Town of Berne

Comprehensive Plan

Part II

May 16, 2011 – Adopted April 12, 2017

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A. Existing Conditions/Profile and Inventory

Population Analysis[1]

The population in the Town of Berne has increased 12.49% between 1980 and 2000. The increase is much higher than that seen by Albany County, whose population remained relatively stable over the years. The growth of population in Berne is also higher than in New York State, but is one half lower than the population growth of the United States. In 2000, the US Census recorded 2,846 persons in Town. From 1980 to 1990, the Town of Berne experienced a 21% rate of increase. This was in stark contrast to the 1990 to 2000 growth rate where Berne lost population at a rate of -6.8%.

Table 1: Population Changes from 1980 to 2000

Area	1980	1990	2000	1980-2000 Change
United States	226,546,000	248,710,000	281,421,906	24.2%
New York State	17,558,165	17,990,455	18,976,457	8.1%
Albany County	285,909	292,588	294,565	3.0%
Town of Berne	2,532	3,053	2,846	12.5%

The population of Berne is estimated to have increased to 2,883 in 2008 by the U.S. Census Bureau. The Capital District Regional Planning Commission has projected population changes for the region. They project that Berne's population will decrease from 2,811 in 2010 to 2, 794 in 2030, and then increase slightly to 2,808 in 2040. At the same time, they also project that the number of households in town will show a steady increase from 1,120 households in 2010 to 1,195 in 2040. Overall, these projections predict slow growth for the Town of Berne. The overall trend in population growth since 1940 is shown below.

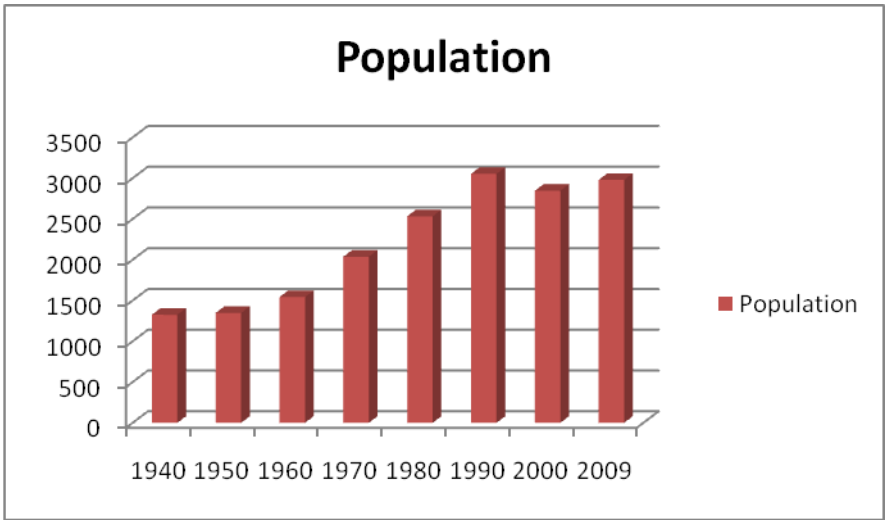


Figure 1: Population Changes 1940-2009

1 All information for population demographics was obtained from the 1980, 1990, and 2000 Census Data from the U.S. Census Bureau. All projections from the ESRI Business Analyst, 2009.

Table 2 compares population changes in Berne, Knox, Westerlo, and Rensselaerville between 1990 and 2000. This chart shows that while the Town of Berne lost population, Knox and Rensselaerville did not change, and Westerlo grew 4.2%.

Table 2: Population Changes from 1990 to 2000, Berne and Surrounding Communities

Area	1990	2000	1990-2000 Change
Berne	3,053	2,846	-6.8%
Knox	2659	2654	<1%
Rensselaerville	1990	1915	<1%
Westerlo	3325	3466	4.2%

Since 1980, Berne has experienced a substantial loss in very young people and those aged 15 to 24 years (Table 3). At the same time, there has been a substantial increase in population aged 45 to 54 (77% increase). The median age has risen from 30.9 years to 39.6 years (a common occurrence throughout New York State). 20% of the Town's population is over 55 years. This data shows an aging population as well as a loss of school-aged children.

The Capital District Regional Planning Commission projected changes in the age structure of the Town. The project for the year 2010 that 29.3% of the population is aged over 55 years and 17.1% is school aged. By 2040, that is projected to be 31.4% over aged 55 and 18% school aged. In 1980, 25.2% of the population was school aged and 19.7% was over 55. These changes in demographics have implications to the school district, housing needs, recreation and other services needed to support the future population.

Table 3: Age Distribution 1980 - 2000.

Age Group	Population			
	1980	**1990**	**2000**	**1980 to 2000 Change**
Under 5 years	195	248	153	-21.5%
5 to 14	395	467	411	4%
15-24	423	359	328	-22.5%
25-44	737	1063	839	14%
45-54	279	329	493	77%
55-64	235	269	281	20%
65+	263	258	342	30%
Median Age	30.9	33.7	39.6	28%

Table 4: Comparison of Age Distribution, Percent of Total Population, 2000

	0-4	5-14	15-24	25-44	45-54	55-64	65 +
Berne	5.3	14.6	11.4	29.4	17.4	9.8	12.0
Albany County	5.7	13.0	15.2	28.9	14.3	8.5	14.5
New York State	6.5	14.1	13.4	15.5	13.5	8.9	12.8

Table 4 shows that Berne's population statistics compare similarly to those in Albany County and New York State for the young population. However, for the 25-44 year old age group, Berne's percentages, like Albany County is almost double that of New York State. As compared to Albany County, it is about 3% higher for the 45-54 age groups (2000 data). Figure 2 summarizes the age distribution changes in Town from 1980 to 2000.

Figure 2: Age Distribution in Berne

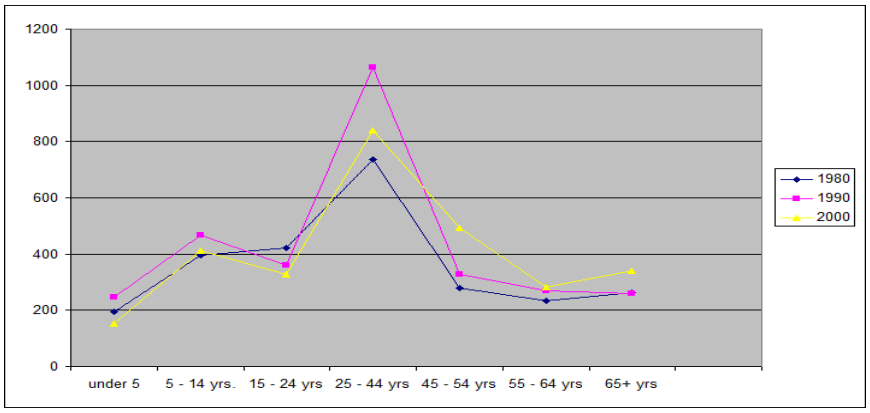


Table 5 illustrates that the number of households has not changed significantly since 1990 but the total number of families has decreased. (Households are defined by the US Census as the people who occupy a housing unit as their usual place of residences. A family includes all people living in the same household who are related by birth, marriage, or adoption.) The number of persons per household in 1990 was 2.77, and in the 2000 US Census, it was 2.59. The number of persons per household is expected to continue to decrease and is projected to be 2.35 persons per household in 2040 (Capital District Regional Planning Commission).

Table 5: Other Population Data Town of Berne

	1990	2000	1990 to 2000 Change
No. of Households	1102	1099	<1%
Total No. of Families	844	806	-4.5%
Number of Housing Units	1372	1385	1%

Table 6 shows other similarities and differences between Berne and its neighbors from the 2000 US Census.

Table 6: Comparison of Other Demographic Characteristics of the Town of Berne to Other Adjacent Towns, 2000

	Town of Berne	Town of Knox	Town of Rensselaerville	Town of Westerlo
Total Population	2846	2654	1915	3466
Number Housing Units	1385	1038	1187	1537
Number Vacant Housing Units	286	86	408	211
Percent of Population 16 and over in Labor Force	66.2	71.3	63.0	62.2
Median Household Income	47,174	55,658	42,391	48,488
Households Below Poverty Level (See note)	5.3	4.9	5.6	6.8
Median Value Owner Occupied Housing Units	93,800	111,800	90,900	98,900

Housing Data

Figure 3 demonstrates that there were very slight changes in the housing unit characteristics in Berne between 1990 and 2000. This chart also illustrates that most units are occupied and there are relatively few rental, vacant, and seasonal units. In 2000, there were 1385 housing units, of which 286 were considered vacant (about a 5% vacancy rate). The Capital District Regional Planning Commission estimated that by 2007, there were a total of 1,456 units in Berne.

Figure 3: Housing Characteristics

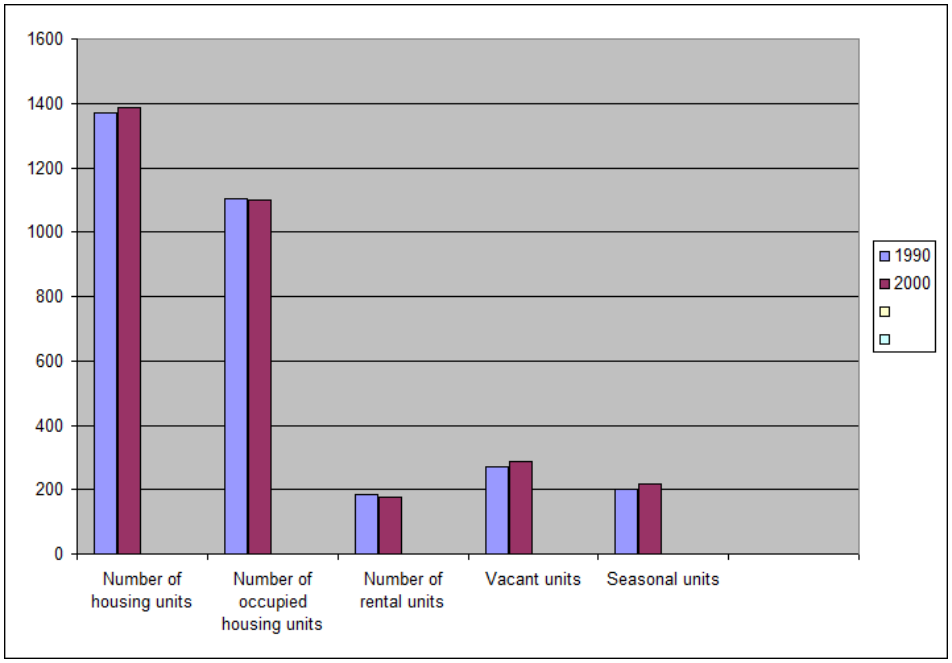
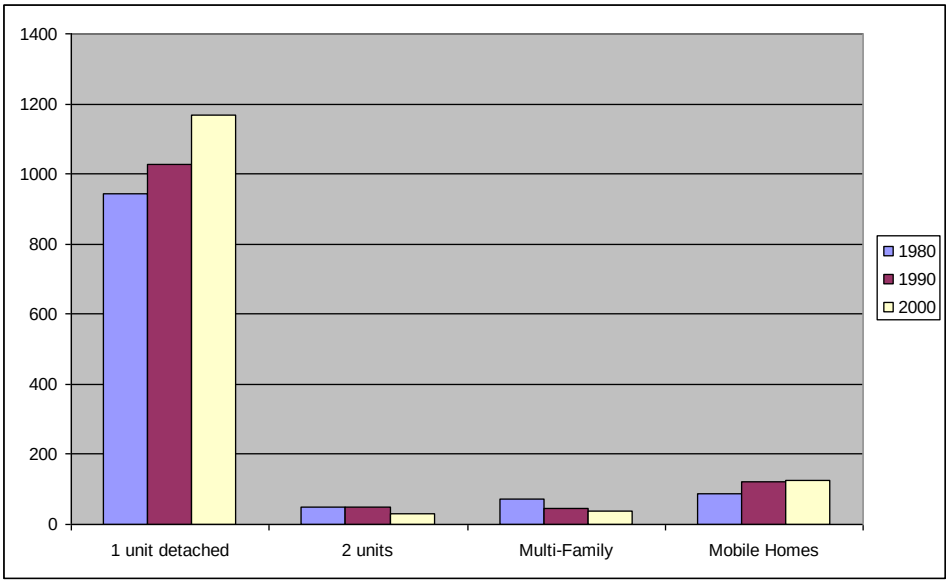


Figure 4 illustrates how about 86% of all units are single family units. About 2% of the town housing stock is two-family, and 3% are 3 or more units. Nine percent or 125 units are classified as mobile homes.

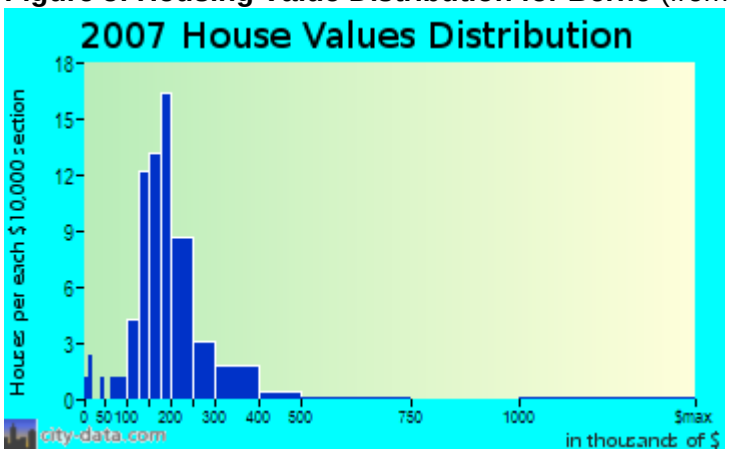
Between 1990 and 2000, the number of single family units increased by about 5.5% while the number of two, three and four family units decreased by almost 8%. The number of mobile homes remained unchanged between 1990 and 2000.

Figure 4: Type of Housing Units in Berne, 2000



The median home value of owner-occupied units in Berne in 2000 was $93,750 (compared to $90,203 in 1990). About 51% of all such units were valued between $50,000 and $99,999 in the year 2000. About 12% of these units were valued over $150,000. For rental units, the median rent pad was $413 in 2000. A slightly different perspective is seen in Figure 5. This data comes from city-data.com which compiles recent real estate sales information. They report for the Town of Berne in 2007 that the average housing value was between $150,000 and $200,000.

Figure 5: Housing Value Distribution for Berne (from city-data.com)



Housing Affordability

There are several ways to determine if housing is generally affordable in a community. One method is to determine the *rental index*. This index shows the maximum gross rent a given household can afford. Affordable rental housing is generally considered to be no more than 30 percent of a household's monthly income.

2000 Data

Median Household Income ($47,174)
Median Gross Rent ($490)
Median Value of Home ($93,750)

A. Rentals. In 2000, the median household income was $47,174, which yields about $3,931 of income per month. Thirty percent of that income is $1,179, which means that the household earning the median income or higher could afford the average $490 per month in rent documented in the 2000 census data. According to the 2000 Census, there were 119 rental units. Of those, 56 had rents over $500. There were no units that had rents in excess of $1000. Using 2000 data, it appears as if rentals were affordable.

