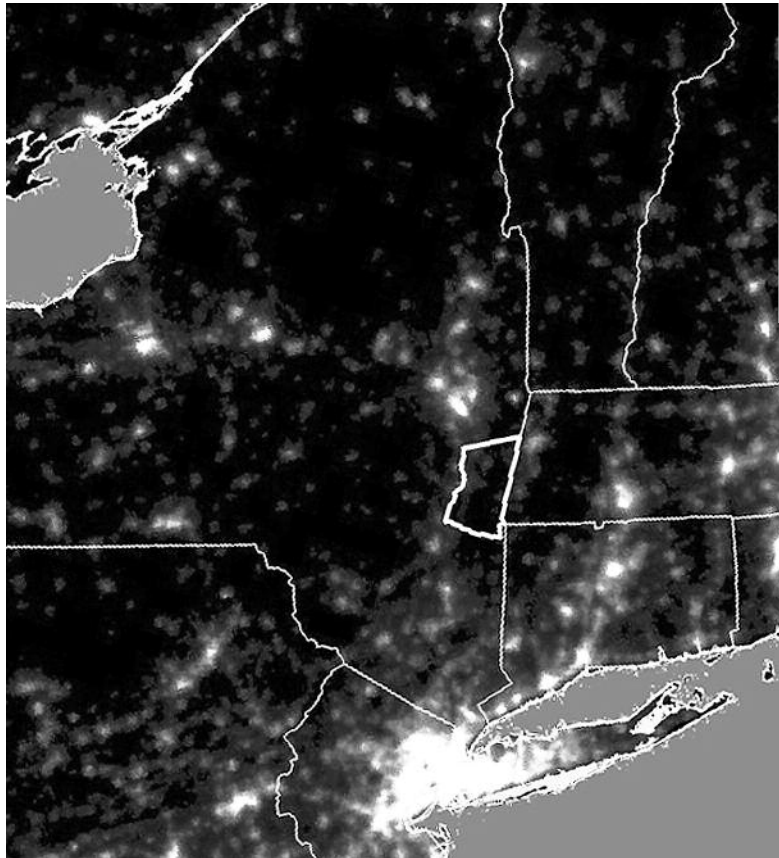


AN ENVIRONMENTAL ATLAS OF COLUMBIA COUNTY

BY CONRAD VISPO AND ANNA DUHON HAWTHORNE VALLEY FARMSCAPE ECOLOGY PROGRAM



Population: 62,006; Population within 150 miles: >25 million.
412,000 acres big; 24,800 households small.
9 species of frogs and toads; 6 breeds of cow shown at County Fair.
Estimated percent forested land, 1870: ca. 25%; 2000: ca. 75%
2,130 miles of roadway; 71 miles of railroad; 12 miles of rail trail (not all open).
23,500 acres of public land; 10 toxics remediation sites.
2002: 10 manufacturers with >50 employees; 1898 (total population = 43,211): 18 such manufacturers.
46 fruit farms, 44 dairy farms, 43 horse farms, 42 vegetable farms.
At least 69 different nationalities; 2 winners of the popular vote for President.
1,334 species of wild plants in the county; 13 kinds of apple at County Fair.
Percent of workforce that works in the county, 1970: 77%; 2000: 58%.
1835: 3.5 sheep/person; 2000: 29.5 people/sheep.
31% Republican; 32% Democrat; 37% other or no party affiliation.
2007: 632 deaths; 587 births.

NORTHEASTERN USA AT NIGHT, FROM SPACE

Maps can tell us so much: treasure maps, road maps, weather maps, topo maps; maps of tax districts, agricultural districts, zip codes, congressional districts. By giving us an overhead view of sorts, they help us know where we are. The maps and figures on the following pages offer a little bit of perspective on this county – where it has come from, where it is, and where it might be headed. Read all of these with a grain of salt. Any map is a simplification of reality. Rather than looking at these as precision aerial photographs of our landscape, look at them as paintings. When you fly over the country in an airplane, what you gain in perspective, you lose in intimacy: you may see patterns and guess at what they mean, but you have lost the personal connection that might be needed to really know where the patterns originate.

Maps aren’t answers; they’re questions. Ask yourself why certain patterns might have happened, how various patterns might overlap and interact, and what evidence of past patterns may still be visible today. As you drive around the county, try to keep some of these maps in your head (and a real road map in the glove compartment).

THE HAWTHORNE VALLEY FARMSCAPE ECOLOGY PROGRAM maintains a collection of maps and other resources to help you gain perspective on our landscape. These are available at: www.hawthornevalleyfarm.org/fep/landscape. Let them know if you have comments, corrections or other maps that you would like to see. They can be reached at: fep@hawthornevalleyfarm.org, or 518-672-7500 ext 254.

DATA SOURCES

Above Statistics Recent national (www.factfinder.census.gov) and agricultural (www.agcensus.usda.gov/) censuses; historical federal (www.census.gov/prod/www/abs/decennial/index.htm) and state censuses (www.nysl.nysed.gov/scandocs/historical.htm); web page of the Columbia County Fair (www.columbiafair.com) and the Harlem Valley Rail Trail (www.hvrt.org); *Flora of Columbia County* by Rogers McVaugh ([http://purl.org/net/nysl/nysdocs/3475833 & 26493717](http://purl.org/net/nysl/nysdocs/3475833&26493717)); NYS GIS Clearinghouse (www.nysgis.state.ny.us); Columbia Land Conservancy (www.clctrust.org); NYS State Board of Elections (www.elections.state.ny.us); historical works cited in text; personal observation; New York State Department of Health Vital Statistics (http://www.health.state.ny.us/nysdoh/vital_statistics/2007/).

Maps and graphs
Transition Zone 1: US Forest Service (esp.cr.usgs.gov/data/atlas/little) and personal observation; *Transition Zone 2:* Primarily Franklin Ellis’s *History of Columbia County* and Peter Stott’s *Looking for Work; How many of us, then and now?*; Primarily state and federal censuses. Early population figures are mainly extrapolations from Albany County data of which Columbia County was part; *Settlement Density:* Lot size comes from data published by the New York State Office of Real Property Services and available at the NYS GIS Clearinghouse; population density is from the Federal census; *The Changing Face of Agriculture:* State and Federal general censuses and Census of Agriculture; *Industrial Abandonment:* see text above map; State and Federal censuses, and Bureau of Economic Analysis, www.bea.gov/regional/reis/; *Protected Land:* Columbia Land Conservancy ; *Wildlife Patterns in Flux:* a set of guesses derived from a variety of historical natural history works (available on request) and our own fieldwork; *Global and Regional Climate Change:* Global CO₂ concentrations graph: from the 2000 report, *Climate Change Impacts on the United States* (www.gerio.org/NationalAssessment/overpdf/overview.html); Northeast contributions to climate change graph: from the 2006 report, *Climate Change in the US Northeast* (www.northeastclimateimpacts.org); *Local Impact of Climate Change?:* Hudson weather graphs: data derived from the CLIMOD database of the Northeast Regional Climate Center (www.nrcc.cornell.edu/page_climod.html).

