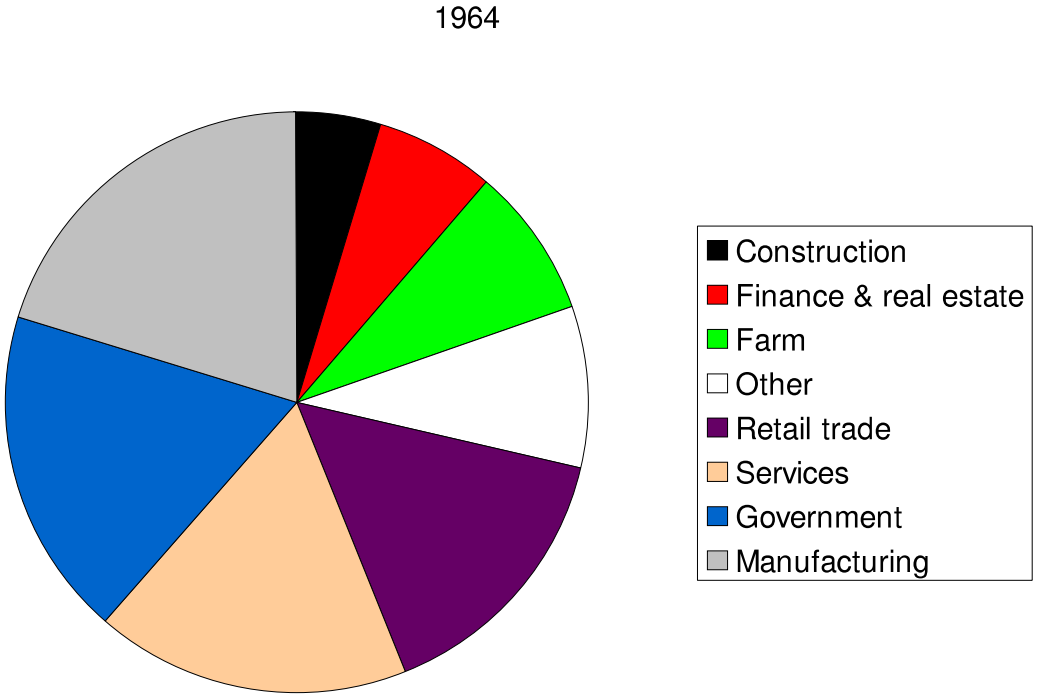


Fig. 21. The composition of the Columbia County workforce in 1964. Manufacturing, government, services and retail get a fairly equal cut of the pie. Date from US Dept. of Commerce, Bureau of Economic Analysis.

The economic doldrums experienced after the decline of farming may have helped fuel the subsequent growth of the County as a second-home venue and bedroom community when many new-comers found its increasingly forested landscape and "rural character" pleasing and its relative proximity to NYC and Albany convenient. Much of the current economy revolves around fulfilling the needs and desires of this populus.

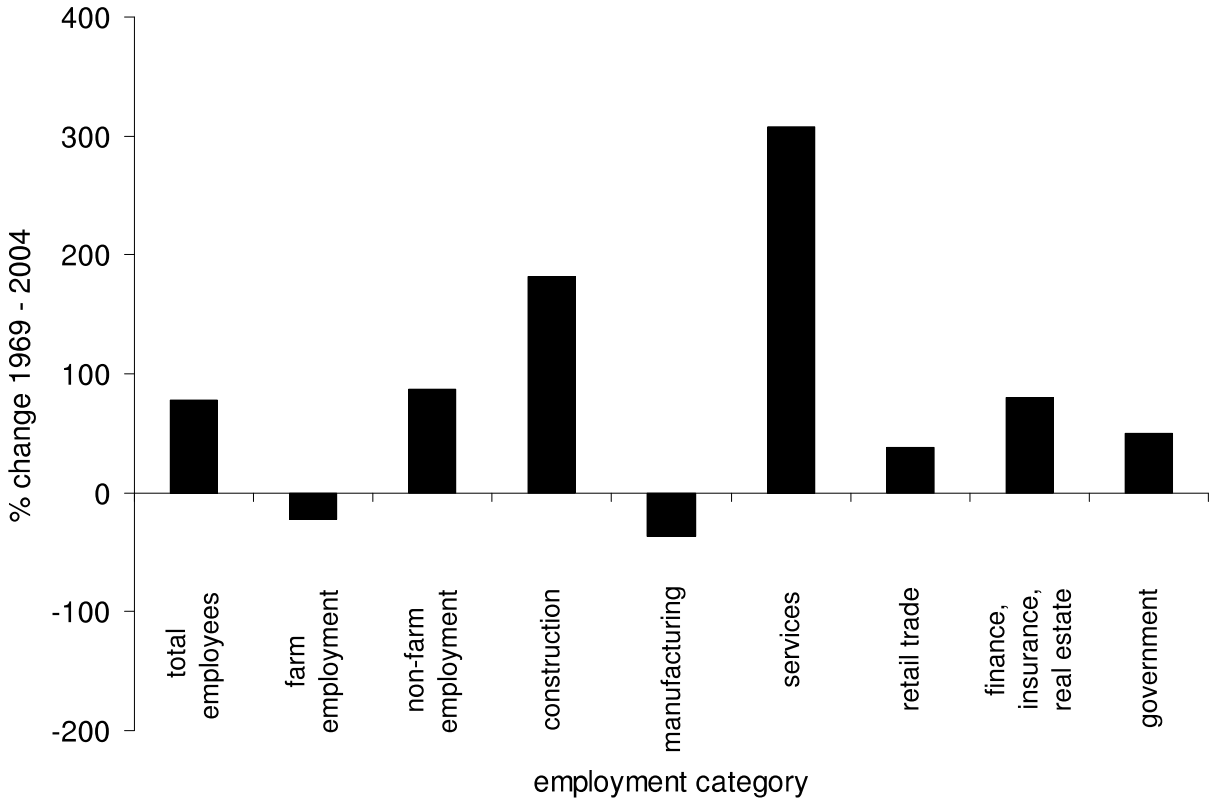


Fig. 22. Dynamics of the Columbia County workforce expressed as number of employees in a given class in 2004 relative to the number of employees in same class in 1969. Date from US Dept. of Commerce, Bureau of Economic Analysis.

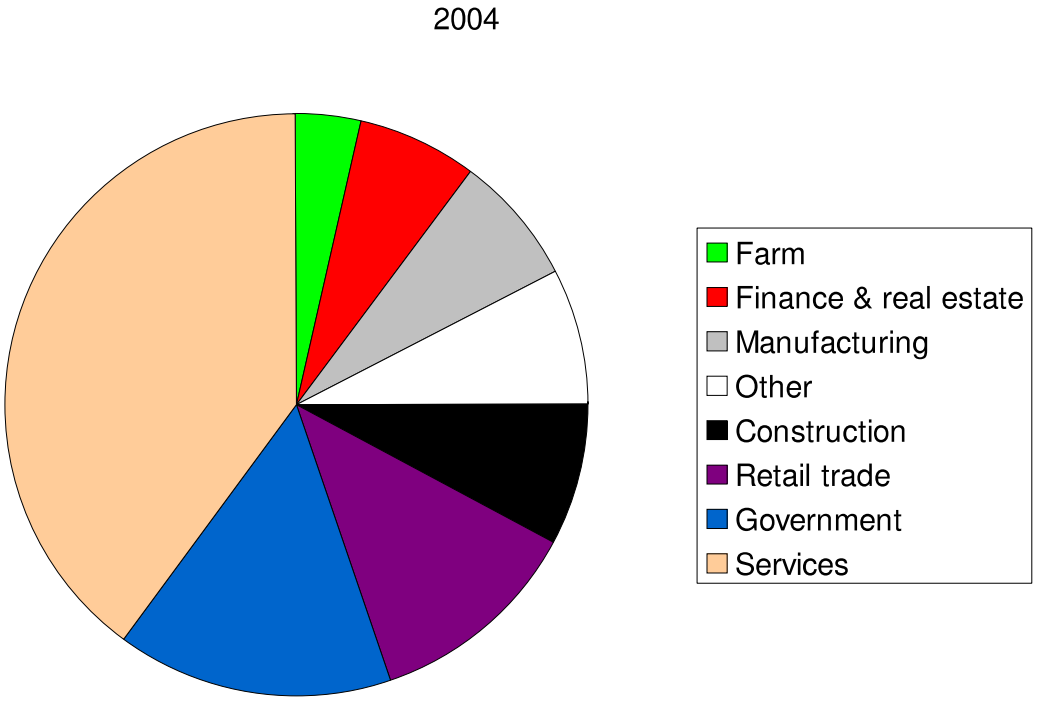


Fig. 23. Composition of the Columbia County workforce in 2004. Services accounted for more than twice the workforce proportion of any other sector. Date from US Dept. of Commerce, Bureau of Economic Analysis.