B. Affordability Ratio. A second method to determine affordability is to look at the ratio between the median value of a single-family house and median household income. Nationally, a ratio of two or less is considered to be affordable. The affordability ratio for Berne is calculated for 2000 as: $93,750 (median value of homes in 2000) divided by $47,174 (median household income), or 1.99. This figure is just at the desired ratio of two and indicates general affordability for households earning median income levels or higher. In 2000, About 574 households earned less than the median income level. For example, 145 households earned between $25,000 and $34,999. For a household earning 25,000, the affordability ratio would be 3.75. At that time, incomes would have to be above $46,875 to meet the affordability definition.

C. Purchase Price Multiplier. A third method, the *purchase price multiplier*, also gives an indication of affordability. This looks at the maximum mortgage approval amount likely to be given to potential homebuyers, which is usually about 2.25 times annual income. Based on

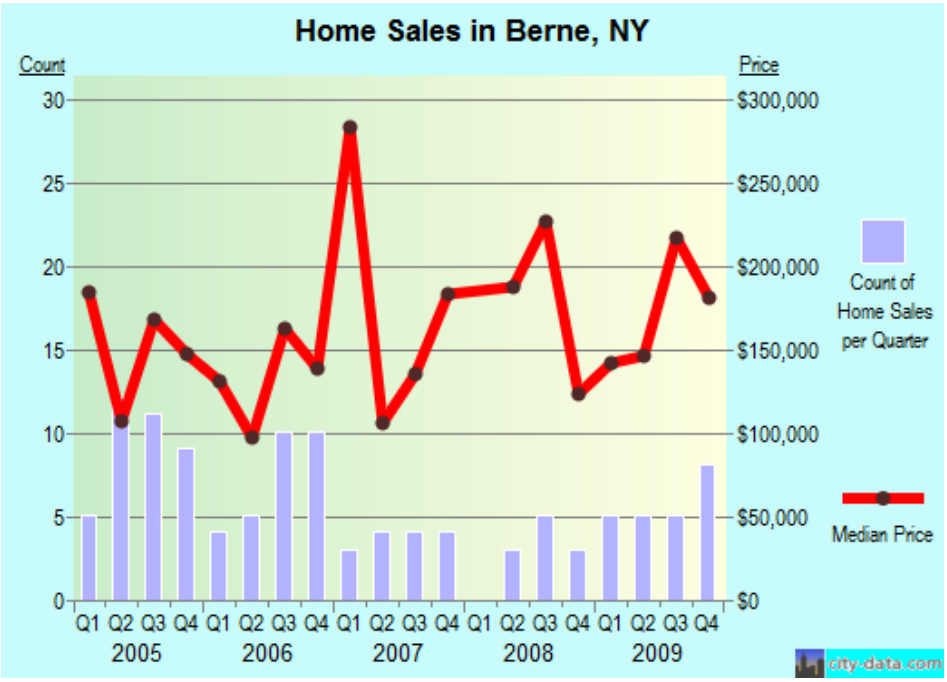
the 2000 median income, this approach indicates the median income household could afford a house costing $116,142, assuming a 10 percent down payment, which was above to the median priced home in 2000.

2008 Data (Estimated from US Census Projections)
Median Household Income ($66,000)
Median Gross Rent ($670)
Median Value of Home ($185,040) (According to the New York State Association of Realtors, the median sales price of homes in Albany County in 2009 was $199,000)

A. Rentals. Using the 30% "rule", rentals would be affordable by households earning at or above the median household income to rental levels up to $1650 per month.

B. Affordability Ratio. The affordability ratio for Berne using estimated 2008 data is: Using the estimated figures, the data shows that the housing affordability ratio is 2.7 for households earning the median income. This indicates a trend towards less affordability. Households earning below the $66,000 median level would have further difficulties affording the median priced house in Berne.

C. Purchase Price Multiplier. The purchase price multiplier (2.25 times the annual income plus 10%) indicates that a house sold at $163,350 would meet the affordable definition. That is below the estimated median home value in Berne, and is another indicator of a growing problem of housing affordability. The chart below shows home sales and values in Berne over the past 5 years.



Commercial/Economic Resources

The Town of Berne has an economy that is primarily dependent on the larger economies surrounding it. The Town is rural by nature yet few residents have farming as a sole income

source. Few opportunities exist within the Town for high-paying employment and there are no large employers within the Town. As a result, residents commute to neighboring municipal centers to seek employment.

Industries and Businesses in Berne

County Business Patterns is a database of economic information collected by the United States. It records businesses, payroll and employee information for all businesses who have Federal Identification Numbers. This information excludes data on self employed individuals, employees of private households, railroad employees, agricultural production employees, and most government employees. Table 7, below, compares data for zip codes 12023 and 12059 for the years 1998 and 2008. This data does not reflect home-based businesses or farms that may not have Federal Identification Numbers. In 2008, there were 37 (down from 42 in 2007) businesses in the zip code area employing 138 persons and having a total payroll of $3,293,000. Retail trade and construction businesses were the most common businesses reporting data. This is an increase from all measurements found in 1998.

Table 7: Business Information for Zip Codes 12023 and 12059

	12023		**12059**	
	1998	**2008**	**1998**	**2008**
Number of Establishments	18	21	15	16
First Quarter payroll (in dollars)	112,000	308,000	170,000	391,000
Number of Employees	35	64	61	74
Annual payroll (in dollars)	640,000	1,497,000	930,000	1,796,000

As shown in Table 8 and 9, the most common occupation is in professional, scientific, management or administration followed by occupations in education, health and social services, then manufacturing, construction and retail trade. Fourteen persons were employed in agricultural occupations in 2000. These patterns remain unchanged from 1980. Of the 1,387 workers in the 2000 US Census, 69% were private wage and salary workers while 24% were government workers, 6.5% were self-employed workers, and less than 1% was unpaid family workers.

Table 8: Occupations by Number of Employed Persons 16 Years or Older, 2000

Industry	**# of Employed Persons in Town of Berne**
Educational, Health, and Social Services	282
Arts, Entertainment, Recreation, Accommodation, and Food Service	93
Retail Trade	106
Construction	129
Manufacturing	154
Other Services	94
Public Administration	142
Professional, Scientific, Management, Administrative	408
Wholesale Trade	50
Agriculture, Forestry, Fishing, Hunting, Mining	14

Industry	# of Employed Persons in Town of Berne
Finance, Insurance, Real Estate, Rental, and Leasing	94
Transportation, Warehousing, and Utilities	83
Information	14

Table 9: Comparison of Occupations, 2000

	% of Employed Persons, Aged 16 and older		
Occupations	Town of Berne	Albany County	New York State
Sales and Office Occupations	27.5%	29%	27%
Management, Professional, and Related	29.4%	42%	37%
Service Occupations	14.1%	14%	17%
Production, Transportation, and Material Moving	14.2%	8.6%	12%
Construction, Extraction, and Maintenance	14.5%	6.1%	7.6%
Farming, Fishing, and Forestry	0.4%	0.1%	0.3%

Table 10: Employment Data for Town of Berne (for those aged 16 and older)

Labor force	1990	2000	1990 to 2000 Change
People in labor force	1602	1487	-7.8%
People Unemployed	54	97	44%
People not in labor force (including retired)	675	758	11%

Income Data

Table 11 illustrates changes in income levels between 1990 and 2000. Income levels increased while the number of public assistance households and the number of individuals living below the federal poverty level decreased. Of those persons living below the poverty level, 17.9% were below the age of 18 years while 2.9% were senior citizens. About 5% of all households were living below the poverty level in 2000. Of those, 21.6% were female-headed households with no husband present and less than 1% was married couple households.

Table 11: Income Data for Town of Berne

	1990	2000	1990 to 2000 Change
Median Income for Families	$39,896	$55,685	28%
Per capita income	$13,611	$22,095	38%
Social Security Households	262	327	20%
Public assistance households	40	21	-90%
Retirement income households	206	231	11%
Self employment households	136	167	19%
Farm self employment households	9	NA	NA
Individuals below poverty level	325 (10.6%)	152 (5.4%)	-114%

Berne has higher median household income levels compared to both New York State and Albany County.

Table 12: Comparison of Median Family and Household Incomes, 1999

Town/State	Median Household Income
New York State	$43,393
Albany County	$43,160
Berne	$47,327

Physical and Environmental Features

The Town of Berne is located southwest of the City of Albany on the Helderberg Plateau, also referred to as the Helderberg Mountains. This plateau represents the northernmost extent of the Appalachian Uplands Physiographic Province, the boundary of which is clearly identified by the Helderberg Escarpment (Broughton, et al., 1966).

Topography (See Slopes Map):

The topography within the Town is hilly to mountainous, and the larger and more prominent hills are located primarily south of Fox Creek in the Hamilton Hills, so called because of the Hamilton Formation comprising them. Steep slopes (<15%) are common in the many ravines cut into the hills and along the contacts between different rock units. One such contact is particularly evident just south of Fox Creek, where the more resistant rocks of the Hamilton Formation outcrop in an east-west belt.

Gentler slopes are generally located in the major stream valleys and on hilltops. In the northeast corner of the Town, the topography is broken and irregular, due to sink holes and other solution features that have developed in the underlying limestone. Ground elevations within the Town

range from roughly 900 feet above mean sea level near West Berne to 2160 feet on Henry Hill, which is located in the southwest corner of the Town.
The 1979 Slope Study for the Town describes slopes in Berne as:

"Class I - 0 – 3% slope. These are lands with little or no relief, ranging from flat (0% slope) to areas that may show a change in elevation up to 3 feet over 100 feet of horizontal distance (or rise with an angle of .03 X 90 degrees = 2.7 degrees with respect to the horizontal). Class I slopes comprise about 6,490 acres of 19% of the area of the Town. They are concentrated in the low floodplain areas of the Switzkill and Foxenkill and on the highlands atop Irish, Cole and Filkins Hills in the southeastern quadrant of the Town.

Class II – 3 – 8% slope. These areas of slight relief (3 – 8 feet change in elevation over 100 feet or 2.7 – 7.2 degrees re horizontal) comprise the predominant slope category in the Town. It includes approximately 13,335 acres or 38% of the area of the Town. Gently sloping lands are distributed throughout the Town, but are less frequent in the Partridge Run area.

Class III – 8 – 15% slope. These are areas of moderate relief (8 – 15 feet change in elevation over 100 feet, or 7.2 – 13.5 degree re horizontal). Class III includes a large area of the Town, approximately 9,124 acres or 26% of its area. Land of moderate slope is distributed patchily throughout all parts of the Town.

Class IV - Greater that 15% slope. Areas of steep slope (over 15 feet change in elevation over 100 feet or greater than 13.5 degree re horizontal) comprise substantial areas of the Town. They make up approximately 5,900 acres or 17% of the Town area. Obviously, this slope class encompasses a great range of slopes from the 15% grades found on some of the steeper Town roads to nearly vertical cliff faces along the escarpments of the major hill systems. Large areas of Class IV slope occur throughout the West Mountain-Partridge Run area in the southwestern part of the Town. Elsewhere, bands of steep slope delineate the north-facing escarpments of Uhai, Irish, Grippy and Cole Hills, and outline the Switzkill valley."

The Slope Inventory concludes with the following:

"For planning purposes, there are obviously cases in which slope by itself constitutes an overriding limitation to development (e.g., on cliff faces of very steep slope). More often, however, slope characteristics interact with other features, most notably soil type. By itself, slope is likely to provide limiting considerations at the two ends of the spectrum, very flat land and very steep land.

Flat sites often present no hindrances to use and development, but this is not always the case. Such flat terrain often has very poor drainage, especially if it consists of soils with low transmission characteristics or is underlain by fragipan or bedrock. This will lead to flooding problems during spring melt-off and periods of high precipitation, particularly to basements and other below-grade structures. Sewage disposal will be a problem. Flat lands are also often occupied by permanent or temporary wetlands. Areas lacking relief may often be usable or developable, but planning should allow for their inherent problems and interests should recognize that costly site modifications may be necessary.

Steeper slopes present a different range of problems. Access is often difficult, soil erosion may be severe if the land is cleared of trees, septic systems malfunction, and the costs of development become prohibitive. Even if unlimited funds for development are available, it may often be in the community's best interest to preclude development because of the impact on

surrounding lands and associated community costs such as road construction and maintenance and fire protection."

Geology (See Bedrock and Surficial Geology Maps):

Bedrock Geology - The bedrock that underlies the Town of Berne consists of a series of nearly flat lying limestones, sandstones and shales. These rocks are in much the same position in which they were deposited 360 to 420 million years ago. The rock units dip gently to the southwest at an average rate of 100 feet/mile, although in some areas steeper (180 feet/mile) and gentler (35 feet/mile) dips exist (Goldring, 19352).

Benches and cliffs have formed where the less resistant shales have been eroded off of the more resistant limestones. The more prominent of these cliffs are the Coeymans/Manlius limestones, which form the lower cliff in the Helderberg Escarpment, and the Onondaga Limestone, which forms the upper cliff. Bedrock benches or terraces in the town are typically located where the Marcellus shale has been eroded, leaving behind a broad bench on the Onondaga limestone. This is particularly evident west of the Hamlet of Berne, near the Town Garage.

The bedrock units that directly underlie the town as shown on the bedrock map depicts the bedrock units comprising the bedrock surface as they would appear if the overburden were removed. These units include, from oldest to youngest, the Esopus shale of grit, Onondaga limestone, Marcellus shale, Hamilton Formation, Skaneateles beds, and the Oneonta beds. Some authors include the Marcellus shale with the Hamilton formation. The contacts between these rock units coincide very closely with the topographic contours, particularly between the Marcellus shale and the Hamilton Formation.

The Esopus shale directly underlies the overburden north of Thompsons Lake, and actually outcrops along the northern shore of the lake (Goldring, 1935). The Esopus is reportedly 80 to 100 feet thick in the town (Goldring, 1935). It is a dense rock unit; however, it is traversed by an extensive system of joints (Arnow, 19493). This joint system, in conjunction with bedding plane partings, provides the pathways through which water can flow to wells that intersect the joints.

The Onondaga limestone directly underlies the overburden in the northwest corner of the town and in the northeast corner, at and around Thompsons Lake. The Onondaga limestone is a dense, impervious rock that achieves a thickness in the town of 85 to 100 feet (Goldring, 1935). The Onondaga limestone is traversed by a very perfect system of joint fissures, the dominant orientations of which are northeast-southwest and northwest-southeast. This system of fissures trends in the same directions as those found in underlying limestones, namely the Beecraft, New Scotland, and Coeymans (Goldring, 1935; Arnow, 1949). The joint fissures help to produce the cliffs along the escarpment by providing a vertical plan of weakness along which the rocks can break.

Solution activity (dissolving of rock) along the fissures and bedding planes in the limestone has formed an extensive underground drainage system. Solution features include caves, sinkholes, and broad solution channels. Where the Onondaga limestone is at or near the ground surface, the effect of the solution activity has been to create a broken and irregular surface called karst

2 Goldring, Winifred. 1935. Geology of the Berne Quadrangle. New York State Museum Bulletin No. 303.

3 Arnow, Theodore. 1949. The Ground Water Resources of Albany County, New York Water Power and Control Commission Bulletin GW-20.

topography.