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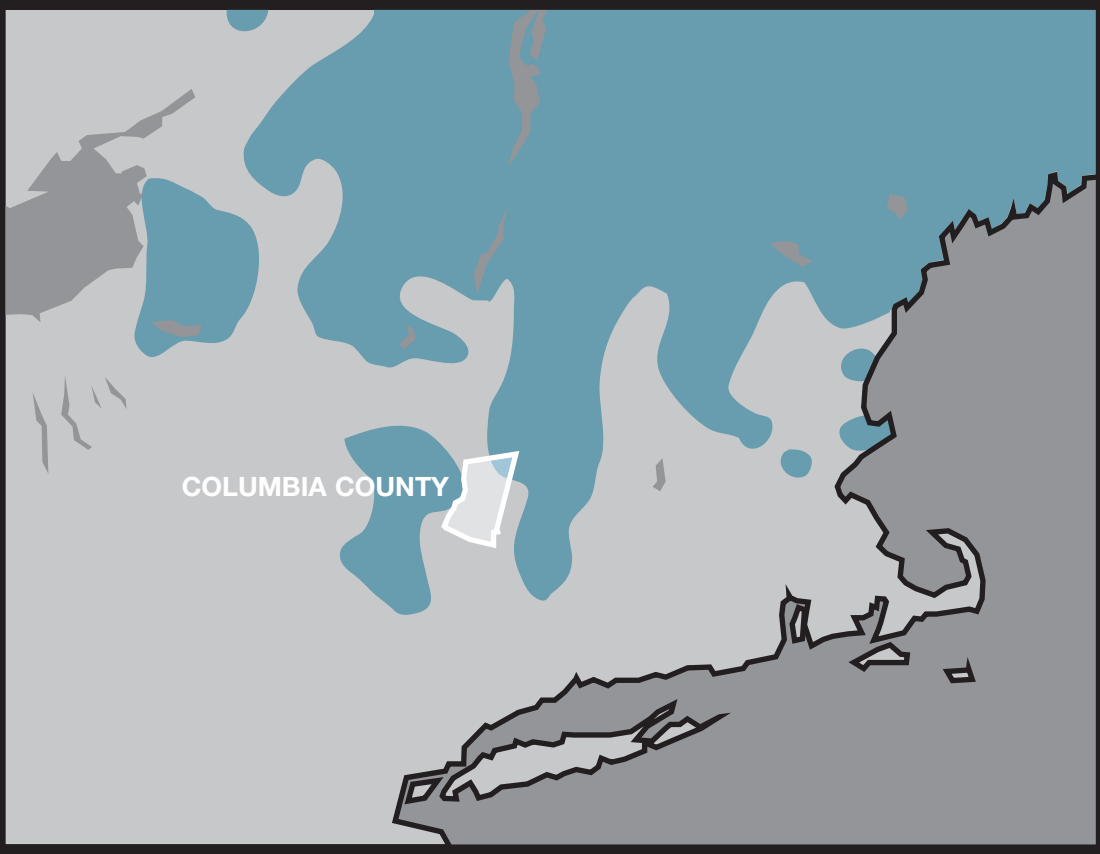


OURTOWN

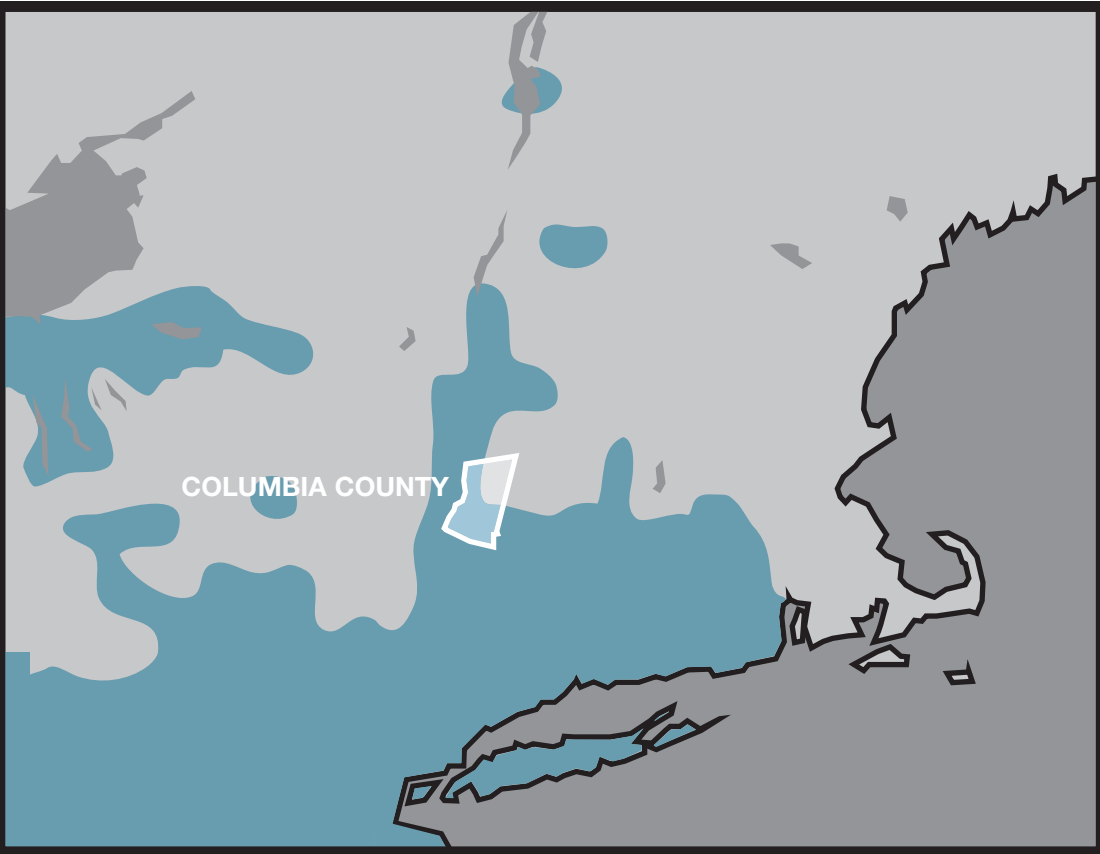
TRANSITION ZONE 1: OVERLAPPING FLORA

Columbia County is in a region of overlap between northern species and southern species. Our warmer lands have plants and animals more typical of farther south, while our colder, higher parts have organisms more typical of farther north. This enhances the county's biodiversity. While this pattern holds for animals, it is perhaps most clearly shown by plant distributions.

DISTRIBUTION OF RED SPRUCE IN NORTHEASTERN USA*



DISTRIBUTION OF TULIP TREE IN NORTHEASTERN USA**



* Map shows the distribution of one northerly tree, Red Spruce, as it dips into Columbia County from the north. Other northerly trees that also have part of their southern boundaries in or near Columbia County include several conifers (such as Balsam Fir, Black Spruce, Red Pine, Northern White Cedar), and a few deciduous trees (Paper Birch, Balsam Poplar, and Mountain Ash).

** Map shows the distribution of Tulip Tree as it creeps up the Hudson Valley from the south. Sharing this general distribution are many Oaks (for example, Pin Oak, Black Oak, Scarlet Oak, and Swamp White Oak), and Hickories (Shagbark, Pignut and Mockernut) plus a smattering of other trees (Black Walnut, Sassafras, Mulberry, Black Gum, Hackberry, and Flowering Dogwood).

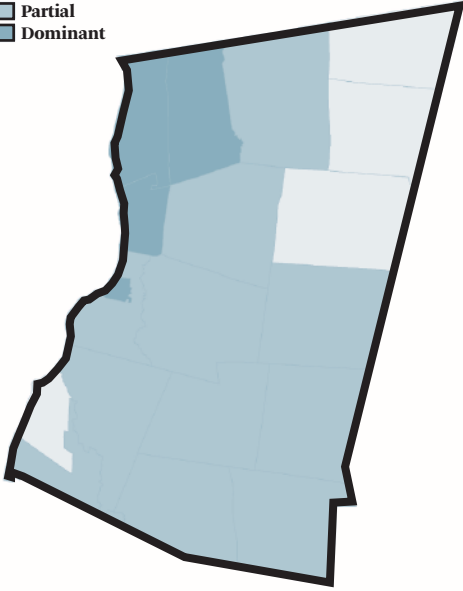
OURTOWN

TRANSITION ZONE 2: OVERLAPPING CULTURES

Columbia County was first colonized by Dutch and, soon after, Germans, who settled along the Hudson river. They spread eastward, but by the mid-18th century bumped up against Yankees coming in from the east. While the passing centuries have diluted the original ethnic patterns, people of Dutch and German ancestry still are most numerous in the western part of the county.