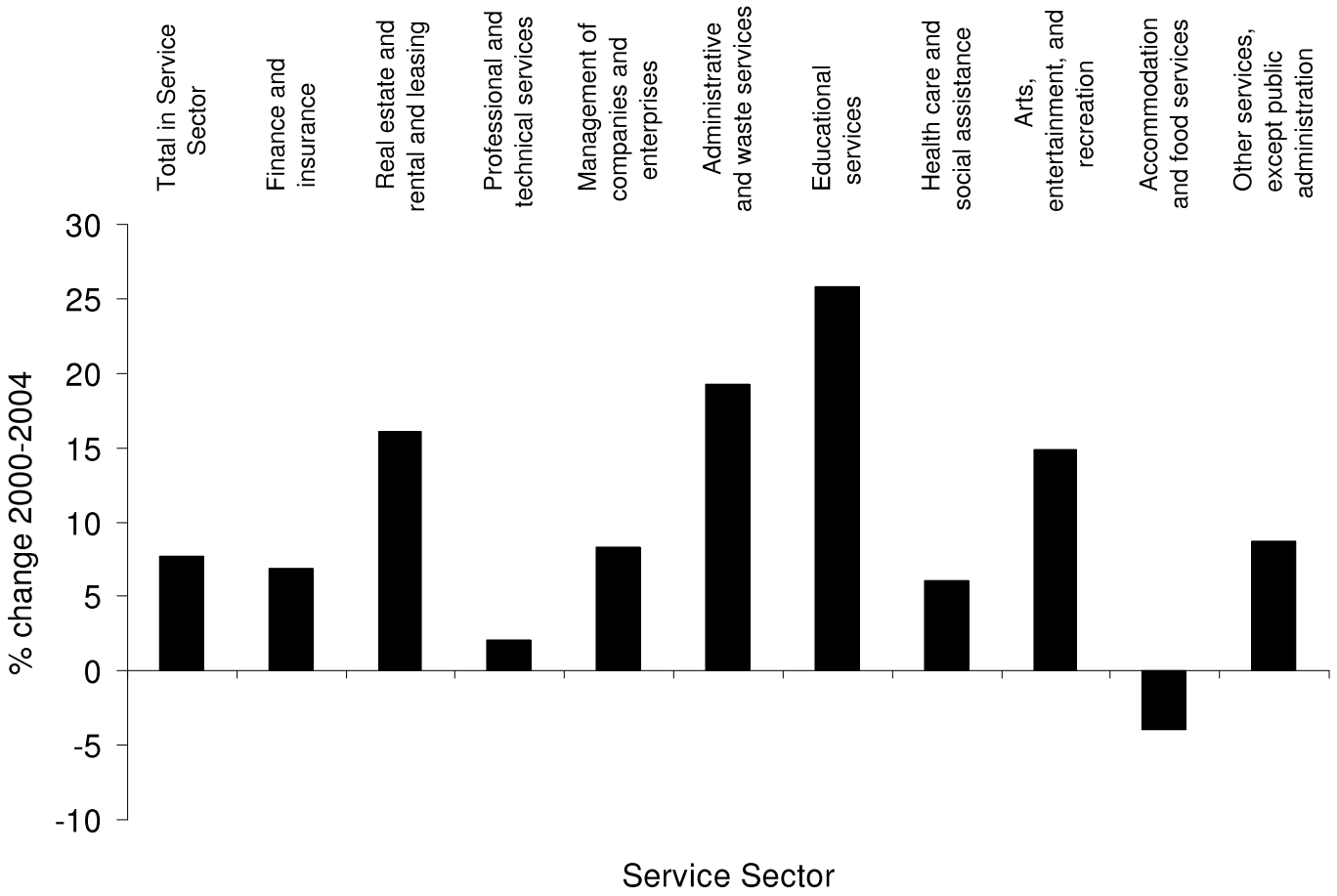


Fig. 24. The dynamics of employment in the service sector of the Columbia County economy, indicated as number of employees in given service job in 2004 relative to number in 2000. Date from US Dept. of Commerce, Bureau of Economic Analysis.

The recent evolution of unemployment and wages are two measures of economic well-being. Absolute unemployment rates and absolute wages are not as useful as relative values. For example, if county unemployment rates increased by 1% while the State average increased by 3%, then Columbia County would still be doing relatively well. Therefore, the unemployment rates and average wages which we present are standardized by dividing the County's value by the State value.

Columbia County's relative unemployment rate (Fig. 25) has, if anything increased, over the past 10 years, rising from 56% to more than 81% of the s\State average. Relative individual annual wages (Fig. 26) have likewise not improved: in 1997, the County's wages were just over 61% of the State average; in 2006, they were slightly under 58%. The differences, at least in the case of wages, are not large, and, in both cases, there is ample year-to-year variation. However, the main point appears to be that the influx of capital that fueled the rise in house prices has not translated into improved employment conditions for individuals working in the County.

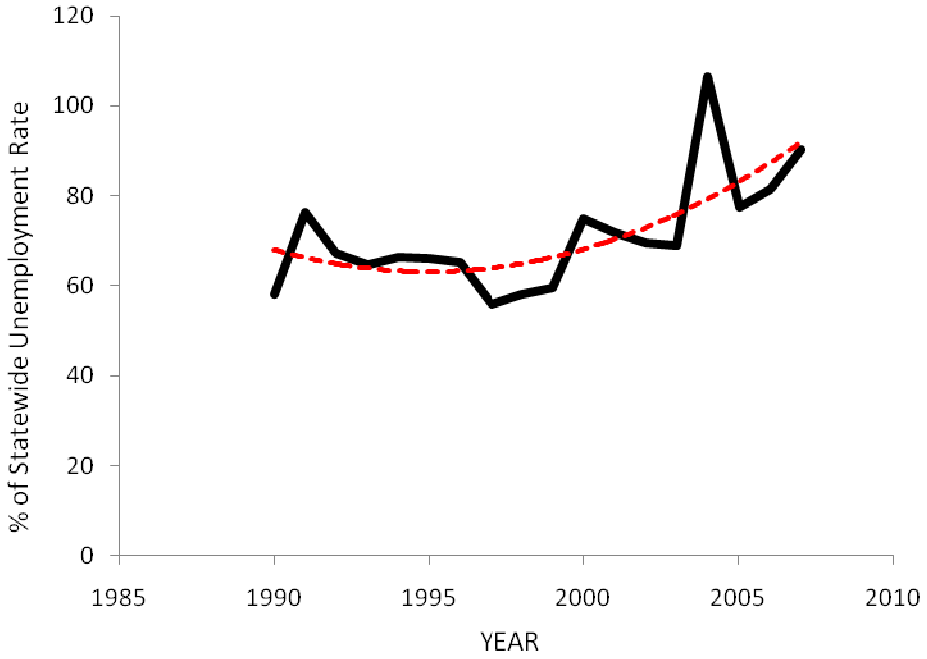


Fig. 25. Columbia County unemployment rate as a % of the New York State rate. If anything, relative unemployment has increased in the County. The dotted red line is a just meant to illustrate general trend. Data from the U.S. Bureau of Labor Statistics.