Karst terrain exists on the Helderberg Plateuah wherever the bedrock is Helderberg group limestones or Onondaga limestone (see Helderberg Escarpment Planning Guide). Karst areas present many challenges for land use due to difficulties siting residential and commercial structures due to instability, groundwater contamination from surface land uses, and possible changes to water flow. Karst terrain can be found in Berne in the northeast corner and in the north-central portion of Town (see Bedrock Geology Map).

Groundwater yields in the Onondaga, as in any limestone, can vary considerably because of the large variation in the size and the degree of interconnection between the solution channels. Water in limestone are particularly susceptible to contamination, since the rock does not offer any filtering or cleansing of the water; the solution channels act as open pipes or conduits. Moreover, once the water is contaminated, depending on the degree of the interconnection between solution channels, the contamination can potentially migrate very quickly across a large area. Limestones at or near the surface are particularly prone to such contamination.

The remaining rocks directly underlying the town are the Marcellus shale, Hamilton Formation, Skaneateles beds, and the Oneonta beds. These rocks are all relatively dense, impervious rocks. The total thickness of these rocks ranges from 800 feet near East Berne to over 1100 feet in the southwest corner of the town. These rocks are traversed by two major intersecting sets of joints, trending northeast-southwest and northwest-southeast (Goldring, 1935). The presence of these joints is clearly marked by the orientation of the stream channels that have preferentially developed along these joinings. The joints in the sandstones and shales are not enlarged by solutional activity and thus do not form underground conduits (Arnow, 1949).

Surficial Geology – The surficial geology in Berne is dominated by glacial or glacial-related sediments deposited 10 to 20 thousand years ago by the continental ice sheet. To a lesser extent, more recent stream deposits are found along the stream courses. Evidence of glacial activity in the town has been preserved on the land surface in the form of elongate ridges and elliptical hills. As indicated by the contours on topographic maps of the town, these landforms are particularly evident north of Fox Creek on the relatively soft Marcellus shale.

The unconsolidated deposits consist of primarily glacial till and stratified drifts (sands and gravels). The glacial till covers a large portion of the town. The till ranges in thickness from 0 to less than 5 feet in the upland areas (depicted on Map 6 as bedrock) to 250 feet in the valleys.

The greatest concentrations of sand and gravel deposits are reportedly in the stream valleys, chiefly Fox Creek and Switzkill. These deposits reportedly achieve relatively great thicknesses along these stream courses, particularly near their confluence (75-100 feet) and along the Fox Creek near East Berne (75+ feet). However, the presence of these sand and gravel deposits could not be confirmed by well logs currently utilized for the groundwater survey. Many well logs actually showed great thicknesses of till where sand and gravel are reportedly present. Well logs not yet acquired may provide confirmation of the sand and gravel deposits. Sands and gravels are excellent water-bearing materials that could potentially serve as significant sources of ground water and may currently be serving as significant recharge areas to underlying sand and gravel or bedrock aquifers. Recharge areas in the unconsolidated deposits are shown on Map 7.

Groundwater Hydrology

Groundwater – General

Groundwater sources currently utilized in the Town of Berne are located primarily in bedrock. This is largely due to the locations and limited extent of adequate water-bearing sand and gravel deposits in the town. As discussed previously, such deposits are reportedly located primarily within the stream valleys, chiefly Fox Creek and the Switzkill. Due to the potential for flooding, little development has occurred and thus few wells have been drilled in these areas. Elsewhere, the town is, for the most part, covered by impermeable glacial till that is generally not capable of yielding sufficient and adequate water. Thus, bedrock is the principal source of water in the town.

The movement of ground water in the town is primarily controlled by the bedrock type and its structure. Topography, to a lesser extent, influences groundwater bedding planes, which are surfaces separating layers of sedimentary rocks. The ability of a rock to transmit water depends on the degree of interconnection between the joints and bedding planes. If the rock is traversed by an extensive system of joints, then it will likely yield adequate water quantities. Further, if the rock is a limestone, the joints and bedding planes could be enlarged through solution activity. This could result in an extensive system of underground conduits able to transmit large volumes of water. Again, however, the yield from such solution features relies on the extent of the drainage system to which such features are hydraulically connected.

The structure of the bedrock dominates the direction of groundwater flow in the northern part of town (north of Fox Creek). While the rocks in this area dip gently to the southwest, the land surface also slopes to the southwest. Surface water is therefore directed southward, as is the ground water, which tends to follow the regional bedrock dip.

This bedrock control on groundwater movement is best demonstrated in the natural drainage from Thompsons Lake. The known natural outlet from the lake is a cave located at the southern end of the lake in the Onondaga limestone. During high water, water from the lake enters this cave and emerges roughly 1.5 miles to the southwest, apparently flowing along solution features oriented with the regional bedrock dip. This drainage pattern as a whole has effectively preserved the Helderberg Escarpment, in that much of potentially erosive surface water and ground water has been directed away from the escarpment (Goldring, 1935). In some areas, however, solution features, particularly those formed along vertical joints, traverse bedding planes and direct ground water in direction other than along bedding planes. This is evident along the Helderberg cliff in Thacher Park, where springs draining from the above limestones issue from the base of the cliff (Goldring, 1935; Arnow, 1945).

South of Fox Creek, in the Hamilton Hills, topographic influence on groundwater flow direction is superimposed on the bedrock control. Instead of strictly following the regional dip, ground water likely flows “downhill” along joints and fractures in the bedrock and emerges into and along stream valleys and ravines. This type of flow is more probable along the Fox Creek and Switz Kill stream valleys, where the topographic relief is greatest. Further south in the Hamilton Hills, groundwater flow direction is likely controlled more by the regional bedrock dip, although local variations in this flow direction occur where stream valleys and ravines intersect water-bearing bedrock joints and fractures.

Groundwater resources in the overburden are currently a minor component of groundwater usage in the town for two reasons: 1) much of the town is mantled by impermeable glacial till, and 2) few wells tap the potentially productive sand and gravel aquifers reportedly occupying the stream valleys. Ground-water flow in stream valleys is generally in the same direction as the stream flow. Thus, groundwater flow along the Fox Creek and Switzkill stream valleys is likely, respectively, from east to west and southeast to northwest.

b. Prior Groundwater Survey

As reported in the 1992 Comprehensive Land Use Plan, a groundwater survey of the town was conducted prior to that time to compile and evaluate all available data concerning existing water supply wells. Well logs were collected from several sources including well drillers, the Albany County Health Department, the U.S. Geological Survey, and individual homeowners. Well logs data were entered into a database and well locations were plotted on a town map by Master Plan Committee members.

Groundwater Occurrence in Bedrock

Based on water-well data compiled as part of that earlier groundwater survey, the overwhelming majority of the wells in the town are drawing water from bedrock. Of the 104 well logs currently utilized in the ground-water analyses, 92 wells or 88 percent are for bedrock wells. The reported yields from the bedrock wells range from 0.5 to 50 gallons per minute (gpm), with an average and standard deviation of 11.3 and 10.8 gpm, respectively. The data indicate a high degree of variability in bedrock well yields, which is typical of bedrock wells. The bedrock well yields were further analyzed for any differences between those wells tapping the Hamilton Formation, all bedrock wells other than those in the Hamilton, and the Onondaga limestone. The results, presented in Table 18, show surprisingly little difference in well yields between the Hamilton Formation and other bedrock. In fact, based on the available data, the Onondaga limestone yields, on average, slightly less water than the Hamilton Formation.

Groundwater Occurrence in Unconsolidated Deposits

As discussed above, few wells in the town draw water from sand and gravel deposits. Of the 104 well logs currently utilized in the groundwater analyses, only 12 were sand/gravel wells. The reported yields for the sand/gravel wells ranged from 5 to 30 gmp, with an average and standard deviation of 20.6 and 10.0 gpm, respectively. The data showed a higher minimum and less variability in the yields for the sand/gravel wells than those for the bedrock wells, which indicates consistently greater yields in the sand/gravel wells.

Groundwater Quality

According to earlier data, the quality of the water obtained from bedrock wells in the Town was generally satisfactory for drinking purposes. There were some wells, however, that supplied less than desirable water. Some wells drawing water from the shale reportedly contained relatively high, unbearable levels of sulfides.

The quality of water obtained from the overburden was generally satisfactory. Based on information in the available well logs, the water-bearing sand and gravel deposits appeared to be protected from direct contamination by an overlying layer of glacial till. However, areas of surface recharge provide potential locations for contamination to the water bearing sand and gravel deposits.

Some drilled wells and many of the dug wells in the hamlets and along the lakes have become contaminated as indicated by high levels of coliform bacteria. A water-well survey conducted in November 1984 in the Hamlet of Berne by the Albany County Department of Health revealed a significant number of unsatisfactorily designed and/or contaminated water supply sources. Out of the 72 properties surveyed, 26 properties (or 36 percent) had unsatisfactorily designed/constructed water supply sources that could not be expected to yield safe drinking water. Of the remaining 46 properties that had properly designed/constructed water supply sources, 19 properties (or 26 percent) had contaminated water supply sources. Thus, in 1984, a total of 45 properties (or roughly 63 percent of water supply sources at that time) in the Hamlet of Berne were or were likely to be contaminated. Many (the actual number was not disclosed) of the contaminated water supply sources reportedly were shallow dug wells, which are more susceptible to contamination. However, some were bedrock wells that likely became contaminated when sewage effluent migrated along joints of possibly along the well itself into the bedrock aquifer. Contamination of bedrock water supplies has reportedly occurred where poor-quality water from underlying bedrock aquifers has migrated upward along well borings into overlying aquifers.

Indicators of Contamination

Coliform bacteria, especially the fecal coliforms, are natural, normally harmless inhabitants of the intestines of all warm-blooded including humans. Coliforms co-exist in fecal material with pathogens of disease-causing organisms such as certain bacteria, viruses and protozoa. Although coliform bacteria are most abundant in fecal material, they may also be found in soil and on vegetation. Sometimes this can cause water to be falsely classified. Coliforms are highly concentrated in wastewater and generally sparse or not present in other habitats. The high correlation between coliform numbers and wastewater makes it a reliable indicator of fecal contamination.

Fecal coliforms are a sub-group of the total coliform group. Escherichia coli (E. coli), of the fecal coliforms, is present only in the intestines of warm-blooded animals and its presence demonstrates fecal contamination and the possible presence of intestinal or enteric pathogens. Several species of fecal streptococci (primarily S. faecalis and S. faecium) are enteric bacteria of humans and their presence indicates wastewater contamination of human origin. S. bovis are associated with cows, and S. equinus with horses. A high ratio of fecal coliform to fecal streptococci indicates wastewater sources.

It is important to note that because the 1984 Berne Hamlet Study reported total coliforms, it is not conclusive that contamination of wells was caused solely by faulty septic systems. Although septic systems are likely the prime source, other sources of coliforms such as animal wastes, vegetation and soil are possible.

Soils:

This section contains general descriptions and locations of soils in the Town of Berne. It outlines those soil properties which constrain development and identifies those areas with soils best suited for development.

Soil Descriptions

Three general types of soils are found in the Town of Berne: soils formed in glacial till, soils

formed in glacial outwash, and soils formed in recent alluvium. The majority of the soils in the town consist of silt loams formed in deep to shallow glacial till derived from shale, limestone, and sandstone. These soils range from gently sloping to very steep, and are classified as moderately well-drained to excessively-drained, primarily owing to surface runoff; some of the soils have a high clay content, are compacted, and have low permeability. Very shallow till-derived soils are generally found in upland areas of the town and on steep hillsides.

Soils composed of stratified drift occur on glacial kame terraces on the valley flanks and around upland lakes, and on outwash plains in the valley bottoms. Slope is nearly level in most areas, as the deposits were water-deposited. Along terrace fronts and in dissected areas, slop ranges from moderate to steep. These sand and gravel deposits are mostly well-drained to excessively-drained because of their coarse texture and loose composition.

Soils that formed in recent alluvium are on low-lying, nearly level, flood plains adjacent to streams that are subject to periodic flooding. The soils range from well-drained to poorly-drained. The water table is close to the surface in many areas.

Soil Constraints

Several properties affect the suitability of soil for development including slope, erodibility, stability, depth to bedrock, depth to seasonal high water table, and soil infiltration and percolation.

Slope constrains are found throughout much of the town, particularly in the western half, as seen on the Slope Map. Many of the slopes of Garvey Hill, Cook Hill, West Mountain, and Irish Hill exceed 15%. Excavation and grading on steep slopes create a high potential for environmental damage. When vegetation is removed from steep slopes, the soil becomes saturated and the land becomes highly susceptible to slope failure, slides, and erosion. Rapid erosion of steep slopes in turn leads to environmental problems including increased surface runoff, increased turbidity of surface runoff, and degradation of surface water quality. Residential, commercial, and industrial development of the steeply sloped areas throughout the town should be discouraged due to the potential for slope failure, slides, erosion, and associated negative impacts to water quality.

Soils which have less than 20 inches of depth to bedrock have severe limitation for construction. Conventional septic systems are not advisable or permitted in such soils, due to their inability to effectively filter and absorb wastes. On such soils, contamination of groundwater is a hazard. Road construction and basement construction are costly due to needed blasting excavation, and filling.

High water table reduces the efficiency of conventional septic systems and often affects load bearing capacity of soils for supporting structures. It interferes with the normal operation of septic systems by not allowing sufficient percolation.

In some cases, high water tables will cause physical, chemical and/or biological clogging in septic systems, thereby severely restricting infiltration. Soil infiltration and percolation affect the absorptive capacity of soil. Soils with high clay and silt contents usually do not allow the adequate passage of liquid. They are generally unsuitable for subsurface wastewater disposal due to the potential for surface breakout of septage. Soils with very high gravel contents often are too permeable, allowing liquid to pass through them too quickly. Soils with extremely fast percolation rates often do not adequately remove contaminants from waste water before waste

water reaches groundwater. However this condition can often be remedied through emplacement of less permeable material.

Soil Suitability for Development

Soils have been ranked, according to suitability for development, by the U.S. Department of Agriculture Soil Conservation Service. Each soil type is classified according to the degree of restrictions—either slight, moderate, or severe—for a variety of construction applications, including: 1) dwellings with basements; 2) dwellings without basements; 3) small commercial buildings; and 4) septic field placement.

Steeply sloping areas and soils formed in glacial till generally received the poorest rating of suitability for development. Most of the soils in the town have severe limitation for two or more of these applications; virtually none are suitable for everything. Many soils that are rated highly for septic systems are on alluvium and are limited for dwellings with basements because of seasonal or high water flooding. Other soils are suitable for dwellings but are limited for septic systems because of either inadequate or excessive permeability of the soil. Some soils suitable for residential housing are considered severely limited for commercial use because of excessive slope.

Many of these limitations can be overcome by special construction designs. For example, residential houses can be built on slabs where poor soil drainage limits basement construction. Soils that are limited for septic systems but are suitable for dwellings can be built upon if artificial drain fields are installed, such as mound or fill systems.