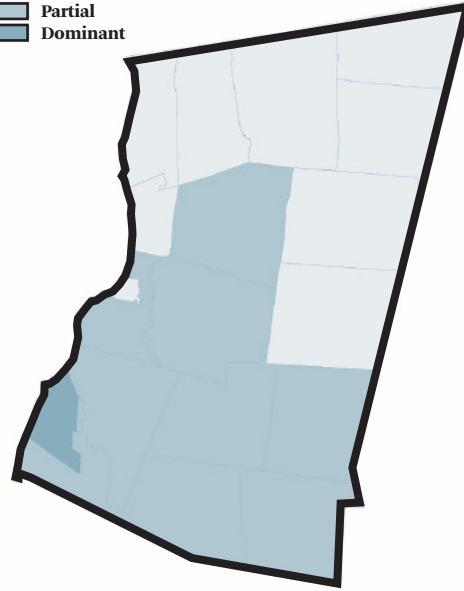
ROLE OF DUTCH IN FIRST SETTLEMENT

Little
Partial
Dominant



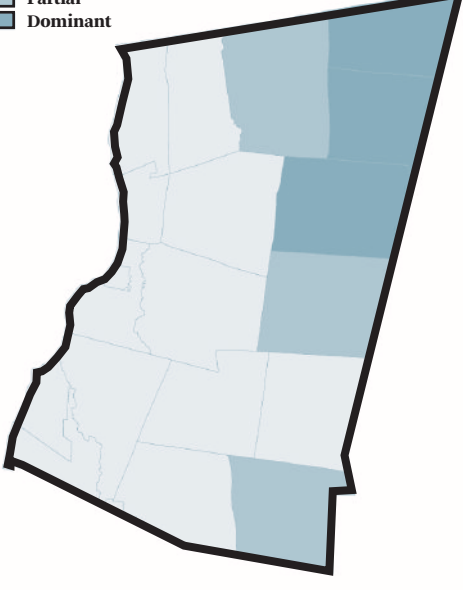
ROLE OF GERMANS IN FIRST SETTLEMENT

Little
Partial
Dominant



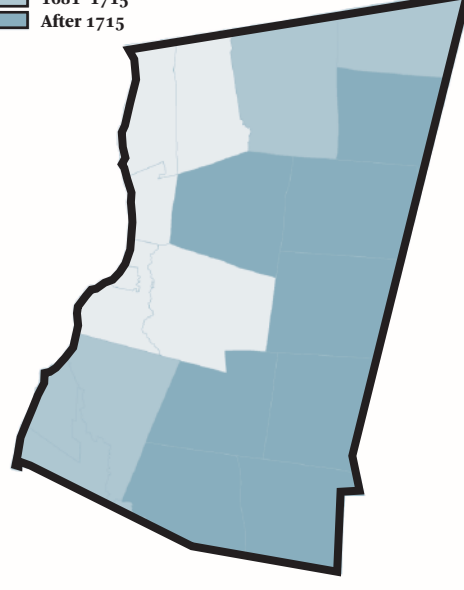
ROLE OF YANKEE/ENGLISH IN FIRST SETTLEMENT

Little
Partial
Dominant



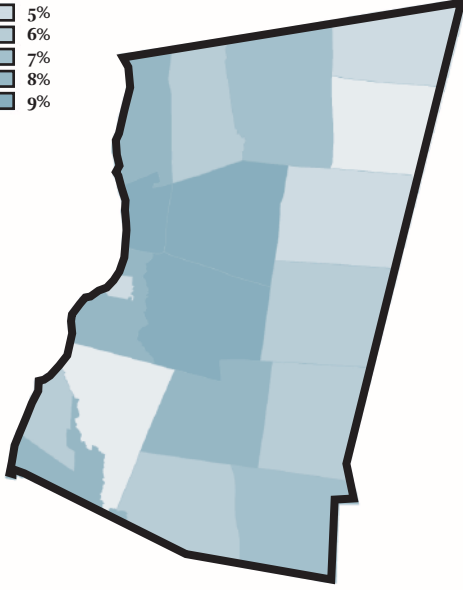
YEAR OF COLONIAL SETTLEMENT

Prior to 1680
1681-1715
After 1715



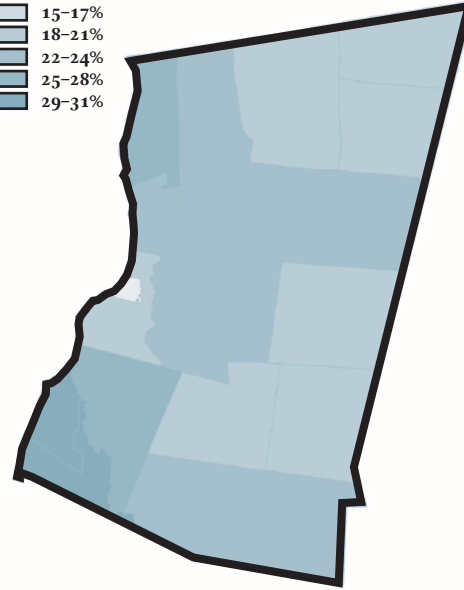
% POPULATION OF DUTCH ANCESTRY (2000 CENSUS)

4%
5%
6%
7%
8%
9%



% POPULATION OF GERMAN ANCESTRY (2000 CENSUS)

10-14%
15-17%
18-21%
22-24%
25-28%
29-31%



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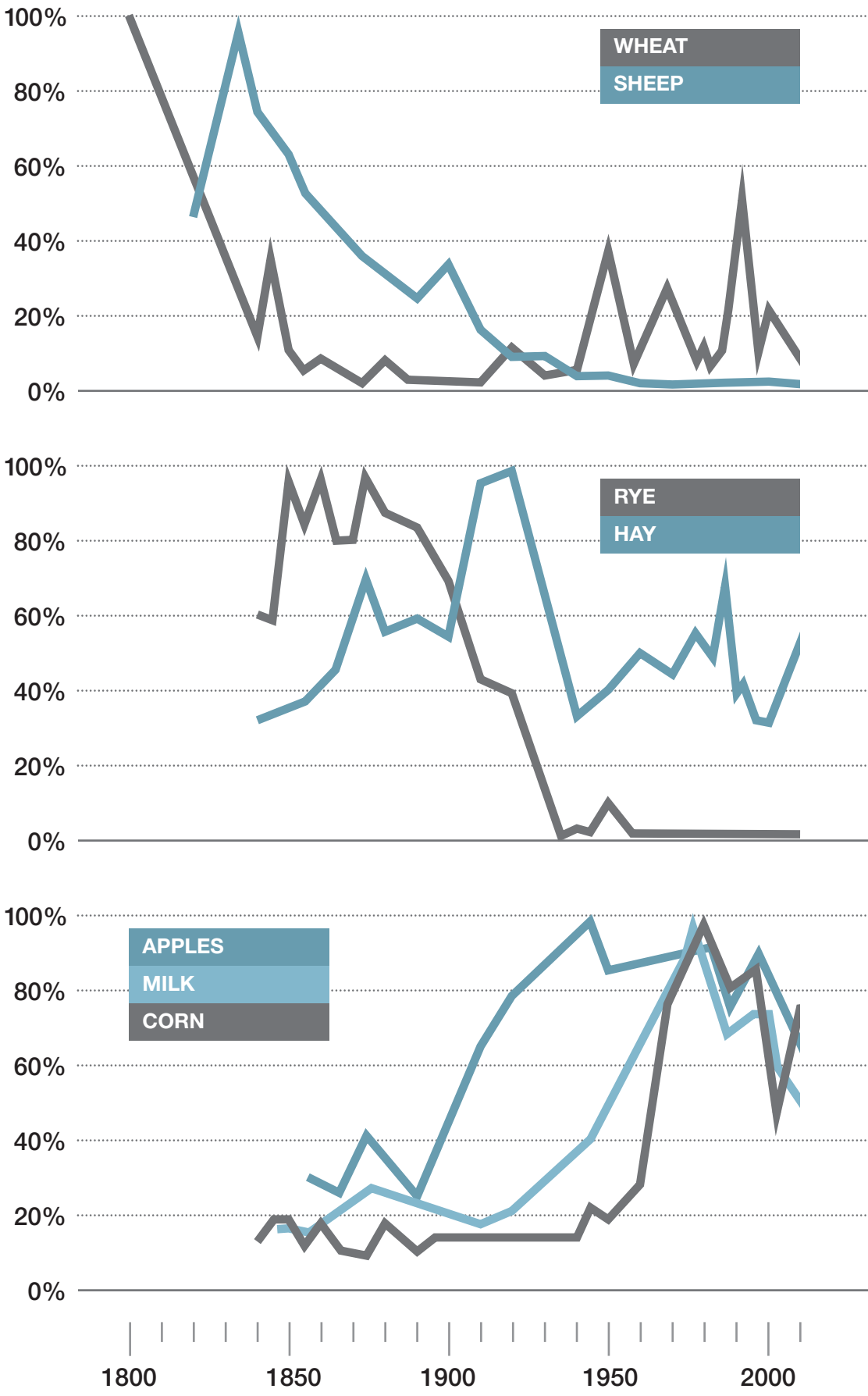
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OURTOWN

THE CHANGING FACE OF AGRICULTURE

Columbia County agriculture has evolved over the past two hundred years, and the major products that farmers sold to market have varied. The following graphs show these changes as lines tracing variation in the harvest, production, or density of animals relative to maximum values recorded over this period. For example, in 1910, Columbia County had only about 20% of the sheep it had at the peak of the sheep boom around 1840. But the hay harvest of 1910 was about 95% of the maximum, while it stood at only 40% in 1840.