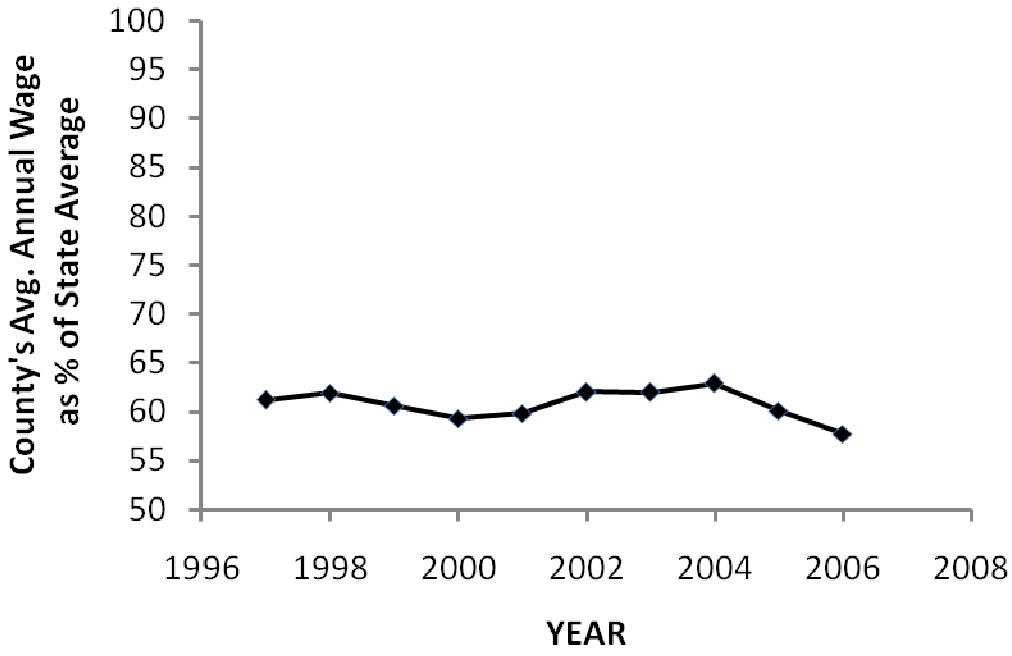


Fig. 26. Columbia County average annual wage as a % of the New York State average. Relative wages have generally been flat, although 2006 saw the lowest relative average in recent history. Data from the U.S. Bureau of Labor Statistics.

Columbia County as a Bedroom Community.
Two patterns bear further discussion. First, it's worth exploring the degree to which the County serves as a bedroom community for individuals who work elsewhere, and what patterns may exist between extra-county work and income levels. The number of residents who work in the County has been declining steadily over the past 30 years (Fig. 25). The majority of extra-county commuters live in the northern and southern tier of townships where most workers commute to the Capital District and Dutchess County respectively (Fig. 26). Although the proportion of workers commuting out of the County is roughly equal in both regions, median household income in the southern area is markedly lower (Fig. 27). Population living in poverty also tends to be higher to the south, although the pattern is not as marked (Fig. 28). Whether the lower household incomes in the south reflect a lower wealth of non-commuters or poorer salaries received by commuters is not immediately clear in the statistics. It is, however, easy to believe that Albany, which is the state capital, home to a State University Campus, and future nanotech hub, offers better salaries.

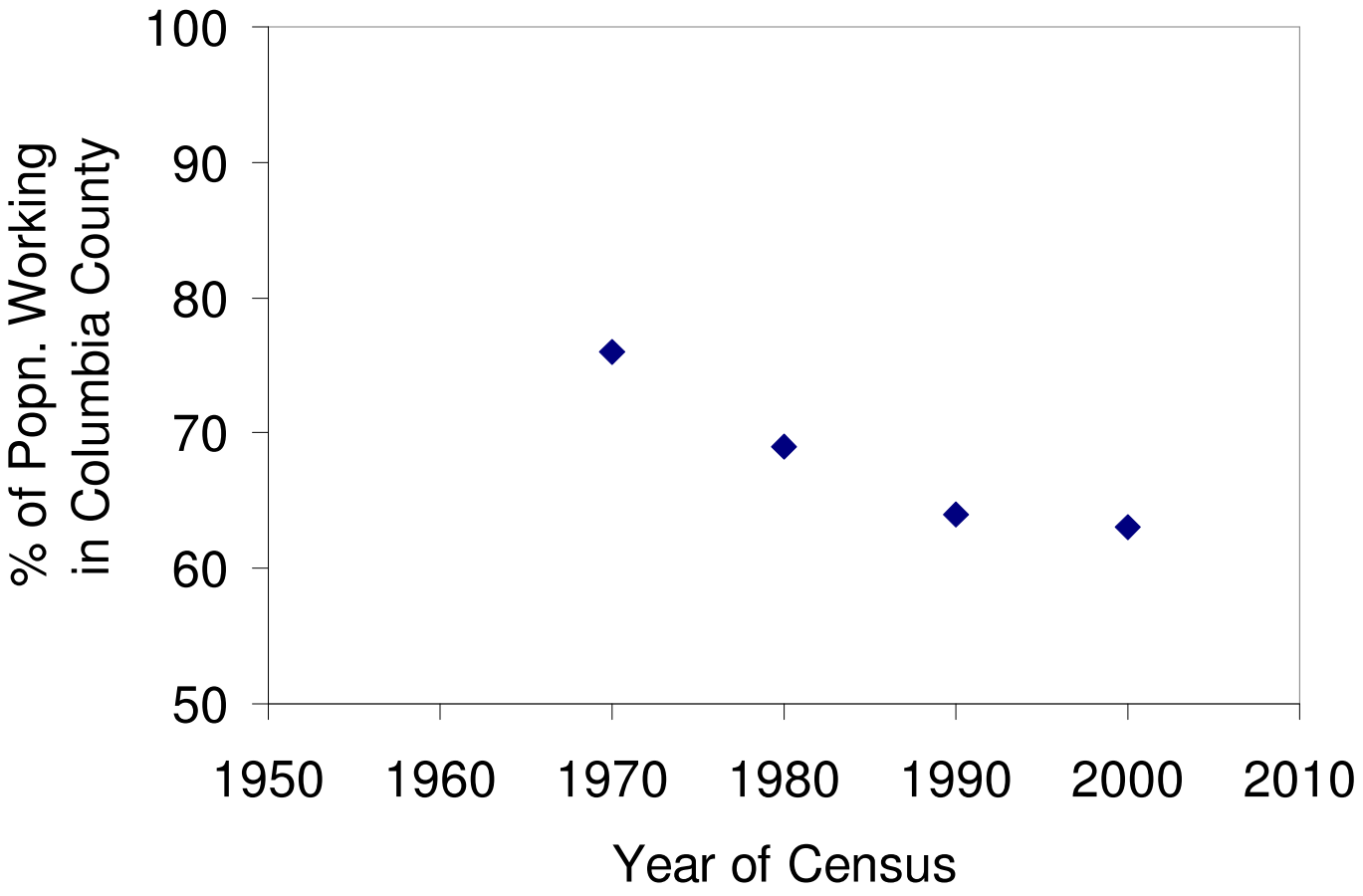


Fig. 27. Proportion of county residents who work in the County. Data from US census.