In general, the best soils in the town for residential, commercial, and industrial development are those derived from glacial outwash and recent alluvium. The only soils in Albany County that are suitable for all application are Chenango gravelly silt loam and Unadilla silt loam, but there are little or none of these present within the Town of Berne. Marginal soils in the town include Howard gravelly silt loam, Riverhead fine sandy loam, Colonie loamy fine sand, and Lackawanna silt loam.

The majority of good and marginal soils are located on outwash gravels and ice-contact deposits along the Fox Creek and Switzkill stream valleys and around the upland lakes. Much of the stratified drift deposits along Fox Creek and New York State Route 443 in the main portion of town are prone to flooding and are therefore limited for development. Exceptions to this are the downtown Berne segment of Route 443 and a mile-long stretch of the highway at the intersection of Filkins Hill Road south of Warner's Lake. Other areas of outwash soils near Route 443 are along the northern end of County Road 2 and along State Route 157A in East Berne. These areas would have above-average suitable for commercial development not only because of the suitability of the soils, but also because of the proximity to state highways.

The largest areas of soils suitable for development are along the flanks of the lower Switzkill in the northwest corner of the town, along the bases of West Mountain and Irish Hill. Areas at the base of West Mountain are accessible from County Road 1 from the town center south to Game Farm Road.

Other areas containing stratified drift deposits which may be suitable for development based on acceptable soils for septic systems are located: 1) in the southwest corner of the town at the intersection of Peasley Road with County Road 12 and with Wood Road; 2) along County Road 1 in South Berne; 3) around the north end of Helderberg Lake; 4) at several areas along Saw

Mill Road; 5) around the southern end of Thompsons Lake; and 6) at the north end of Warner's Lake and outward along Route 157A. Because the mapping of stratified drift deposits was based primarily on aerial photographs, this information would have to be field checked.

Water Features, Wetlands, and Floodplains (See Water Features Map):

For a full inventory of water features in Berne see the Conservation Advisory Board 1982 Inventory of Water Resources. Major water bodies include the following lakes, ponds, and creeks:

Helderberg Lake
Thompson Lake
Warner's Lake
Tubbs Pond
Becker Pond
White Birch Pond
Woods Pond
Fawn Lake
Rapp Pond
Shultes Pond
Camp Givah Pond
Woodstock Pond
Josie's Pond
Fox Creek
Switzkill

Streams (See Water Features Map): The town has two major drainage systems, the Switzkill and Fox Creek. Small first and second-order tributaries that feed these major streams form a lattice in all parts of the town. Although inconspicuous as compared with the large streams, the tributaries are important sources of water. In addition, they provide spawning areas for fish, habitat for furbearers such as muskrat (Ondatra zibethicus), and mink (Mustela vison), and they serve as refuges for fish and other aquatic animals during times of pollution or other disturbances on the main streams.

New York State classifies all streams into different classes based on their use. Class A streams are water sources for people, Class B streams can be used for primary contact recreation and other uses except as a source of water supply for consumption, and Class C waters are mainly for fishing. A C(t) stream indicates the stream is designated as suitable for trout. Most of the streams in the Town of Berne are classified as Class C.

The streams and lakes in the Town of Berne provide water sources for wildlife and habitat for fish. Many of the streams in town that are shaded by vegetative cover provide habitat suitable for trout survival (labeled C[T] or habitat for trout spawning (labeled C[TS]. NYSDEC requires a stream protection permit, pursuant to Article 15 of the Environmental Conservation Law (ECL), for any activity that would change, modify, or disturb the stream bed or bank of any protected stream (Class C[T] or higher, i.e. A or B).

Stream classifications are updated periodically and should be determined for any project proposing to disturb, modify, or alter a stream bed or bank. NYSDEC should be contacted for each project to determine the most updated stream classification information and to determine if a permit it required.

The waterways in the town provide scenic beauty and recreation. There are a number of points along the Switzkill in the southern part of town, and Fox Creek in the northern part of town, that are noted for their scenic value. Additionally, canoeists enjoy traveling along Fox Creek near West Berne to the Switzkill near Sickle Hill Road. The numerous lakes and ponds in town, particularly the larger lakes (Thompsons, Warner's, and Helderberg Lakes), are used extensively for recreation. Activities enjoyed on these lakes/ponds include boating, fishing, swimming, picnicking, and waterfowl hunting in areas with few or no residences.

Fox Creek. The Fox Creek flows for approximately 11.7 miles in the Town of Berne. Its headwaters lie at the junction of Smokey Hollow Road and county Road 14. Historically the Fox Creek was of commercial importance in that it supported two mills. Lobdell's Grist Mill was located in East Berne (Historic Site 15), while Carding and Fulling Mills (Historic Site 5) were located in Berne. The Fox Creek is subject to flooding along its entire course throughout the town of Berne.

The Switzkill. The Switzkill originates at Onderdonk Lake in the Town of Westerlo and flows for 6.9 miles through the Town of Berne before entering Fox Creek. The Switzkill is a third-order stream that can potentially have multiple recreation uses such as fishing, boating, trapping and picnicking, but it is presently extensively posted with extremely limited public access. As was the case for the Fox Kill, the waters of the stream are probably unsafe for drinking and swimming. The Switzkill is subject to flooding about 0.5 miles downstream of the point where it crosses Gifford Hollow Road.

Floodplains (See Water Features Map): A floodplain is defined as the low lands adjoining the channel of a river, stream or watercourse, lake or other body of standing water, which have been or may be inundated by flood water. When left in a natural state, floodplain systems store and dissipate floods without adverse impacts on humans, buildings, roads and other infrastructure. In 1968, the United States Congress established the National Flood Insurance Program (NFIP), which enables property owners to purchase affordable flood insurance. The program is based on a partnership between communities and the federal government in which the community adopts floodplain management regulations to reduce flood risks and the federal government makes flood insurance available within the community. The NFIP is administered in the context of two distinct phases—the Emergency Phase and the Regular Phase.

Wetlands (See Water Features Map): New York State regulates wetlands greater than 12.4 acres in size. Additionally, the US Army Corps of Engineers regulates all wetlands, and are called NWI wetlands. NWI wetlands are found scattered throughout the Town and are located mainly along streams but can be found in other low-laying locations. DEC regulated wetlands are mostly riparian wetlands (found along streams) and are located throughout the Town. DEC regulated wetlands cover 1,212 acres (33 different areas) and an additional 429 acres are classified as NWI wetland.

Of the wetlands mapped on the Freshwater Wetlands maps, two are Class I wetlands (approximately 177 acres), twenty-eight are Class II wetlands (approximately 1000 acres), three are Class III wetlands (approximately 46 acres), and none are Class IV wetlands. Class I wetlands are considered the most valuable wetlands, providing the most functions and benefits, whereas Class IV wetlands provide the least functions and benefits of the regulated wetlands. There are smaller wetlands scattered throughout the town that provide benefits similar to the larger wetlands and may fall under ACOE jurisdiction.

Ecological Data

Existing Inventories: The Town of Berne Conservation Advisory Board has conducted several ecological inventories over the years. This includes an inventory of forest and wildlife resources, status of New York State reptiles and amphibians, a report on the Swtiz Kill Natural Area, and an inventory of wetlands greater than 12.4 acres. Most of this information was collected in the 1970's and 1980's. The New York State Breeding Bird Atlas, the US Fish and Wildlife Service Breeding Bird Survey, the New York State Herpetological Atlas, and the Natural Heritage Program are all newer programs that provide other sources of ecological data for Berne. In addition, a biodiversity assessment for part of the Town has recently been completed through a program sponsored by Hudsonia. The following information summarizes known inventories:

Natural Heritage Program: Data from the New York State Department of Environmental Conservation, Natural Heritage for Berne is as follows:

Berne has two significant natural communities included in the database. The Hemlock-Northern Hardwood Forest was given a state conservation rank of S4 which means it is apparently secure. The Maple-Basswood Rich Mesic Forest was given a State Conservation Rank of S3 meaning that the community type is vulnerable.

New York Natural Heritage Program, a partnership between the New York State Department of Environmental Conservation and The Nature Conservancy listed four rare plant species in Albany County***. Pod Grass*** and ***False Hop Sedge*** are two of the four. Animals and plants listed under NYS regulations as Endangered, Threatened, Special Concern and Rare are protected under NYS law.

Breeding Bird Atlas: The first Breeding Bird Atlas Project was conducted in 1980-1985.In 2000-2005, New York conducted its second NYS Breeding Bird Atlas Project which is a statewide survey designed to show the distribution of breeding birds in New York. The 2nd NYS Breeding Bird Atlas documents changes in bird distribution which occurred over twenty years.

The number of bird species included in the surveys ranged between 68 per survey block to a high of 102 species. In 1980, two species considered to be threatened were found in three survey blocks: Northern Harrier and the Bald Eagle. Also in 1980, five of the eight blocks in the Town of Berne inventoried species of Special Concern. These included Coopers Hawk, Grasshopper Sparrow, Northern Goshawk, Vesper Sparrow, American Bittern, Red Headed Woodpecker, Golden Winged Warbler, Sharp-shinned Hawk, and Whip-poor-will. In the 2000 survey, five blocks were found to be a habitat of species of Special Concern but the diversity of species was decreased. In 2000, the Osprey, Sharp-shined Hawk, American Bittern, and Coopers Hawk were the only listed species included.

From 1990-1999, a survey was conducted to document the geographic distribution of the approximately 70 amphibians and reptiles in New York State. There has not been significant sampling done through this program in the Town of Berne, However, the Conservation Advisory Council conducted a local inventory in 1983. Fourteen snakes, one lizard, 16 salamanders, ten toads and frogs, and seven species of turtle were included in the inventory. This inventory did include the Timber Rattlesnake.

Helderberg Bird Conservation Area. This BCA includes Partridge Run WMA and State Forest,

Knox (Burke) WMA, and Cole Hill State Forest. It is an upland complex that includes hardwood and conifer (plantation) forests, young regenerating forests, old fields, shrublands, reverting farmland, wooded swamp, shrub wetlands, and numerous ponds and wetlands. Some of the species of interest include American woodcock, ruffed grouse, brown thrasher, eastern towhee, prairie warbler, chestnut-sided warbler, Nashville warbler, blue-winged warbler, as well as a wide variety of forest warblers and songbirds, winter finches. Woodland raptors include northern goshawk (special concern). A map and a Bird Conservation Area Management Guidance Summary can be found at the DEC Website at http://www.dec.ny.gov/animals/27233.html.

John Boyd Thacher/Thompson's Lake Bird Conservation Area. This BCA consists of portions of two nearly contiguous State Parks in Albany County. John Boyd Thacher sits atop the Helderberg escarpment, a 100 foot high calcareous cliff. Thacher is dominated by forested uplands. The Thompson's Lake area consists of additional upland forest, old fields and a bur oak-black ash swamp adjacent to the lake. There are 171 species of birds that have been identified within the John Boyd Thacher/Thompson's Lake BCA, of which 102 are confirmed or probable breeders, including: sharp-shinned hawk (Special Concern), Cooper's hawk (Special Concern), northern goshawk (Special Concern) and golden-winged warbler (Special Concern). The forests support some of the area's highest densities of breeding songbirds such as hermit thrush, winter wren, magnolia, black-throated blue, black-throated green, blackburnian, Canada and worm-eating warblers and Louisiana and northern waterthrushes. This BCA supported the first recent regional nesting of common ravens and is now the nucleus for the population in the area. Woodland raptors include northern goshawk (special concern). A map and a Bird Conservation Area Management Guidance Summary can be found at the DEC Website at http://www.dec.ny.gov/animals/27016.html.

Berne Biodiversity Study (*Excerpted from the Biodiversity Assessment of a Town of Berne study area)*

Public officials and community members from the towns of Berne and Knox participated in a Biodiversity Assessment Training program led by Hudsonia Ltd. and funded by the NYS DEC Hudson River Estuary Program. The team's study area covered roughly 3,400 acres in the Switz Kill Valley and Highlands in the western part of Berne, bounded by Switzkill Road (County Rt. 1) and Ravine Road (County Rt. 6) on the east, Ravine Road and Sickle Hill Road on the south, Sickle Hill Road and Bradt Hollow Road on the west, and Canaday Hill Road (County Rt. 9) on the north. The study area is in the watersheds of the Switzkill (a trout stream) and Fox Creek, and includes a portion of the Switzkill Valley, but is dominated by the steep, north-northeast facing slopes of West Mountain. Elevations range from approximately 920 ft above-sea-level (asl) where the Switzkill runs under Canaday Hill Road, to 1800 ft asl at the northern summit of West Mountain.

A wide range of habitats were identified and mapped and are described in this report. Using remote sensing techniques, predicted habitats were mapped and as many as possible were field-checked. As expected, the team found high-quality habitats, for native wildlife and plants, and including some unusual habitats likely to support rare species. We found large areas of upland forests, upland meadow, and upland shrubland throughout the study area; large wetland complexes along the Switzkill and Foxenkill, [several] intermittent woodland pools embedded in the forested uplands, and a spectacular cool ravine. Major habitat types found include perennial and intermittent streams, upland forests (hardwood, conifers, and mixed), cool ravine, crest/ledgel/talus, intermittent woodland pool, bog lake, shrubland, upland meadow, wet and calcerous wet meadow, and hardwood swamp.

This study showed that the Town of Berne study area includes significant biological diversity and high-quality habitats. The conservation values of each of these habitats are further enhanced by their interrelations and connectivity with other habitats within the larger network. The matrix of wetland, meadow, shrubland and upland forests that stretches from the northern border of the study area across and over West Mountain to and beyond the southern reaches of the study area is only minimally interrupted by Switzkill Road, which bisects the study area in an east-west direction.

Albany County Environmental Management Council (ACEMC) prepared maps for the Town of Berne as part of its environmental inventory many years ago. These included identification of forest resources from an 1874 aerial photo and locations of state-regulated wetlands. A number of wetlands have been amended to reflect changes in boundary determinations by NYSDEC since the 1981 inventory. These revisions are included on the Wetlands Map.

At the time of the inventory by BCAC, most of the town was forested, with agriculture being the secondary land use. Approximately 52% of the town was forested, including hardwood forests (24%), mixed forest types (21%), and softwood forests (7%). Approximately 16% of the town was shrubland, and 25% was active agriculture (cropland and pasture). The remaining 7% of the town was comprised of mixed forest/forest brush, inactive agriculture, developed areas, water, quarries, cemeteries, and forest clearcut areas.

In comparison to color infra-red aerial photos from 1986, it is evident that, in general, these percentages are representative of the present-day cover types, though there have been minor changes in the land use patterns. For instance, some areas of shrubland have grown into young forest, areas of agricultural lands have been abandoned and succeeded into old field/shrubland or have been developed for residential uses, and tracts of forest land have been cleared for agriculture or residences. These changes have not been very dramatic, however. It is expected that the land use trends in the Town of Berne are consistent with those across the state in that less land is in agriculture and is reverting to shrubland and eventually forest. This conversion, however, takes places over time and would not be easily noticeable over a short time span.