RELATIVE AGRICULTURAL PRODUCTION 1800–2010*



* Agriculture has been changing continuously over the last two centuries. The modern decline of fruit and dairy does not necessarily mean the end of the county's farming. New approaches that may peak in the future include organic fruits and vegetables, grass-raised livestock, Community Supported Agriculture and market farms.

OURTOWN

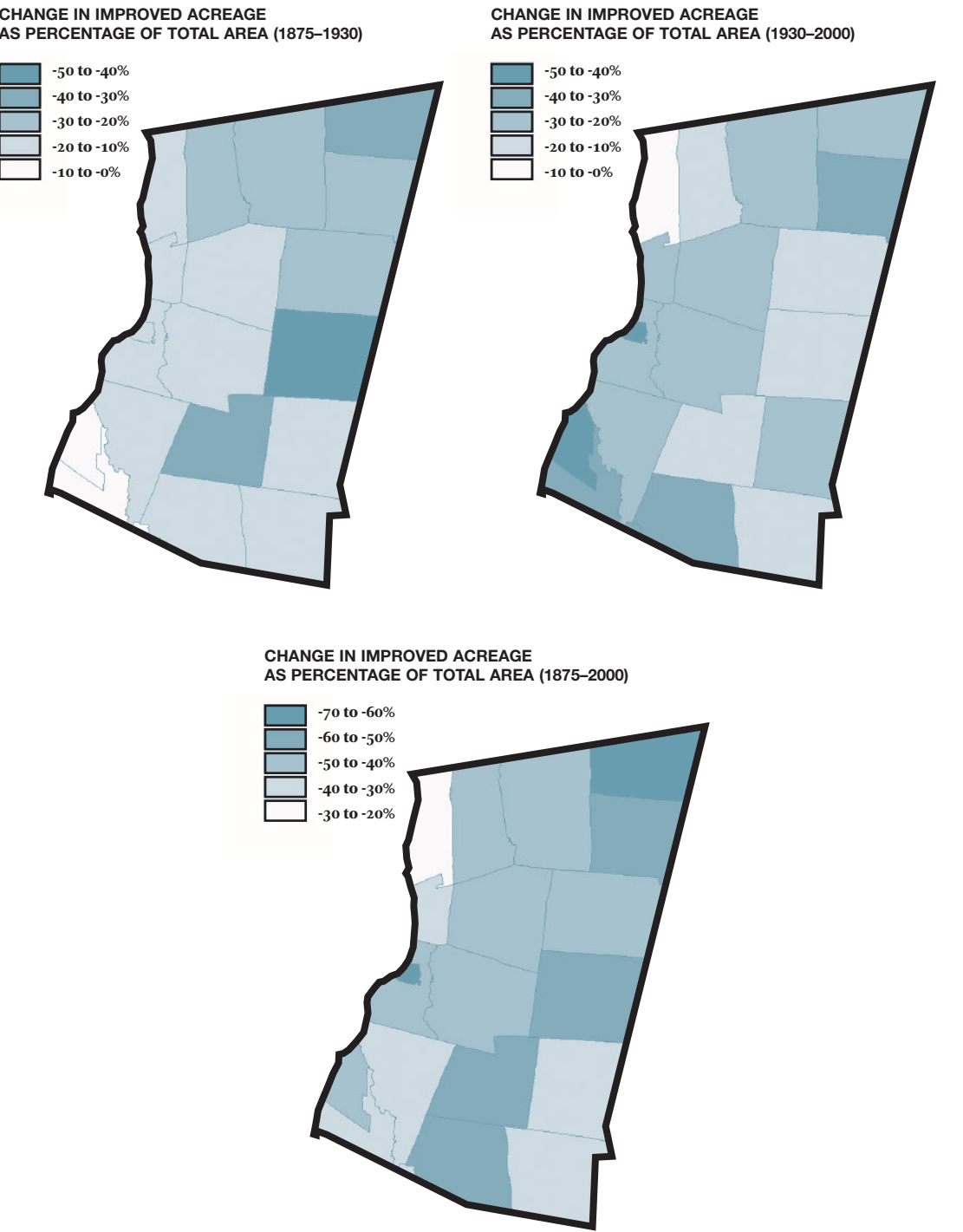
FARMLAND ABANDONMENT

One of the main factors that has shaped the Columbia County landscape has been the abandonment of farmland. This came about not only because farmers went west to where land was cheaper and the soil richer, but also because agricultural practices changed.

For example, as grain-based dairy and fruit production became dominant, less cropland (much of the grain was shipped in from elsewhere), less pasture, and less hayfield were needed locally. The poorer lands were thus abandoned, even if the farm itself was not. Between 1875, (the approximate peak of agriculture in our county) and 1930, the eastern hill towns experienced the largest decline in improved acreage (that is, land being actively farmed). These were some of the poorest soils in the county, and abandonment began thereon. Between 1930 and 2000, Germantown and Clermont (formerly centers of fruit production) recorded some of the highest rates of abandonment. Overall, it has been the northeastern and southcentral towns that have experienced the greatest amounts of farmland loss.

For these maps, farmland loss was calculated as the change in each town's actively farmed land over the given period. This change is expressed as a percent of the given town's total area. For example, between 1875 and 1930, Ancram lost an estimated 5,400 acres. Because Ancram has a total surface area of about 27,350 acres, its change in cropland over this period can be expressed as slightly less than -20%.

This farmland loss has had major cultural, economic and ecological corollaries. New habitats have meant the decline of some creatures and the rise of others. New ways of earning a living have changed our connection to the land.



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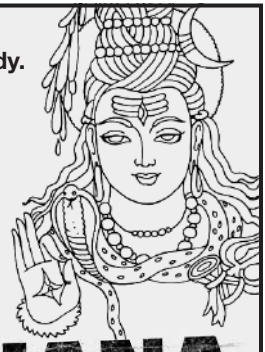


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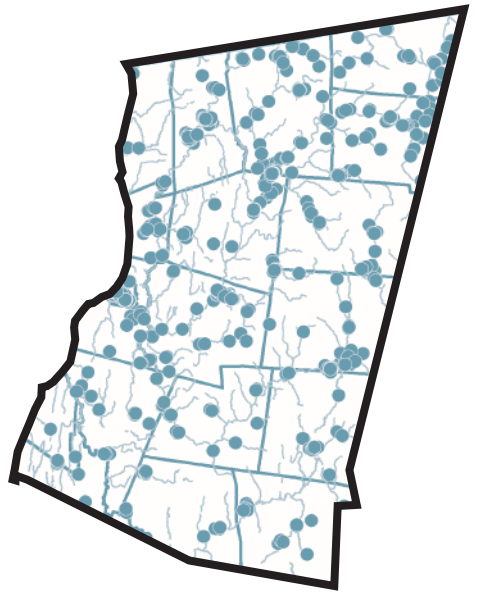
INDUSTRIAL ABANDONMENT

The Columbia County landscape has experienced not only an agricultural but also an industrial revolution. Understanding what people were doing helps us understand not only how land and water were used, but also how connected people's livelihoods were to natural resources.

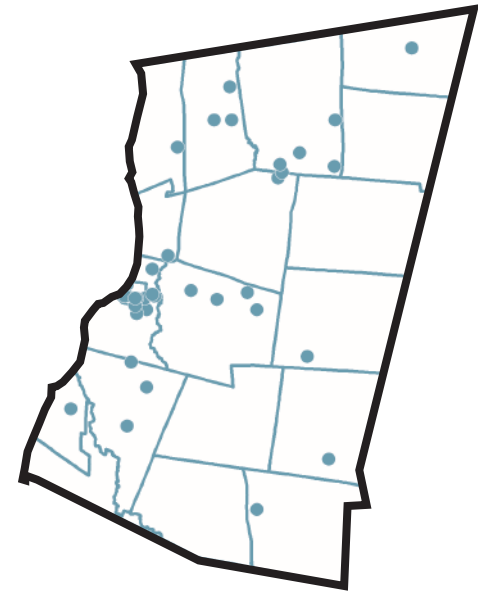
To illustrate the more industrial aspects of our county's history, we've mapped the location of "manufacturing" of all different sizes for two time periods: for 1870-1890 and for the last decade. For each period, we assembled lists and locations of manufacturers from State and Federal census data, the Beers atlas of 1873, Sanborn Fire Insurance maps, county histories (particularly the works of Ellis and of Stotts), Child's 1871 business gazetteer, and lists provided by the Chamber of Commerce and Columbia Hudson Partnership (whose collaboration we much appreciate).