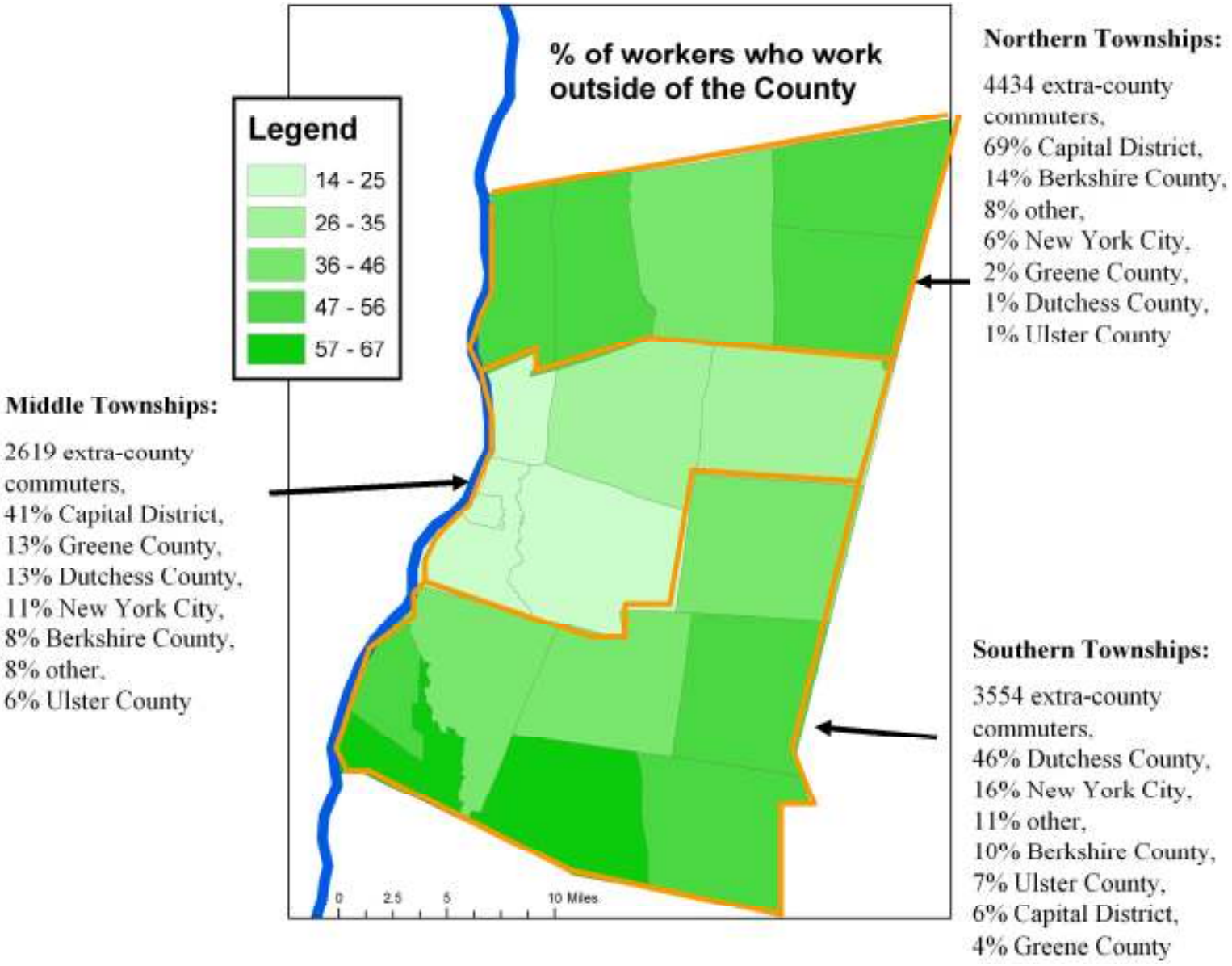


Fig. 28. Percent of workforce which works outside of the County by township. Northern and southern townships show the greatest extra-county commuting although destinations differ. Data from US census.

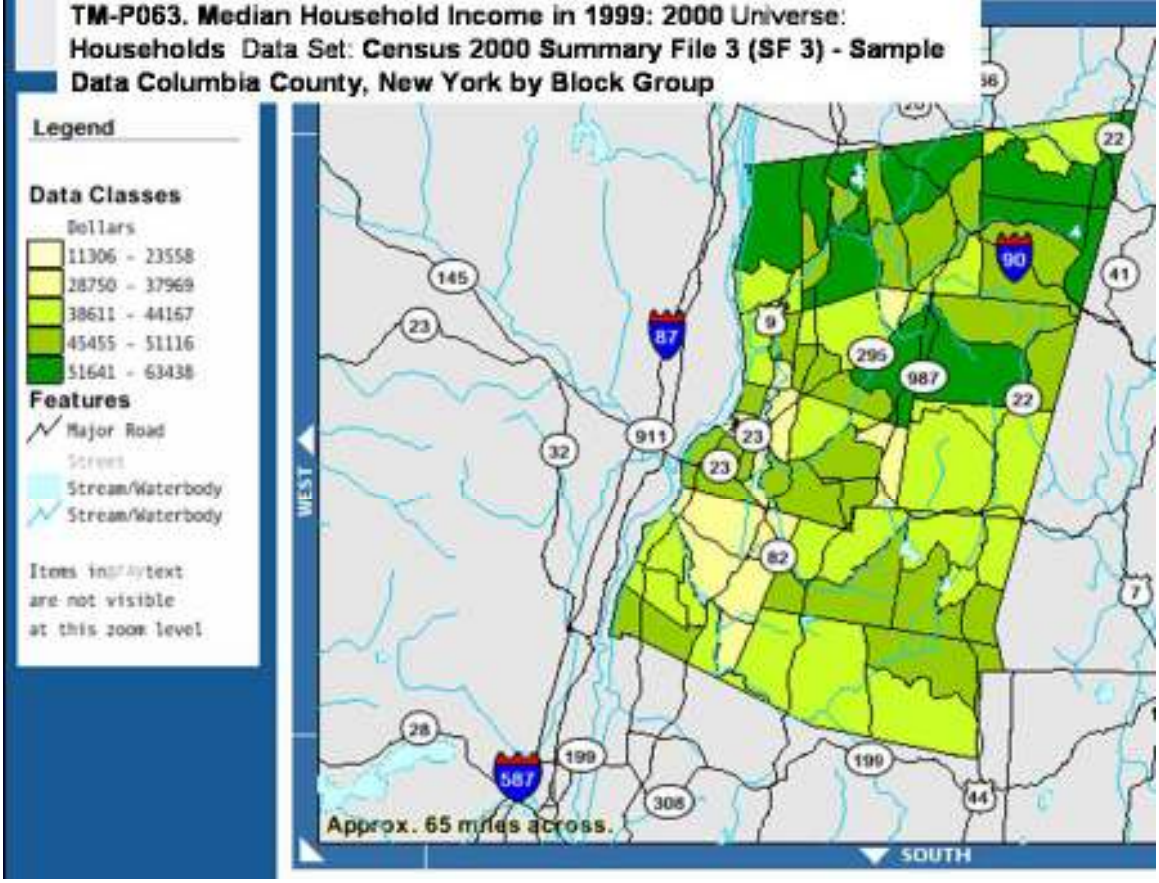


Fig. 29. Median household income of residents. The median income of some northern townships is twice that of certain southern ones. Data from US census.