Vegetation in Berne

The town of Berne has many vegetation communities, from active agricultural fields to mature northern hardwood forests. The historic and present land uses, as well as varying topography, soil conditions, and hydrology, influence the vegetation communities in town. The majority of the forested areas in the town have resulted from old field succession following the abandonment of agricultural land, from timber harvesting activities and practices, and/or from reforestation efforts. The less accessible areas, generally on steeper slopes, have been left relatively undisturbed and support mature forest. These are wetlands, shublands, and old fields dispersed throughout the town. Each vegetation community within the town provides a variety of benefits and functions.

The northwest portion of the Town, in the areas of the hamlets of Berne and West Berne, is predominantly agricultural. Forest is found on the steeper slopes where the land is less accessible and the soils generally poorer. Five state-regulated wetlands are located in the northwest section of town: G-20, G-28, RE-1, RE-2, and RE-4.

The northeast section of Berne is both agricultural and forested, with the agricultural land concentrated in the valleys and on the more moderates slopes. Due to the geologic

characteristics of this area, it is a sink hole region. There are two large lakes, Warner's Lake and Thompsons Lake, as well as nine state-regulated wetlands, in this area. These wetlands are AL-26, AL-27, AL-28, AL-35, AL-37, W-1, W-2, W-5, and W-7.

The southeast section of Berne has large areas of shrubland, much of which is the result of agricultural land abandonment and poor growing conditions. The forested areas are predominantly hardwood forests, though there are patches of mixed forest as well. These are two small lakes, Helderberg Lake and Lake Woodstock, as well as eight state-regulated wetlands, in the southeast section of town. These state-regulated wetlands are W-6, W-8, W-10, W-11, W-12, W-13, W-49, and W-65. Two of these wetlands, W-11 and W-13, are Class I wetlands.

Most of the southwest section of town is within the Partridge Run State Wildlife Management Area and includes areas of steep slopes. This section of town is the most heavily forested. This area supports the majority of the softwood forest found in town, generally due to reforestation efforts by the state. Hardwood and mixed forest are found on the relatively steep slopes, and agricultural land is found in the Switzkill Valley. Scattered shrubland in this area is due primarily to agricultural land abandonment. There are scattered ponds in this section of town, in addition to ten state-regulated wetlands: RE-7, RE-8, RE-12, RE-15, RE-18, RE-19, RE-25, RE-47, RE-50, and RE-51.

State Land

There are approximately 6,000 acres of state land in the Town of Berne. This includes approximately 4,300 acres in the partridge Run Wildlife Management Area and approximately 1,700 acres in the state reforestation areas. The cover types are mostly successional forest and conifer plantations, with lesser components of old field, wetlands and ponds. The New York State Department of Environmental Conservation (NYSDEC) manages these lands for multiple purposes, including wildlife habitat, saw timber production, recreation, and watershed protection.

Forests

The specific components of the various forest types in the town are described in the Forest and Wildlife Inventory report (BCAC, 1978), as well as discussion of the wildlife species associated with each forest type. These forest types are: hardwood forest, including northern hardwoods and oak-hickory-locust types; softwood forest, both natural and plants; and mixed forest (deciduous and coniferous mix).

There are numerous benefits furnished by the abundant and dispersed forested areas within the town. They provide suitable habitat and movement corridors for a variety of wildlife species. The forest serves to maintain desired water quality for trout streams by providing canopy cover to shade the streams as well as stabilizing the stream banks to reduce erosion and turbidity. Additionally, the forests of Berne protect watershed areas and serve as water recharge areas. The trees provide soil stability to reduce erosion, particularly on areas of steep slopes. The forest also provides as source of recreation opportunities and commercial income (e.g., timber harvesting). The forested areas in the Town of Berne increase the aesthetic value and maintain the rural character of the town.

The dense evergreen canopy of the coniferous forest offers winter refuge to white-tailed deer.

NYSDEC Significant Habitat Program has identified five deer winter concentration areas in the Town of Berne. Three of these areas are in the northern part of town. The locations of these wintering areas are: along Beaverdam Creek; in the vicinity of Tabor and Turner Roads; and near Warner's Lake. Two deer winter concentration areas are located in the southern part of town, along Schoharie Creek and in the Partridge Run Wildlife Management Area.

A rich forest type on limestone soils is found in the area called "The Gulf" in the southwest section of the town. Though no rarities have been found in this area, the community type is uncommon and is possibly botanically significant. The remoteness and beauty of The Gulf is also worthy of note.

Open, Agricultural, and Shrubland Areas

The open and shrubby vegetated areas within the town offer some benefits similar to the forested areas of the town. The benefits of the more open vegetated areas include meeting the specific habitat needs for certain species of wildlife (e.g., American woodcock, cottontail rabbit, woodchuck, bobolink), diversity of landscape, soil stability, aesthetics and recreation. These areas also serve to provide open areas for views and vistas.

Wetlands

Wetlands are transition areas between uplands and aquatic habitats. There are many types of wetlands, including wet meadow, emergent marsh, deciduous forested swamp, coniferous forested swamp, shrub swamp, floating and submergent vegetation, and wetland open water. Each of these cover types provides different benefits.

Wetlands are one of the most valuable habitats for many forms of wildlife. They provide grounds for breeding, nesting, feeding, resting, cover, and water. Many species of wildlife depend upon wetlands for part of their life cycle, including many of those species identified as endangered, threatened, and special concern in New York State.

Wetland areas in the town provide suitable habitat for species such as beaver, muskrat, mink, river otter, fisher, wood duck, mallard, great blue heron, northern harrier, and osprey. Both the northern harrier and osprey are threatened species in New York State. Many of the wetland communities in the town also provide suitable habitat for numerous reptile and amphibian species, including two special concern amphibian species, the Jefferson salamander and the spotted salamander.

Activities affecting wetlands in the town fall under two jurisdictions: New York State Department of Environmental Conservation (NYSDEC) and United States Army Corps of Engineers (ACOE). A Freshwater Wetlands permit from NYSDEC pursuant to the Freshwater Wetlands Act (Article 24 of the Environmental Conservation Law (ECL) is required for any activity impinging upon or otherwise substantially affecting a regulated wetland or its adjacent area (100 foot boundary around wetland). A Section 04 permit from the ACOE is required for the placement of fill into waters of the United States pursuant to the Clean Water Act (33 CFR Parts 320 through 330). Waters of the United States are comprised of open water and wetlands. These two Acts are intended to preserve, protect, and conserve freshwater wetlands and the benefits derived from them.

To be protected under the New York State Freshwater Wetlands Act a wetland must be at least

12.4 acres in size or be designated as a wetland of unusual local importance. Activities regulated by NYSDEC include draining, dredging, filling, placing of obstructions, or introducing any form of pollution. Many agricultural activities involving wetlands are exempt from permitting. Unlike NYSDEC, there are no acreage limitations on the size of wetlands regulated by ACOE. Based on the adoption of the "no net loss" doctrine by the federal government, most activities affecting one acre or more of wetland can be regulated by ACOE. Ordinarily the wetland itself, not any buffer area adjacent to the wetland, receives protection. The ACOE identifies wetlands only when application is made for a determination in a particular case.

The wetlands in the town provide many functions and benefits for the public and environment. Some of the benefits derived from wetlands include: providing natural flood control; improving water quality; recharging aquifers; stabilizing the flow of streams; and providing habitat for fish and wildlife resources. They also contribute to the production of agricultural products and timber, and provide recreational, scientific, and aesthetic resources to the town and public. Though all the identified state-regulated wetlands have important values and function, for of these wetlands, located in the northwest section of town, have special characteristics worthy of note. The wetlands in the triangle formed by Route 443 and County Roads 1 and 9 (RE-2, RE-3) are unique in that they support balsam fir, an uncommon plant species in the area. Wetland G-20 supports some balsam fir, as well. Wetland RE-4 supports a great blue heron rookery, currently having thirteen nests. This property was purchased by the Town in 1991 with funds provided by the Iroquois Natural Gas Pipeline Company.

Diverse Wildlife Habitat

Wildlife population characteristics are dependent upon available habitat. There are various vegetation communities throughout the Town of Berne providing habitats to support a fairly diverse assemblage of wildlife species. Though some wildlife species are associated with particular vegetation communities, most species require a variety of plant communities to meet all their life-sustaining requirements. These needs include food, cover, water, reproductive needs and other special considerations. It is best to maintain a diverse landscape to meet these various needs. Ideally, the landscape should include areas of mature and successional forests, both deciduous and coniferous, broken by patches of clearings and openings, and sources of water. Wetlands within the town provide sources of water as well as unique wildlife habitat.

Though habitat diversity is necessary to support a variety of wildlife, some wildlife species in the town, such as black bear, fisher, bobcat, barred owl, pileated woodpecker, and goshawk, depend upon the existence of large tracts of forested land for survival. The large forested tracts of land in the area of Partridge Run Wildlife Management Area are valuable habitats for these uncommon wildlife species.

The vegetated canopy cover over stream corridors serve to protect habitat for fish and wildlife. These vegetated stream corridors provide suitable passageways for wildlife movement. The dense forest canopy also helps to maintain the water quality (e.g., cool water temperature, low turbidity) suitable for fish habitat.

The various wildlife habitats within the town provide good hunting and trapping opportunities. Game species in the area include white-tailed deer, wild turkey (which have increased dramatically during the last ten years), ruffed grouse, American woodcock, varying hare, cottontail rabbit, gray squirrel, raccoon, muskrat, beaver, mink, fox, and assorted waterfowl including black duck, mallard, wood duck, and Canada goose.

Among predatory mammals, short-tailed weasels, ermine, and mink are not uncommon. Red Fox populations are cyclical and gray foxes are rare. Wild canines, or coyotes, have increased dramatically in numbers during the last ten years (Jackson, personal communication).

Scenic Views, Vistas, and Corridors

The Town of Berne contains and abundance of visually appealing landscapes. Beautiful scenery is found in patchworks of field and forest in the lowlands to the northeast. More rugged scenery is found in the forested uplands to the south and west. Throughout the town the combination of farmland, abandoned farmland, and forest create a rural landscape, which defines the town's character and gives it a special quality.

The valleys of the Switzkill and Fox Creek and the rolling hills to the north of Fox Creek are characterized by fields broken by hedgerows and patches of forest land. This setting, combined with the traditional colonial architecture of the hamlets creates a visual quality far superior to the suburban sprawl that characterizes the low lying towns of Albany County.

Upland areas to the south contain a more rugged landscape with steeper, higher hills, and fewer farms. These areas contains large areas of shrubs and pioneer species, stunted by the thin soils, large areas of second growth forest, and extensive conifer plantations that make up the two DEC reforestation areas.

A major scenic element of the Route 443/Fox Kill corridor is the dramatic series of forested escarpments rise out of the valley to the south and provide a panoramic backdrop for the town's lower lying lands. A similar series of high hills surrounds the lower Switzkill Valley. These escarpments also contain some of the largest concentrations of relatively undisturbed forest land found in the town. To this date many of these escarpments remain unmarred by extensive clearing or development. These escarpments also contain several large, deep "gulfs" caused by stream erosion down through the steep embankments.

Though presently access is limited to the escarpments and hilltop areas above them, these areas may be desirable for development because of the potential for dramatic views. However development along hilltops would reduce their scenic value considerably, especially if the treeline is broken or if structures rise above the horizon created by the hill. These escarpments deserve special protection to preserve both their scenic value and their ecological value as large areas of undisturbed forest.

A report entitles "Historic and Scenic Inventory: Town of Berne" was compiled by Thomas Conklin for the Berne Conservation Advisory Council in 1979. This report defines specific scenic resources in the town and remains a good baseline for identifying the town's scenic resources.

Three types of scenic resources are defined in the Conklin report: scenic areas, scenic vistas, and scenic corridors. Conklin defines these terms as follows:

Scenic Area – An area which is generally undeveloped, expansive and may have water features as prominent elements. It has a wide variety of plant cover with much wildlife. Scenic areas offer broad and changing views. The scenic area…is enjoyed by walking or driving through [it]. Five scenic areas, seven scenic vistas, and five scenic corridors are identified and are shown on the scenic and historic resources map (See Scenic Resources Map).

The scenic areas identified include both state reforestation areas, the Kenrose Preserve owned by the Nature Conservancy, a large lightly developed area along County Route 14, and the hamlet of Berne which was included because of its historic character. These scenic areas should be re-evaluated periodically to include new areas or to exclude areas no longer meeting the definition of a scenic area.

At present, three of the five scenic areas are effectively protected by virtue of being state land or being owned by the Nature Conservancy. Area E could be protected by including it in the Natural Resources Overlay District discussed below, and by targeting acquisition fo conservation easements in this area.

Scenic Vista – Broad panoramic views with a deep field of vision. Scenic vista points are significant because of the views they afford. At points these locations are not the object of the view, but rather the means of access to the view.

Conklin identifies seven scenic vistas which he considers particularly significant. Scenic vistas identify not only the vista point, but also the viewed area or viewshed visible from the vista. Viewsheds can be identified in detail on a topographic map, though the process is time consuming and laborious and a particular viewshed may encompass a very large area. Once identified, viewshed areas could be included in a scenic overlay district in which development proposals would be subject to a scenic impact study before approved. While preservation of viewsheds would be desirable in theory, it could be very difficult to implement in practice because of the large areas involved and the difficulty of clearly defining project impacts.

Scenic Corridors – Scenic corridors are enclosed or partially enclosed channel-like views. A corridor is said to be scenic if it has an unspoiled, undeveloped nature. Most scenic corridors are gently winding roads which feature a closed-in leafy tunnel.

Five scenic corridors are identified by Conklin. All five scenic corridors are in the less developed southern portion of town. The majority of the length of corridors S, T, and U are located inside state reforestation lands. The other corridors noted on Gulf Hill Road and Crawford Road traverse private lands in the southeastern corner of town. There may be other roads in the town that have value as scenic corridors and the town should undertake a thorough inventory to identify all such corridors. For example, the section of Gulf Hill Road from its intersection with State Route 443 southward to Partridge Run Road has a relatively undisturbed setting and “back road” quality that make it a possible candidate for inclusion as a scenic corridor. Woodstock Road west of County Route 2 is another potential scenic corridor in town that should be noted.

Schools, Community Organizations, Historic Resources and Recreation

Schools

According to the US Census in 1990, there were 789 people aged three and older enrolled in private and public schools (including colleges). In 2000, there were 686 people. The difference can be attributed to a decrease in the number of students enrolled in public and private colleges.
Table 20 shows that the total enrollment in the Berne Knox Westerlo School District has decreased steadily and significantly since 1999 (a loss of 174 students). Other school

demographics have remained largely unchanged. However, while student population has decreased, the number of teachers has increased. In 2000, the student/teach ratio was 12 to 1. In 2008 that ratio was 10.9 to 1. Table 21 breaks down school enrollment by grade. There has been a dramatic decrease since the early 1990's for students enrolled in grades K-6. (740 students in 1991 to 492 students in 2008). Over the past few years, the number of upper class students have remained more steady and there was a slight increase in the number of elementary students recently.