Defining "manufacturing" is a bit tricky. Basically, we described it as the making of a saleable item from raw materials. There are grey zones. While we tried to include grist mills, flour mills and breweries, we excluded bakeries and restaurants. While we included dressmakers and clothes makers, we excluded tailors (who may have focused on repair rather than manufacture of clothing). We included blacksmiths, barrel makers, tin shops, and shoe and hat makers, but excluded mines and house builders. We included saw mills, but not lumber yards unassociated with timber sawing. These choices were guided partially by the criteria of *making* retail items, plus practicality—house building, for example, may not have been a separate profession in the 1800s, and most baking was done in the home.

MANUFACTURING OPERATIONS 1870-1890



MANUFACTURING OPERATIONS 2000-2010



The map of manufacturers around 1880 shows their broad distribution. Most towns had at least a mill or two, plus at least one blacksmith, wagon maker, shoemaker and the occasional dressmaker. Many larger towns had large-scale textile and paper mills, and some also had factories making agricultural implements or other specialized equipment. Finally, there was a smattering of smaller companies that focused on items like thermometers, pumps, or scales. We included streams in this map to emphasize the importance of water power in locating industry. Most of the larger factories relied upon hydropower, although, by 1885, some were going over to steam power.

By 2000, most of these manufacturers had disappeared, although a few large companies remained. We have no doubt missed some small manufacturers in both time periods (our apologies to any one who feels left out), but the change is clear: in the last quarter of the nineteenth century, Columbia County had widespread and diversified manufacturing; by the end of the twentieth century, manufacturing had dwindled substantially.

Industry had various effects upon the land. In the 1800s and earlier, only limited attention was paid to regulating environmental impacts, and damage followed. People were quick to bemoan the effects of damming on migratory fish, and we are still haunted by the industrial pollution of our waters and soils.

On the other hand, counties were more self-sufficient: woolen mills were fed, at least in part, by wool from local sheep; paper mills were surrounded by huge stacks of the locally-grown rye straw used in the paper; iron foundries were able to use local iron. While this use of local raw materials may have made the immediate impacts of manufacturing even more dramatic, it also meant that people lived with the environmental consequences of their own needs, rather than exporting those costs to distant countries.

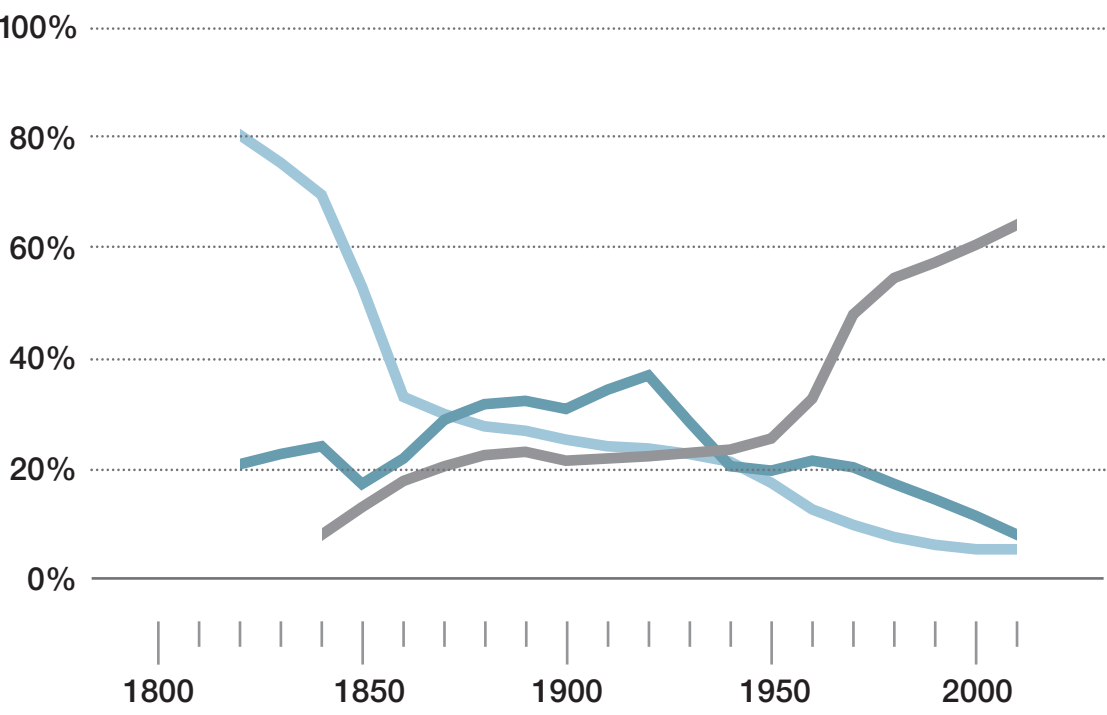
OURTOWN

INDUSTRIAL ABANDONMENT

To portray these changes in a more continuous form, we have plotted the data we were able to find on employment in agriculture, manufacturing, and services/retail. While the exact definitions of these employment classes and of "workforce" differed over time, the pattern seems clear. At the beginning of the 19th century, the Columbia County workforce was predominately farmers; by the late 1800s, the workforce was more diversified, with about equal parts in farming, manufacturing and services/retail; and, by the end of the 20th century, services/retail was the main type of employment.

Today, about half the total population is in the censused workforce (it was about a quarter for much of the 19th century; much work went uncensused). Around 50% of today's workforce is in service industries, with government, retail, construction, manufacturing, real estate, and agriculture making up most of the remainder in descending order of magnitude.

EMPLOYMENT SECTORS AS PERCENTAGE OF TOTAL WORKFORCE



Year	Manufacturing (%)	Farming (%)	Services and retail (%)
1800	20	80	0
1850	25	35	10
1900	35	25	20
1950	20	15	40
2000	10	5	65

Manufacturing

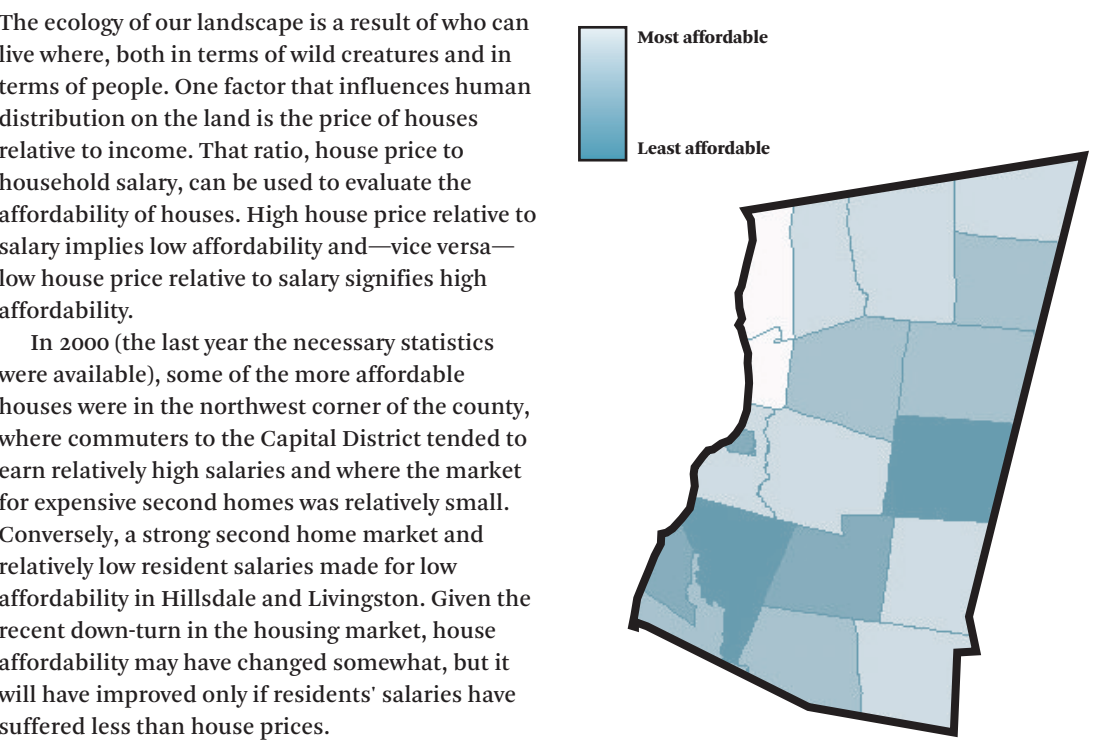
Farming

Services and retail


HOUSE AFFORDABILITY INDEX

The ecology of our landscape is a result of who can live where, both in terms of wild creatures and in terms of people. One factor that influences human distribution on the land is the price of houses relative to income. That ratio, house price relative to household salary, can be used to evaluate the affordability of houses. High house price relative to salary implies low affordability and—vice versa—low house price relative to salary signifies high affordability.