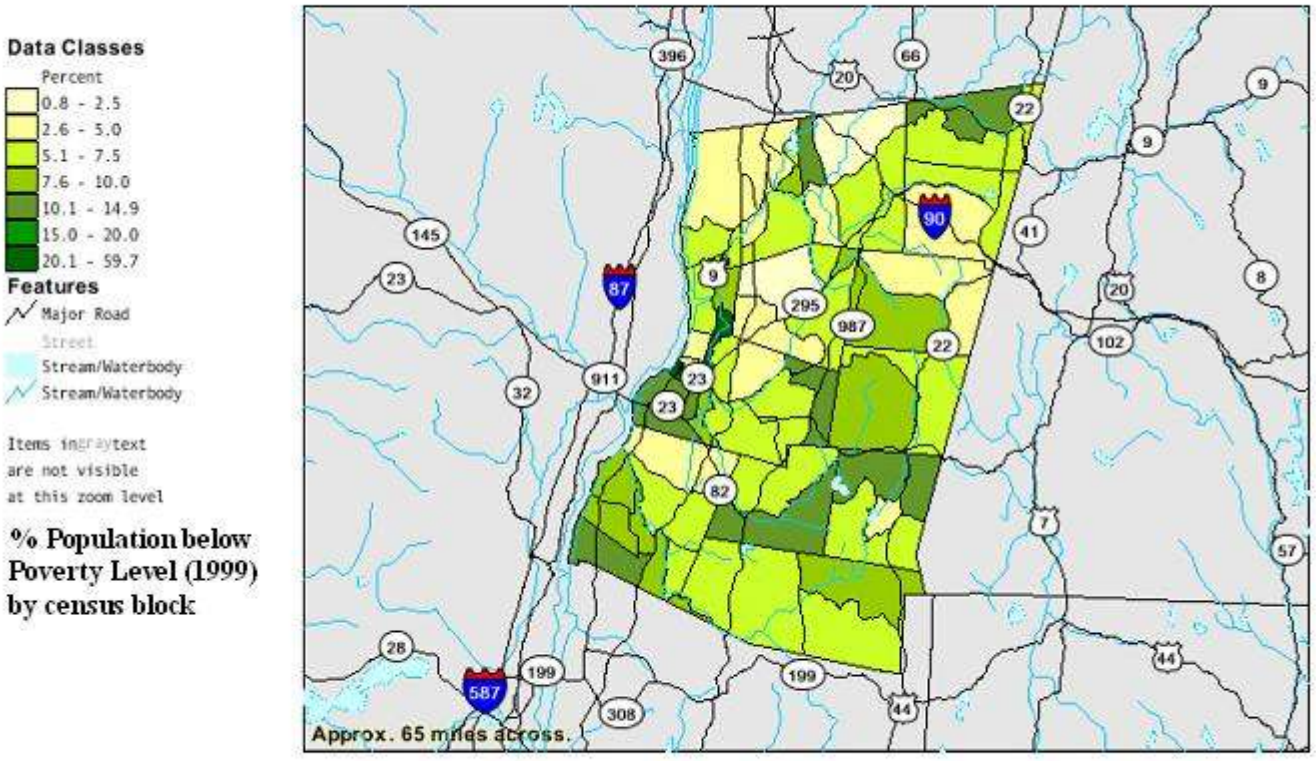


Fig. 30. % of population below poverty level by township. Again, a pronounced regional variation in wealth is evident, with northern portions tending to be richer than southern ones. Data from US census.

The apparent importance of the Capital District for current housing development is evidenced in Figs. 20 and 31. The former figure indicates that the NW corner of the County is one of the most rapidly developing parts of the County, while the latter indicates that the rate of subdivision was highest in the northern half of our area. However, work by Crowell (2005) showed that for "arm's-length sales" of residential land, 68% of purchasers were from Columbia, Dutchess or Rennsalaer Counties, 26% from the NYC area, and only 6% from elsewhere (which would include most of the Capital District counties). There is no doubt that Capital District jobs are an important economic source for the northern part of the County. It is less clear that the current boom in housing and jump in housing prices (see below) relate to changes in this part of the economy.

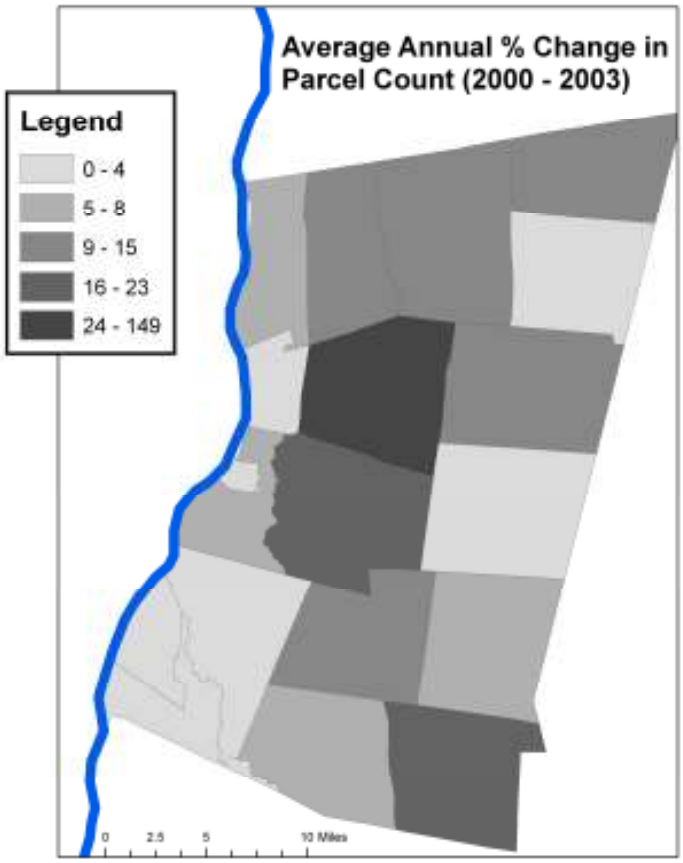


Fig. 31. The recent rate of subdivision indicated as the average annual change in number of parcels. Subdivision appears to be occurring outside of the wealthier regions and on the flatter land. The influence of individual town governments can also be substantial. Data compiled by Crowell (2005) from data in the Columbia County Assessor's office.

Columbia County as an Outpost of NYC.

A second trend worth noting is that of increasing home purchases by NYC residents. This dynamic appears to have had a major influence on housing prices and construction in at least part of the County. This settlement pattern grew post 9-11 as fear of city life fueled a shift to country living, and the internet facilitated tele-commuting. The County's access by highway (the Taconic State Parkway, I-90) and by rail (Amtrak to Hudson, Metro North to Wassaic in northern Dutchess County just south of the County) have aided this flow of people. The statistics of Crowell (2005) have already been mentioned: more than a quarter of all arm's length purchases of residential land made between 2001 and 2003 were by NYC residents. An evaluation of the tax rolls, shows that 15% of recently constructed houses in the County were owned by individuals who listed NYC region addresses. It appears that there has been a rise in both second home purchases and in residential exodus from the City. Most of the second homes owned by NYC residents are located midst the scenic, forested hills of the eastern side of the County (Fig. 32). Further evidence of this pattern is the distribution of vacant units in the County (even though this is pre-2001 data; Fig. 33).