Table 20. NYS Department of Education School Report Card for Berne, Knox, Westerlo School District.

	Berne, Knox, Westerlo School District					
	1999 to 2000	**2000 to 2001**	**2004 to 2005**	**2006 to 2007**	**2007 to 2008**	**2008 to 2009**
Total Enrollment	1183	1152	1087	1080	1049	1009
Attendance Rate	95.6%	95.2%	95%	95%	94%	NA
Suspension Rate	2.0%	1.7%	3%	3%	2%	NA
% with Free or Reduced Lunch	23.7%	21%	26%	25%	23%	25%
# Teachers*	NA	89	88	87	92	92

Free or reduced lunch eligibility is based on household income by household size. For example, a family of four with an income of $39,220 per year would be eligible for the free lunch program.

Table 21: Berne Knox Westerlo School District Enrollment

		1991-1992	**2002-2003**	**2007-2008**	**2008-2009**
	grades K-6	740	558	484	492
	grades 7-9	283	283	282	242
	grades 10-12	222	270	283	275
	Total	1245	1111	1049	1009

Table 22 Educational Attainment Town of Berne (25 years and older) in 1990 and 2000 (From US Census)

Educational Attainment	**1990**	**2000**	**1990 to 2000 Change**
Less than high school diploma	213	221	3.6%
High school diploma	660	771	14.3%
College, no degree	266	342	22.2%
Associates, Bachelors degree or higher	583	581	-0.34%

Community Organizations

The following is a list of current organizations in the Town of Berne:

- Berne Historical Society organized in 1971
- Berne Masonic Lodge #684 organized in 1868
- Berne Public Library
- Berne Volunteer Fire Company organized in 1929
- Friends of the Library
- Warner's Lake Improvement Association, an active organization
- Helderberg Ambulance
- Hilltown Senior Citizens
- A variety of church and religious organizations
- A variety of youth groups such as boy scouts, girl scouts and 4-H
- Thompson Lake Association

Historic Resources

According to the New York State Historic Preservation Office, the following locations are listed on the State and National Historic Registers (See Historic Resources Map):

Table 23: Other Historical Resources

Saint Paul's Lutheran Church **1835 NY 443, North Side; West of Irish Hill Rd** **NY 443**
Reformed Dutch Church **South Side; at Irish Hill Rd; West Side** **NY 443, NY 156**
General Store **South Side; East of CR 9 NY 443**
Dearstyne-Sheldon Farmstead **Irish Hill; East/West Sides** **1250' South of CR 1**

Recreational Resources

Berne offers a large number of natural areas for recreational purposes. There are scenic areas which include state forested lands and wildlife areas where trails provide the hiker with hours of quiet outdoor pursuit. These areas include Fox Creek Park which is a small park below Berne Falls in the Berne hamlet; Helderberg Bird Conservation Area (Partridge Run Wildlife Management Area's 6,594 acres): John Boyd Thacher State Park (includes campgrounds); The Long Path; Switzkill Natural Area; and Tenzin Gyatso Institute which has 350 acres of unspoiled hills and meadows in the town of Berne.

Some state lands offer hunting, fishing and trapping. Cole Hill State Forest and Partridge Run New York State Wildlife Management Area have hunting, fishing and trapping in addition to their hiking trails. They are both units in the Helderbergs Management Area of the NYS Department of Environmental Conservation. (Partridge Run has a state-developed management plan.)

Both Berne Town Park and Thompsons Lake State Park offer playing fields and picnic tables while Thompsons Lake State Park also offers a beach, playground and campgrounds and public access to swimming, boating and fishing. For water recreation, Fox Creek, also called Foxenkill and Thompsons Lake are available to the public. Warner's Lake and Helderberg Lake, a manmade lake, however, are not.

Community Facilities and Infrastructure

Transportation and Highway

Town Roads: As of 2009, the Town of Berne Highway Department had six full time employees, one part time highway clerk, one part time transfer station employee, and several seasonal part-timers as needed. Facilities include a main building built in the 1960's that has 5 bays and an office, a secondary heated building of two bays, and a pole barn with five bays used for salt storage. Equipment is fully inventoried by type, age, mileage, and condition. There are a total of 79.29 miles of town road: 22 are paved, 13 are oil and stone, 44.09 are dirt. Nine seasonal roads exist for a total of 10.3 miles. The Department lists Sawmill, Betts Lane, Gulf Hill, Cook Hill, Wood Road, Erwin Dr., Smokey Hollow (West End), Grippy Lane, Peasley and Beaver roads as locations where flooding problems are known to exist. Drainage issues can be found on Irons Lane, Rowe Lane, Smith Lane, Schreiber Lane, and Gulf Hill, Peasley, Beaver, Game Farm, Cook Hill, and Wood roads. Formal agreements between the Town of Berne and the towns of Westerlo, Knox, and Wright exist to share equipment as needed. Informal shared services exist where the towns help each other out whenever possible on an as needed basis. Informal shared services takes place between Berne, Bethlehem, New Scotland, Rennsealerville, Coeymans, and Albany County.

County Roads: The County has one field office in Berne located on Cole Hill Road. The county has reconstructed several county roads in Berne in the past few years and Gifford Hollow bridge was replaced in 2008. The County works in an informal and cooperative manner with the Town to occasionally share equipment or services as needed.

State Roads: The State maintains routes 443, 156, 157, 157a, and 85 within the Town of Berne. Traffic counts for State and County roads are in tables 24 and 25.

Table 24: Traffic Volumes on State Roads

Route	Count Location	AADT in early 1990's	AADT in late 1990's	Most Recent AADT(year)	% Change in AADT (from earliest to latest count)
85	Overlap with Route 443	1850 (92)	1900 (98)	2150 (09)	16%
85	End Route 443	3650 (94)	3750 (99)	4200 (09)	15%
156	Junction 157	1150 (92)	1200 (98)	1340 (09)	16.5%
157	Junction 157A	720 (94)	540 (98)	1250 (09)	73%
157A	157 End of Route 157A	880 (95)	1050 (99)	930 (09)	5.7%
443	Route	760 (95)	840	1060 (09)	39.5%

	156		(98)		
443	910J	1650 (94)	1700 (99)	1870 (09)	13%
443	Start 85	1450 (94)	1550 (99)	1740 (09)	20%

Table 25: Traffic Volumes on County Roads

Route	Location of Count	Average Annual Daily Traffic Volume	Year	% Change in AADT
Switzkill Road	County Road 9 to State Rd 443	NA	2010	NA
		500	2001	
Bradt Hollow Road	CR9 Canady Hill Rd toCR1 Switzkill Rd	251	2007	-16%
		300	2001	
Canady Hill Road	CR1Switzkill Rd to NY 443	615	2007	53%
		400	2001	

Emergency Services

Emergency services are accessed through the Albany County E-911 system. Emergency service providers and programs include:

New York State Police
Albany County Sheriff
New York State Department of Environmental Conservation (EnCon Officer and Forest Ranger)
Helderberg Ambulance

The Town of Berne has an emergency management plan which was adopted in 1995. The Supervisor is designated as the Emergency Services Coordinator.

Utilities, Water and Waste Water

The entire town is located in the electric service territory of National Grid. The town of Berne has no lighting districts. As yet, there is no access to the Iroquois Gas Transmission System (IGTS) pipeline.

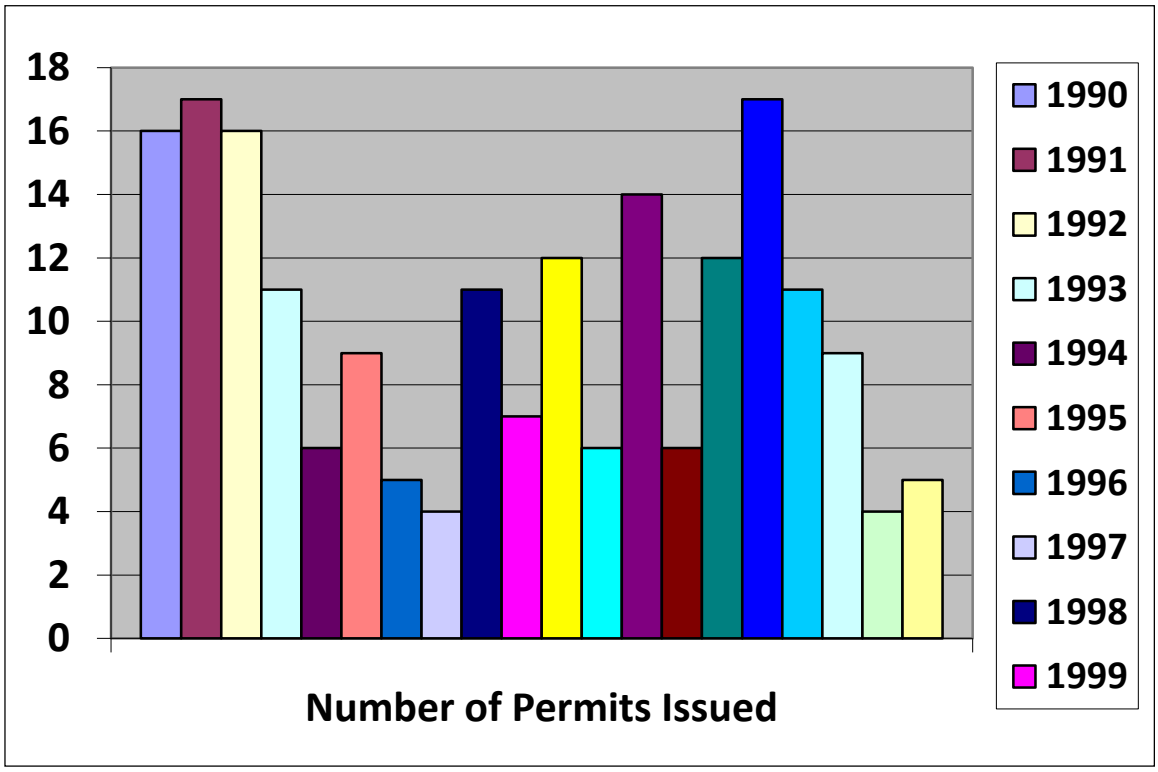
Land Use

From 1996-2008, the average number of single-family new house construction building permits in a given year was 9.9 permits. The average cost of building during the same time period is $87,292. Although the number of building permits fluctuates from year to year, the trend is for a fewer number of new housing starts over the past few years. According to City-Data.com, the average number of new construction permits during the years 1981-1991 was 12.2.

Table 26: Building Permit Summary – Single Family Homes

Year	Number of Permits Issued
1990	16
1991	17
1992	16
1993	11
1994	6
1995	9
1996	5
1997	4
1998	11
1999	7
2000	12
2001	6
2002	14
2003	6
2004	12
2005	17
2006	11
2007	9
2008	4
2009	5
Total Number of New Single Family Homes 1990-2010	198

Figure 8. Building Permits Issued for New Single Family Homes, 1990-2009



During this same time period, there were 280 subdivision applications submitted and approved by the Town of Berne (Table 27). From those 280 subdivisions, at least 560 lots were created.

Table 27: Subdivision Activity in the Town of Berne, 1990-2009

Year	Number of Subdivision Permits Issued
1990	24
1991	20
1992	25
1993	13
1994	9
1995	18
1996	11
1997	12
1998	13
1999	17
2000	10
2001	9
2002	18
2003	12
2004	11
2005	7
2006	18
2007	14

Year	Number of Subdivision Permits Issued
2008	16
Total Number of Approved Subdivision Applications	280

Table 28: Number of Parcels and Acreage of Land Uses, 2009

Property Class	Number of Parcels	Acres	Percent of Land Area
Agricultural	65	3,451	10.2%
Residential	1,308	17,787	52.5%
Commercial	21	147	0.4%
Industrial	2	114	0.3%
Community Services	40	390	1.2%
Public Services	7	19	0.1%
Recreation and Entertainment	155	247	0.7%
Vacant Land	473	9,039	26.7%
Wild, Forested, Conservation Lands and Public Parks	30	2,664	7.9%
Grand Total	2,101	33,859	100.0%

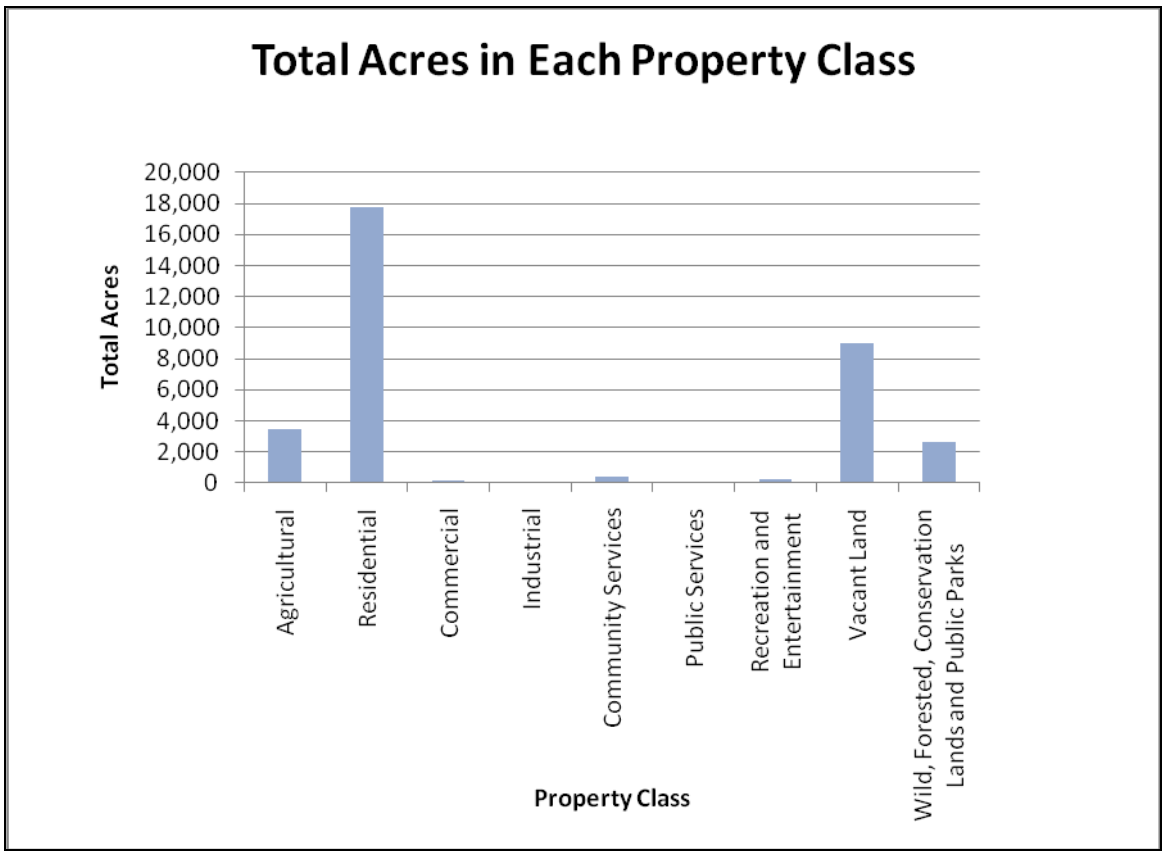


Figure 9. Acres by Land Use in Berne, 2009

Table 29. Parcels and Acres in Residential Land Uses, 2009

Residential Sub-Class	Number of Parcels	Acres	Percent of Land Area
Apartment Condominium	9	16.92	0.05%
Mobile Home	47	402.34	1.2%
Mobile Home Park	2	27.87	0.1%
Multiple	49	2,149.75	6.3%
Rural Estate	262	10,815.79	31.9%
Seasonal	157	893.58	2.6%
Single Family	756	2,830.97	8.4%
Three Family	3	24.30	0.1%
Two Family	23	625.09	1.8%
Residential Total	1308	17,786.61	52.5%