In 2000 (the last year the necessary statistics were available), some of the more affordable houses were in the northwest corner of the county, where commuters to the Capital District tended to earn relatively high salaries and where the market for expensive second homes was relatively small. Conversely, a strong second home market and relatively low resident salaries made for low affordability in Hillsdale and Livingston. Given the recent down-turn in the housing market, house affordability may have changed somewhat, but it will have improved only if residents' salaries have suffered less than house prices.



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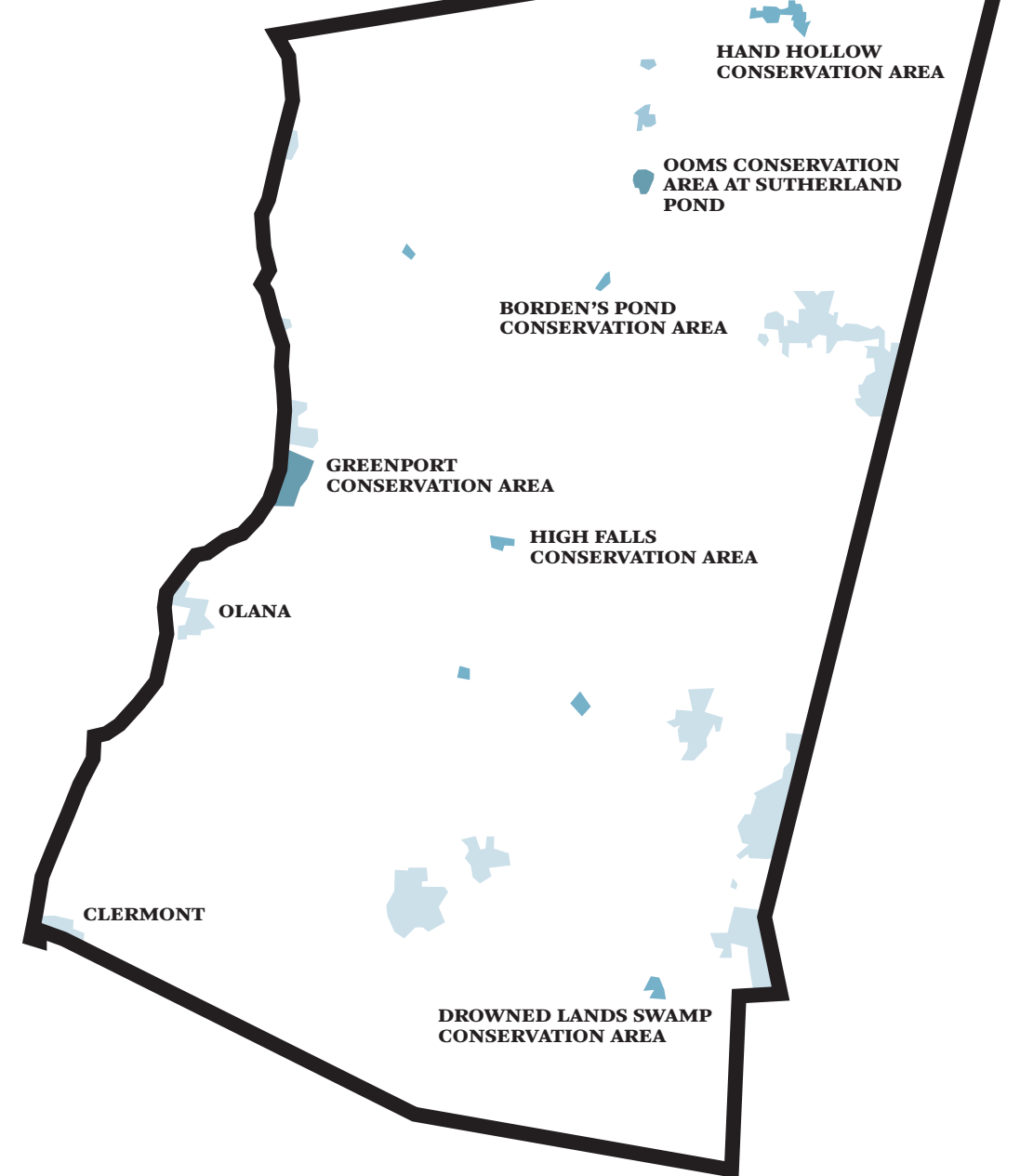
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518-392-1001

Weekdays 7am – 9pm
Friday 7am – 11pm
Saturday 7am – 9pm
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OURTOWN

PROTECTED LAND

- Owned by New York State, Borden's Pond Preserve, Inc., The Nature Conservancy, National Audubon Society, or Scenic Hudson
- Public Conservation Area protected with conservation easement but not owned by Columbia Land Conservancy
- Owned and managed by Columbia Land Conservancy
- Public Conservation Area jointly acquired by Columbia Land Conservancy and Open Space Institute, managed by Columbia Land Conservancy



Around 5% of Columbia County is protected public land, similar to some surrounding counties, but, according to the Columbia Land Conservancy, less than a quarter of what is found in Berkshire County, Massachusetts, or Litchfield County, Connecticut.

To some degree, the value of protection is in the eye of the beholder. Some would say that true protection means the absence of hunting or fishing, while others would argue it is only through the continuation of such use that widespread public support for conservation can be assured. Likewise, the definition of *public* also bears considering. Clearly, land that is open to all can have diverse public benefits, but what of protected land which is not open to the public (such as lands under conservation easements)? While some might describe these as providing mostly private gain, others would note their potential importance to native plants and animals (and, in some cases, agriculture) and their value in preserving the

appearance of the landscape. Is this too much protected land or too little? Certain people view a map of protected areas as a map of too many roadblocks or infringements; others see it as a map of too few opportunities and ecological safe-havens.