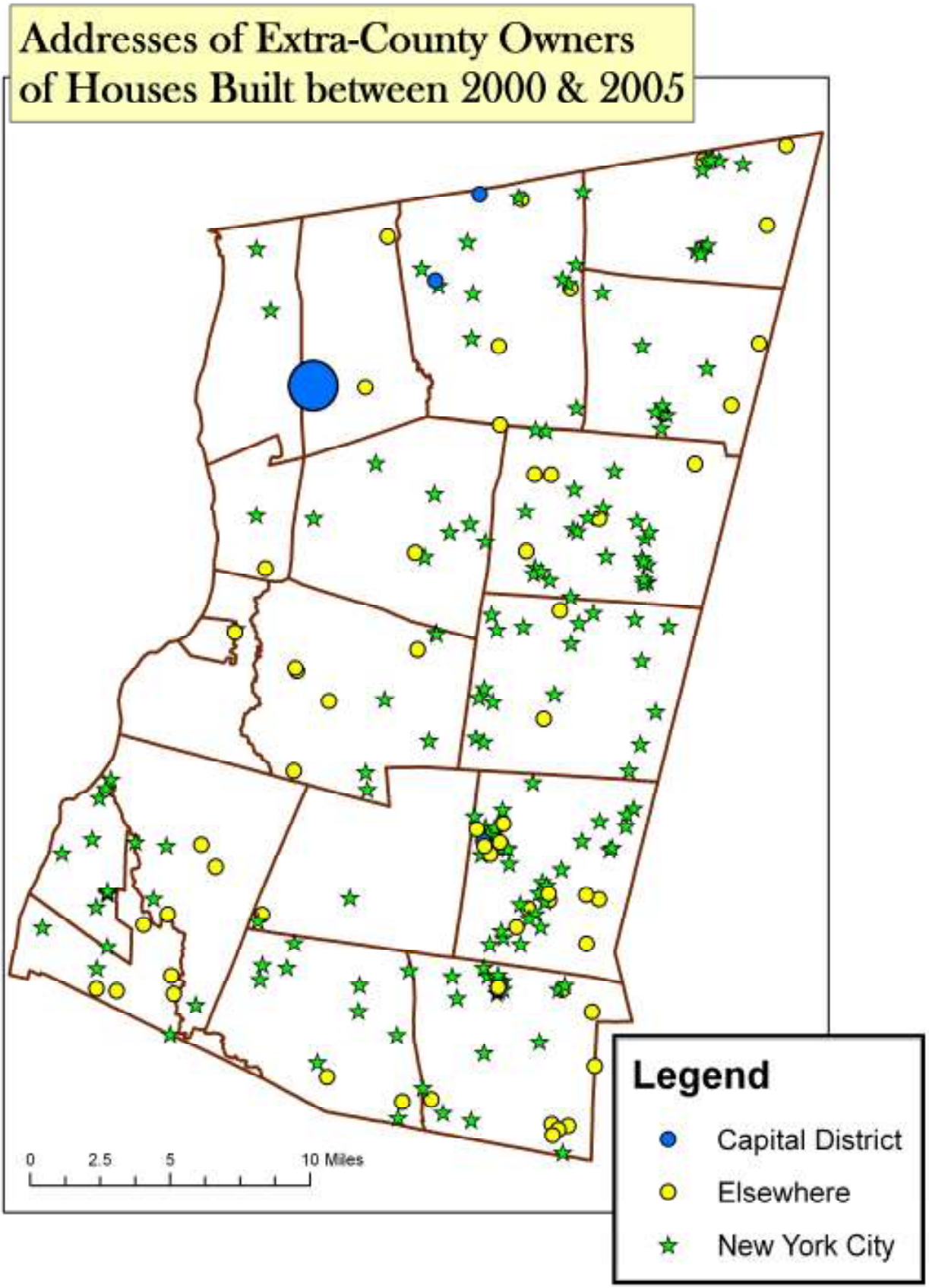


Fig. 32. Address of residence listed in Columbia County tax rolls for recently-constructed houses owned by individuals outside the County (ca. 15% of all owners of such houses). The large blue dot indicates the location of 10 homes. Data from NYS Office of Real Property.

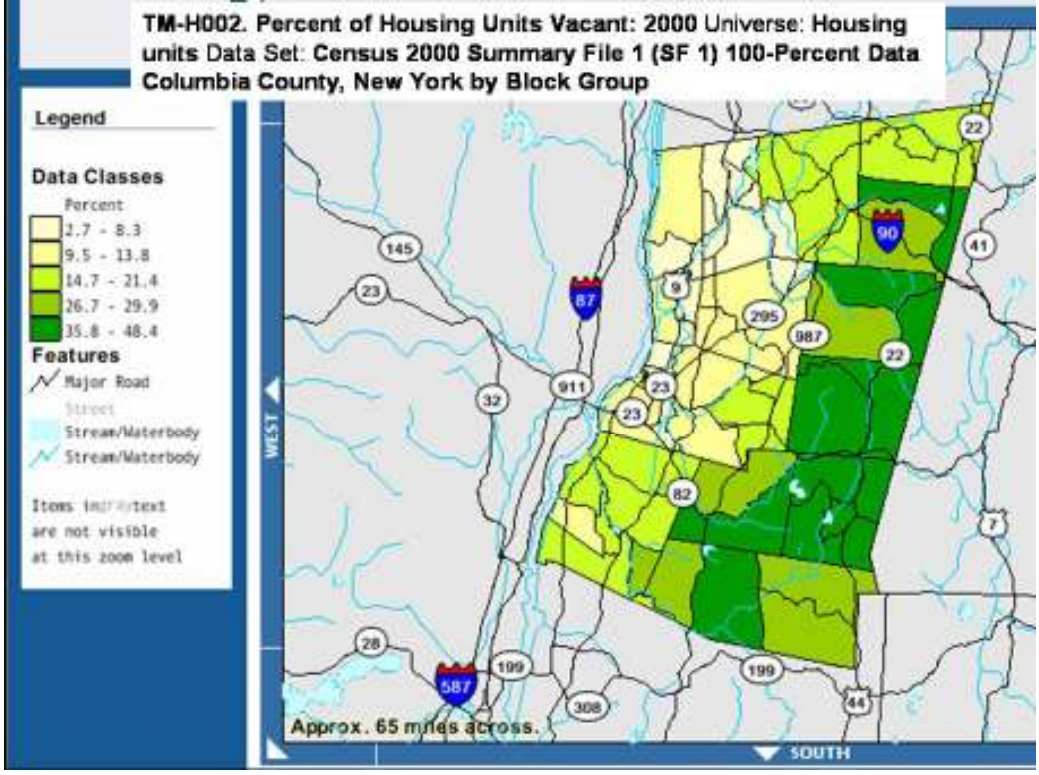


Fig. 33. Distribution of "vacant" houses, many of which are second homes. Most such houses are located in the eastern hills. Data from US 2000 census.

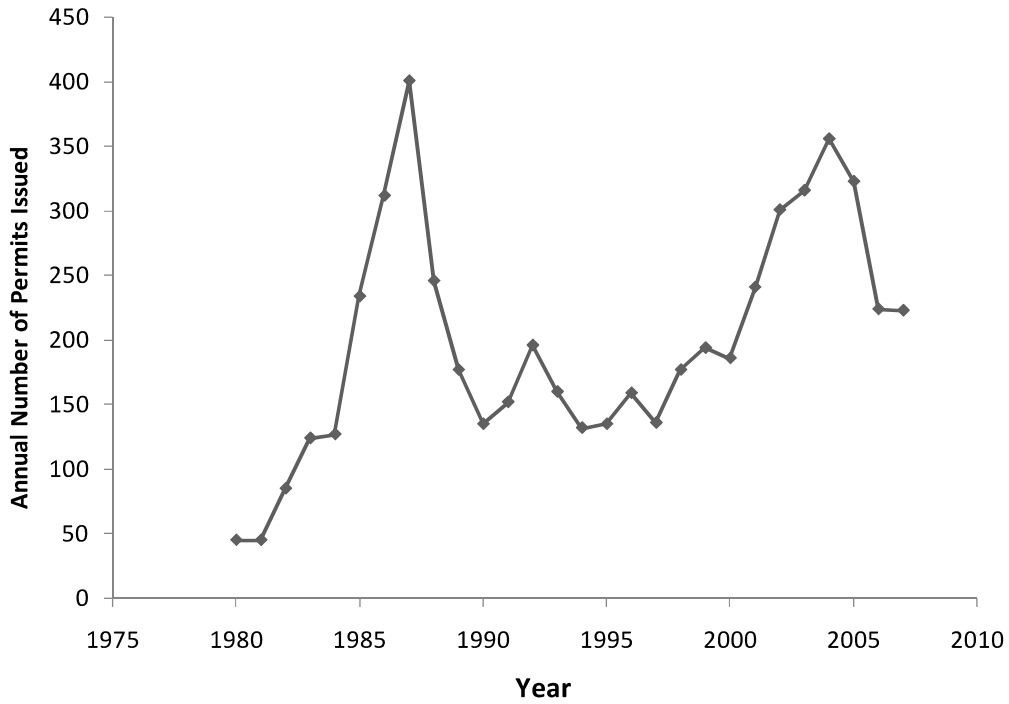


Fig. 34. Absolute number of building permits issued for single family homes in Columbia County (excepting Gallatin for which there were no data). At least two housing booms are evident in this graph. Permit data from U.S. Dept. of Housing and Urban Development (socds.huduser.org).

There was a recent surge in house construction from about 2002 – 2005 (Fig. 34). The distribution of building permits (Fig. 35) suggests that a variety of markets drove this. The relatively high construction rates along the eastern margin of the County may partially reflect the pressures just discussed. However, the density of housing construction in the NW township of Kinderhook has likely been tied to Capital District markets, and development in the central township of Ghent can not easily be explained by either of these.