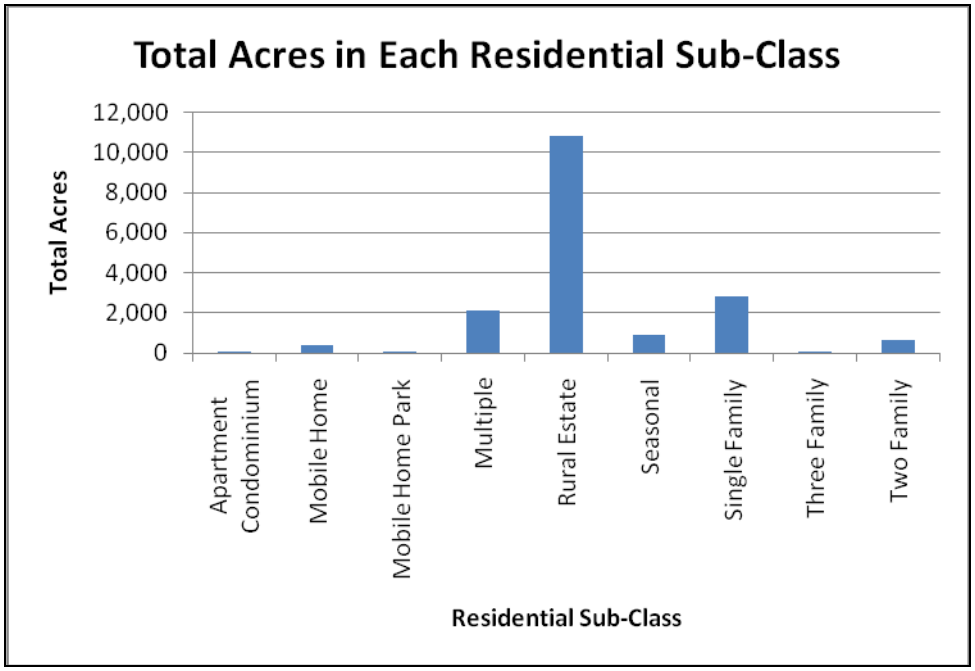


Figure 10. Acres of Residential Uses in Berne, 2009

Table 30. Parcels and Acres of Commercial Land Uses in Berne, 2009

Commercial Sub-Class	Number of Parcels	Acres	Percent of Land Area
Auto	2	2.55	0.01%
Dining	4	12.11	0.04%
Junkyard	1	25.96	0.1%
Multipurpose	4	2.85	0.01%
Office	3	2.29	0.01%
Parking	3	2.40	0.01%
Storage and Distribution	4	98.66	0.3%
Commercial Total	21	146.82	0.4%

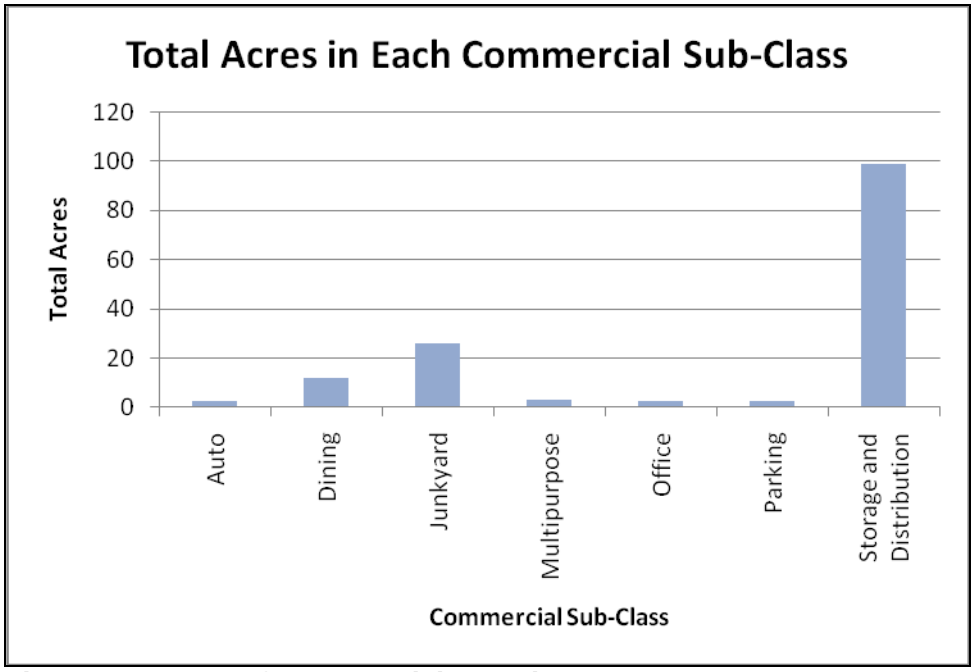


Figure 11. Acres of Commercial Uses in Berne, 2009

Table 31. Parcels and Acres of Other Land Uses in Berne, 2009

Industrial Sub-Class	Number of Parcels	Acres	Percent of Land Area
Manufacturing	1	11.07	0.03%
Mining	1	102.71	0.3%
Industrial Total	2	113.78	0.3%
Community Services Sub-Class	**Number of Parcels**	**Acres**	**Percent of Land Area**
Cemetery	14	28.91	0.1%
Educational	1	79.00	0.2%
Government	4	8.56	0.03%
Protection	6	77.50	0.2%

Industrial Sub-Class	**Number of Parcels**	**Acres**	**Percent of Land Area**
Religious	15	195.84	0.6%
Community Services Total	40	389.82	1.2%
Public Services Sub-Class	**Number of Parcels**	**Acres**	**Percent of Land Area**
Communication	1	0.78	0.00%
Electric and Gas	3	5.92	0.02%
Waste Disposal	2	11.82	0.03%
Water	1	0.46	0.00%
Public Services Total	7	18.98	0.1%
Recreation and Entertainment Sub-Class	**Number of Parcels**	**Acres**	**Percent of Land Area**
Camp Resort	152	164.38	0.5%
Social	2	1.40	0.004%
Sports	1	81.72	0.2%
Recreation and Entertainment Total	155	247.50	0.7%
Vacant Land Sub-Class	**Number of Parcels**	**Acres**	**Percent of Land Area**
Agricultural	36	1,613.72	4.8%
Commercial	2	3.36	0.01%
Residential	383	6,445.33	19.0%
Rural	45	975.58	2.9%
Rural Estate	1	0.63	0.002%
Waterfront	6	0.75	0.002%
Vacant Land Total	473	9,039.37	26.7%
Wild, Forested, Conservation Lands and Public Parks Sub-Class	**Number of Parcels**	**Acres**	**Percent of Land Area**
Government Owned	15	2,084.51	6.2%
Private	8	495.76	1.5%
Public Park	7	84.22	0.2%
Wild, Forested, Conservation Lands and Public Parks Total	30	2,664.48	7.9%

Budgets

Between 2006 and 2010, the Highway appropriations increased from 45% of the Town Budget to 55%.

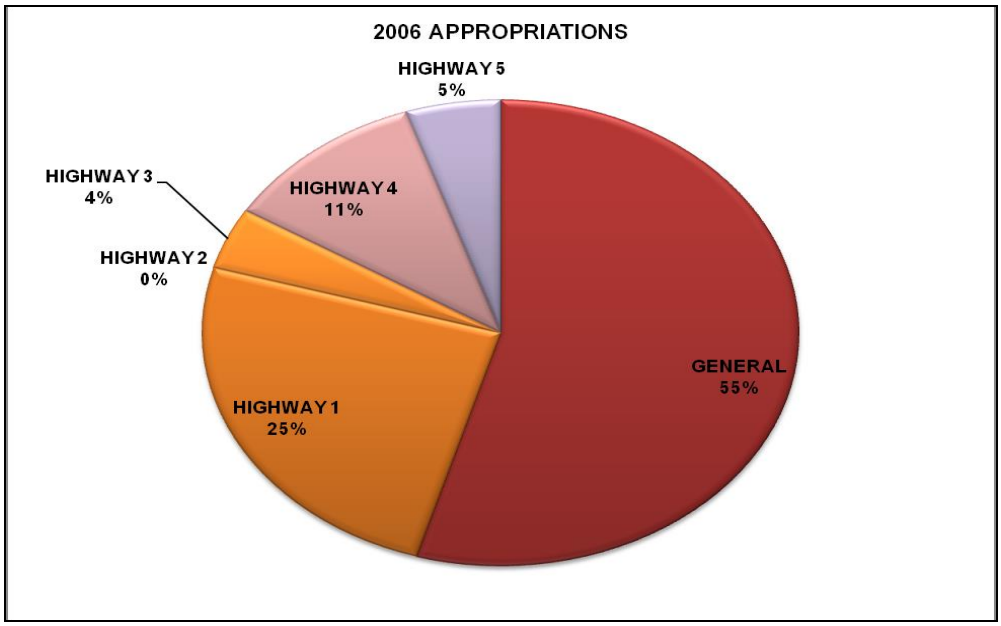


Figure 12: 2006 Town of Berne Appropriations

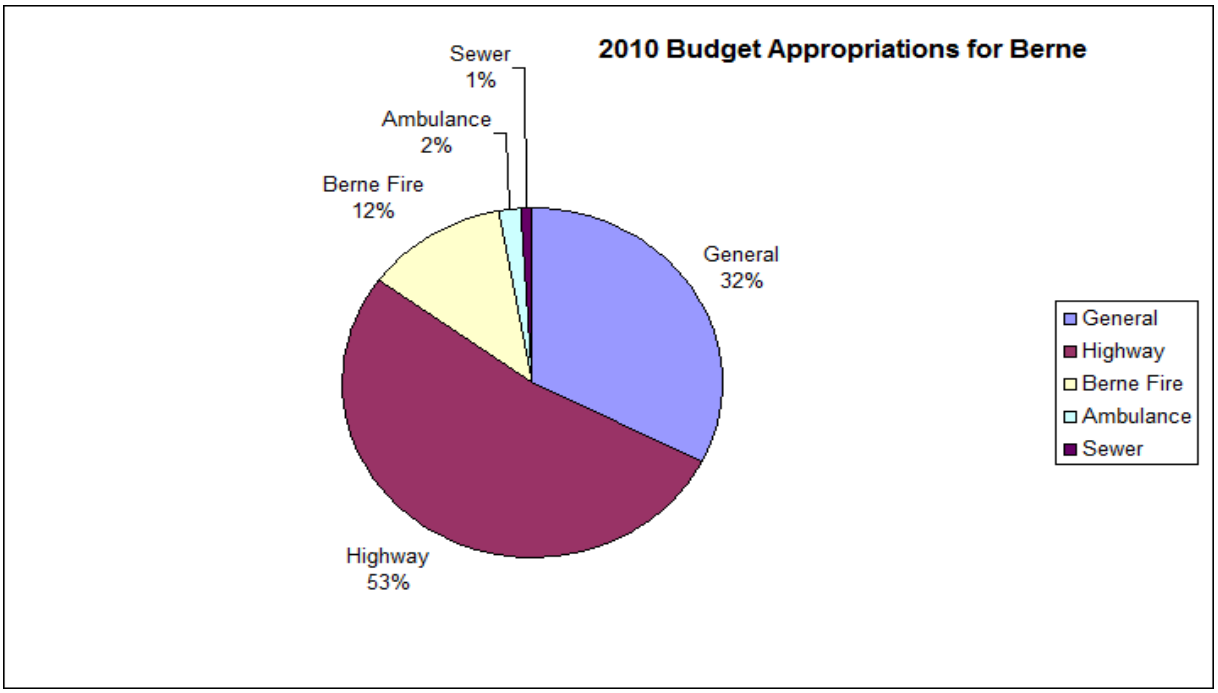


Figure 13: 2010 Budget Appropriates for Berne
(Appropriations for the Sewer come from funds derived from the Sewer District and various grants.)

Regional Planning Efforts

Town Planning Efforts:

- Natural Resource Inventory Studies (Conducted by the Town Conservation Advisory Council in the 1970's and 1980's):
  - Forest and Wildlife Resources
  - Historic and Scenic Resources
  - Wetlands >12.4 Acres
  - Slope Characteristics
  - Switzkill Natural Area Report
  - Status of New York State Reptiles and Amphibians in Berne
  - Inventory of Cemeteries
  - Inventory of Water Resources
  - Groundwater Study

- 1992 Town of Berne Master Plan
- Berne Hamlet Study
- East Berne Hamlet Strategic Study/Linkage Plan
- 2009 Biodiversity Assessment

County and Regional Planning Efforts:

Albany County Agriculture and Farmland Protection Plan
Albany County Right-to-Farm Law
Capital District Regional Planning Commission (data and a variety of regional studies of which Berne is a part)
Helderberg Escarpment Planning Guide (2002)
Partridge Run Management Plan

B. Agricultural Resources

(See Farmland, Agriculture, Farmland Inventory, and Farmland Prioritization Maps)

Status of Farm Operations and Farmland

Table 32: Acres of Farmland by Type of Farm

Feature	Acres
(105) Productive Vacant Land	732
(110) Livestock	138
(112) Dairy	322
(113) Cattle	588
(120) Field Crops	1,951
Non-Farm class properties, but identified as farmland through planning process	8,884
Total Farmland Acres	12,615
Number of parcels rented for farmland (estimate)	209 (non-ag class parcels)
Average Size of Farm	46.5

Table 33: Acres by Soil Type

Farmland Soils	Acres
Prime Farmland in the Town	9,418
Soils of Statewide Importance in the Town	14,350
Prime Farmland Soils on farms	3,970
Soils of statewide importance on farms	3,946

Table 34: Parcels and Acres of Agricultural Land

Agricultural Sub-Class	Number of Parcels	Acres	Percent of Land Area
Crops	41	2,010.67	5.9%
Livestock	11	795.28	2.3%
Vacant Land	13	645.25	1.9%
Agricultural Total	65	3,451.20	10.2%