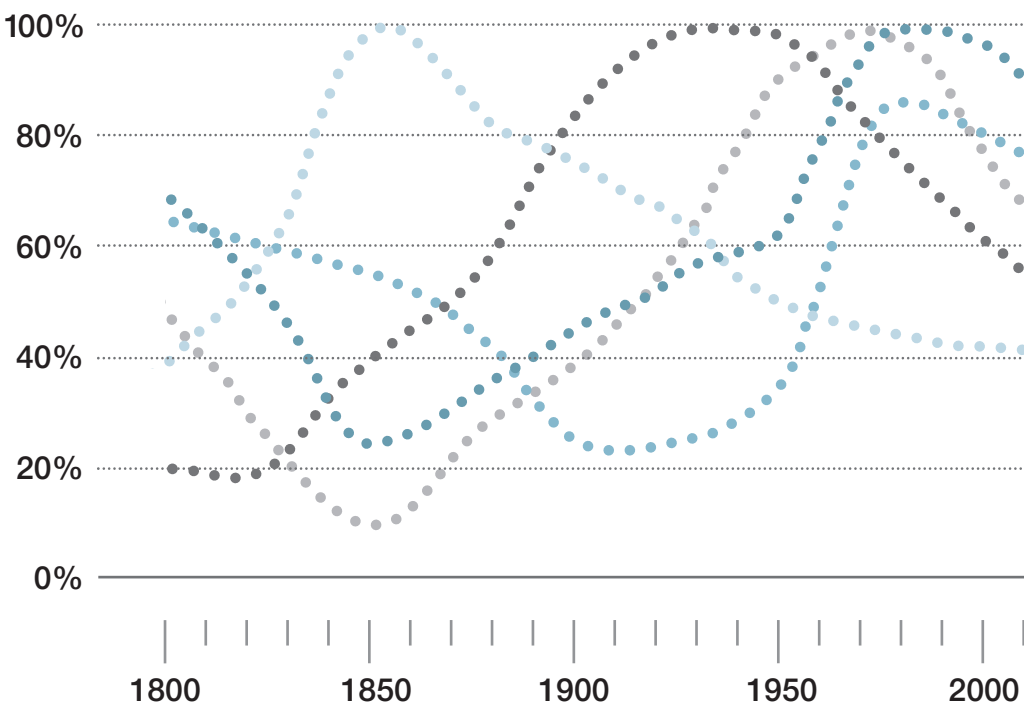
Our own perspective is that such places do have great value, as opportunities for all to partake of the land and as reservoirs for the protection of demographically delicate organisms. And yet, if our goal is a landscape where humans and nature live healthily side-by-side, then discrete protected patches are not enough. If we 'green' our landscape and yet continue to import 'polluting' goods from elsewhere, then we are, essentially, throwing our trash into somebody else's backyard. Further, few of our native creatures could survive if their only homes were these small pieces; like a color on an artist's palette, small 'protected areas' succeed ecologically only if they are part of a larger, hospitable canvas.

OURTOWN

WILDLIFE PATTERNS IN FLUX

The changing face of our region has meant changing fates for the native plants and animals with which we share this land. The following graph illustrates an estimate of the relative abundance of some of these creatures over the past two centuries.

RELATIVE ABUNDANCE OF WILDLIFE SPECIES 1800–2010



- Forest organisms
- Wetland organisms
- Grassland birds
- Hill pasture plants/butterflies
- Shrubland birds

Forest organisms suffered steep declines in the 19th century as forest was converted to agriculture; they rebounded with the 20th century return of forest on former farmland. The more regular sightings of moose, fisher and bear exemplify the results of this reforestation. In much of the Northeast, however, such forest return has now switched to decline, this time due primarily to commercial and residential development rather than agriculture.

Wetland organisms suffered as their home habitat was drained for farming, an activity that became particularly intense late in the 19th century and during the first half of the 20th century. Some of those formerly drained wetlands have now reverted to their larger extents as the maintenance of agricultural drainage dwindled. Development continues to threaten smaller wetlands.

Grassland birds probably had their heyday during the second quarter of the 1800s, as hay fields expanded but before early hay cutting became the norm. Most baby grassland birds have left the nest by mid July. In 1840 we have a report from the county that haying began around the same time. It thus probably had little impact on these birds. By the end of that century, however, progressive farmers were recommending cutting in June. Since then, technology has allowed that cut to become ever earlier. Today when, with the advent of "baleage" (essentially, hay bales that are fermented in plastic wrap) and full mechanization of the harvest, many fields are first cut in May and may be re-cut at least two times thereafter. Such modernization together with an overall decline in

open fields has severely reduced the habitat available to these animals.

The organisms of hill pastures and shrublands show somewhat parallel fates: as hill pastures continued to be grazed, their soils often became more exhausted. This resulted in better ground for native plants, which had been unable to outcompete the non-native forages on good soils. When such pastures were abandoned, grassland species lost habitat, but, as woody plants began to take over, shrubland species gained land. Finally, as the brush grew into the forests we see around us today, shrubland organisms were replaced by forest life.

It is important to consider these changes at the continental scale as well as at the county scale. For example, many of our grassland birds originally had their demographic heartland in the prairies of the Midwest. The late 19th century decline of good grassland habitat in the Northeast coincided with the conversion of much Tall Grass prairie to industrial agriculture and so dealt these birds a one-two punch.

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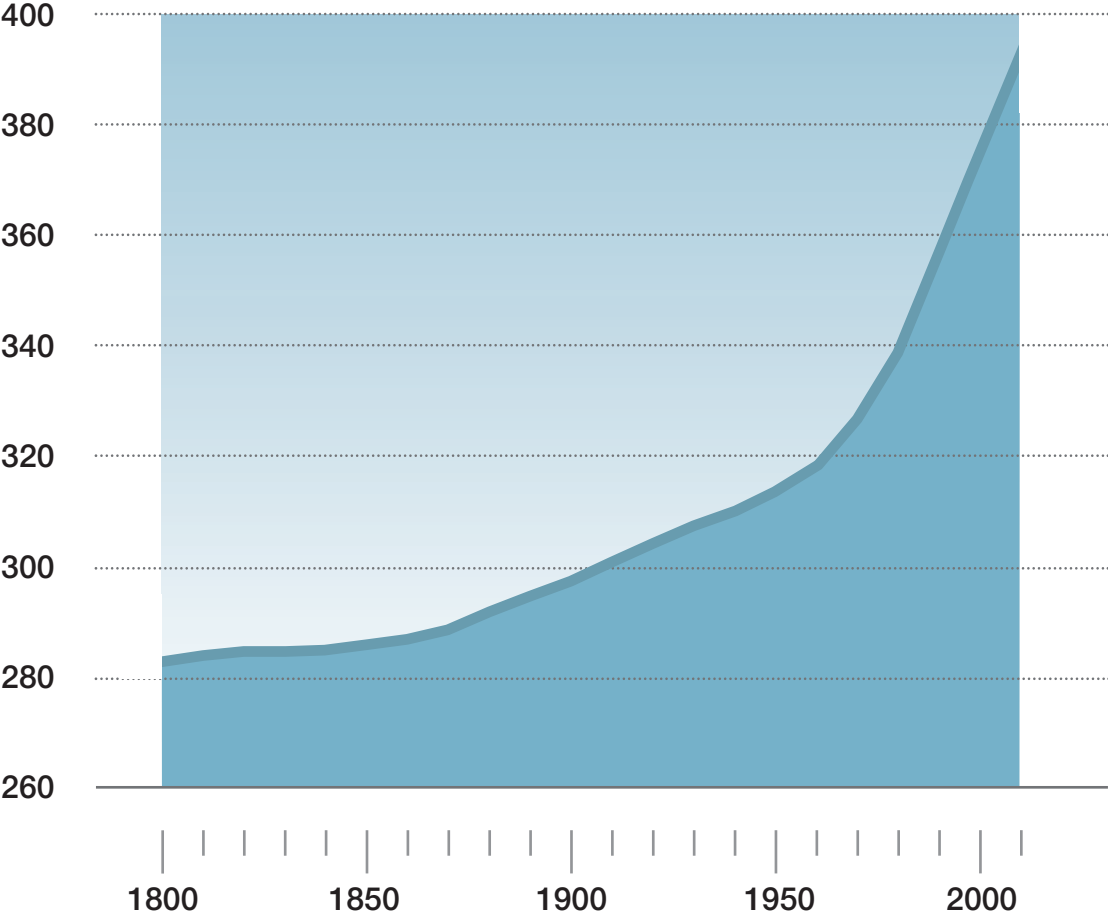
OURTOWN

GLOBAL AND REGIONAL CLIMATE CHANGE

Many scientists attribute the recent changes in global weather patterns primarily to human-induced emissions of greenhouse gasses (GHG) such as carbon dioxide, methane and nitrous oxide, that have occurred since the Industrial Revolution. GHG emissions predominantly come from the burning of fossil fuels, agricultural practices, and land use changes such as forest clearing. The graph below charts the global rise of carbon dioxide concentration in the atmosphere, as parts per million (PPM), over the last two centuries. Researchers have estimated that 350 PPM is the safe upper limit for carbon dioxide, and warn that higher concentrations are unsustainable, and may lead to devastating and irreversible climactic impacts.