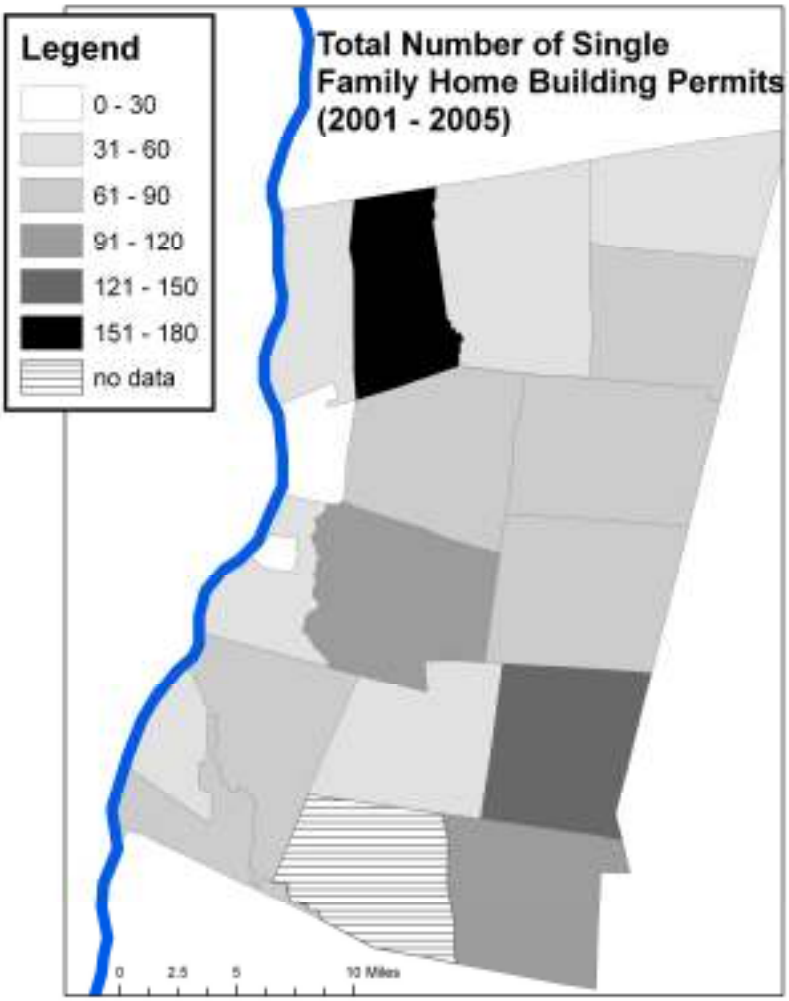


Fig. 35. Distribution of building permits issued between 2001 and 2005. Permit data from U.S. Dept. of Housing and Urban Development (socds.huduser.org).

Aside from any implications for county sociology, the substantial in-flow of NYC buyers has dramatically affected house affordability. Apparently, NYC salaries rather than local salaries are now driving much of the housing market. Since 2000 the median single-family house price has more than doubled (Fig. 36), putting many homes out of reach of residents (the index for affordability for the county as a whole is now around 4.8). While we do not have recent statistics for the individual townships, housing affordability probably continues to follow the earlier geographic patterns indicated in Fig. 37, although affordability has likely dropped substantially in each township (the county-wide rate was 2.7 in 1999). The parcel subdivision intensity (Fig. 31) does *not* mirror apparent distribution of second homes. This suggests that many of the new second homes are on relatively large parcels and the construction of high-end units may not be the primary driver of subdivisions. Sub-divisions appear to be more likely to provide homes for full-time residents. (The potential role of Capital District commuters is also indicated in the map of house values [Fig. 38], although this map is largely outdated.)

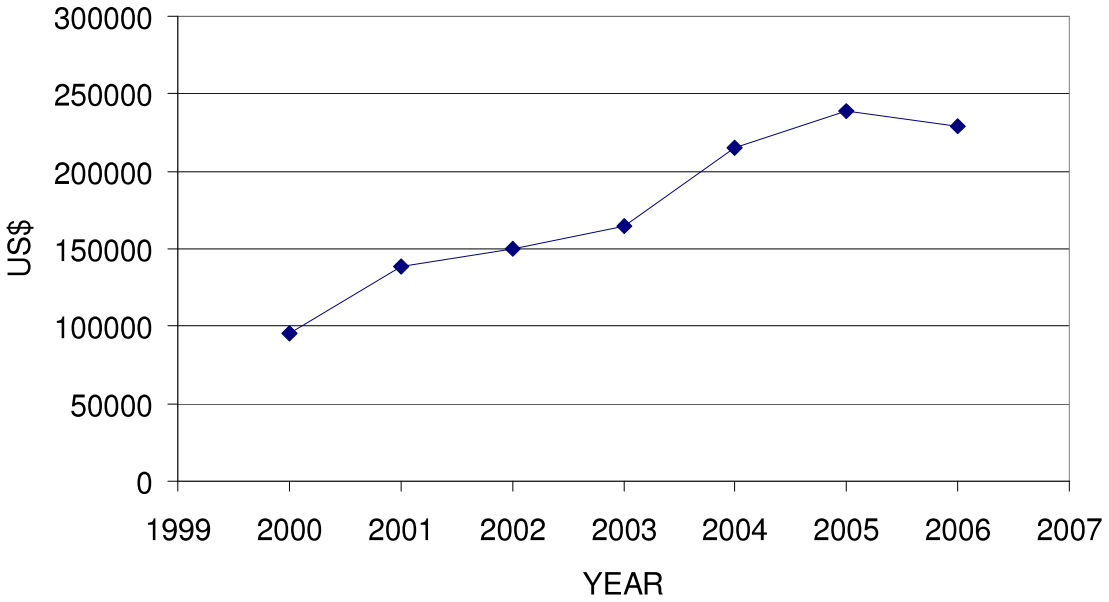


Fig. 36. Median house prices in Columbia County since 2000. Data from NYS Assoc. of Realators.

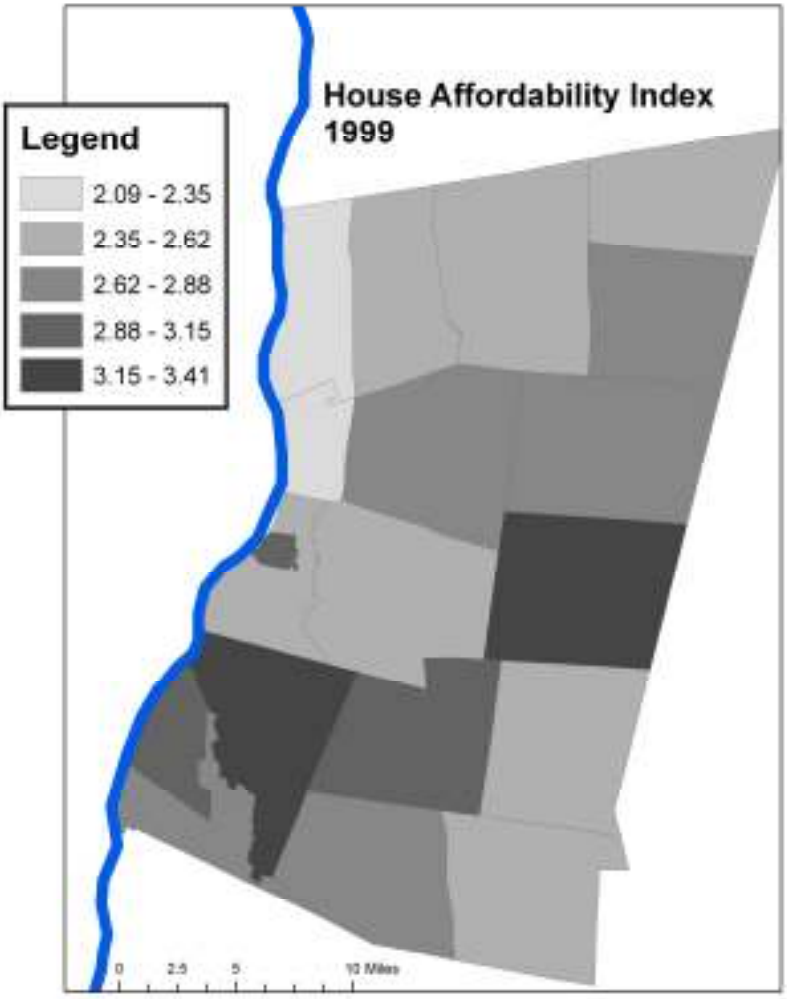


Fig. 37. The distribution of the 1999 house affordability index (median house price/median household income). A value above three is considered problematic; the county average is now around 4.8. Data and interpretation courtesy of S. Goetz.