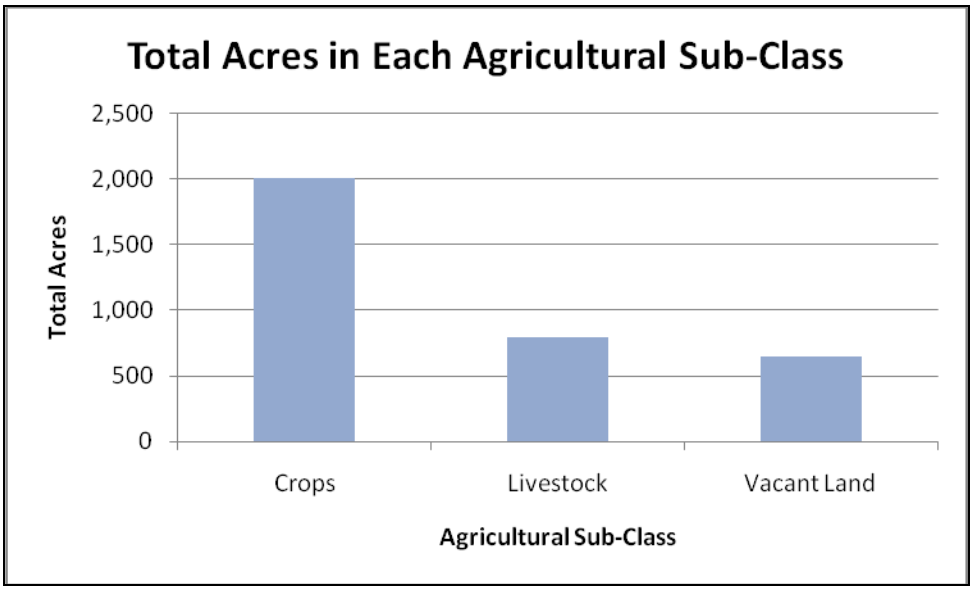


Figure 6. Acres of land by farm type in Berne, 2009

Highlights of US Census of Agriculture by Zip Code (12023 and 12059)

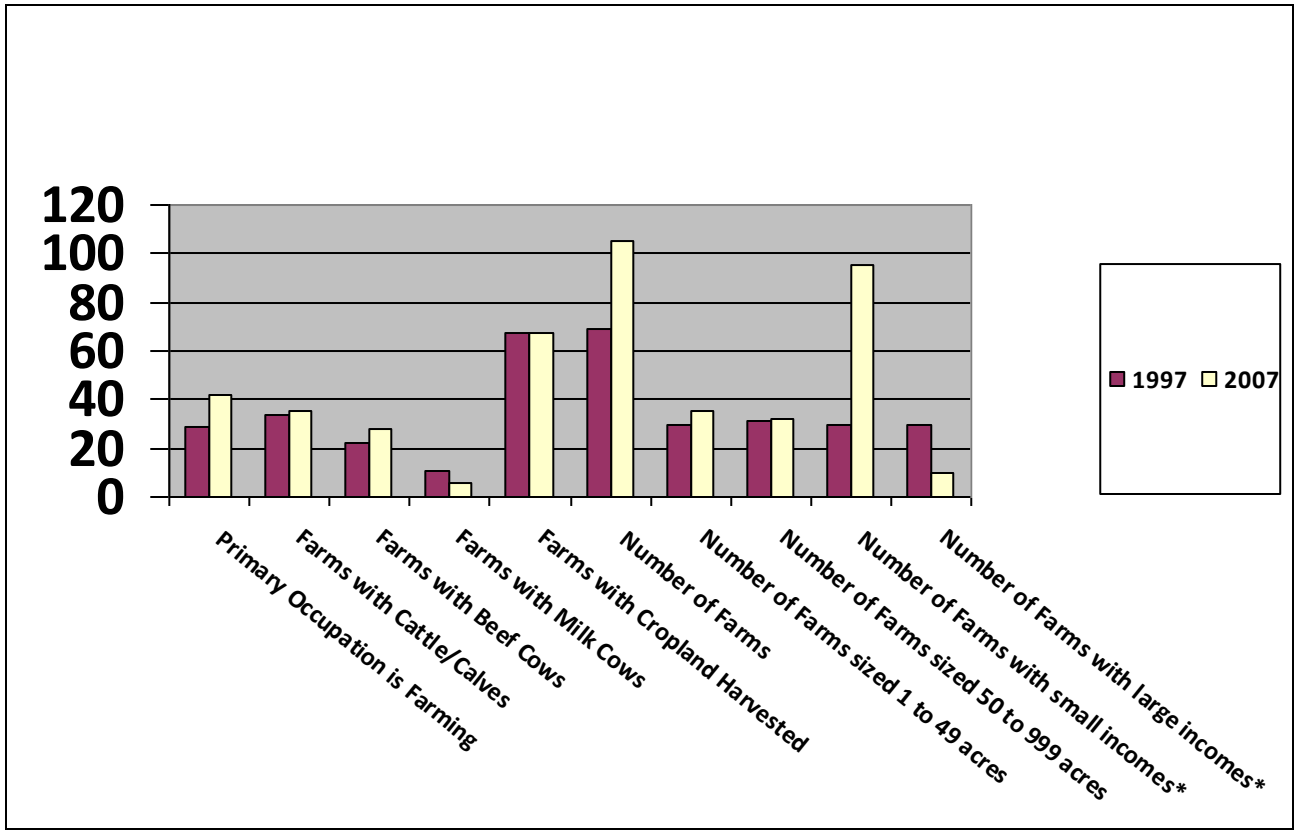
Table 35 details data from the US Census of Agriculture by zip code. (Note that the zip code data does not exactly match the borders of the Town of Berne. This data includes the two major zip codes within the Town but extends into other areas as well.)

Table 35: Comparison of 1997 and 2007 US Census of Agriculture Data for Zip Codes 12023 and 12059

	1997			2007		
	12023	**12059**	**Totals**	**12023**	**12059**	**Totals**
Farms by size all farms	46	23	69	70	35	105
Farms by size 1 to 49 acres	11	4	15	24	19	43
Farms by size 50 to 999 acres	34	19	53	46	16	62
Farms by size 1000 acres or more	1	0	1	0	0	0
Market value of agricultural products sold total farms	46	23	69	70	35	105
Market value of agricultural products sold	19 ($10000 or less)	11 ($10000 or less)	30($1000 0 or more)	62 (<50K)	33(<$50K)	95(<50K)
Market value of agricultural products sold	16($10000 to $99999)	11($1000 0 to $99999)	27($1000 0 to $99999)	7 (50K to 250K)	2 (50K to 250K)	9 (50K to 250K)
Market value of agricultural products sold	3($100000 or less)	0($10000 0 or more)	3($10000 0 or more)	1 (250K>)	0 (250K>)	1 (250K>)
Full owners	26	15	41	53	26	79
Part owners	18	6	24	14	9	23
Tenants	2	2	4	3	0	3
Operators by Principal Occupation farming	18	11	29	26	16	42
Operators living on the farm operated	38	15	53	63	34	97
Operators not living on the farm operated	7	6	13	7	1	8
Cropland harvested total farms	41	20	61	44	23	67
Cropland harvested 1 to 49 acres	20	10	30	19	16	35
Cropland harvested 50 to 499 acres	21	10	31	24	7	31
Cropland harvested 500 acres or more	0	0	0	1	0	1

	1997			2007		
	12023	**12059**	**Totals**	**12023**	**12059**	**Totals**
Cropland used for pasture or grazing total farms	26	11	37	18	4	22
Cropland idle total farms	13	2	15	10	5	15
Total woodland total farms	35	18	53	53	27	80
Pasture and rangeland other than cropland or woodland pastured total farms	16	6	22	36	22	58
Land under Conservation Reserve or Wetlands Reserve Programs total farms	1	2	3	5	1	6
Cattle and calves inventory total farms	25	9	34	22	13	35
Beef cow inventory total farms	15	7	22	17	11	28
Milk cow inventory total farms	9	2	11	5	1	6
Cattle and calves sold total farms	23	8	31	17	8	25
Hogs and pigs sold total farms	1	2	3	3	4	7
Sheep and lambs inventory total farms	6	3	9	5	2	6
Hens & pullets laying age inventory total farms	3	3	6	3	8	11
Horses and ponies of all ages inventory total farms	13	4	17	27	11	38
Turkeys sold total farms	1	1	2	3	2	5
Corn for grain total farms	2	1	3	6	3	9
Corn for grain 1 to 49 acres	2	1	3	6	3	9
Corn for silage total farms	11	5	16	11	1	12
Oats for grain total farms	2	2	4	3	3	6
Hay-alfalfa other tame small grain etc. total farms	35	16	51	38	19	57
Hay-alfalfa other tame small grain etc. 1 to 49 acres	16	6	22	14	14	28
Hay-alfalfa other tame small grain etc. 50 to 249 acres	18	8	26	23	4	27
Hay-alfalfa other tame small grain etc. 250 acres or more	1	2	3	1	1	2
Land used for veget les total farms	0	2	2	6	1	7
Berries total farms	0	1	1	1	1	2
Maple Trees tapped total farms	3	0	3	2	0	2

	1997			2007		
	12023	12059	Totals	12023	12059	Totals
Cut Christmas Trees	2	1	3	1	0	1
Fruit and Nut trees	0	0	0	1	1	2
Grains, Oilseeds, Dry Beans	1	0	1	8	3	11



*Market values reported in 1997 differ from those in 2007: 1997 Ag Census categories were $10,000 or more, $10,000 to $99,999 and $100,000 or more. 2007 categories were less than $50,000, $50,000 to $250,000 and more than $250,000.

Figure 7: Changes in Certain Agricultural Statistics, 1997 to 2007 for Zip Codes 12023 and 12059

Although this chart extends beyond the boundary of the Town of Berne, and does not represent all the land within the Town, it is an approximation of the changes that have occurred between 1997 and 2007 related to agricultural operations, this chart shows some significant trends. The general trends show a decrease in all measures of agriculture. Many of the indicators are positive: there are more farms, and an increase in the number of farms where farming is the primary occupation. The number of farms with milk cows decreased. Although the number of farms increased, the number of small farms increased, while the number of larger farms stayed about the same. That mirrors trends from other places in New York State where the number of small farms is growing. Further, the trend of more farms with smaller incomes from their agricultural products grew substantially and the number of farms with larger incomes fell. This reflects not only the difficulties farmers are having being profitable, but also a trend towards farms that require other off-farm incomes to sustain the family. It *is important to note that the observed trend may be influenced by more farmers filling out the census from one year to the next.*

Table 36: Agricultural District Information

Land in a NY Certified Ag District	13,463
Farmland in a NY Certified Ag District	11,437
Number of farmland parcels in a NY Certified Ag District	253
Total Acreage in the Town of Berne	41,393

Table 37: Agricultural Class Parcel Information and Market Value

AGRICULTURE CLASS PARCELS INCLUDED IN 2007 TOWN ASSESSMENT ROLL					
Property Use Code	**Category**	**Number of Parcels**	**Number of Parcels With Ag. Exemption***	**Average Value ($)**	**Total Market Value ($)**
Agriculture Class Parcels					
105	Productive Vacant Land	12	NA	47,175	566,100
110	Livestock	2	NA	52,150	104,300
112	Dairy	4	NA	151,325	605,300
113	Cattle	5	NA	146,700	733,500
120	Field Crops	39	NA	63,592	1,653,400
Total		**62**	**NA**	**74,747**	**3,662,600**

***If the committee wants this, I will need to get the data from the local assessor.**

Farmland Prioritization

Land Evaluation and Site Assessment, also referred to as LESA, is a tool to help citizens and local officials to prioritize those lands that should be protected from conversion to nonagricultural uses. LESA was developed by the United States Natural Resources Conservation Service, and is based on a technique developed in Orange County, NY in 1971 (the first place it was used in the United States.) LESA has a long history of use in New York, and throughout the United States. It is basically a rating system designed with local conditions and needs in mind. It is a tool that can help local officials identify farmlands needing protection by taking into account soil quality and other factors that affect agricultural practices.

LESA is an analytical tool. It is not a regulatory program. LESA's role in Berne is to provide a systematic and objective procedure to rate and rank parcels in order to help people make decisions on where to target farmland protection programs. A LESA system can be useful to answer questions such as what lands are most appropriate to designate for long-term continuation in agricultural uses, and which farms should be given the highest priority for purchase of development rights or other monies.

Farmland preservation is an investment in the future of agriculture as an industry and in the future quality of life of the non-farm community. In addition to providing environmental and other amenities for farmers and non-farmers, farmland preservation itself can shape the future environment within which agriculture operates. The vision for Berne's agriculture includes diversity, profitability, and sustainability and in order to attain this vision, agriculture must be resilient. Identifying critical or priority farmland in Town is one step to help Berne attain this vision.

How LESA Works

LESA is a rating system developed by the Federal government several years ago. It is a method used to evaluate farmland and provide a community-developed and unbiased method of identifying priority areas that may be suitable for targeting farmland protection programs to. The LESA system combines features that describe soil quality for farming with other factors that affect how well the land may sustain continued agriculture. The Berne LESA establishes a variety of characteristics that the Town feels help define priority farmlands. Each characteristic is given points based on the actual features present on the land.

It ranks a variety of features and characteristics that are known to influence the ability of farmland to remain in that land use. In order to provide an unbiased method of selecting properties for the future farmland protection programs, the Town of Berne developed its own LESA ranking model. This ranking system evaluates all lands in Berne and gives points to each parcel based on the agricultural and other characteristics present. The Town of Berne used the following criteria and ranks to prioritize farmlands in Town. The results of the prioritization can be found on the Farmland Prioritization Map.

Table 38: Criteria Used for Prioritizing Farmland in Berne

Criteria	Rankings	Description of Each Criteria
LE Soils Criteria/Weight	**42.7 of 100%**	
Percent of parcel in prime soils		
	15	>75% of parcel
	10	50 to 74% of parcel
	5	25% to 50% of parcel
Soils of Statewide Importance	**13**	>75%
	8	50 to 74% of parcel
	5	25% to 50% of parcel
SA1 Farm Resource Criteria	**25.2 of 100%**	
Size of parcel	**8**	100+ acres
	5	49.99 to 99.99 acres

Criteria	Rankings	Description of Each Criteria
	3	24 to 49.99 acres
	1	7 to 23.99 acres
	0	< 7 acres
Compatibility of surrounding uses	**4**	75%+ compatible w/in 500'
	3	50 to 74%
	2	25% to 49%
	1	<24%
% site in ag uses	**4**	is 100 class parcel or id as ag
	2	is not in ag now
SA2 - Development Pressure Criteria	**20.6 of 100%**	
Land in a NYS Ag District	**3**	Yes
Distance to major highway	**3**	0 to 1/4 mile
	2	1/4 to 1/2
	1	> 1/2
Length of public road frontage	**6**	>600 feet
	3	300 to 600 feet
	0	<300 feet
Proximity to Protected lands	**6**	within 300 feet
	3	within 600 feet
	0	> 1/4 mile
SA3: Environmental Resources and Other public values	**11.5 of 100%**	
Wetlands exist on property	**4**	Wetlands and 100' buffer present
Streams/Stream Corridor exist	**3**	Streams/Stream Corridor present
Scenic Values exist	**2**	Within mapped area of scenic viewshed
Wildlife habitats exist*	**1**	Known habitat present
Floodplains exist	**2**	FEMA floodplain present
Historic structure on site*	**1**	Historic Structure present
Ridgeline exists on site	**2**	Mapped ridgeline present