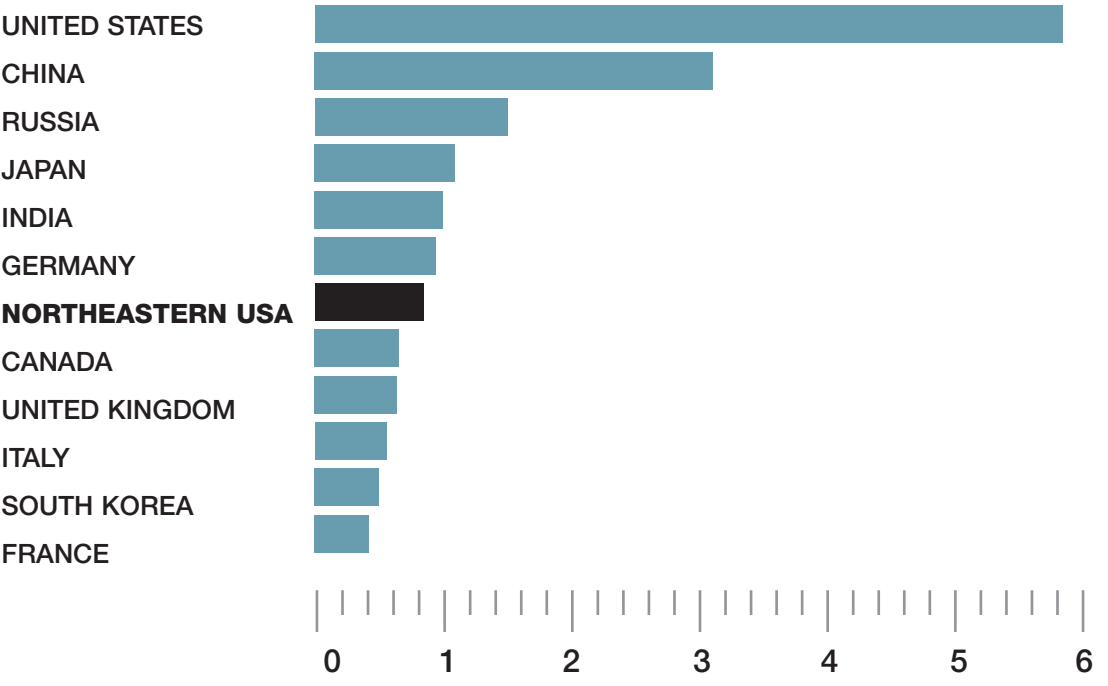
While many are aware that the United States and China are the largest GHG emitters, the significant role that regions within the USA play in GHG emissions is less well-known. New York State, for example, is responsible for 1% of global GHG emissions (while having 0.3% of the world's population). A 2001 graph shows that if the northeastern USA were a country, it would be ranked 7th in the world for highest annual GHG emissions.

GLOBAL CO₂ CONCENTRATIONS IN PARTS PER MILLION BY VOLUME



REGIONAL CONTRIBUTIONS TO CLIMATE CHANGE

ANNUAL EMISSIONS IN 2001 (GIGATONS OF CARBON DIOXIDE)



OURTOWN

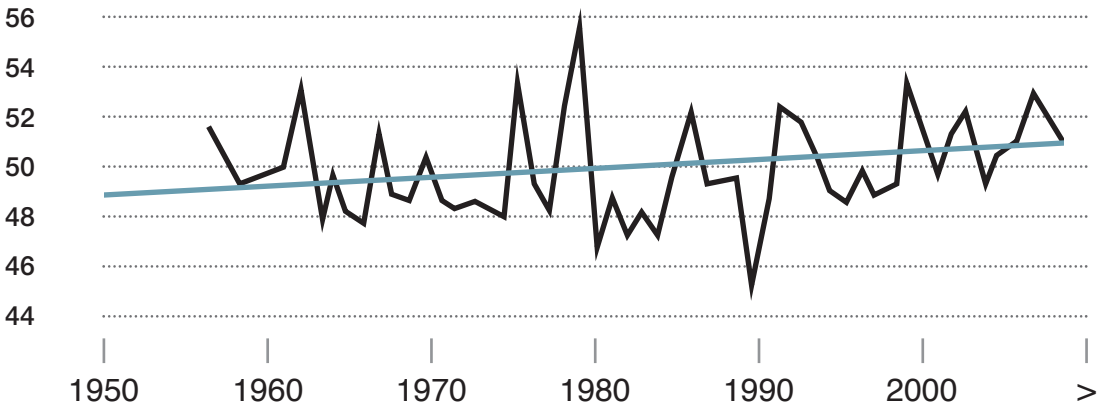
LOCAL IMPACT OF CLIMATE CHANGE?

What are the recent patterns in local weather? The graphs below show changes in temperature and precipitation in Hudson over the last half century; the longest consistent weather records in the county. Over this 51 year period, the mean average temperature in Hudson increased by slightly over 2 degrees Fahrenheit, and the mean average precipitation increased by more than 15 inches.

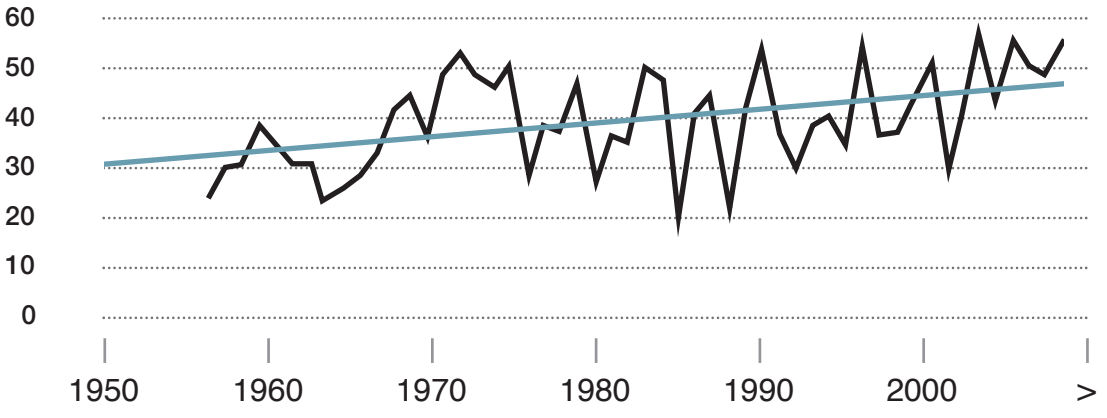
Such changes dramatically impact agricultural activity. The bottom graph shows the change in the average length of the growing season over this 51 year period. The average annual number of growing days increased by 30 days. Despite the longer growing season that these new conditions would seem to promise, it is difficult for farmers to plan for long term trends when there is so much inherent variability in the year-to-year-weather.

It is important to keep in mind that these graphs are drawn only from a small window of time. Such short, sometimes incomplete, local data sets cannot prove or disprove climate change, let alone elucidate its causes. Still, the apparent local trends do reflect the overall trends that scientists have identified in the Northeast using more complete data sets: warmer, wetter conditions. *(Trend lines in color.)*

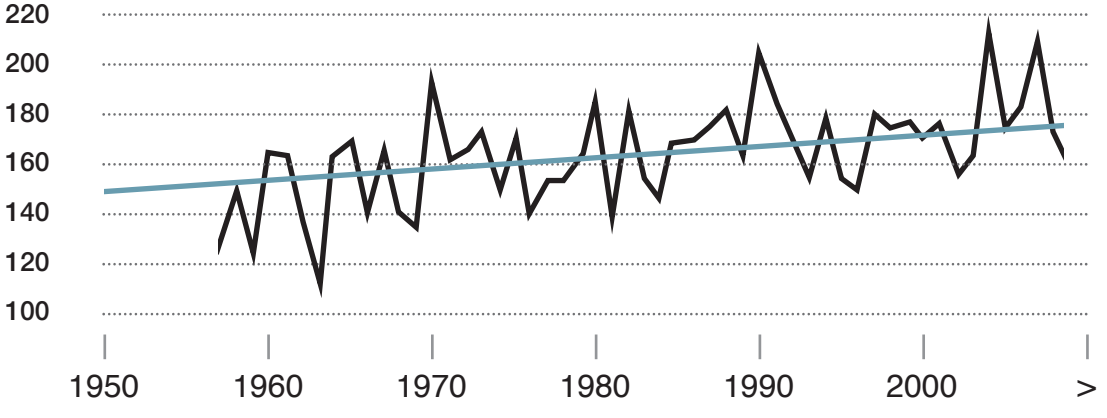
HUDSON NY: MEAN AVERAGE TEMPERATURE (°F) 1957–2008



HUDSON NY: MEAN AVERAGE PRECIPITATION (INCHES) 1957–2008



HUDSON NY: GROWING DAYS 1957–2008



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