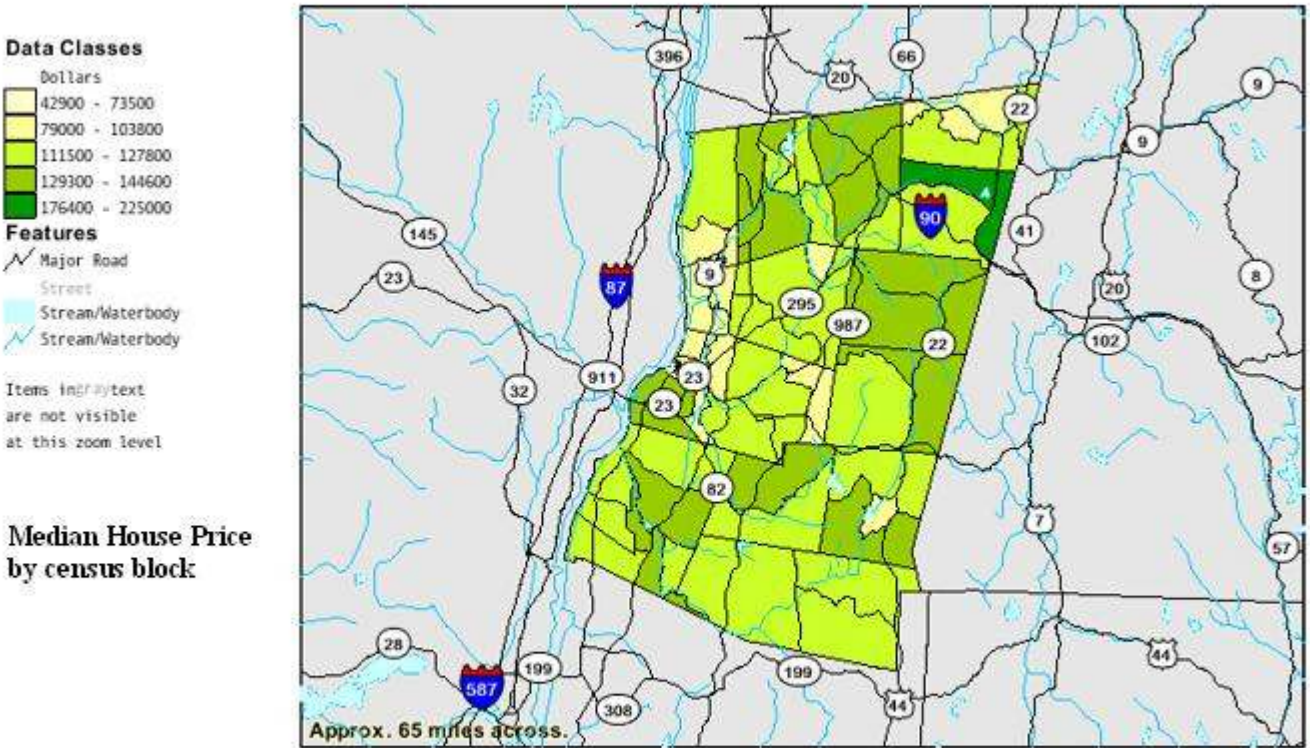


Fig. 38. Median house value in 1999 by census block; these data are outdated. Data from US census.

Concluding Thoughts

Conflict between residents and new comers exists. It was exemplified by the debate in the first years of this century over the expansion of a large cement plant south of the city of Hudson. Opposition, largely (but hardly entirely) composed of new-comers, crystallized and eventually thwarted these industrial plans. Sometimes pitched as a debate between locals looking for a job and second-home owners hoping to maintain their view, the reality was, of course, more complex. Disquiet continues, often in the form of land use debates as developers benefit from the state of farmers whose dire economic conditions and now hugely increased land values make them willing to sell (between 2000 and 2003, the price of vacant land increased 169% [S. Crowell 2005 from Office of Real Property]). Such new-comer / long-term resident disagreement is somewhat along political party lines as what was a Republican county now turns more Democratic (Fig. 39). Thus, some of the land use debates are based not only on we/them tensions, but also on deeply-held differences in political philosophies.

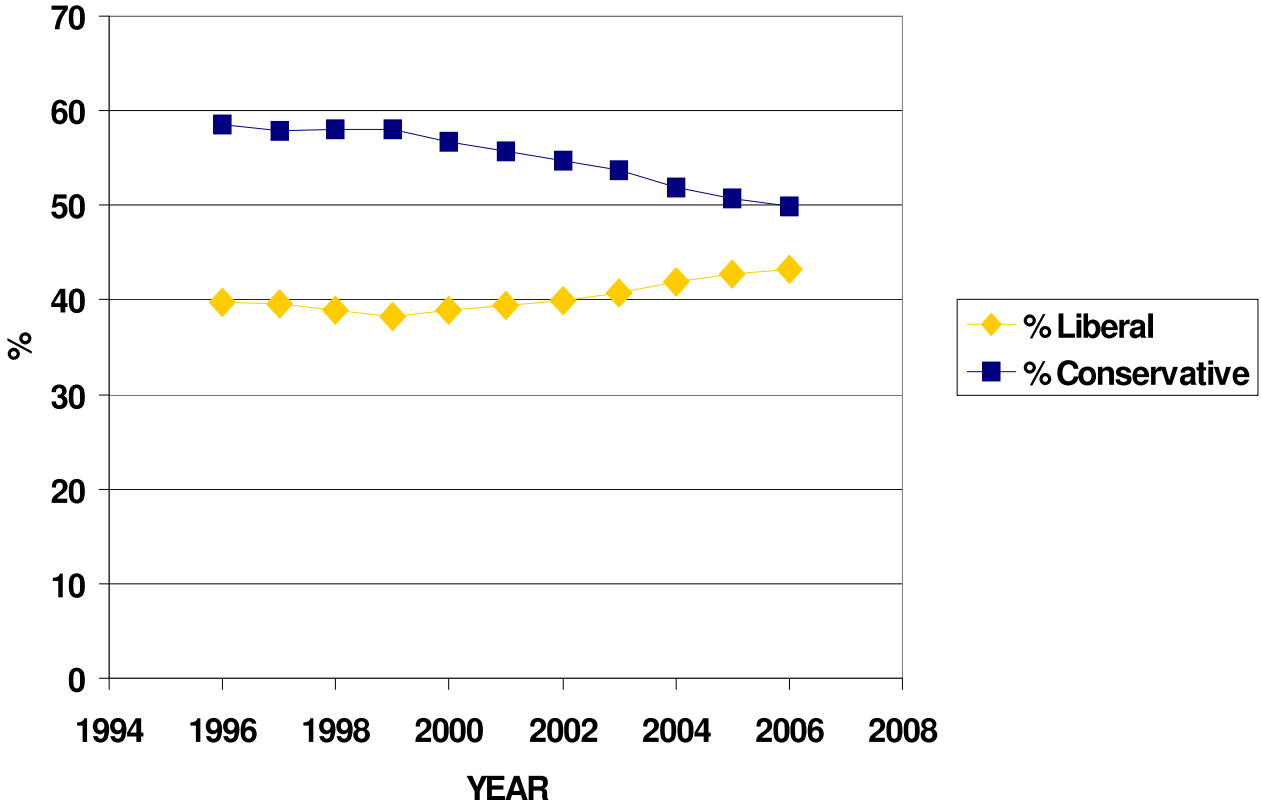


Fig. 39. Political affiliations of registered voters. In this over-simplified diagram, I have combined Republican and somewhat like-minded parties in the "conservative" category, and Democrats and somewhat like-minded parties under the "liberal" label. Apologies to all for over-simplifying. Data from NYS Board of Elections.

Many of the geographic factors that influenced county history continue to do so today. While the decrease of agriculture has reduced the relevance of plant growth factors in determining settlement patterns, topography, as a factor influencing vistas and landscapes, continues to exert a large influence on who settles where. Likewise, while the County no longer ships much hay, grain, livestock or dairy to NYC, that city continues to have a huge effect on the County's economics. It forms the biggest market for the newly arising niche farms, and, even more centrally, second-home owners in or recent urban émigrés from "the City" are primary determinants not only of the County's housing markets, but likely many other aspects of the economy. The relationship to Albany has doubtless existed for a long time, although it is only with the increasing viability of commuting and the decrease in local agriculture and manufacturing that northern Columbia County has become a bedroom community for the Capital District. Perhaps maps and statistics such as those presented here can help make us more conscious of patterns in our county and hence, fingers crossed, better able to address the future with foresight and fairness.

Thanks to S. Goetz and S. Crowell for providing copies of their data and reports;